



LIGHTING

Comprehensive Handbook 1985

Including Technical Section.

PHILIPS LIGHTING

1925



1985

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LIGHTING

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Products offered for sale may differ from those described in this Handbook owing to later production changes in specifications, components or place of manufacture. The contents of this Handbook are therefore not to be taken as representations as to the current availability of products as described nor as to products actually offered for sale.

All dimensions are in millimetres unless otherwise stated.

PHILIPS

Philips Electronic and Associated Industries Ltd.

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Contact Information

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Cambridge	Cambridge (0223) 66121	81552
Nottingham	Nottingham (0602) 292716	N/A
Eastleigh	Eastleigh (0703) 617866	N/A
Belfast	Belfast (0232) 751121	N/A
Croydon	01-688 7766 NIGHT LINES: Haulage 01-688 2803 Traffic 01-686 3108	261268
Heywood	Heywood (0706) 66371	635683
Potters Bar	Potters Bar (77) 58520	N/A
Sywell	Northampton (0604) 43611 NIGHT LINE: (0604) 491707	31383
Sutton Coldfield	(021) 351-3628	N/A
Hamilton	Hamilton (0698) 282111 NIGHT LINE: (05522) 23513	77538
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Colour 83

Hotel/restaurant, leisure, domestic and retail applications requiring 'warm' appearance, high efficiency and good colour rendering

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Direct replacement for 40-100W GLS lamps

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Slimline equivalent to low wattage GLS lamps. Wide range of special luminaires

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Choice is governed by the lighting task. In general, the narrower the beam, the sharper the spot of light. Low voltage halogen spots (eg Light Point) produce less heat on the goods than mains voltage spots

BEAM WIDTHS & APPLICATIONS

Pencil Beam

Less than 10°. Pinpoints a single object amid darkness, or highlights a generally lit 'stocky' display

Narrow Beam

10—25°. Slightly less dramatic cut-off: 'islands' of light encompass larger objects

Medium Beam

25—40°. Heightens attention on a wider area and adds considerably to general lighting. Particularly effective using coloured lamps

Wide Beam

Over 40°. Broad wallwashing or floorbathing sweeps of background illumination

LAMPS & CHARACTERISTICS

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For external parabolic reflector fittings. Narrow, sharply defined beam minimises glare

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Double life of blown bulb lamps. Indoor and outdoor use. Improved beam definition. Narrow, medium or wide flood. Choice of colours

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Medium or wide beam. Choice of wattages and colours. For general use in low ambient light

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Philips Lighting Customer Service

Sales Office & Order Desk



Call the Sales Office for lighting quotations and contact with Philips extensive field sales force, which offers a fast and personal service.

For placing of new orders, and immediate information on product prices and availability, the Customer Service

Order Desk is equipped with RETOPS – Real Time Order Processing System – which uses computers and high-speed data links to gather, collate and communicate information to all the people who need it, to help serve you as quickly and efficiently as possible. Stock availability, price changes, product shipments, order progress and other information is kept up-to-date, and available at the touch of a button. So you *know* that prices are correct, and that goods are in stock to meet your promised delivery date, all for the cost of a telex or local telephone call.



London Carriers

London Carriers is the Philips distribution and central stores network. It operates a large fleet of vehicles to give a 24 hour service between the central stores, the 13 regional distribution centres and customers nationwide, to assure fast and reliable deliveries.



Lighting Theatre

The Croydon headquarters of Philips Lighting has a large permanent lighting theatre, fully equipped both as a lecture facility and as a demonstration room. In addition to presentations by Philips to its customers, the theatre may be reserved by specifiers for presentations to their own clients.



Demonstration Vehicles

Philips mobile demonstration vehicles, fully equipped for exhibition and demonstration of lighting technology, regularly visit various parts of the UK in support of trade shows and for training purposes. By arrangement, we can visit your premises to update your staff on the latest developments in lighting, and to support your client presentations.



Customer Service - Technical



Technical Services Department is the focal point for all technical enquiries, whether for product data on performance, application information or lighting design advice. This department is backed by the following specialist sections for specific topics.

Projects Group

The Projects Group of Philips Lighting designs and manufactures special luminaires to customer specification. They may be modifications of standard products – including, for example, a choice of many different types of diffuser, controller or reflector; or new, custom-designed luminaires providing electrical, mechanical, optical or aesthetic features beyond the standard catalogue range. Minimum order quantities may be as low as 50 units, according to type, technical feasibility and production economics.



LiDEC

This is Philips Lighting Design & Engineering Centre, which carries out scheme design using special programs and other advanced techniques to generate computer-assisted designs for all types of lighting scheme.



Product Information

Separate engineering and marketing functions which specialise in particular product types, providing detailed, authoritative information on all aspects of lighting technology.

Applications Engineering

Staffed by specialist engineers for discharge, fluorescent and tungsten lighting, established to solve product application problems brought to them by customers, contractors and specifiers.



Energy Advisory Group

EAG provides information and advice on energy effective lighting, to counter the rising cost of electricity – vital when energy cost typically accounts for 50-70% of the total cost of lighting. The Energy Advisory Group publishes the *Philips Energy Effective Lighting Manual*, which shows how electricity consumption can be reduced without sacrifice of colour quality or level of illumination. EAG is responsible for operating training courses on all aspects of energy effective lighting products and scheme design.



LIGHTING
Energy Advisory
Group

Notes

Prices

The Handbook is designed for use in conjunction with the Philips Lighting General Price List. The arrangement and indexing of the two publications are similar, to facilitate cross-referencing.

Section Indexes

In addition to the general indexes contained in this preliminary section, detailed lists of contents are given on the index pages which head each section.

Technical Section

The Technical Section beginning on page 475 includes detailed notes on the fundamentals of lighting and lighting terminology, characteristics of lamps and luminaires, and the use of the photometric data given in the Handbook. It also gives applications and scheme design recommendations for different types of lighting scheme, and outlines the calculation methods employed. The importance of energy effectiveness is discussed, and its financial implications are reviewed as a guide to specifiers, contractors and users of lighting.

Philips KombiPaks

The Philips KombiPak concept means easy ordering, easy storage and stockholding and easy installation; because a KombiPak is a complete luminaire in a single carton — including control gear, lamps, reflector or controller and fixing parts.

Each KombiPak carton includes full installation instructions — including mounting templates for fluorescent luminaires — and a quick lighting design guide to help you check the numbers and types of luminaires required.

Currently available KombiPaks:

Protector Powerslimmer TCW 075	(protected fluorescent luminaire)
Commercial Powerslimmers PSM 158/258	(surface mounted fluorescent)
Powerslimmer Recessed Luminaires PRK 66/612	(recessed fluorescent)
PAR 38 Luminaire DHF 017	(floodlighting)
High-bay Powerslimmers SDK 250/400	(industrial discharge luminaires)
18W MiniSox Bulkhead MSB 18	(security and amenity)
18W MiniSox Lantern/Bulkhead XGC 001	(security and amenity)
55W SOX Lantern SXX 55	(security and amenity)
70W SON Lantern SNK 70	(security and amenity)
Plant Lighting Set PLS 160	(plant lighting)
Chef-Aid CWF 300	(food warming)

New Products

This Handbook includes a number of new products for which full technical information was not available at the time of closing for press. Information on these products is marked 'NEW'. Customers are advised to check whether further information has become available.

Philips Energy Savers

Certain products listed in the 'Index of Product Types and Applications' are marked as Philips Energy Savers. These products provide particularly good performance, within their areas of application, in terms of energy cost effectiveness. Since the cost of electricity is the largest element of total lighting cost, selection of energy effective products can make a significant contribution to the containment of business costs.

Notable examples include the new SOX-E range of low pressure sodium lamps; and the SL* and PL* compact fluorescent lamps, which meet many requirements currently satisfied by GLS filament lamps. SL* and PL* lamps have average lives of 5000 hours, five times that of GLS lamps, and reduce electricity consumption by 75% or more, for equivalent light output.

Literature

Sales and technical literature — and particularly the latest editions of data sheets — are available on request to Philips Lighting Customer Service or from: Philips Lighting, Marketing Services Department, FREEPOST, City House, 420-430 London Road, Croydon CR9 9ET.

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Colour Plates

Installation	Equipment	Page
Talbot Parts Depot, Coventry	GTX 201	66 A1
New Slim-Profile TCS 605 Luminaire	TCS 605	67 A2
Royal Courts of Justice	TBS 100/Colour 83	98 B1
Hong Kong & Shanghai Bank, Jersey	TBS 100/Colour 84	99 B2
Tyne & Wear P.T.E Depot, Gosforth	Hermes/400W SON	162 D1
British Oxygen Co., Shoreham	Lowbay/400W SON/T	163 D2
M5 Motorway, Avon	SOX-E	194 E1
Wandsworth	SGS 203	195 E2
Decorative Post-top Lantern	CYCAR	226 F1
Decorative Post-top Lantern	Agate Sphere	227 F2
Brandon Speedway, Coventry	HNF 002/HNF 013/HPI/T	258 G1
Frigate Dry Docks, Devonport	HNF 003/400W SON/T	259 G2
Romford Brewery	SNF 200/150W SONT	290 H1
Salisbury Cathedral	Project "Lighting Control"	291 H2
Mother Hubbard Restaurant, Oldham	SL* Conversion	322 I1
Benetton, London	PL*	323 I2
Warwick University	PL* Conversion	354 J1
St. James's Palace, Westminster	SL Conversion	355 J2
Watford Football Club Halt	SGS 201/70W SON	386 K1
Milton Keynes Town Centre	HPL Comfort Lamp	387 K2
Peterborough Ice Rink	400W HPI/T	418 L1
Bisham Abbey Sports Workshop	Variable Mixed Installation	419 L2
Shell Centre, London	Project Luminaires	450 M1
The Guildhall, York	SL* Conversion	451 M2

EUROBATTEN TMS 012 RANGE

General-purpose batten luminaires for fluorescent lamps

General-purpose batten luminaires for fluorescent lamps.

A range of single-lamp battens in 600mm (2ft) 1200mm (4ft) and 1500mm (5ft) nominal lengths and two lamp batten 1500mm (5ft), especially for use with the Philips PowerSlimmer TLD range of krypton-filled 26mm lamps. The slim-section battens are attractively finished in white stove enamel.

Matching clip-on single lamp diffusers are optionally available for all three lengths, and trough reflectors for the 1500mm (5ft) length battens.

RANGE

Battens

TMS 18/012 – for 18W 600mm (2ft) PowerSlimmer TLD lamp

TMS 36/012 – for 36W 1200mm (4ft) PowerSlimmer TLD lamp

TMS 58/012 – for 58W 1500mm (5ft) PowerSlimmer TLD lamp

TMS 258/012 – for two 58W 1500mm (5ft) PowerSlimmer TLD lamps

All battens have standard switchstart circuits.

Diffusers

DF 18/012 – diffuser for 18W 600mm lamp

DF 36/012 – diffuser for 36W 1200mm lamp

DF 58/012 – diffuser for 58W 1500mm lamp in TMS 58/012.

Diffusers clip directly to 26mm diameter PowerSlimmer TLD lamps; they are not suitable for 38mm diameter lamps.

Trough reflector

GKD 158 – for TMS 58/012 batten only.

GKH 258 – for TMS 258/012 batten only.

APPLICATIONS

- Small and large offices
- Shops and departmental stores
- Corridors
- Stock and store rooms
- Canteens
- Workshops



To reorder this Data Sheet quote

PL 3008/4

Issued 7/83

Replaces PL 3008/3

EUROBATTEN TMS 012 RANGE

FEATURES

- Eurobatten – proven product throughout Western Europe.
- Steel U-section channel with integral longitudinal reinforcing ribs and steel coverplate retained by screws. Phosphated and white stove enamelled for corrosion resistance and easy-clean, long-lasting finish.
- High-quality ballast for low Watts loss and minimal hum.
- PowerSlimmer TLD 26mm diameter krypton-filled lamps use around 8 per cent less energy than comparable 38mm diameter argon-filled lamps of same nominal length.
- ∇ symbol marking; may be mounted directly on suitable wooden surfaces.
- Attractive polystyrene diffuser, easily attached to 26mm diameter lamp.
- One-piece, lightweight trough reflector is easily attached to batten; white-stove-enamelled finish gives high reflectance and easy-clean surface.



TMS used as concealed lighting.

Fixing

Directly on to ceiling by means of keyhole slots.

Suspension from chains or tubes up to 16mm diameter by means of pre-punched holes in channel.

Wiring

Batten is supplied with control gear ready wired, with 2-pole screw terminal block and separate earthing stud.

Lamps

Philips TMS 012 Eurobattens are specifically for use with Philips PowerSlimmer TLD krypton-filled 26mm diameter lamps, which use around 8 per cent less energy than a comparable 38mm diameter argon-filled lamp for about the same light output. TLD krypton lamps are for use in switchstart circuits only.

Full details of PowerSlimmer TLD White 35 lamps are given in Data Sheet PL 3005.

MATERIALS & FINISH

Channel, coverplate and trough reflector: Sheet steel (0.5mm), phosphated and stove enamelled white.

Lampholders: Bi-pin rotor type; white urea mouldings.

Control gear: Low-loss ballast. Glow starter accessible through hole in cover plate for single lamp and internal with lampholder for twin lamp. PF correction capacitor (except 600mm length).

Diffuser: Ribbed opal polystyrene extrusion with white end caps. Attached to 26mm diameter lamp by plated spring steel clips.

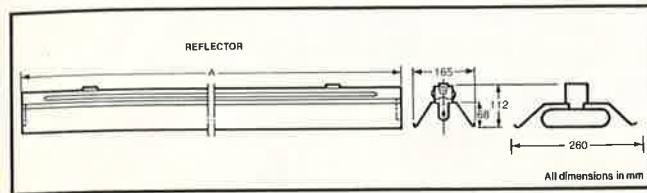
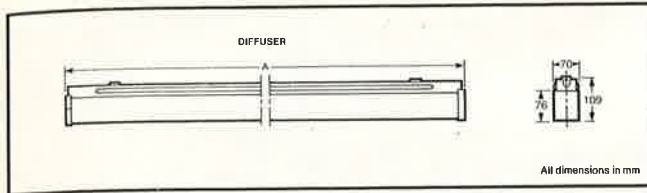
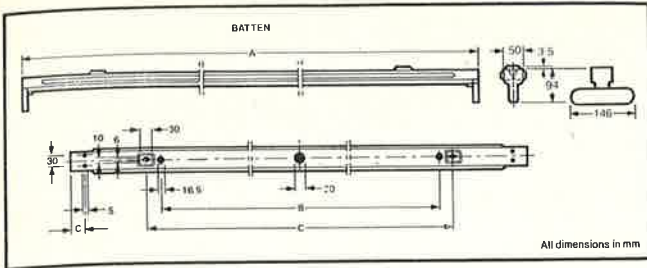
SPECIFICATION

■ Type compliance with BS 4533 2.2 Class I (electrical) ordinary indoor.

■ ∇ symbol; may be mounted on suitable wooden surfaces.
Radio interference: Complies with SI 1978 No. 1268: Regulation 6. Suppressed for use in residential areas.

To specify state:

Fluorescent batten luminaires with 50mm channel width and white stove enamel finish, for use with 26mm diameter krypton-filled lamps. Essentially as Philips TMS 012 Eurobatten.



ELECTRICAL DATA

Rating	Circuit Watts (running)	Circuit current (A)	Minimum Power Factor	Ballast catalogue No.	Starter catalogue No.	Capacitor
18W 600mm (2ft)	29	0.37	0.35	BTP20 L25	S10	None
36W 1200mm (4ft)	46	0.23	0.85	BTP40 L25	S10	H1642
58W 1500mm (5ft)	70	0.34	0.85	BTP65 L25	S10	H1665
2 x 58W 1500mm (5ft)	140	0.68	0.85	2 x BTP65 L 25	2 x S10	2 x H1665

Values are averages, measured under standard conditions.

DIMENSIONS AND WEIGHTS

Catalogue No.	Rating	Overall length (A) mm	Fixing centres (tube/ chain) (B) mm	Fixing centres (direct mtg) (C) mm	Weight with lamp kg/lb
TMS 18/012	18W 600mm (2ft)	614	450	515	1.25/2.75
TMS 36/012	36W 1200mm (4ft)	1224	750	820	1.75/3.86
TMS 58/012	58W 1500mm (5ft)	1524	750	820	2.40/5.29
TMS 258/012	2 x 58W 1500mm (5ft)	1524	750	820	4.60/10.0
Diffusers					Diffuser weight
DF 18/012	For 18W 600mm lamp	620	—	—	0.50/1.10
DF 36/012	For 36W 1200mm lamp	1230	—	—	0.75/1.65
DF 58/012	For 58W TMS 58 only	1530	—	—	0.90/1.98
Trough reflector					Reflector weight
GKD 158	For TMS 58/012 batten only	1524	—	—	1.45/3.19
GKH 258	For TMS 258/012	1524	—	—	2.9/6.4

EUROBATTEN TMS 012 RANGE

ORDERING DATA

Rating/Description	Catalogue No.	Packing Quantity
Battens		
18W 600mm (2ft)	TMS 18/012	6
36W 1200mm (4ft)	TMS 36/012	6
58W 1500mm (5ft)	TMS 58/012	6
2 x 58W 1500mm (5ft)	TMS 258/012	6
Accessories		
Diffuser for 600mm lamp	DF 18/012	6
Diffuser for 1200mm lamp	DF 36/012	6
Diffuser for 1500mm lamp TMS 58 only	DF 58/012	6
Trough reflector for TMS 58/012	GKD 158	6
Trough reflector for TMS 258/012	GKH 258	6
Spare		
Lampholder	LH1	6

Please order battens and accessories in the form given in the following example, in multiples of the packing quantity. Note that lamps are packed in boxes of 25, and must be ordered separately:

- 24 Philips luminaires TMS 58/012
- 24 Philips diffusers DF 58/012
- 25 Philips TLD 58W/35 lamps.

LAMPS

Rating	White 35 lamp (Nominal colour temperature 3500K)
18W 600mm (2ft)	TLD 18W/35
36W 1200mm (4ft)	TLD 36W/35
58W 1500mm (5ft)	TLD 58W/35

All lamps are supplied packed in boxes of 25.

RANGE OF OPERATION

240V 50Hz.
Normal indoor conditions.

Luminaire: Made in Holland.
Lamps: TLD lamps made in Holland.

NEW STREAMLITE

General-purpose luminaires
for fluorescent lamps



New Streamlite is a range of energy-saving luminaires which may be used as battens, or with diffusers, controllers or reflectors. The range is suitable for general use in commerce and industry.

RANGE

All luminaires are available in one-lamp and two-lamp versions.

Packs with White 35 lamp(s)

- 18W 600mm (2ft) switchstart*
- 36W 1200mm (4ft) switchstart*
- 58W 1500mm (5ft) switchstart*
- 70W 1800mm (6ft) switchstart*
- 100W 2400mm (8ft) switchstart**

*with PowerSlimmer TLD 26mm dia. krypton lamp(s).

**with MCF 38mm dia. krypton lamp(s).

Battens only

- 18W 600mm (2ft) switchstart
- 36W 1200mm (4ft) switchstart
- 58W 1500mm (5ft) switchstart
- 70W 1800mm (6ft) switchstart
- 100W 2400mm (8ft) switchstart
- 100W 2400mm (8ft) E-Start

FLUORESCENT LUMINAIRE

To reorder this Data Sheet quote

PL 3010/3

Issued 7/83

Replaces PL 3010/1

NEW STREAMLITE LUMINAIRES

APPLICATIONS

General-purpose batten for most indoor applications:

- Small or large offices
- Shops and department stores
- Corridors
- Stock and store rooms
- Travel concourses
- Light industry
- Banks and building societies

FEATURES

■ Efficient luminaires using latest technology. The 1800mm (6ft) and shorter lengths are for use with Philips PowerSlimmer TLD 26mm dia. krypton-filled lamps, reducing energy consumption by about 8 per cent for a light output comparable with that of the corresponding argon-filled lamp; the 2400mm (8ft) length uses the MCF 100W krypton-filled lamp, giving an energy saving of about 20 per cent with a smaller reduction in light output. All luminaires have low-loss control gear, further reducing circuit Watts throughout the range.

■ Stylish, slim appearance, with durable all-white finish and radiused endcaps.

■ Vacuum-impregnated ballasts; reduced operating noise from luminaires.

■ Provision for woodscrew or conduit fixing, or for mounting directly on BS boxes. Endcaps have 20mm ($\frac{3}{4}$ in) knockouts for conduit termination at both ends.

■ Easy wiring to angled terminal block mounted adjacent to an outer BS box detail, and clearly marked with L, N and E symbols.

■ Lampholders clip into place in seconds for speedy installation; a peg prevents crossover of twin-lamp lampholders. Rotor action isolates lamp electrically before it can be removed.

■ 2400mm (8ft) battens available in 100W ratings fitted with Philips electronic starters; fast, reliable starting is assured, even at near freezing temperatures.

LAMP SUITABILITY

■ PowerSlimmer TLD lamps in 600mm (2ft), 1200mm (4ft), 1500mm (5ft) and 1800mm (6ft) ratings are 26mm (1in) dia.; compared with 38mm dia. lamps, there is less light absorption in enclosed luminaires. Also, replacement lamps occupy 40 per cent less storage space.

■ The corresponding 38mm dia. lamps (20W, 40W, 65W, 75W) may also be used, but electrical and photometric characteristics will change.

MATERIALS & FINISH

Channel and coverplate: Sheet steel, Durawhite stoved finish.

Channel end caps: White medium-impact polystyrene with radiused ends.

Lampholders: Quick-fix rotor bi-pin; white polycarbonate with high-temperature rotors.

SPECIFICATION

■ Type compliance with BS 4533 2.2 Class I (electrical) Ordinary Indoor.

To specify state:

Energy-saving fluorescent lamp luminaires complying with BS 4533 2.2, with low-loss ballasts and Durawhite finish, for metric and Imperial fixing; similar to Philips New Streamlite.

(For electronic start types, insert wording: 'low-loss ballast and electronic starter, Durawhite finish etc.')

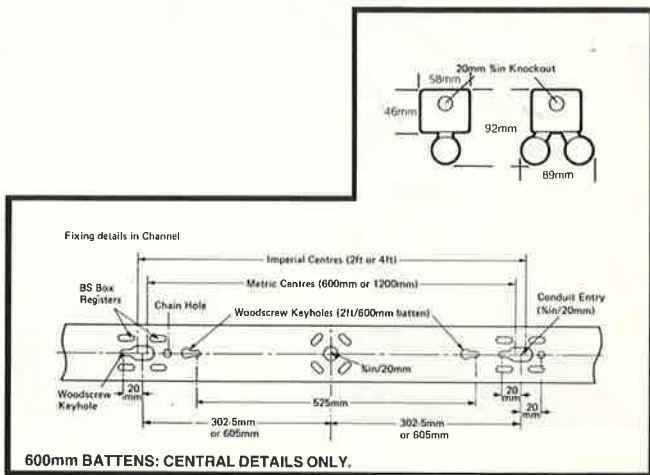
RANGE OF OPERATION

240V 50Hz.

Normal indoor conditions.

Lamp: Made in Great Britain or Holland.

Luminaire: Made in Great Britain.



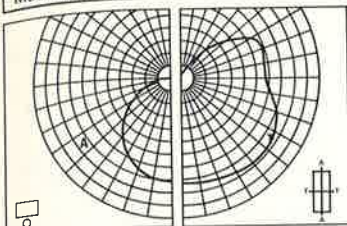
DIMENSIONS & WEIGHTS

Catalogue Numbers Packs (battens with White 35 lamps)	Battens only	Rating	Overall length (mm/in)	Fixing centres (mm/in)	Weight with lamp(s) (kg/lb)
Switchstart types					
P2N	—	1-lamp 18W 600mm (2ft)	621/24-45	525/20-67	2-00/4-4
P22N	—	2-lamp 18W 600mm (2ft)	621/24-45	525/20-67	3-9/7-8
P4N	S4N	1-lamp 36W 1200mm (4ft)	1232/48-50	600/24	3-0/6-6
P24N	S24N	2-lamp 36W 1200mm (4ft)	1232/48-50	600/24	4-3/9-5
P5N	S5N	1-lamp 58W 1500mm (5ft)	1532/60-31	600/24	4-2/9-4
P25N	S25N	2-lamp 58W 1500mm (5ft)	1532/60-31	600/24	6-6/14-5
P6N	S6N	1-lamp 70W 1800mm (6ft)	1800/71	600/24	4-6/10-1
P26N	S26N	2-lamp 70W 1800mm (6ft)	1800/71	600/24	7-1/15-6
P8N	S8N	1-lamp 100W 2400mm (8ft)	2407/94-76	1200/48	5-4/11-9
P28N	S28N	2-lamp 100W 2400mm (8ft)	2407/94-76	1200/48	8-4/18-5
Electronic start types					
—	S8EN1	1-lamp 100W 2400mm (8ft)	2407/94-76	1200/48	5-4/11-9
—	S28EN1	2-lamp 100W 2400mm (8ft)	2407/94-76	1200/48	8-4/18-5

PHOTOMETRIC DATA NEW STREAMLITE 1 LAMP

BATTEN WITHOUT ATTACHMENT

Mounting: SUSPENDED



Nadir Intensity 150cd/1000 lm
CIE Flux Code 31 60 83 72 98

SHR MAX (Square) 1.98 (1.75 NOM)
SHR MAX TR (Continuous Rows) 2.61

ULORL 0.28 Multiply by
DLORL 0.70 each Service
LORL 0.98 Correction Factor

Glare Data (CIBS)

Flux Fraction Ratio 0.39
ACG Classification ACG 2
Glare BZ (RI 2.5, SHR NOM) BZ6

Luminous Area (sq cm)				
18W	36W	58W	70W	100W
450	900	1100	1300	1750

Service Correction Factors

	18W	36W	58W	70W	100W
Length Factor	1.00	1.00	1.00	1.00	0.99
Colours 80 Factor	1.00	1.00	1.00	1.00	1.00
38mm Factor	0.98	0.98	0.98	0.98	1.00
Ballast Lumen Factor	1.00	1.00	1.00	1.00	1.00

Utilization Factors UF(F) for SHR NOM

Room Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	47	53	59	64	71	75	79	84	87
	30		40	45	51	56	63	69	73	78	82
	10		34	39	45	50	58	63	68	74	78
50	50	20	43	47	53	57	63	67	70	75	77
	30		37	41	46	51	57	62	66	71	74
	10		32	36	41	46	53	58	61	67	71
30	50	20	39	43	47	51	56	60	63	66	69
	30		34	37	42	46	52	56	59	63	66
	10		30	33	37	42	48	52	55	60	63
0	0	0	25	27	31	35	40	43	46	50	53

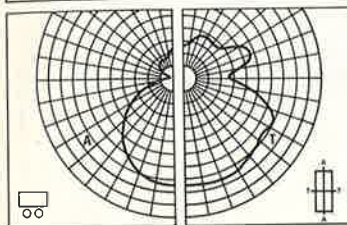
Multiply by each Service Correction Factor

Test No. C128 Date 81.04.02
Measured in accordance with BS 5225
Calculations based on CIBS TM5 and TR10

NEW STREAMLITE 2 LAMP

BATTEN WITHOUT ATTACHMENT

Mounting: SUSPENDED



Nadir Intensity 155cd/1000 lm
CIE Flux Code 34 63 86 67 97

SHR MAX (Square) 1.84 (1.75 NOM)
SHR MAX TR (Continuous Rows) 2.26

ULORL 0.32 Multiply by
DLORL 0.65 each Service
LORL 0.97 Correction Factor

Glare Data (CIBS)

Flux Fraction Ratio 0.50
ACG Classification ACG2
Glare BZ (RI 2.5, SHR NOM) BZ6

Luminous Area (sq cm)				
18W	36W	58W	70W	100W
600	1150	1450	1750	2300

Service Correction Factors

	18W	36W	58W	70W	100W
Length Factor	1.00	1.00	1.00	1.00	0.99
Colours 80 Factor	1.00	1.00	1.00	1.00	1.00
38mm Factor	0.98	0.98	0.98	0.98	1.00
Ballast Lumen Factor	1.00	1.00	1.00	1.00	1.00

Utilization Factors UF (F) for SHR NOM

Room Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	48	53	59	64	71	75	79	83	86
	30		40	46	51	57	64	69	73	78	82
	10		35	40	46	51	59	64	68	74	78
50	50	20	43	48	52	57	63	67	70	74	76
	30		37	41	46	51	57	62	65	70	73
	10		33	37	42	46	53	58	61	67	70
30	50	20	39	42	46	50	55	59	61	65	67
	30		34	37	42	46	51	55	58	62	65
	10		30	33	38	42	48	52	55	59	62
0	0	0	26	27	31	34	39	42	45	48	51

Multiply by each Service Correction Factor

Test No. C135 Date 81.04.02
Measured in accordance with BS 5225
Calculations base on CIBS TM5 AND TR10

NEW STREAMLITE LUMINAIRES

FIXING

New Streamlite channels are supplied with three BS box details (one only on 600mm battens), as shown overleaf. They offer the following options for fixing:

1. **Direct mounting onto BS boxes.** The batten may be screwed directly to two BS boxes, using the screw holes provided in the outer BS box details. The screw holes are elongated to register with boxes at metric or Imperial centres (1200mm/48in. on 2400mm battens; 600mm/24in. on all other battens except the 600mm length, which has a single central BS box detail).

2. **Conduit suspension.** The holes in the centre of the outer BS box details accept 20mm ($\frac{3}{4}$ in.) conduit, and are elongated to register with conduit drops at metric or Imperial centres as listed in 1.

3. **Chain suspension.** Holes are provided in the outer BS box details for chain hooks.

4. **Direct mounting to ceiling.** Keyhole slots enable the luminaire to be engaged with screws already entered in the ceiling, simplifying installation.

Notes

1. Sufficient clearance must be allowed between battens mounted in a line to permit the subsequent fitting of attachments. Minimum clearances are:

Diffusers or controllers require clearance of at least 15mm between battens.

Reflectors with wireguards require clearance of at least 45mm between battens.

Bare battens, or those to be fitted with reflectors without wireguards, may abut.

2. Keyhole slot centres are offset relative to the centre of the batten - see overleaf.

WIRING

All New Streamlite luminaires are supplied with control gear prewired to a three-way screw-terminal block with central Earth and capacity for 2 x 2.5mm² or 1 x 4mm² conductors in each way. The terminal block is angled for ease of wiring, and terminal symbols are embossed on the channel.

The endcaps have 20mm ($\frac{3}{4}$ in) knockouts for conduit or cable entry. Slim cable may be run alongside ballasts but must have high-temperature insulation.

ELECTRICAL DATA

Rating	Circuit	Circuit Watts (running)	Circuit current (A)	Ballast	Catalogue Nos. for replacement	
					Starter	Capacitor
Single lamp luminaires						
18W 600mm (2ft)	Switchstart	29	0.37	BTP20 L 25	S10	—
36W 1200mm (4ft)	Switchstart	46	0.23	BTP40 L 25	S10	H1642
58W 1500mm (5ft)	Switchstart	70	0.34	BTP65 L 25	S10	H1655
70W 1800mm (6ft)	Switchstart	86	0.35	BCS75 L	S16	H1655
100W 2400mm (8ft)	Switchstart	115	0.60	BCS100	S16	H1684
100W 2400mm (8ft)	E-Start	115	0.60	BCS100	ES08	H1684
Twin lamp luminaires						
2 x 18W 600mm (2ft)	Switchstart	46	0.46	1 x BTP40 L 25	2 x S2	H1642
2 x 36W 1200mm (4ft)	Switchstart	92	0.46	2 x BTP40 L 25	2 x S10	2 x H1642
2 x 58W 1500mm (5ft)	Switchstart	140	0.68	2 x BTP65 L 25	2 x S10	2 x H1655
2 x 70W 1800mm (6ft)	Switchstart	172	0.70	2 x BCS75 L	2 x S16	2 x H1655
2 x 100W 2400mm (8ft)	Switchstart	230	1.2	2 x BCS100	2 x S16	2 x H1684
2 x 100W 2400mm (8ft)	E-Start	230	1.2	2 x BCS100	2 x ES08	2 x H1684

† Not necessarily items originally fitted.

All circuits P.F. corrected except 1 x 20W. Harmonic content less than 3 x 16%.

ORDERING DATA

Rating	Circuit	Lamp type (white 35)	Catalogue Numbers Pack (battens with White 35 lamps)	Battens only
1-lamp 18W 600mm (2ft)	Switchstart	1 x TLD 18W/35	P2N	S2N
2-lamp 18W 600mm (2ft)	Switchstart	2 x TLD 18W/35	P22N	S22N
1-lamp 36W 1200mm (4ft)	Switchstart	1 x TLD 36W/35	P4N	S4N
2-lamp 36W 1200mm (4ft)	Switchstart	2 x TLD 36W/35	P24N	S24N
1-lamp 58W 1500mm (5ft)	Switchstart	1 x TLD 58W/35	P5N	S5N
2-lamp 58W 1500mm (5ft)	Switchstart	2 x TLD 58W/35	P25N	S25N
1-lamp 70W 1800mm (6ft)	Switchstart	1 x TLD 70W/35	P6N	S6N
2-lamp 70W 1800mm (6ft)	Switchstart	2 x TLD 70W/35	P26N	S26N
1-lamp 100W 2400mm (8ft)	Switchstart	1 x MCF 100W/35	P8N	S8N
2-lamp 100W 2400mm (8ft)	Switchstart	2 x MCF 100W/35	P28N	S28N
1-lamp 100W 2400mm (8ft)	Electronic Start	1 x MCF 100W/35	—	S8EN1
2-lamp 100W 2400mm (8ft)	Electronic Start	2 x MCF 100W/35	—	S28EN1

Cat. Number BBC - coverplate BS Box - 10 coverplates BBC per carton. Battens and packs are individually packed.

Please order in the form given in the following example. Note that lamps must be ordered separately for battens only, in multiples of 20 (2400mm lengths) or 25 (other lengths):

20 Philips luminaires S8N
20 Philips lamps MCFE 100W/35

NEW STREAMLITE Opal diffusers



A range of diffusers for simple fixing to New Streamlite battens. Rectangular-section bodies have linear external reeding; standard push-fit white endcaps have a textured surface.

Two widths: narrow version for use with single-lamp battens and wide version for one-lamp or two-lamp battens.

RANGE

Diffusers are available in narrow and wide versions to fit battens in the New Streamlite range:

- 18W 600mm (2ft) (narrow)
- 36W 1200mm (4ft)
- 58W 1500mm (5ft)
- 70W 1800mm (6ft)
- 100W and 125W 2400mm (8ft)

APPLICATIONS

- Small and large offices
- Shops and stores
- Concourses
- Light industry
- Corridors
- Stock and store rooms

FLUORESCENT LUMINAIRE

To reorder this Data Sheet quote

PL 3011/2

Issued 9 82

Replace PL 3011/1

NEW STREAMLITE OPAL DIFFUSERS

FEATURES

- Diffuser has linear reeding with an attractive appearance both lit and unlit.
- Push-fit endcaps in white medium-impact polystyrene have a smart inset textured surface.
- Large keyhole slot fixing of coverplate and diffuser supports over captive screws in channel speeds and simplifies assembly.
- Slim-section diffuser is particularly suitable for use with Philips PowerSlimmer TLD 26mm dia. krypton-filled lamps which reduce energy consumption by about 8 per cent for a light output comparable with that of a standard argon-filled lamp.

FIXING & WIRING

Please refer to New Streamlite luminaires Data Sheet PL 3010 for fixing details of battens. Note that at least 15mm clearance must be allowed between battens mounted in a line, to give clearance for diffuser endcaps. Wiring guidance is contained in Data Sheet PL 3010.

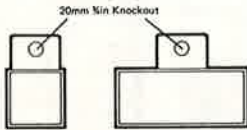
Mounting of diffuser to batten

1. Slacken screws in batten coverplate, and engage diffuser supports. Tighten screws and fit lamp(s).
2. Engage diffuser in support.

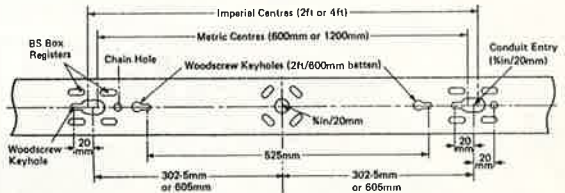
Removing diffuser

The diffuser is removed by pulling away from the supports on one side. It may then be disengaged from the batten, or left to hang from the supports for lamp changing.

Overall width : Narrow type 70mm/2.76in.
Wide type 180mm/7.09in.
Overall depth : 110mm/4.33in. (Both types).



Fixing details in Channel



DIMENSIONS & WEIGHTS

Packs (battens with White 35 lamps)	Catalogue Numbers Battens only	Diffuser assembly only (narrow)	Diffuser assembly only (wide)	Weight* complete with lamps (kg/lb)	Overall length (mm/in.)	Batten fixing centres (mm/in.)
	P2N	S2N	DF2N	—	2-4/4-8	630/24-80 525/20-67
	P4N	S4N	DF4N	*	3-6/7-9	1240/48-82 600/24
	P24N	S24N	—	DF24N	5-7/12-5	1240/48-82 600/24
	P5N	S5N	DF5N	*	4-9/10-8	1540/60-63 600/24
	P25N	S25N	—	DF25N	7-7/16-9	1540/60-63 600/24
	P6N	S6N	DF6N	*	5-4/11-9	1804/71-02 600/24
	P26N	S26N	—	DF26N	8-3/18-3	1804/71-02 600/24
	P8N, P8EN	S8N, S8EN1	DF8N	*	6-5/14-3	2415/95-08 1200/48
	P28N, P28EN	S28N, S8EN1	—	DF28N	10-0/22-0	2415/95-08 1200/48

*Weight (one-lamp) is with narrow diffuser.

MATERIALS & FINISH

Diffuser: Opal polystyrene extrusion with push-fit white polystyrene end caps and two support straps.

RANGE OF OPERATION

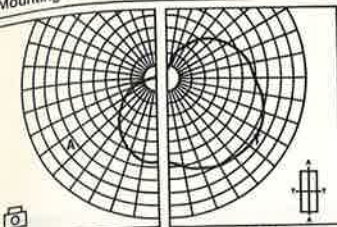
240V 50Hz.
Normal dry indoor conditions.
Diffusers are not suitable for vertical mounting.

NEW STREAMLITE OPAL DIFFUSERS

HOTOMETRIC DATA NEW STREAMLITE LAMP

WITH NARROW DIFFUSER

Mounting: SUSPENDED



Nadir Intensity 91cd/1000 lm
CIE Flux Code 30 57 81 67 74

SHR MAX (Square) 2.07 (2.00 NOM)
SHR MAX TR (Continuous Rows) 2.99

ULORL 0.25
DLORL 0.49
LORL 0.74

Multiply by each Service Correction Factor

Glare Data (CIBS)

Flux Fraction Ratio 0.50
ACG Classification ACG 2
Glare BZ (RI 2.5, SHR NOM) BZ8

Luminous Area (sq cm)

18W	36W	58W	70W	100W
600	1200	1500	1750	2350

Service Correction Factors

	18W	36W	58W	70W	100W
Length Factor	1.00	1.00	1.00	1.00	0.97
Colours 80 Factor	1.01	1.01	1.01	1.01	1.01
38mm Factor	0.97	0.97	0.97	1.00	1.00
Ballast Lumen Factor	1.00	1.00	1.00	0.98	1.00

Utilization Factors UF (F) for SHR NOM

Room Reflectances				Room Index								
C	W	F		0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20		36	39	43	47	52	56	58	62	64
	30			30	33	38	41	47	51	54	58	61
	10			26	29	33	37	43	47	50	55	58
50	50	20		32	35	38	41	46	49	51	54	57
	30			27	30	34	37	42	45	48	51	54
	10			24	26	30	33	38	42	45	49	51
30	50	20		29	31	34	36	40	43	45	48	49
	30			25	27	30	33	37	40	42	45	47
	10			22	24	27	30	34	37	40	43	45
	0	0	0	19	19	22	24	27	30	32	35	36

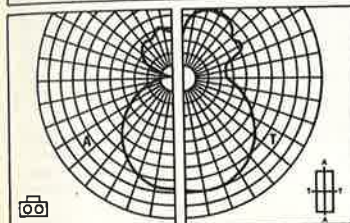
Multiply by each Service Correction Factor

Test No. C131 Dated: 81.04.02
Measured in accordance with BS 5225
Calculations based on CIBS TM5 and TR10

NEW STREAMLITE 2 LAMP

WITH WIDE DIFFUSER

Mounting: SUSPENDED



Nadir Intensity 123cd/1000 lm
CIE Flux Code 38 68 88 57 79

SHR MAX (Square) 1.79 (1.75 NOM)
SHR MAX TR (Continuous Rows) 2.14

ULORL 0.34
DLORL 0.45
LORL 0.79

Multiply by each Service Correction Factor

Glare Data (CIBS)

Flux Fraction Ratio 0.74
ACG Classification ACG2
Glare BZ (RI 2.5, SHR NOM) BZ5

Luminous Area (sq cm)

18W	36W	58W	70W	100W
1000	2000	2450	2900	3850

Service Correction Factors

	18W	36W	58W	70W	100W
Length Factor	1.00	1.00	1.00	1.00	0.97
Colours 80 Factor	1.02	1.02	1.02	1.02	1.02
38mm Factor	0.97	0.97	0.97	1.00	1.00
Ballast Lumen Factor	1.00	1.00	1.00	0.98	1.00

Utilization Factors UF (F) for SHR NOM

Room Reflectances				Room Index								
C	W	F		0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20		38	43	48	52	57	60	63	66	69
	30			33	37	42	46	52	56	59	63	66
	10			29	33	38	42	48	52	55	60	63
50	50	20		34	38	42	45	49	52	54	57	59
	30			30	33	37	41	45	49	51	55	57
	10			26	30	34	37	42	46	48	52	55
30	50	20		30	33	36	39	42	45	46	49	50
	30			27	29	32	35	39	42	44	47	49
	10			24	26	30	33	37	40	42	45	47
	0	0	0	19	21	23	25	28	31	32	35	36

Multiply by each Service Correction Factor

Test No. C139 Dated: 81.04.02
Measured in accordance with BS 5225
Calculations based on CIBS TM5 and TR10

NEW STREAMLITE OPAL DIFFUSERS

ORDERING DATA

Rating	Lamp type (White 35)	Batten with White 35 lamp	Catalogue Numbers		
			Batten only	Diffuser assembly (narrow)	Diffuser assembly (wide)
2 x 18W 600mm (2ft)	2 x TLD 18W/35	P22N	S22N	—	DF22N
18W 600mm (2ft)	TLD 18W/35	P2N	—	DF2N	—
36W 1200mm (4ft)	TLD 36W/35	P4N	S4N	DF4N	DF24N
2 x 36W 1200mm (4ft)	2 x TLD 36W/35	P24N	S24N	—	DF24N
58W 1500mm (5ft)	TLD 58W/35	P5N	S5N	DF5N	DF25N
2 x 58W 1500mm (5ft)	2 x TLD 58W/35	P25N	S25N	—	DF25N
70W 1800mm (6ft)	TLD 70W/35	P6N	S6N	DF6N	DF26N
2 x 70W 1800mm (6ft)	2 x TLD 70W/35	P26N	S26N	—	DF26N
100W 2400mm (8ft)	MCF 100W/35	P8N, P8EN	S8N, S8EN1	DF8N	DF28N
2 x 100W 2400mm (8ft)	2 x MCF 100W/35	P28N, P28EN	S28N, S28EN1	—	DF28N

Cal. number – coverplate BS box – 10 coverplates BBC per pack

Battens and packs are individually packed. Diffusers are packed 2 per carton, with endcaps and supports.

Lamps are packed 20 per carton (2400mm lengths); 25 per carton (all other lengths).

Please order in the form given in the following example, in multiples of the packing quantity. Note that lamps must be ordered separately if battens only are ordered:

50 Philips batten packs P25N

50 Philips diffusers DF25N

Luminaire: Made in Great Britain.

NEW STREAMLITE

Clear prismatic
controllers



A range of prismatic controllers for simple fixing to New Streamlite battens. Linear prisms are formed on the inside surfaces of the sides, and the base has regular, well-defined impressions of pyramid form to provide efficient light control and to look attractive whether lit or unlit. Standard push-fit white endcaps have a textured surface. Two widths: narrow version for use with single-lamp battens and wide version for one-lamp and two-lamp battens.

RANGE

Controllers are available in narrow and wide versions to fit battens in the New Streamlite range:

- 36W 1200mm (4ft)
- 58W 1500mm (5ft)
- 70W 1800mm (6ft)
- 100W 2400mm (8ft)

APPLICATIONS

- Small and large offices
- Shops and stores
- Concourses
- Banks and Building Societies
- Light industry
- Corridors
- Stock and store rooms

FLUORESCENT LUMINAIRE

To reorder this Data Sheet quote **PL 3013/3**
Issued 6/83 Replaces PL 3013/2

NEW STREAMLITE CLEAR PRISMATIC CONTROLLERS

FEATURES

- Controller has internal linear prisms on the sides and external pyramid prisms on the base – light is adequately controlled, and appearance is attractive both lit and unlit.
- Push-fit endcaps in white medium-impact polystyrene have a smart inset textured surface.
- Large keyhole slot fixing of coverplate and controller supports over captive screws in channel speeds and simplifies assembly.
- Slim-section controller is particularly suitable for use with Philips PowerSlimmer TLD 26mm dia. krypton-filled lamps which reduce energy consumption by about 8 per cent for a light output comparable with that of a standard argon-filled lamp.

FIXING & WIRING

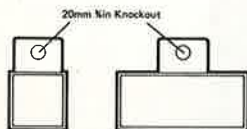
Please refer to New Streamlite Data Sheet (PL 3010) for fixing details of battens. Note that at least 15mm clearance must be allowed between battens mounted in a line, to give clearance for controller endcaps. Wiring guidance is given in PL 3010.

Mounting of controller to batten

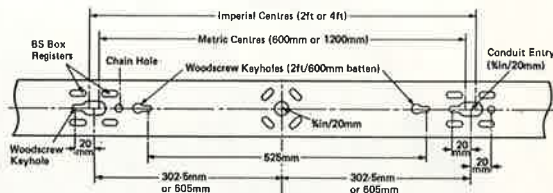
1. Slacken screws in batten coverplate, and engage controller supports. Tighten screws and fit lamp(s).
2. Engage controller in support.

The controller is removed by pulling away from the supports straps on one side. It may then be disengaged from the batten, or left to hang from the supports for lamp changing.

Overall width : Narrow type 70mm/2.76in.
Wide type 180mm/7.09in.
Overall depth : 110mm/4.33in. (Both types).



Fixing details in Channel



MATERIALS & FINISH

Prismatic controller: Clear polystyrene prismatic extrusion with push-fit white polystyrene endcaps and two support straps.

RANGE OF OPERATION

240V 50Hz.

Normal dry indoor conditions.

Controllers are not suitable for wall mounting.

DIMENSIONS & WEIGHTS

Packs (battens with White 35 lamps)	Battens only	Catalogue Numbers Controller assembly only (narrow)	Controller assembly only (wide)	Weight* complete with lamps (kg/lb)	Overall length (mm/in.)	Batten fixing centres (mm/in.)
P4N	S4N	PC4N	*	3.5/7.7	1240/48.82	600/24
P24N	S24N	—	PC24N	5.3/11.7	1240/48.82	600/24
P5N	S5N	PC5N	*	5.0/11.0	1540/60.63	600/24
P25N	S25N	—	PC25N	5.4/11.9	1540/60.63	600/24
P6N	S6N	PC6N	*	5.6/12.3	1804/71.02	600/24
P26N	S26N	—	PC26N	6.5/18.7	1804/71.02	600/24
P8N, P8EN	S8N, S8EN1	PC8N	—	6.7/14.7	2415/95.08	1200/48
P28N, P28EN	S28N, S28EN2	—	PC28N	10.3/22.7	2415/95.08	1200/48

*Weight (one-lamp) is with narrow controller

NEW STREAMLITE CLEAR PRISMATIC CONTROLLERS

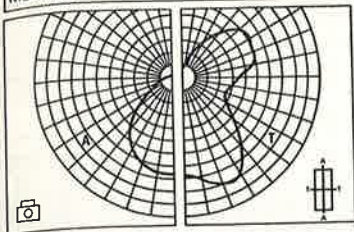
PHOTOMETRIC DATA

NEW STREAMLIGHT

1 LAMP

WITH NARROW CONTROLLER

Mounting: SUSPENDED



Nadir Intensity : 143cd/1000 lm
CIE Flux Code 44 71 86 61 80

SHR MAX (Square) 1.76 (1.75 NOM)
SHR MAX TR (Continuous Rows) 2.02

ULORL 0.31 Multiply by
DLORL 0.49 each Service
LORL 0.80 Correction Factor

Glare Data (CIBS)

Flux Fraction Ratio 0.64
ACG Classification ACG6
Glare BZ (RI 2.5, SHR NOM) BZ5

Luminous Area (sq cm)

18W	36W	58W	70W	100W
600	1200	1500	1750	2350

Service Correction Factors

	18W	36W	58W	70W	100W
Length Factor	1.00	1.00	1.00	1.00	0.99
Colours 80 Factor	1.01	1.01	1.01	1.01	1.01
38mm Factor	0.97	0.97	0.97	0.97	1.00
Ballast Lumen Factor	1.00	1.00	1.00	1.00	1.00

Utilization Factors UF (F) for SHR NOM

Room Reflectances				Room Index								
C	W	F		0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20		42	47	51	54	59	63	65	68	71
	30			37	41	45	49	55	58	61	65	68
	10			33	37	41	45	51	55	58	62	65
50	50	20		38	42	45	48	52	55	57	60	62
	30			34	37	41	44	48	52	54	57	59
	10			31	34	37	41	45	49	51	55	57
30	50	20		34	37	40	42	46	48	49	52	53
	30			31	33	36	39	43	45	47	50	52
	10			28	31	34	36	40	43	45	48	50
0	0	0		24	25	27	30	32	34	36	38	39

Multiply by each Service Correction Factor

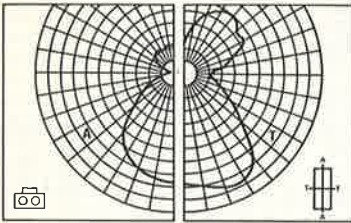
Test No. C130 Dated: 81.04.02
Measured in accordance with BS 5225
Calculations based on CIBS TM5 and TR10

NEW STREAMLITE CLEAR PRISMATIC CONTROLLERS

NEW STREAMLITE

2 LAMP

WITH WIDE CONTROLLER
Mounting: SUSPENDED



Nadir Intensity 163cd/1000 lm
 CIE Flux Code 49 79 92 57 86

SHR MAX (Square)	1.80 (1.75 NOM)
SHR MAX TR (Continuous Rows)	2.06

ULORL	0.37	Multiply by each Service Correction Factor
DLORL	0.49	
LORL	0.86	

Glare Data (CIBS)

Flux Fraction Ratio	0.76			
ACG Classification	ACG5			
Glare BZ (RI 2.5, SHR NOM)	BZ4			
Luminous Area (sq cm)				
18W	36W	58W	70W	100W
1000	2000	2450	2900	3850

Service Correction Factors

	18W	36W	58W	70W	100W
Length Factor	1.00	1.00	1.00	1.00	0.99
Colours 80 Factor	1.02	1.02	1.02	1.02	1.02
38mm Factor	0.97	0.97	0.97	0.97	1.00
Ballast Lumen Factor	1.00	1.00	1.00	1.00	1.00

Utilization Factors UF (F) for SHR NOM

Room Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	46	51	56	60	65	69	71	75	77
	30		41	46	51	55	61	64	67	71	74
	10		37	42	46	51	57	61	64	68	71
50	50	20	42	46	49	53	57	60	62	65	66
	30		37	41	45	49	53	57	59	62	64
	10		34	38	42	46	50	54	56	60	62
30	50	20	37	40	43	46	49	52	53	55	57
	30		34	37	40	43	47	49	51	54	55
	10		32	34	38	41	45	47	49	52	54
0	0	0	27	28	31	33	36	37	39	41	42

Multiply by each Service Correction Factor

Test No. C138	Dated: 81.04.02
Measured in accordance with BS 5225	
Calculations based on CIBS TM5 and TR10	

ORDERING DATA

Rating	Lamp type (white 35)	Batten with White 35 lamp	Batten only	Catalogue Number	
				Controller assembly (narrow)	Controller assembly (wide)
1 x 36W 1200mm (4ft)	1 x TLD 36W/35	P4N	S4N	PC4N	PC24N
2 x 36W 1200mm (4ft)	2 x TLD 36W/35	P24N	S24N	—	PC24N
1 x 58W 1500mm (5ft)	1 x TLD 58W/35	P5N	S5N	PC5N	PC25N
2 x 58W 1500mm (5ft)	2 x TLD 58W/35	P25N	S25N	—	PC25N
1 x 70W 1800mm (6ft)	1 x TLD 70W/35	P6N	S6N	PC6N	PC26N
2 x 70W 1800mm (6ft)	2 x TLD 70W/35	P26N	S26N	—	PC26N
1 x 100W 2400mm (8ft)	1 x MCF 100W/35	P8N, P8EN	S8N, S8EN1	PC8N	PC28N
2 x 100W 2400mm (8ft)	2 x MCF 100W/35	P28N, P28EN	S28N, S28EN2	—	PC28N

Cat. Number BBC - Coverplate BS box - 10 coverplates BBC per carton.
Battens and packs are individually packed. Controllers are packed 2 per carton, with **endcaps and supports**.

Lamps are packed 20 per carton (2400mm lengths); 25 per carton (all other lengths).

Please order in the form given in the following example, in multiples of the packing quantity. Note that lamps must be ordered separately if battens only are ordered:

- 50 Philips batten packs P25N
- 50 Philips controller assemblies PC25N

Luminaire: Made in Great Britain.

NEW STREAMLITE

Trough reflectors & optional wireguards

A range of Durawhite stoved finish open-ended trough reflectors for simple fixing to New Streamlite battens. One width fits both one-lamp and two-lamp versions. Slots give a small amount of upwards light. Clips are optionally available to make a neat join between reflectors of battens mounted end-to-end.

Optional wireguards made from galvanised steel are available for 1500mm (5ft) battens upwards.

RANGE

Trough reflectors to fit one-lamp and two-lamp New Streamlite battens in the following lengths and ratings:

- 36W 1200mm (4ft)
- 58W 1500mm (5ft)
- 70W 1800mm (6ft)
- 100W 2400mm (8ft)

Wireguards for trough reflectors in the following lengths and ratings:

- 58W 1500mm (5ft)
- 70W 1800mm (6ft)
- 100W 2400mm (8ft)

APPLICATIONS

- Factories
- Workshops and repair areas
- Instrument reading areas
- Stock and store rooms

The wireguard provides additional protection in areas where lamps may be exposed to damage.



To reorder this Data Sheet quote

PL 3014/3

Issued 6/83

Replaces PL 3014/4

NEW STREAMLITE TROUGH REFLECTORS & OPTIONAL WIREGUARDS

FEATURES

- High-quality Durawhite stoved finish for high reflectance and long service life.
- Large-diameter keyhole slot fixing for easy attachment, with detent for positive location once the fixing screws have been tightened.
- Slim-section reflector is particularly suitable for use with Philips PowerSlimmer TLD 26mm dia. krypton-filled lamps which reduce energy consumption by about 8 per cent for a light output comparable with that of a standard argon-filled lamp.
- Upward light slots to reduce 'tunnel' effect.
- Optional clips (Catalogue No. RJ2) make a simple, neat join between reflectors of battens mounted end-to-end.
- Optional wireguards for additional protection of lamps.

FIXING & WIRING

Please refer to New Streamlite Data Sheet PL 3010 for fixing details of battens. Battens may abut when mounted in line, unless wireguards are to be fitted, in which case at least 45mm must be allowed between battens.

Wiring instructions are contained in Data Sheet PL 3010.

Mounting of reflector to batten

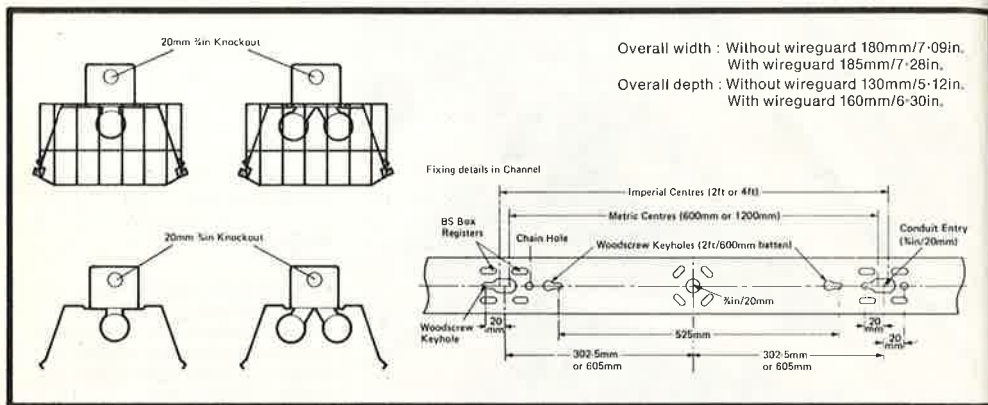
1. Slacken screws in batten coverplate, and engage keyhole slots in reflector over screwheads.
2. Slide reflector laterally until screw-heads engage detents, and tighten screws. Insert lamp(s).

MATERIALS & FINISH

- Reflector:** Sheet steel, Durawhite stoved finish.
- Reflector joining clip:** Sheet steel, Durawhite stoved finish.
- Wireguard:** Mild steel wire, galvanised.

RANGE OF OPERATION

- 240V 50Hz.
- Normal dry indoor conditions.



Overall width : Without wireguard 180mm/7.09in.
 With wireguard 185mm/7.28in.
 Overall depth : Without wireguard 130mm/5.12in.
 With wireguard 160mm/6.30in.

DIMENSIONS & WEIGHTS

Packs (battens with White 35 lamps)	Catalogue Numbers Battens only	Slotted open-end reflector	Wireguard	Weight with lamp(s) and reflector (kg/lb)	Weight with lamp(s), reflector & wireguard (kg/lb)	Overall length With reflector (mm/in.)	Overall length With reflector & wireguard (mm/in.)	Batten fixing centres (mm/in.)
P4N	S4N	R4N	—	4.9/10.8	—	1232/48.5	—	600/24
P24N	S24N	R4N	—	6.7/14.7	—	1232/48.5	—	600/24
P5N	S5N	R5N	G5N	6.6/14.5	8.4/18.51	1532/60.31	1580/62.2	600/24
P25N	S25N	R5N	G5N	9.0/19.8	10.6/23.76	1532/60.31	1580/62.2	600/24
P6N	S6N	R6N	G6N	7.5/16.5	9.3/20.40	1796/70.71	1835/72.24	600/24
P26N	S26N	R6N	G6N	10.0/22.0	11.8/25.96	1796/70.71	1835/72.24	600/24
P8N, P8EN	S8N, S8EN1	R8N	G8N	9.3/20.5	10.5/23.40	2407/94.40	2445/96.26	1200/48
P28N, P28EN	S28N, S28EN1	R8N	G8N	12.3/27.1	14.1/31.02	2407/94.76	2445/96.26	1200/48

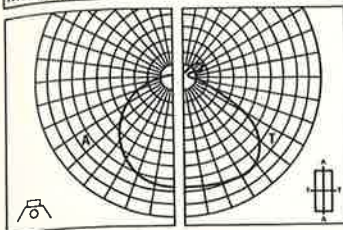
NEW STREAMLITE TROUGH REFLECTORS & OPTIONAL WIREGUARDS

1

PHOTOMETRIC DATA NEW STREAMLITE 1 LAMP

WITH TROUGH REFLECTOR

Mounting: SUSPENDED



Nadir Intensity 241cd/1000 lm
CIE Flux Code 43 79 96 95 87

SHR MAX (Square) 1.92 (1.75 NOM)
SHR MAX TR (Continuous Rows) 2.36

ULORL 0.04 Multiply by
DLORL 0.83 each Service
LORL 0.87 Correction Factor

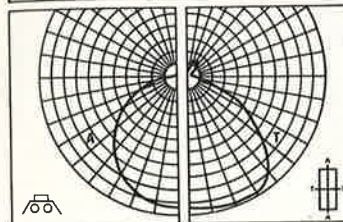
Glare Data (CIBS)

Flux Fraction Ratio	0.05		
ACG Classification	ACG1		
Glare BZ (RI 2.5, SHR NOM)	BZ4		
Luminous Area (sq cm)			
36W	58W	70W	100W
2200	2750	3300	4400

NEW STREAMLITE 2 LAMP

WITH TROUGH REFLECTOR

Mounting: SUSPENDED



Nadir Intensity 239cd/1000 lm
CIE Flux Code 46 80 96 91 83

SHR MAX (Square) 1.80 (1.75 NOM)
SHR MAX TR (Continuous Rows) 2.08

ULORL 0.07 Multiply by
DLORL 0.76 each Service
LORL 0.83 Correction Factor

Glare Data (CIBS)

Flux Fraction Ratio	0.09		
ACG Classification	ACG1		
Glare BZ (RI 2.5, SHR NOM)	BZ4		
Luminous Area (sq cm)			
36W	58W	70W	100W
2200	2750	3300	4400

Service Correction Factors

	36W	58W	70W	100W
Length Factor	1.00	1.00	1.00	0.99
Colours 80 Factor	1.00	1.00	1.00	1.00
38mm Factor	0.98	0.98	0.98	1.00
Ballast Lumen Factor	1.00	1.00	1.00	1.00

Utilization Factors UF (F) for SHR NOM

Room Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	55	59	65	70	76	80	83	86	89
	30		49	53	59	64	71	75	78	83	86
	10		44	48	54	59	66	71	75	80	83
50	50	20	53	57	62	67	73	76	79	82	84
	30		48	51	57	62	68	72	75	79	82
	10		44	47	53	58	65	69	72	77	80
30	50	20	51	55	60	64	69	73	75	78	80
	30		47	50	55	60	66	70	72	76	78
	10		43	46	52	56	63	67	70	74	77
0	0	0	41	44	49	53	59	63	66	69	72

Multiply by each Service Correction Factor

Test No. C129 Dated: 81.04.02
Measured in accordance with BS 5225
Calculations based on CIBS TM5 and TR10

Service Correction Factors

	36W	58W	70W	100W
Length Factor	1.00	1.00	1.00	0.99
Colours 80 Factor	1.00	1.00	1.00	1.00
38mm Factor	0.98	0.98	0.98	1.00
Ballast Lumen Factor	1.00	1.00	1.00	1.00

Utilization Factors UF (F) for SHR NOM

Room Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	53	57	62	67	72	76	79	82	84
	30		47	51	57	61	68	72	75	79	81
	10		43	47	52	57	64	68	71	76	79
50	50	20	51	55	59	63	69	72	74	77	79
	30		46	50	55	59	65	69	71	75	77
	10		43	46	51	55	61	66	69	73	75
30	50	20	49	52	57	61	65	68	70	73	75
	30		45	48	53	57	62	66	68	71	73
	10		42	45	49	54	59	63	66	69	72
0	0	0	40	42	46	50	55	59	61	64	66

Multiply by each Service Correction Factor

Test No. C136 Dated: 81.04.02
Measured in accordance with BS 5225
Calculations based on CIBS TM5 and TR10

NEW STREAMLITE TROUGH REFLECTORS & OPTIONAL WIREGUARDS

ORDERING DATA

Rating	Lamp type (white 35)	Catalogue Numbers			
		Batten with White 35 lamp	Batten only	Slotted open-end reflector	Wireguard
1 x 36W 1200mm (4ft)	1 x TLD 36W/35	P4N	S4N	R4N	—
2 x 36W 1200mm (4ft)	2 x TLD 36W/35	P24N	S24N	R4N	—
1 x 58W 1500mm (5ft)	1 x TLD 58W/35	P5N	S5N	R5N	G5N
2 x 58W 1500mm (5ft)	2 x TLD 58W/35	P25N	S25N	R5N	G5N
1 x 70W 1800mm (6ft)	1 x TLD 70W/35	P6N	S6N	R6N	G6N
2 x 70W 1800mm (6ft)	2 x TLD 70W/35	P26N	S26N	R6N	G6N
1 x 100W 2400mm (8ft)	1 x MCF 100W/35	P8N	S8N	R8N	G8N
2 x 100W 2400mm (8ft)	2 x MCF 100W/35	P28N	S28N	R8N	G8N
1 x 100W 2400mm (8ft)	1 x MCF 100W/35	—	S8EN1	R8N	G8N
2 x 100W 2400mm (8ft)	2 x MCF 100W/35	—	S28EN1	R8N	G8N
Reflector joining clip*		RJ2*			

Cat. Number BBC – Coverplate BS Box – 10 coverplates BBC per carton.
Battens and batten/lamp packs are individually packed.

Reflectors and wireguards are packed 5 to a carton.

Lamps are packed 20 per carton (2400mm lengths); 25 per carton (all other lengths).

*Two clips required per reflector join, e.g. 10 clips RJ2 for six reflector row.

Please order in the form given in the following example, in multiples of the packing quantity. Note that lamps must be ordered separately if battens only are ordered:

50 Philips batten packs P25N

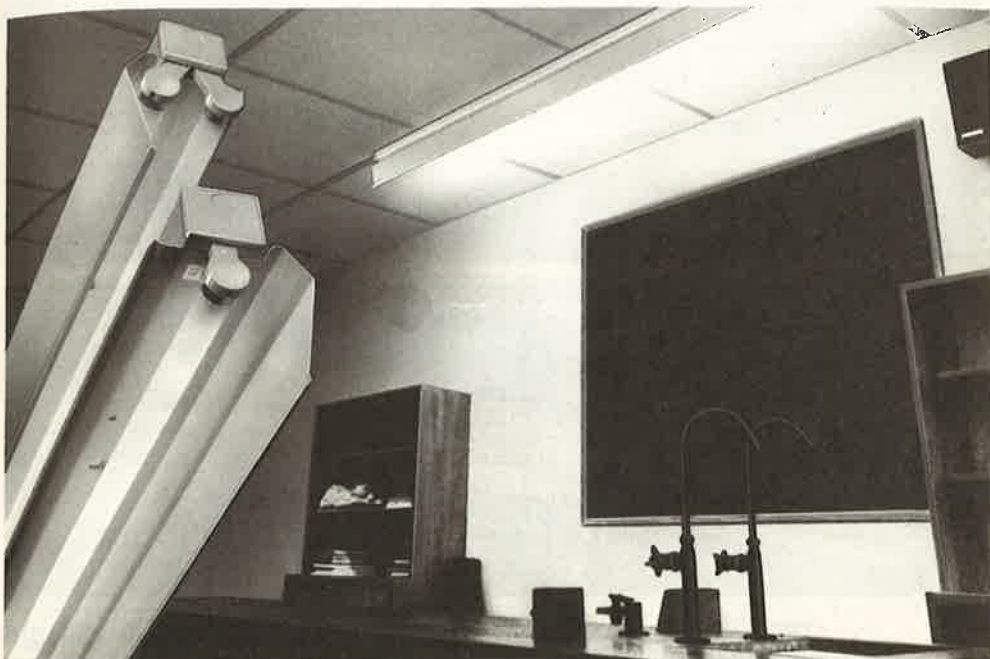
50 Philips reflectors R5N

50 Philips wireguards G5N

Luminaire: Made in Great Britain.

NEW STREAMLITE

Angle reflectors &
optional wireguards



A range of Durawhite stoved finish open-ended angle reflectors for simple fixing to New Streamlite battens. One width fits both one-lamp and two-lamp versions. Optional wireguards made from galvanised steel are available.

RANGE

Angle reflectors and optional wireguards available to fit one-lamp and two-lamp New Streamlite battens in the following lengths and ratings:

- 58W 1500mm (5ft)
- 70W 1800mm (6ft)
- 100W 2400mm (8ft)

APPLICATIONS

For use in normal indoor situations of a commercial or industrial nature where an angled light distribution is required, such as:

- Lighting for blackboards or wall charts
- Cabinet type instrument panels
- Task lighting to supplement general lighting

The wireguard provides additional protection in areas where lamps may be exposed to damage.

FLUORESCENT LUMINAIRE

To re-order this Data Sheet quote

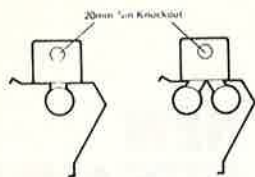
PL 3015/2

Issued 7/83

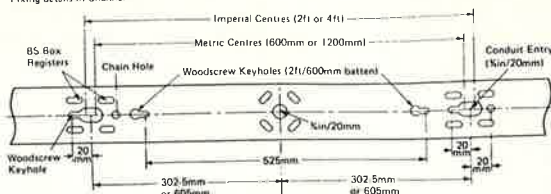
Replaces PL 3015/1

NEW STREAMLITE ANGLE REFLECTORS & OPTIONAL WIREGUARDS

Overall width : 120mm/4-72in.
Overall depth : 165mm/6-50in.



Fixing details in Channel



FEATURES

- High-quality Durawhite stoved finish for high reflectance and long service life.
- Large-diameter keyhole slot fixing for easy attachment, with detent for positive location once the fixing screws have been tightened.
- Optional wireguards for additional protection of lamps.

FIXING & WIRING

Please refer to New Streamlite luminaires Data Sheet PL 3010 for fixing details of battens. Battens may abut when mounted in line, unless wireguards are to be fitted, in which case at least 45mm must be allowed between battens.

Wiring instructions are contained in Data Sheet PL 3010.

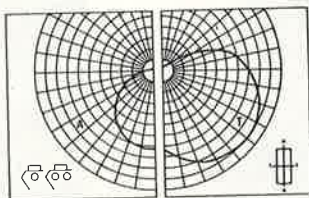
Mounting of reflector to batten

- Slacken screws in batten coverplate, and engage keyhole slots in reflector over screwheads.
- Slide reflector laterally until screw heads engage detents, and tighten screws. Insert lamp(s).

DIMENSIONS & WEIGHTS

Packs (battens with White 35 lamps)	Catalogue Numbers Battens only	Angle reflector	Wire-guard	Weight with lamp(s) and reflector (kg/lb)	Weight with lamp(s) reflector and wireguard (kg/lb)	Overall length (mm/in.)	Batten fixing centres (mm/in.)
P5N	S5N	AR5N	AG5	6-1/13-4	7-5/16-5	1532/60-31	600/24
P25N	S25N	AR5N	AG5	8-5/18-7	10-2/22-4	1532/60-31	600/24
P6N	S6N	AR6N	AG6	6-8/15-0	8-2/18-0	1796/70-71	600/24
P26N	S26N	AR6N	AG6	9-4/20-7	11-2/24-6	1796/70-71	600/24
P8N, P8EN	S8N, S8EN1	AR8N	AG8	8-4/18-5	10-8/23-7	2407/94-76	1200/48
P28N, P28EN	S28N, S28EN1	AR8N	AG8	11-4/25-1	13-8/30-4	2407/94-76	1200/48

POLAR CURVES



MATERIALS & FINISH

Reflector: Sheet steel, Durawhite stoved finish.

Wireguard: Mild steel wire, galvanised.

RANGE OF OPERATION

240V 50Hz.

Normal dry indoor conditions.

ORDERING DATA

Rating	Lamp type (White 35)	Batten with White 35 lamp	Catalogue Numbers Batten only	Angle reflector	Wireguard
1 x 58W 1500mm (5ft)	1 x TLD 58W/35	P5N	S5N	AR5N	AG5
2 x 58W 1500mm (5ft)	2 x TLD 58W/35	P25N	S25N	AR5N	AG5
1 x 70W 1800mm (6ft)	1 x TLD 70W/35	P6N	S6N	AR6N	AG6
2 x 70W 1800mm (6ft)	2 x TLD 70W/35	P26N	S26N	AR6N	AG6
1 x 100W 2400mm (8ft)	1 x MCF 100W/35	P8N	S8N	AR8N	AG8
2 x 100W 2400mm (8ft)	2 x MCF 100W/35	P28N	S28N	AR8N	AG8
1 x 100W 2400mm (8ft)	1 x MCF 100W/35	—	S8EN1	AR8N	AG8
2 x 100W 2400mm (8ft)	2 x MCF 100W/35	—	S28EN1	AR8N	AG8

Cat. Number BBC - coverplate BS box - 10 coverplates BBC per carton. Battens and batten/lamp packs are individually packed.

Angle reflectors and angle wireguards packed 5 to a carton.

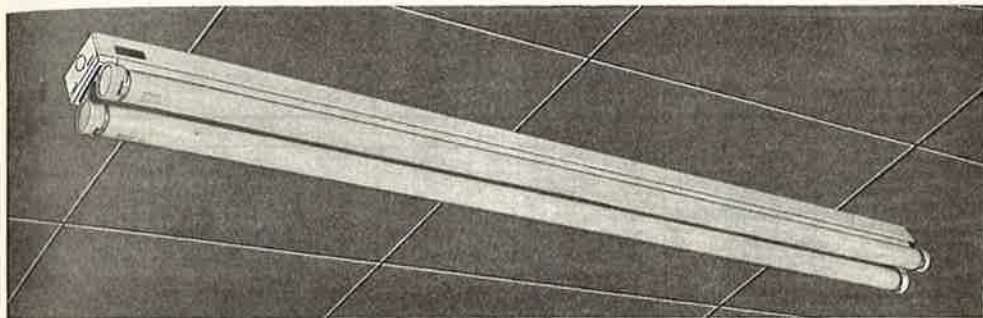
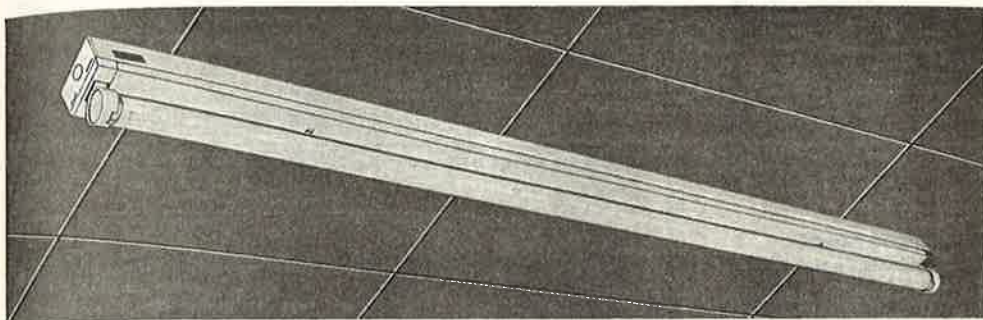
Lamps are packed 20 per carton (2400mm lengths): 25 per carton (all other lengths).

Please order in the form given in the following example, in multiples of the packing quantity. Note that lamps must be ordered separately if battens only are ordered:

50 Philips batten packs P25N
50 Philips angle reflectors AR5N

Luminaire: Made in Great Britain.

FEATURE



High-quality Luminaires for Fluorescent Lamps

Feature high quality luminaires may be used as Battens, with Trough or Angle Reflectors or with Diffusers or Prismatic Controllers. The Battens are attractively finished in Durawhite stoved finish with white chamfered end caps.

Feature luminaires are a traditional type, for use with the 38mm dia. argon filled lamps.

RANGE

One- and two-lamp batten luminaires:

1200mm (4ft), 1500mm (5ft)
1800mm (6ft) Starterless
2400mm (8ft) in electronic start

Full details of the attachments can be found in Data Sheets:

PL 1720 Trough Reflectors
PL 1721 Angled Reflectors
PL 1722 Opal Diffuser
PL 1723 Prismatic Controllers.

APPLICATIONS

For use in any normal indoor situation such as:-

- Small or large offices
- Shops and departmental stores
- Corridors
- Stock and store rooms
- Canteens
- Workshops

FLUORESCENT LUMINAIRE

To reorder this Data Sheet quote

PL 1719/6

Issued 7/83

Replaces PL 1719/5

FEATURE – FLUORESCENT LUMINAIRE

FEATURES

- Easily mounted onto a standard BS box, which it covers completely.
- The channel and cover plates are finished in Durawhite stoved finish for long service and retention of reflective properties.
- Attractively chamfered end caps feature 20mm ($\frac{3}{4}$ in.) knockouts for end conduit terminations.
- Spring-mounted, injection-moulded lampholders are fixed in seconds, and one person can re-lamp a luminaire from one end. Lampholders of two-lamp luminaires are individually mounted, so that one lamp can be removed without disturbing the other, and are keyed to prevent accidental cross-over.
- Starterless control gear.
- Each batten is provided with a 3-way terminal block of 2 x 2.5mm² section cable capacity, and a fuse. Internal wiring is held by cleats, and additional cleats are provided down one side for contractors' wiring.

MATERIALS & FINISH

Channels and cover plates: Sheet steel, Durawhite stoved finish.

Channel end caps: White medium-impact polystyrene.

Sprung bi-pin lampholders: White urea mouldings fitted to plated spring steel supports.

SPECIFICATION

- Type compliance with BS 4533 2.2 Class I Ordinary Indoor.

To specify state:

Batten fluorescent lamp luminaires complying with BS 4533 2.2, with Durawhite stoved finish, fuse and starterless control gear, covering a BS box, similar to Philips Feature luminaires.

CIRCUIT COMPONENTS

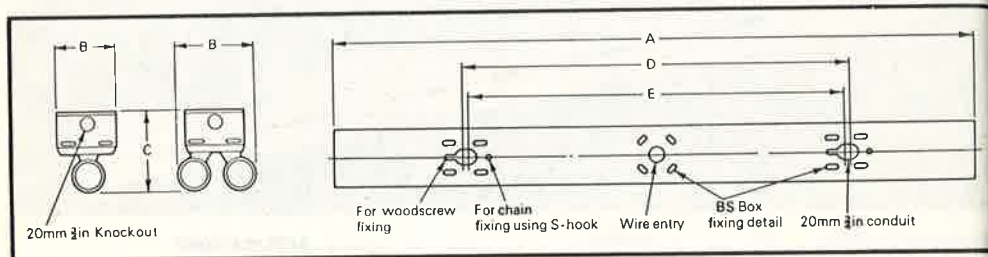
Catalogue numbers		Capacitor part numbers	Capacitor (dry film type)
Batten	Ballast		
FSQ4	1 x BBX40	1 x H1655	1 x 5.5mfd $\pm 5\%$ (250V)
FSQ24	2 x BBX40	2 x H1655	2 x 5.5mfd $\pm 5\%$ (250V)
FSQ5	1 x BBX65	1 x H1684	1 x 8.4mfd $\pm 5\%$ (250V)
FSQ25	2 x BBX65	2 x H1684	2 x 8.4mfd $\pm 5\%$ (250V)
FSQ675	1 x BBX75	1 x H1684	1 x 8.4mfd $\pm 5\%$ (250V)
FSQ2675	2 x BBX75	2 x H1684	2 x 8.4mfd $\pm 5\%$ (250V)
FSQ8E	1 x BCS125*	1 x H1672	1 x 7.2mfd $\pm 5\%$ (440V)
FSQ28E	2 x BCS125*	2 x H1672	2 x 7.2mfd $\pm 5\%$ (440V)

* Or BCE 125. With ES08 electronic starters see Data Sheet PL 1785.

Harmonic content

Third harmonic content will not normally exceed 3 x 16% in the neutral of a balanced 3-phase 4-wire supply.

All information quoted relates to average luminaires on a 240V 50Hz supply at 25°C.



DIMENSIONS, WEIGHTS & ELECTRICAL DATA

Catalogue number	Rating	Overall length A (mm/in.)	Fixing centres (mm/in.)	Weight with lamp(s) (kg/lb)	Circuit Watts (running)	Electrical characteristics	
						Circuit current (Amperes)	Minimum power factor
Starterless types							
FSQ4	1 lamp 40W 1200mm (4ft)	1234/48.6	600/24	3.4/7.5	52	0.25	0.9
FSQ24	2 lamp 40W 1200mm (4ft)	1234/48.6	600/24	5.8/12.7	104	0.5	0.9
FSQ5	1 lamp 65W 1500mm (5ft)	1534/60.5	600/24	4.4/9.6	77	0.34	0.9
FSQ25	2 lamp 65W 1500mm (5ft)	1534/60.5	600/24	6.8/15.0	154	0.68	0.9
FSQ675	1 lamp 75W 1800mm (6ft)	1800/71	600/24	4.6/10.0	90	0.42	0.9
FSQ2675	2 lamp 75W 1800mm (6ft)	1800/71	600/24	7.1/15.6	180	0.84	0.9
Electronic start types							
FSQ8E	1 lamp 125W 2400mm (8ft)	2409/95	1200/48	5.4/11.9	137	0.94	0.66 LDG
FSQ28E	2 lamp 125W 2400mm (8ft)	2409/95	1200/48	8.4/18.5	276	1.98	0.66 LDG

Overall width: One lamp 76mm (3in.)

Two lamp 98mm (3.8in.)

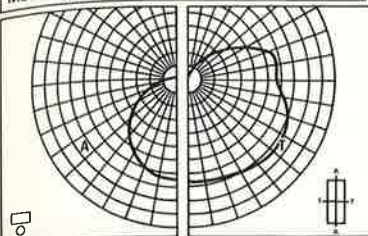
Overall depth (all luminaires): 100mm (4in.)

FEATURE – FLUORESCENT LUMINAIRE

1

PHOTOMETRIC DATA FEATURE BATTEN 1 LAMP

BATTEN WITHOUT ATTACHMENT
Mounting: SUSPENDED



Nadir Intensity 140cd/1000 total lm
Multiply by each Service Corr Factor
CIE Flux Number 213955

SHR MAX (Square) 2.01 (2.00 NOM)
SHR MAX TR (Transverse, end-end) 2.67

ULORL 0.24
DLORL 0.67
LORL 0.91
Multiply by each Service Correction Factor

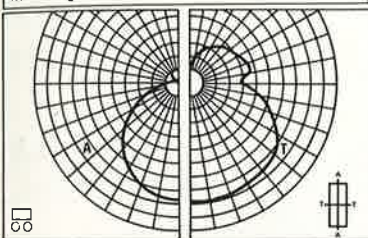
Glare Data (CIBS)

Flux Fractions Ratio 0.36
ACG Classification ACG2
Glare BZ (R1 2.5, SHR = NOM) BZ6
Luminous Areas (sq cm)
40W 65W 75W 125W
900 1100 1300 1750

Measured: BS 5225 Part 1 1975
Calculated: CIBS TM 5 and TR 10
Test No: A612 Dated: 76.08.26

FEATURE BATTEN 2 LAMP

BATTEN WITHOUT ATTACHMENT
Mounting: SUSPENDED



Nadir Intensity 167cd/1000 total lm
Multiply by each Service Corr Factor
CIE Flux Number 234256

SHR MAX (Square) 1.86 (1.75 NOM)
SHR MAX TR (Transverse, end-end) 2.35

ULORL 0.28
DLORL 0.65
LORL 0.93
Multiply by each Service Correction Factor

Glare Data (CIBS)

Flux Fractions Ratio 0.43
ACG Classification ACG2
Glare BZ (R1 2.5, SHR = NOM) BZ6
Luminous Areas (sq cm)
40W 65W 75W 125W
1150 1450 1750 2300

Measured: BS 5225 Part 1 1975
Calculated: CIBS TM 5 and TR 10
Test No: A617 Dated: 76.09.01

Service Correction Factors

	40W 1200mm	65W 1500mm	75W 1800mm	125W 2400mm
Lamp Factor	1.00	1.00	1.00	0.97
Colour 80 Factor	1.00	1.00	1.00	1.00
Ballast Lumen Factor	1.01	0.96	0.98	0.99

Utilization Factors UF (F) for SHR NOM

Room Reflectances			Room Index								
C	W	F	0.75	1	1.25	1.5	2	2.5	3	4	5
70	50	20	43	48	54	58	65	69	73	77	80
	30		36	41	46	51	58	63	67	72	76
	10		31	35	40	45	53	58	62	68	72
50	50	20	39	44	48	53	58	62	65	69	72
	30		33	37	42	47	53	57	61	65	68
	10		29	32	37	42	48	53	57	62	65
30	50	20	36	39	43	47	52	56	58	62	64
	30		31	34	38	42	48	52	55	59	62
	10		27	30	34	38	44	48	51	56	59
0	0	0	23	25	29	32	37	40	43	47	49

CIBS Standard Presentation

Multiply by each Service Correction Factor

Service Correction Factors

	40W 1200mm	65W 1500mm	75W 1800mm	125W 2400mm
Lamp Factor	1.00	1.00	1.00	0.97
Colour 80 Factor	1.00	1.00	1.00	1.00
Ballast Lumen Factor	1.01	0.96	0.98	0.99

Utilization Factors UF (F) for SHR NOM

Room Reflectances			Room Index								
C	W	F	0.75	1	1.25	1.5	2	2.5	3	4	5
70	50	20	43	50	56	61	68	72	76	80	83
	30		36	42	49	54	61	66	70	75	79
	10		30	37	43	48	56	61	66	71	76
50	50	20	39	45	50	54	61	64	67	71	76
	30		33	39	44	49	55	60	63	67	71
	10		28	34	40	44	51	56	59	64	68
30	50	20	35	40	45	49	54	57	60	63	66
	30		30	35	40	44	50	54	56	60	63
	10		26	31	36	40	46	50	54	58	61
0	0	0	22	26	30	33	39	42	44	48	51

CIBS Standard Presentation

Multiply by each Service Correction Factor

FEATURE — FLUORESCENT LUMINAIRE

ORDERING DATA

Catalogue Number	Rating	Circuit
FSQ4	1 x 40W 1200mm (4ft)	Starterless
FSQ24	2 x 40W 1200mm (4ft)	Starterless
FSQ5*	1 x 65W 1500mm (5ft)	Starterless
FSQ25*	2 x 65W 1500mm (5ft)	Starterless
FSQ675	1 x 75W 1800mm (6ft)	Starterless
FSQ2675	2 x 75W 1800mm (6ft)	Starterless
FSQ8E	1 x 125W 2400mm (8ft)	Electronic Start
FSQ28E	2 x 125W 2400mm (8ft)	Electronic Start

All battens are supplied packed individually.

Lamps should be ordered separately.

Please order as in the form given in the following example:

50 Philips FSQ25 fluorescent luminaires.

*1500mm Feature Battens in (FSS5D or FSS25D) dimming versions are available to special order.

Made in Great Britain

FEATURE Opal Diffusers

Diffusers mainly for commercial applications, with rectangular-section bodies with linear external reeding. Push-fit grey end caps have a textured surface.

Diffusers are available in two widths: for use with a single lamp only, or in a wider version for one or two lamps.

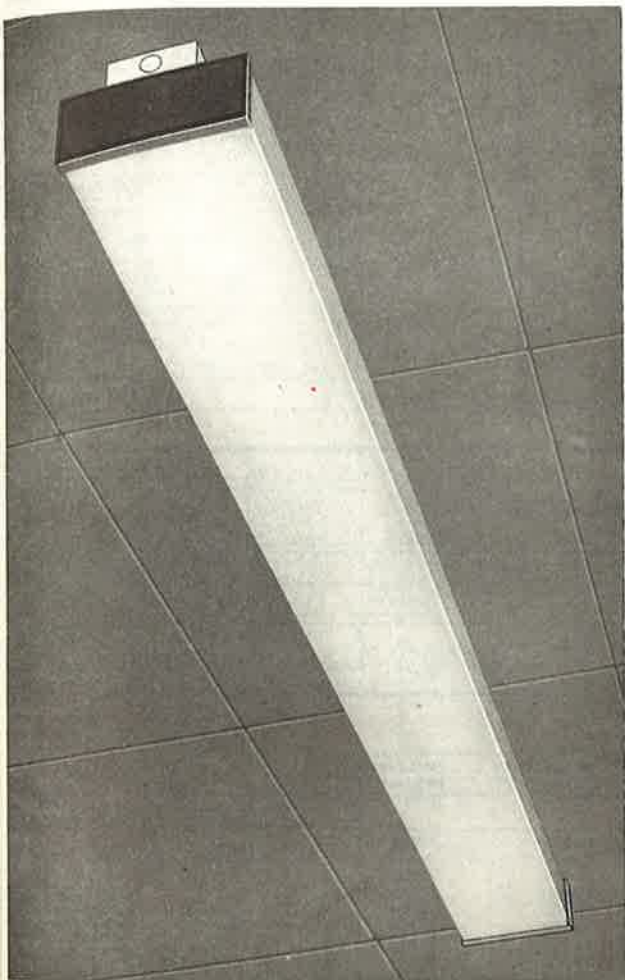
RANGE

Diffusers are available in both narrow (1-lamp) or wide (1- or 2-lamp) versions to fit all lengths of Feature battens. Diffuser couplers are available to provide a neat joint between diffusers of battens mounted end-to-end.

APPLICATIONS

For use in normal indoor applications such as:

- Small and large offices
- Shops and stores
- Travel concourses
- Banks and Building Societies
- Canteens
- Corridors



Wide version diffuser.

FLUORESCENT LUMINAIRE

To reorder this Data Sheet quote	PL 1722/6
issued 6/83	Replaces PL 1722/5

FEATURE OPAL DIFFUSERS – FLUORESCENT LUMINAIRE

FEATURES

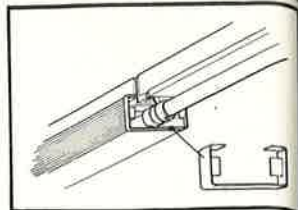
- Opal polystyrene extrusions with external linear reeding maintain an attractive appearance whether lit or unlit.
- Push-fit end caps in grey medium-impact polystyrene have an inset textured surface.
- Optional diffuser couplers make a neat join between diffusers of battens mounted end-to-end.
- 100W versions of Feature have electronic start.

MATERIALS & FINISH

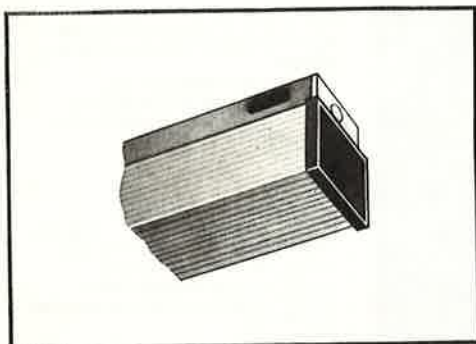
- Channels and cover plates:** Sheet steel, Durawhite stoved finish.
- Channel end caps:** White medium-impact polystyrene mouldings.
- Sprung bi-pin lampholders:** White urea mouldings fitted to plated spring steel supports.
- Diffuser:** Opal polystyrene extrusion with push-fit grey medium-impact polystyrene end caps and two support straps.
- Diffuser coupler:** Sheet steel, Durawhite stoved finish.

RANGE OF OPERATION

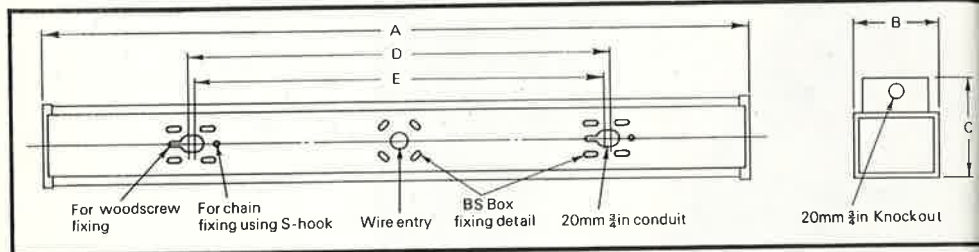
- 240V 50Hz.
- 5°C to 25°C (single lamp 30°C).
- Diffusers not suitable for wall-mounting.



Diffuser coupler



Close-up of Catalogue Number DF5 opal diffuser.



DIMENSIONS & WEIGHTS

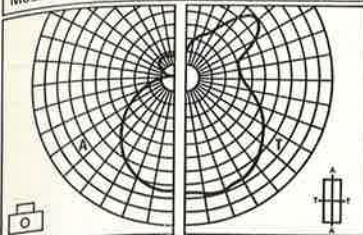
Batten only	Catalogue Nos. Diffuser attachment only	Weight complete with lamps (kg/lb)	Overall length (mm/in.) (A)	Fixing centres (mm/in.) (E/D)
FSQ4	DF4	4-0/8-9	1242/49	600/24
FSQ4	DF24	4-3/9-5	1242/49	600/24
FSQ24	DF24	6-7/14-7	1242/49	600/24
FSQ5	DF5	5-1/11-4	1542/61	600/24
FSQ5	DF25	5-5/12-1	1542/61	600/24
FSQ25	DF25	7-9/17-5	1542/61	600/24
FSQ675	DF6	5-4/12-2	1808/71-2	600/24
FSQ675	DF26	5-8/12-8	1808/71-2	600/24
FSQ2675	DF26	8-3/18-4	1808/71-2	600/24
FSQ8E	DF8	6-5/14-3	2417/95-2	1200/48
FSQ8E	DF28	7-0/15-4	2417/95-2	1200/48
FSQ28E	DF28	10-0/22-0	2417/95-2	1200/48

Overall width (B): 1 lamp 97mm (3.8in.)
1 or 2 lamp 160mm (6.3in.)
Overall depth (C) (both types): 115mm (4.5in.)

FEATURE OPAL DIFFUSERS – FLUORESCENT LUMINAIRE

PHOTOMETRIC DATA FEATURE 1 LAMP

WITH DIFFUSER	NARROW	OPAL
Mounting:	SUSPENDED	



Nadir Intensity 106cd/1000 total lm
Multiply by each Service Corr Factor
CIE Flux Number 163041

SHR MAX (Square) 1.99 (1.75 NOM)
SHR MAX TR (Transverse, end-end) 2.57

ULORL 0.21
DLORL 0.50
LORL 0.71
Multiply by each Service Correction Factor

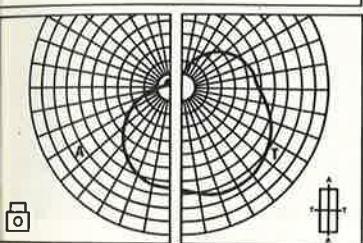
Glare Data (CIBS)

Flux Fractions Ratio 0.42
ACG Classification ACG1
Glare BZ (RI 2.5, SHR = NOM) BZ6
Luminous Areas (sq cm)
40W 65W 75W 125W
1205 1496 1754 2344

Measured: BS 5225 Part 1 1975
Calculated: CIBS TM 5 and TR 10
Test No: A682 Dated: 76.12.09

FEATURE 1 LAMP

WITH WIDE OPAL DIFFUSER	
Mounting:	SUSPENDED



Nadir Intensity 119cd/1000 total lm
Multiply by each Service Corr Factor
CIE Flux Number 173141

SHR MAX (Square) 1.84 (1.75 NOM)
SHR MAX TR (Transverse, end-end) 2.24

ULORL 0.29
DLORL 0.47
LORL 0.76
Multiply by each Service Correction Factor

Glare Data (CIBS)

Flux Fractions Ratio 0.62
ACG Classification ACG2
Glare BZ (RI 2.5, SHR = NOM) BZ6
Luminous Areas (sq cm)
40W 65W 75W 125W
1987 2467 2893 3867

Measured: BS 5225 Part 1 1975
Calculated: CIBS TM 5 and TR 10
Test No: A871 Dated: 77.12.09

Service Correction Factors

	40W 1200mm	65W 1500mm	75W 1800mm	125W 2400mm	
Lamp Factor	1.00	1.00	1.00	0.97	
Colour 80 Factor	1.01	1.01	1.01	1.01	
Ballast Lumen Factor	1.01	0.96	0.98	0.99	

Utilization Factors UF (F) for SHR NOM

Room Reflectances			Room Index								
C	W	F	0.75	1	1.25	1.5	2	2.5	3	4	5
70	50	20	34	36	42	46	51	54	57	60	62
	30		29	32	37	41	46	50	53	56	59
	10		25	28	33	36	42	46	49	53	56
50	50	20	31	34	38	41	45	48	51	53	56
	30		26	29	33	37	41	45	47	51	53
	10		23	26	30	33	33	42	44	48	51
30	50	20	28	31	34	37	40	43	45	47	49
	30		24	27	30	33	37	40	42	45	47
	10		22	24	27	30	34	38	40	43	45
0	0	0	18	20	23	25	28	31	33	36	38

CIBS Standard Presentation

Multiply by each Service Correction Factor

Service Correction Factors

	40W 1200mm	65W 1500mm	75W 1800mm	125W 2400mm	
Lamp Factor	1.00	1.00	1.00	0.97	
Colour 80 Factor	1.00	1.00	1.00	1.00	
Ballast Lumen Factor	1.01	0.96	0.98	0.99	

Utilization Factors UF (F) for SHR NOM

Room Reflectances			Room Index								
C	W	F	0.75	1	1.25	1.5	2	2.5	3	4	5
70	50	20	37	41	46	49	55	58	61	64	66
	30		32	36	40	44	50	54	56	61	63
	10		28	31	36	40	46	50	53	57	60
50	50	20	33	36	40	43	48	51	53	56	58
	30		29	32	36	39	44	47	50	53	55
	10		25	28	32	36	41	44	47	51	53
30	50	20	29	32	35	38	41	44	46	48	50
	30		26	28	32	34	39	41	43	46	48
	10		23	25	29	32	36	39	41	44	47
0	0	0	19	20	23	25	29	31	33	35	37

CIBS Standard Presentation

Multiply by each Service Correction Factor

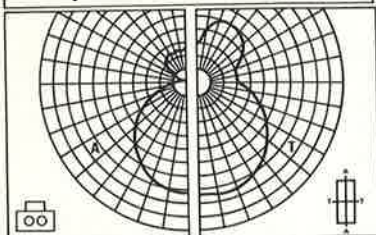
FEATURE OPAL DIFFUSERS – FLUORESCENT LUMINAIRE

PHOTOMETRIC DATA

FEATURE 2 LAMP

WITH WIDE OPAL DIFFUSER

Mounting: SUSPENDED



Nadir Intensity 116cd/1000 total lm
Multiply by each Service Corr Factor
CIE Flux Number

172937

SHR MAX (Square) 1.77 (1.75 NOM)
SHR MAX TR (Transverse, end-end) 2.10

ULORL 0.25
DLORL 0.42
LORL 0.67
Multiply by each Service
Correction Factor

Glare Data (CIBS)

Flux Fractions Ratio 0.60
ACG Classification ACG2
Glare BZ (RI 2.5, SHR = NOM) BZ5
Luminous Areas (sq cm)
40W 65W 75W 125W
1987 2467 2893 3867

Measured: BS 5225 Part 1 1975
Calculated: CIBS TM 5 and TR 10
Test No: A873 Dated: 77.12.14

Service Correction Factors

	40W 1200mm	65W 1500mm	75W 1800mm	125W 2400mm
Lamp Factor	1.00	1.00	1.00	0.97
Colour 80 Factor	1.02	1.02	1.02	1.02
Ballast Lumen Factor	1.01	0.96	0.98	0.99

Utilization Factors UF (F) for SHR NOM

Room Reflectances			Room Index									
C	W	F	0.75	1	1.25	1.5	2	2.5	3	4	5	
70	50	20	33	37	41	44	49	52	54	57	59	
		30	29	32	36	40	45	48	50	54	57	
		10	25	29	33	36	41	45	47	51	54	
50	50	20	30	33	36	39	43	46	47	50	52	
		30	26	29	32	35	40	43	45	48	50	
		10	23	26	29	33	37	40	42	45	48	
30	50	20	27	29	32	34	38	40	41	43	45	
		30	24	26	29	31	35	38	39	42	43	
		10	21	24	26	29	33	36	37	40	42	
0	0	0	18	19	21	23	26	28	30	32	34	

CIBS Standard Presentation

Multiply by each Service Correction Factor

ORDERING DATA

Description	Catalogue Nos.	
	Batten only	Diffuser attachment only
1 x 40W 1200mm (4ft) narrow diffuser	FSQ4	DF4
1 x 40W 1200mm (4ft) wide diffuser	FSQ4	DF24
2 x 40W 1200mm (4ft) wide diffuser	FSQ24	DF24
1 x 65W 1500mm (5ft) narrow diffuser	FSQ5	DF5
1 x 65W 1500mm (5ft) wide diffuser	FSQ5	DF25
2 x 65W 1500mm (5ft) wide diffuser	FSQ25	DF25
1 x 75W 1800mm (6ft) narrow diffuser	FSQ675	DF6
1 x 75W 1800mm (6ft) wide diffuser	FSQ675	DF26
2 x 75W 1800mm (6ft) wide diffuser	FSQ2675	DF26
1 x 125W 2400mm (8ft) narrow diffuser	FSQ8E	DF8
1 x 125W 2400mm (8ft) wide diffuser	FSQ8E	DF28
2 x 125W 2400mm (8ft) wide diffuser	FSQ28E	DF28

Associated accessories:

Diffuser coupler (narrow) (one required per luminaire)
Diffuser coupler (wide) (one required per luminaire)

Spare:

Lampholder assembly
Grey diffuser end cap (narrow) (2 required per luminaire)
Grey diffuser end cap (wide) (2 required per luminaire)
White batten end cap and clips (1 lamp) (2 required per luminaire)
White batten end cap and clips (2 lamp) (2 required per luminaire)

Catalogue No.

DC1
DC2

A7673
A8023
A8024
FP494
FP495

Please order in the form given in the following example, in multiples of the packing quantity:

50 Philips Feature battens FSQ5.
50 Philips diffuser attachment DF25.
50 Diffuser couplers DC2.

All Feature circuits are starterless or electronic start.

Lamps should be ordered separately.

Packing:

Diffusers: Two per carton.

Diffuser couplers:

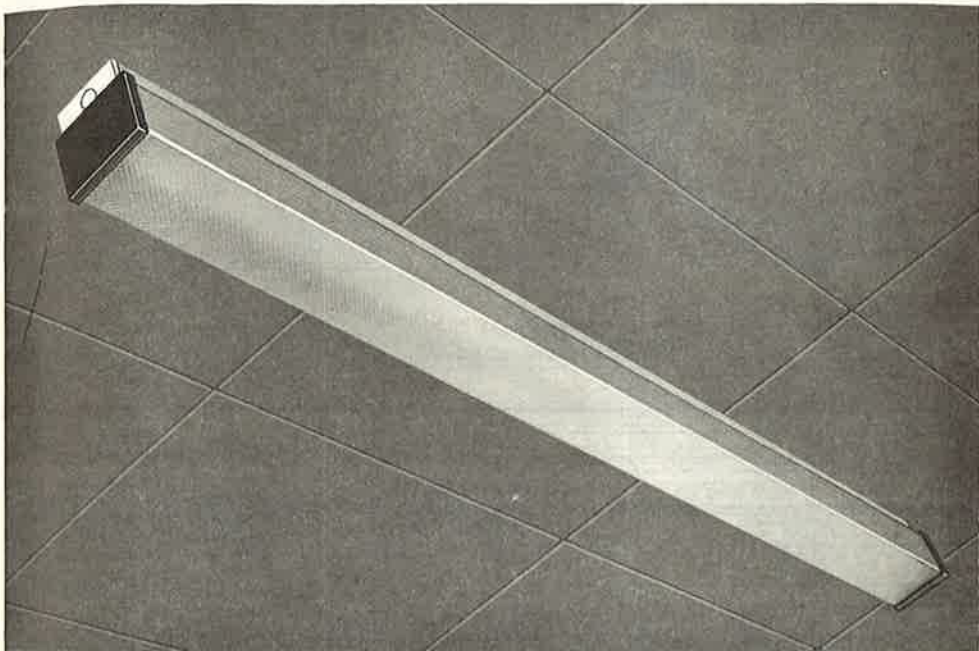
Ten per carton (narrow)

Five per carton (wide).

Replacement end caps: Packed to order.

Made in Great Britain

FEATURE Prismatic Controllers



Prismatic controller with extruded body of rectangular section. Linear prisms are formed on the inside surfaces of the sides, and the base has regular, well-defined impressions of pyramid form to look attractive whether lit or unlit and to control the light. Push-fit grey end caps have a textured surface. Prismatic controllers are available in two widths: for use with a single lamp or in a wider version for one or two lamps.

APPLICATIONS

For use in normal indoor applications such as:-

- Small and large offices
- Shops and stores
- Travel concourses
- Banks and Building Societies
- Canteens
- Offices

RANGE

Prismatic controllers are available in both narrow (1-lamp) or wide (2-lamp) versions to fit all lengths of Feature batten.

Controller couplers are available to provide a neat joint between controllers of battens mounted end-to-end.

To reorder this Data Sheet quote

PL 1723/7

issued 6/83

Replaces PL 1723/6

FEATURE PRISMATIC CONTROLLERS

FEATURES

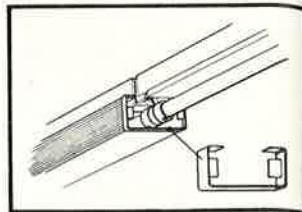
- Clear polystyrene extrusions with internal linear prisms on the sides and external pyramid prisms on the base – light is controlled to limit direct glare in the angles above 60° from the vertical, and appearance is attractive whether lit or unlit.
- Push-fit end caps in grey medium-impact polystyrene have an inset textured surface.
- Optional couplers between controllers mounted end-to-end, make a neat join.
- 125W version of Feature electronic start

MATERIALS & FINISH

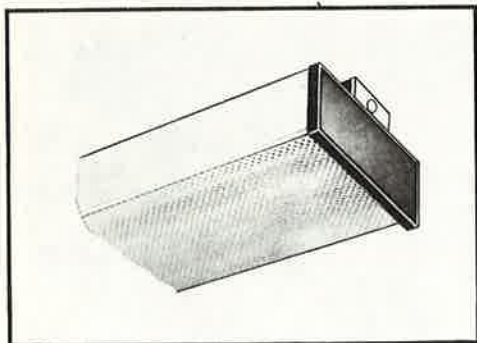
- Channels and cover plates:** Sheet steel, Durawhite stoved finish.
- Channel end caps:** White medium-impact polystyrene mouldings.
- Sprung bi-pin lampholders:** White urea mouldings fitted to plated spring steel supports.
- Controller:** Clear polystyrene prismatic extrusion with push-fit grey polystyrene end caps and two support straps.
- Controller coupler:** Sheet steel, Durawhite stoved finish.

RANGE OF OPERATION

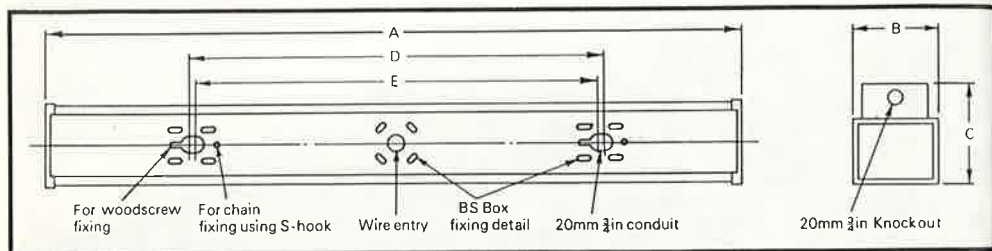
- 240V 50Hz.
- 5°C to 25°C (single lamp 30°C).
- Controllers not suitable for wall-mounting.



Controller coupler



Close-up of Catalogue Number PC25 prismatic controller.



DIMENSIONS & WEIGHTS

Batten only	Catalogue Nos. Controller attachments only	Weight complete with lamps (kg/lb)	Overall length (mm/in.) (A)	Fixing centres (mm/in.) (E/D)
FSQ4	PC4	4-0/8-9	1242/49	600/24
FSQ4	PC24	4-4/9-7	1242/49	600/24
FSQ24	PC24	6-8/14-9	1242/49	600/24
FSQ5	PC5	5-2/11-4	1542/61	600/24
FSQ5	PC25	5-6/12-3	1542/61	600/24
FSQ25	PC25	8-0/17-7	1542/61	600/24
FSQ675	PC6	5-6/12-2	1808/71-2	600/24
FSQ675	PC26	6-0/13-1	1808/71-2	600/24
FSQ2675	PC26	8-5/19-7	1808/71-2	600/24
FSQ8E	PC8	8-6/19-0	2417/95-2	1200/48
FSQ8E	PC28	9-2/20-3	2417/95-2	1200/48
FSQ28E	PC28	13-9/30-8	2417/95-2	1200/48

Overall width (B): One lamp 97mm (3.8in.)

One or two lamp 160mm (6.3in.)

Overall depth (C) (both types): 115mm (4.5in.)

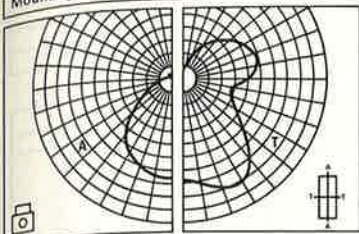
FEATURE PRISMATIC CONTROLLERS

PHOTOMETRIC DATA

FEATURE 1 LAMP

WITH NARROW PRISMATIC CONTROLLER

Mounting: SUSPENDED



Nadir Intensity 142cd/1000 total lm
 Multiply by each Service Corr Factor
 CIE Flux Number 233745

SHR MAX (Square) 1.84 (1.75 NOM)
 SHR MAX TR (Transverse, end-end) 2.15

ULORL 0.29
 DLORL 0.52
 LORL 0.81
 Multiply by each Service Correction Factor

Glare Data (CIBS)

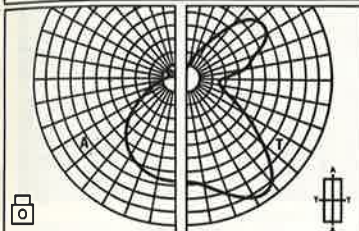
Flux Fractions Ratio 0.56
 ACG Classification ACG5
 Glare BZ (Ri 2.5, SHR = NOM) B25
 Luminous Areas (sq cm)
 40W 65W 75W 125W
 1205 1496 1754 2344

Measured: BS 5225 Part 1 1975
 Calculated: CIBS TM 5 and TR 10
 Test No: A616 Dated: 76.08.31

FEATURE 1 LAMP

WITH WIDE PRISMATIC CONTROLLER

Mounting: SUSPENDED



Nadir Intensity 142cd/1000 total lm
 Multiply by each Service Corr Factor
 CIE Flux Number 244149

SHR MAX (Square) 2.07 (2.00 NOM)
 SHR MAX TR (Transverse, end-end) 2.42

ULORL 0.33
 DLORL 0.53
 LORL 0.86
 Multiply by each Service Correction Factor

Glare Data (CIBS)

Flux Fractions Ratio 0.62
 ACG Classification ACG5
 Glare BZ (Ri 2.5, SHR = NOM) B24
 Luminous Areas (sq cm)
 40W 65W 75W 125W
 1987 2467 2893 3867

Measured: BS 5225 Part 1 1975
 Calculated: CIBS TM 5 and TR 10
 Test No: A872 Dated: 77.10.13

Service Correction Factors

	40W 1200mm	65W 1500mm	75W 1800mm	125W 2400mm
Lamp Factor	1.00	1.00	1.00	0.97
Colour 80 Factor	1.01	1.01	1.01	1.01
Ballast Lumen Factor	1.01	0.96	0.98	0.99

Utilization Factors UF (F) for SHR NOM

Room Reflectances			Room Index								
C	W	F	0.75	1	1.25	1.5	2	2.5	3	4	5
70	50	20	43	47	52	56	60	64	66	70	72
	30		37	41	46	50	55	60	62	66	69
	10		33	37	42	46	51	56	59	63	66
	50	20	39	42	46	49	53	57	59	61	63
50	30		34	38	42	45	49	53	55	59	61
	10		31	34	38	42	46	50	53	56	59
	30	20	35	38	41	44	47	50	51	54	55
30	30		32	34	37	41	44	47	49	52	53
	10		29	31	35	38	41	45	47	50	52
	0	0	0	25	26	29	31	34	36	38	40

CIBS Standard Presentation

Multiply by each Service Correction Factor

Service Correction Factors

	40W 1200mm	65W 1500mm	75W 1800mm	125W 2400mm
Lamp Factor	1.00	1.00	1.00	0.97
Colour 80 Factor	1.00	1.00	1.00	1.00
Ballast Lumen Factor	1.01	0.96	0.96	0.99

Utilization Factors UF (F) for SHR NOM

Room Reflectances			Room Index								
C	W	F	0.75	1	1.25	1.5	2	2.5	3	4	5
70	50	20	41	46	51	55	60	63	66	69	71
	30		36	41	46	50	55	59	62	66	68
	10		32	37	42	45	51	56	59	63	66
	50	20	35	39	42	45	49	52	54	56	58
50	30		31	35	38	41	46	49	51	54	56
	10		28	32	35	39	43	46	49	52	54
	30	20	29	32	34	36	39	41	42	44	46
30	30		26	29	32	34	37	39	41	43	44
	10		24	27	29	32	35	38	39	42	43
	0	0	0	18	19	20	22	24	25	26	27

CIBS Standard Presentation

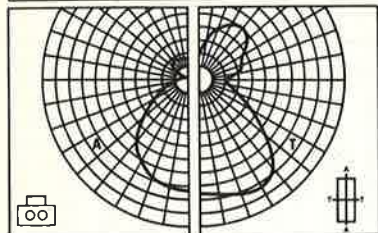
Multiply by each Service Correction Factor

FEATURE PRISMATIC CONTROLLERS

PHOTOMETRIC DATA (contd.)

FEATURE 2 LAMP

WITH WIDE PRISMATIC CONTROLLER
Mounting: SUSPENDED



Nadir Intensity 157cd/1000 total lm
 Multiply by each Service Corr Factor
 CIE Flux Number 243946

SHR MAX (Square) 1.84 (1.75 NOM)
 SHR MAX TR (Transverse, end-end) 2.14

ULORL	0.30	Multiply by each Service Correction Factor
DLORL	0.49	
LORL	0.79	

Glare Data (CIBS)

Flux Fractions Ratio	0.61		
ACG Classification	ACG5		
Glare BZ (RI 2.5, SHR = NOM)	BZ4		
Luminous Areas (sq cm)			
40W	65W	75W	125W
1987	2467	2893	3867

Measured: BS 5225 Part 1 1975

Calculated: CIBS TM 5 and TR 10

Test No: A621 Dated: 76.09.03

Service Correction Factors

	40W 1200mm	65W 1500mm	75W 1800mm	125W 2400mm
Lamp Factor	1.00	1.00	1.00	0.97
Colour 80 Factor	1.02	1.02	1.02	1.02
Ballast Lumen Factor	1.01	0.96	0.98	0.99

Utilization Factors UF (F) for SHR NOM

Room Reflectances	Room Index											
	C	W	F	0.75	1	1.25	1.5	2	2.5	3	4	5
70	50	20		43	48	52	56	61	64	66	69	71
	30			38	42	47	51	56	60	62	66	69
	10			34	38	43	47	53	57	59	63	66
50	50	20		39	43	46	50	54	56	58	61	62
	30			35	39	42	46	50	53	55	58	60
	10			32	35	39	43	47	51	53	56	59
30	50	20		35	38	41	44	47	49	51	53	54
	30			32	35	38	41	45	47	49	51	53
	10			30	32	36	39	43	45	47	50	52
0	0	0		26	27	30	32	35	37	38	40	41

CIBS Standard Presentation

Multiply by each Service Correction Factor

ORDERING DATA

Description	Catalogue Nos.	
	Batten only	Controller assembly only
1 x 40W 1200mm (4ft) narrow controller	FSQ4	PC4
1 x 40W 1200mm (4ft) wide controller	FSO4	PC24
2 x 40W 1200mm (4ft) wide controller	FSQ24	PC24
1 x 65W 1500mm (5ft) narrow controller	FSQ5	PC5
1 x 65W 1500mm (5ft) wide controller	FSQ5	PC25
2 x 65W 1500mm (5ft) wide controller	FSQ25	PC25
1 x 75W 1800mm (6ft) narrow controller	FSQ675	PC6
1 x 75W 1800mm (6ft) wide controller	FSQ675	PC26
2 x 75W 1800mm (6ft) wide controller	FSQ2675	PC26
1 x 125W 2400mm (8ft) narrow controller	FSQ8E	PC8
1 x 125W 2400mm (8ft) wide controller	FSQ8E	PC28
2 x 125W 2400mm (8ft) wide controller	FSQ28E	PC28

Associated accessories-

Controller coupler (narrow) (1 required per luminaire)

Controller coupler (wide) (1 required per luminaire)

Cat. No.

DC1

DC2

Spares:

Lampholder assembly

A7673

Grey controller end cap (narrow) (2 required per luminaire)

A8023

Grey controller end cap (wide) (2 required per luminaire)

A8024

White batten end cap and clips (1 lamp) (2 required per luminaire)

FP494

White batten end cap and clips (2 lamp) (2 required per luminaire)

FP495

Please order in the form given in the following example, in multiples of the packing quantity:

50 Philips Feature battens FSQ5
 50 Philips controller attachments PC25
 50 controller couplers DC2.

All Feature circuits are starterless or electronic start.
 Lamps should be ordered separately.

Packing:

Controllers: Two per carton.

Controller couplers:

Ten per carton (narrow)

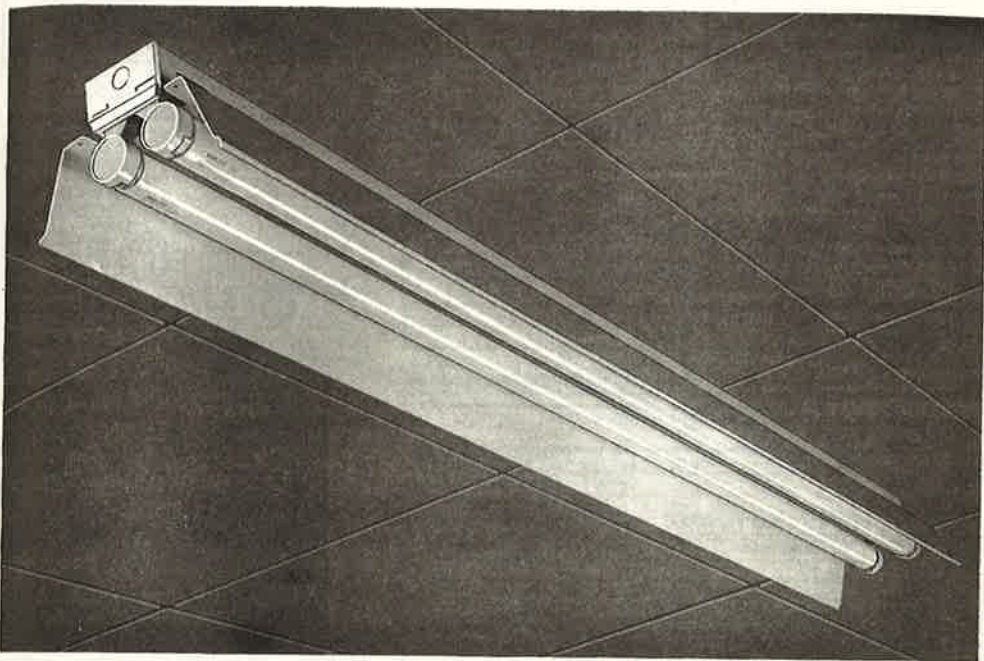
Five per carton (wide).

Replacement end caps: Packed to order.

Made in UK

FEATURE Trough Reflectors

Including information on optional
wire guards.



The Durawhite stoved open-ended trough reflectors are easily fitted to the high-quality Feature battens. One width fits both one- and two-lamp versions. Slots give a small amount of upward light, and clips are available to make a neat join between reflectors or battens mounted end-to-end.

Optional wire guards are made from stout galvanised steel wire.

RANGE

Trough reflectors are available to fit one- and two-lamp versions of the Feature range in sizes 1200mm (4ft), 1500mm (5ft), 1800mm (6ft) and 2400mm (8ft).

APPLICATIONS

For use in normal indoor applications of an industrial or utility nature, such as:

- Factories
- Workshops and repair areas
- Instrument reading areas
- Stock and store rooms.

The wire guard provides additional protection in areas where the lamp may be exposed to damage.

FLUORESCENT LUMINAIRE

To reorder this Data Sheet quote

PL 1720/5

Issued 7/83

Replaces PL 1720/4

FEATURE TROUGH REFLECTORS – FLUORESCENT LUMINAIRE

FEATURES

- High-quality Durawhite stoved finish for high reflectance and long service.
- Keyhole slot fixing for easy attachment, with detent for positive location once the fixing screws have been tightened.
- Upward light slots to reduce 'tunnel' effect.
- Optional clips to give a simple, light-tight seal between reflectors of battens mounted end-to-end. (Type RJ2).
- Optional wireguards for additional protection of lamp.
- 125W versions of Feature electronic start.

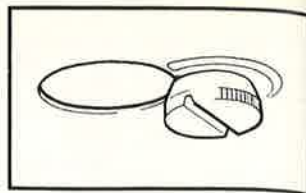
MATERIALS & FINISH

Reflector: Sheet steel, Durawhite stoved finish.

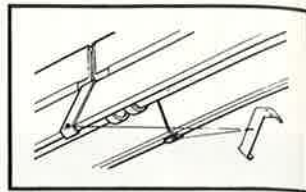
Reflector joining clip: Sheet steel, Durawhite stoved finish.

Wireguard: Mild steel wire, zinc plated.

Wireguard fixing bracket: Sheet steel, Durawhite stoved finish.

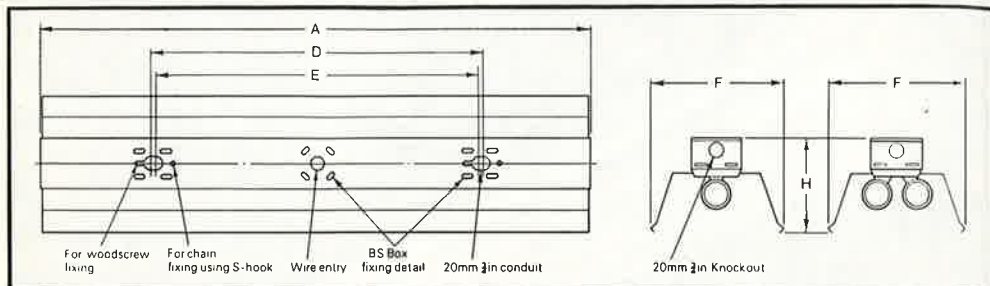


Key slot fitting

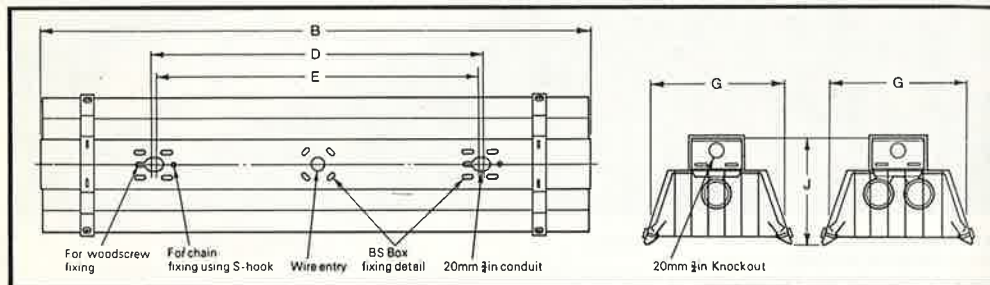


Type RJ2 clip

Reflector



Reflector and Wireguard



DIMENSIONS & WEIGHTS

Batten only	Catalogue numbers		Wire guard only	Weight with lamp(s) & reflector (kg/lb)	Weight with lamp(s), reflector & wire guard (kg/lb)	Overall length		Fixing centres (mm/in.) D/E
	Slotted open-end reflector only	FR				With reflector (mm/in.) A	With reflector & wire guard (mm/in.) B	
FSQ4	FR4	—	—	5-3/11-7	—	1234/48-6	—	600/24
FSQ24	FR4	—	—	7-7/16-9	—	1234/48-6	—	600/24
FSQ5	FR5	G5	—	6-7/14-8	8-4/18-5	1534/60-4	1549/60-9	600/24
FSQ25	FR5	G5	—	9-2/20-3	10-5/23-1	1534/60-4	1549/60-9	600/24
FSQ675	FR6	G6	—	7-5/16-5	9-3/20-5	1800/71	1815/71-5	600/24
FSQ2675	FR6	G6	—	10-0/22-0	11-4/25-1	1800/71	1815/71-5	600/24
FSQ8E	FR8	G8	—	11-2/24-7	13-6/29-9	2409/95	2424/95-5	1200/48
FSQ28E	FR8	G8	—	15-9/35-2	18-3/40-26	2409/95	2424/95-5	1200/48

Width with reflector (one or two lamps) F: 190/7-48

Width with reflector and wireguard (one or two lamps) G: 223/8-78

Depth with reflector H: 132/5-20

Depth with reflector and wireguard J: 147/5-78

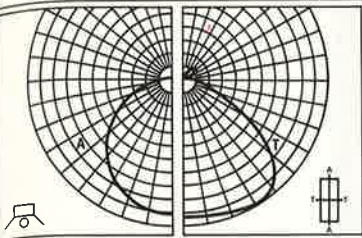
FEATURE TROUGH REFLECTORS – FLUORESCENT LUMINAIRE

PHOTOMETRIC DATA

FEATURE 1 LAMP

WITH REFLECTOR SLOTTED TROUGH

Mounting: SUSPENDED



Nadir Intensity 235cd/1000 total lm
Multiply by each Service Corr Factor
CIE Flux Number

356276

SHR MAX (Square) 1.92 (1.75 NOM)
SHR MAX TR (Transverse, end-end) 2.27

ULORL 0.05
DLORL 0.79
LORL 0.84
Multiply by each Service Correction Factor

Glare Data (CIBS)

Flux Fractions Ratio 0.06
ACG Classification ACG1
Glare BZ (RI 2.5, SHR = NOM) BZ4

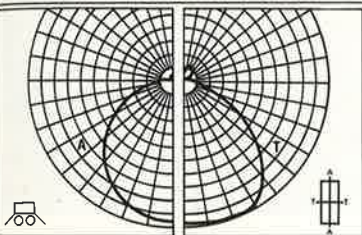
Luminous Areas (sq cm)
40W 65W 75W 125W
2200 2750 3300 4400

Measured: BS 5225 Part 1 1975
Calculated: CIBS TM 5 and TR 10
Test No: A614 Dated: 76.08.26

FEATURE 2 LAMP

WITH REFLECTOR SLOTTED TROUGH

Mounting: SUSPENDED



Nadir Intensity 245cd/1000 total lm
Multiply by each Service Corr Factor
CIE Flux Number

356072

SHR MAX (Square) 1.76 (1.75 NOM)
SHR MAX TR (Transverse, end-end) 1.99

ULORL 0.08
DLORL 0.74
LORL 0.82
Multiply by each Service Correction Factor

Glare Data (CIBS)

Flux Fractions Ratio 0.11
ACG Classification ACG1
Glare BZ (RI 2.5, SHR = NOM) BZ4

Luminous Areas (sq cm)
40W 65W 75W 125W
2000 2750 3300 4400

Measured: BS 5225 Part 1 1975
Calculated: CIBS TM 5 and TR 10
Test No: A618 Dated: 77.09.01

Service Correction Factors

	40W 1200mm	65W 1500mm	75W 1800mm	125W 2400mm
Lamp Factor	1.00	1.00	1.00	0.97
Colour 80 Factor	1.00	1.00	1.00	1.00
Ballast Lumen Factor	1.01	0.96	0.98	0.99

Utilization Factors UF (F) for SHR NOM

Room Reflectances			Room Index								
C	W	F	0.75	1	1.25	1.5	2	2.5	3	4	5
70	50	20	52	57	63	67	73	76	79	83	85
	30		46	51	57	61	68	72	76	80	82
	10		42	47	52	57	64	68	72	77	80
50	50	20	51	55	60	64	69	73	76	79	81
	30		45	50	55	59	65	69	72	76	79
	10		42	46	51	55	62	66	70	73	76
30	50	20	49	53	57	61	66	69	72	75	77
	30		44	48	53	57	63	66	69	73	75
	10		41	45	50	54	60	64	67	71	73
0	0	0	39	42	47	51	56	60	63	66	68

CIBS Standard Presentation

Multiply by each Service Correction Factor

Service Correction Factors

	40W 1200mm	65W 1500mm	75W 1800mm	125W 2400mm
Lamp Factor	1.00	1.00	1.00	0.97
Colour 80 Factor	1.00	1.00	1.00	1.00
Ballast Lumen Factor	1.01	0.96	0.98	0.99

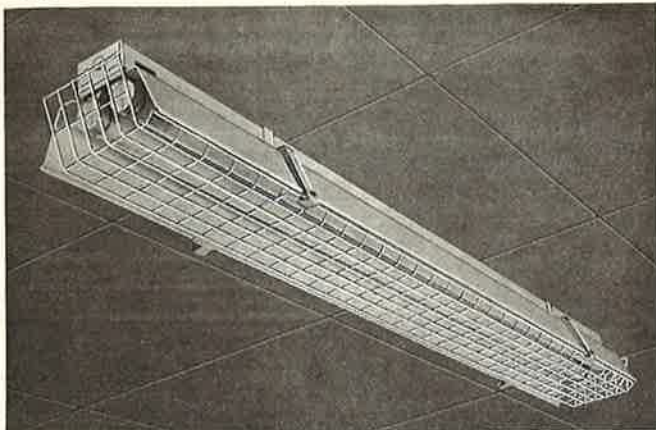
Utilization Factors UF (F) for SHR NOM

Room Reflectances			Room Index								
C	W	F	0.75	1	1.25	1.5	2	2.5	3	4	5
70	50	20	52	56	61	65	71	75	77	80	83
	30		47	50	56	60	67	70	73	77	80
	10		43	46	52	56	63	67	70	75	78
50	50	20	50	54	58	62	67	70	73	76	78
	30		45	49	54	58	64	67	70	73	76
	10		42	45	50	54	61	64	67	71	74
30	50	20	48	51	56	59	64	67	69	71	73
	30		44	47	52	56	61	64	68	69	72
	10		41	44	49	53	58	62	64	68	70
0	0	0	39	41	45	49	54	57	59	62	65

CIBS Standard Presentation

Multiply by each Service Correction Factor

FEATURE TROUGH REFLECTORS – FLUORESCENT LUMINAIRE



ORDERING DATA

Description	Batten only	Catalogue numbers	
		Slotted open-end reflector only	* Wire guard only
1 x 40W 1200mm (4ft)	FSQ4	FR4	—
2 x 40W 1200mm (4ft)	FSQ24	FR4	—
1 x 65W 1500mm (5ft)	FSQ5 †	FR5	G5
2 x 65W 1500mm (5ft)	FSQ25 †	FR5	G5
1 x 75W 1800mm (6ft)	FSQ675	FR6	G6
2 x 75W 1800mm (6ft)	FSQ2675	FR6	G6
1 x 125W 2400mm (8ft)	FSQ8E	FR8	G8
2 x 125W 2400mm (8ft)	FSQ28E	FR8	G8
Reflector joining clip (optional)	RJ2 (2 required per join)		

Please order in the form given in the following example, in multiples of the packing quantities:-

- 50 Phillips Feature luminaires FSQ25.
- 50 Phillips slotted open-end reflector FR5.
- 50 Phillips wire guards G5.
- 50 Phillips reflector joining clips RJ2 (optional for end-to-end mounting).

Packing quantities:

- Battens: individually packed.
- Reflectors: 5 per carton.
- Wire guards: 5 per carton.
- Reflector joining clips: packed to order.

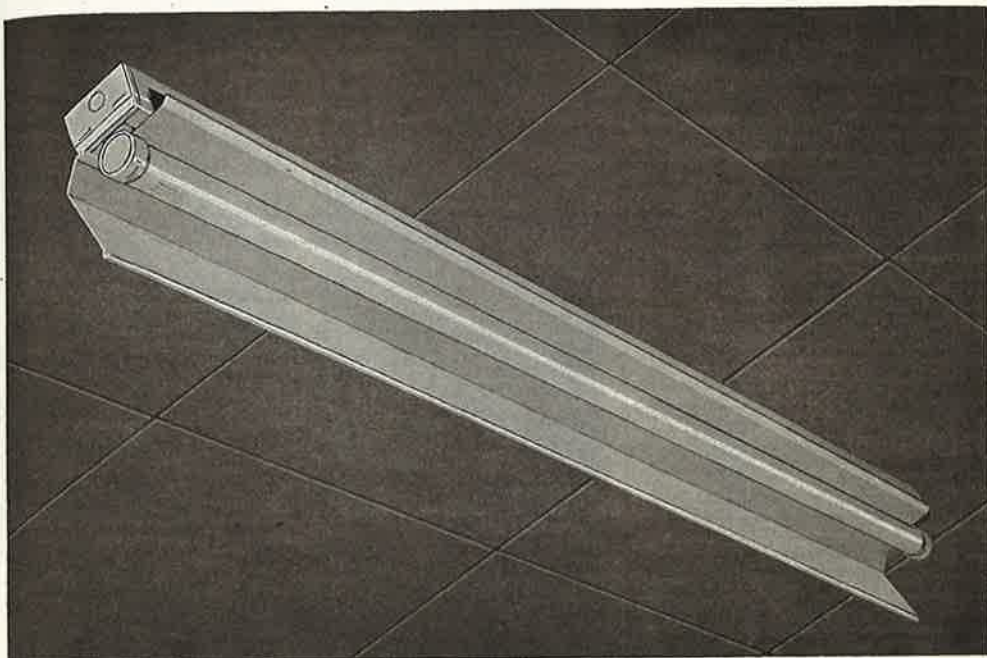
*Aperture size in grid 50 x 25mm.

Wireguards cannot be fitted to switch start Streamlite battens, and cannot be fitted to luminaires mounted end-to-end.

† 1500mm Feature Battens (FSS5D or FSS25D) in dimming versions are available to special order.

Made in UK

FEATURE Angle Reflectors



Durawhite stoved finish open-end angle reflectors are made from sheet steel and are easily fitted to the high-quality Feature battens to give an angled light distribution.

RANGE

Angle reflectors are available to fit the Feature range of battens and packs in sizes 1500mm (5ft), 1800mm (6ft) and 2400mm (8ft). One width fits both one- and two-lamp versions.

APPLICATIONS

For use in normal indoor situations of a commercial or industrial nature where an angled light distribution is required, such as:-

- Lighting for blackboards or wall charts.
- Cabinet type instrument panels.
- Task lighting where general lighting is not adequate.

To reorder this Data Sheet quote

PL 1721/5

Issued 6/83

Replaces PL 1721/4

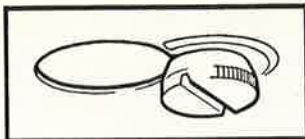
FEATURE ANGLE REFLECTORS

FEATURES

- High-quality Durawhite finish for high reflectance and long service life.
- Keyhole slot fixing for easy attachment, with detent for positive location once the fixing screws have been tightened.
- 125W versions of Feature in electronic start

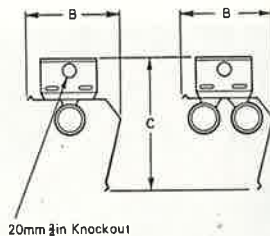
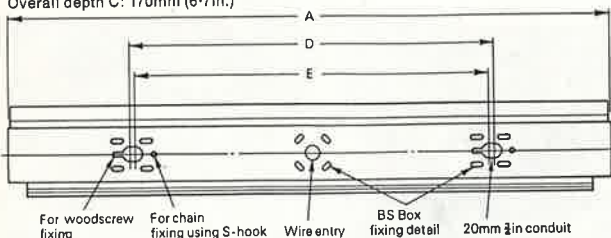
MATERIALS & FINISH

Angle reflectors: Sheet steel, Durawhite stoved finish.



Key slot fitting

All types:
Overall width B: 115mm (4.5in.)
Overall depth C: 170mm (6.7in.)



DIMENSIONS & WEIGHTS

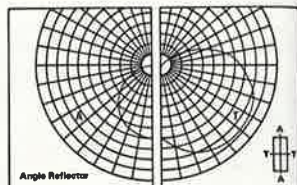
Batten only	Catalogue Nos.		Overall length (A) (mm/in.)	Fixing centres (E/D) (mm/in.)
	Open-end angle reflector only	Weight with lamp(s) & reflector (kg/lb)		
FSQ5	AR5	6.3/13.8	1534/60.4	600/24
FSQ25	AR5	8.7/19.2	1534/60.4	600/24
FSQ675	AR6	6.8/15.1	1800/71	600/24
FSQ2675	AR6	9.4/20.8	1800/71	600/24
FSQ8E	AR8	10.3/22.7	2409/95	1200/48
FSQ28E	AR8	15.0/33.1	2409/95	1200/48

ORDERING DATA

Description	Catalogue Numbers	
	Batten only	Open-end angle reflector only
1 x 65W 1500mm (5ft)	FSQ5	AR5
2 x 65W 1500mm (5ft)	FSQ25	AR5
1 x 75W 1800mm (6ft)	FSQ675	AR6
2 x 75W 1800mm (6ft)	FSQ2675	AR6
1 x 125W 2400mm (8ft)	FSQ8E	AR8
2 x 125W 2400mm (8ft)	FSQ28E	AR8

Please order in the form given in the following example, in multiples of the pack size:-
50 Phillips Feature luminaires FSQ25.
50 Phillips open-end angle reflectors AR5.

POLAR CURVES



Made in UK

GTX 201 & GTX 202

Reflectors for rack lighting

A range of anodised aluminium specular reflectors for attachment to 1500mm (5ft) Streamlite battens, providing a narrow beam of light for energy-effective illumination of high racking.

RANGE

GTX 201/158 – reflector for Streamlite batten with 1 x 58W TLD lamp; beam angle 2 x 16°.

GTX 202/158 – reflector for Streamlite batten with 1 x 58W TLD lamp; beam angle 2 x 32°.

GTX 202/258 – reflector for Streamlite batten with 2 x 58W TLD lamps; beam angle 2 x 35°.

APPLICATIONS

GTX 201/158 is for tall, narrow-aisle racking.

GTX 202/158 and 258 are for work areas, and in stores with medium/low racking.

FEATURES

- Controlled light distribution avoids waste light at high angles.
- High peak beam intensity gives illumination on lower levels of storage rack, where fast moving goods are stored.
- Large surface area of reflector provides low brightness and therefore comfortable working conditions.
- White 35 fluorescent lamps give acceptable colour in non critical areas. Colour 80 Series lamps can give even greater energy savings (or higher illuminance) and can be used in colour critical areas.
- In an high rack aisle under 3 metres wide, GTX201 158 reflector using only 1 x 58W lamp can provide higher illuminance (on the floor) than a 2 x 70W batten with a conventional reflector saving 102 watts per point.
- Because of the quick re-starting of fluorescent lamps GTX reflector luminaires are suitable for use with energy management systems.

FLUORESCENT LUMINAIRE

To reorder this Data Sheet quote

PL 3059

Issued 8.84

NEW



GTX 201 & GTX 202

FIXING AND WIRING

Battens

Please refer to new Streamlite data sheet PL-3010 for fixing details of battens.

Battens may touch when mounted in line. Wiring instructions are contained in data sheet PL-3010.

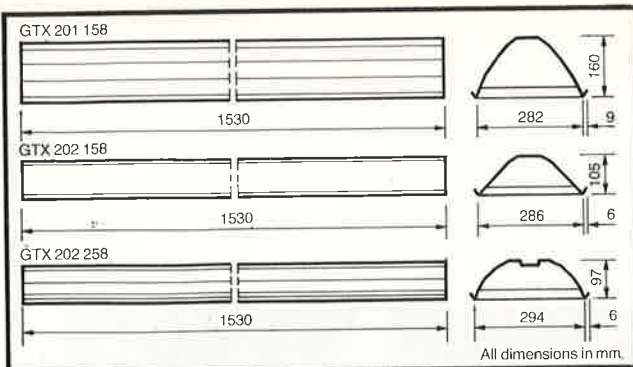
Mounting of reflector to batten

1. Slacken screws in batten coverplate.
2. Engage slip fix plates supplied and tighten screws.
3. Fit cross brackets supplied and bend over side tabs to fix.

MATERIALS & FINISH

Reflector: Anodised aluminium. Note: protected in transit by a tinted plastic film, which should be removed.

DIMENSIONS



PHOTOMETRIC DATA

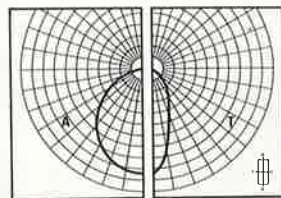
Rack Lighting using GTX201/158 and P5N. For aisle widths up to 3 metres. Lamp Lumens 4500. For higher output lamps (eg. 80 colours) spacing may be reduced pro rata.

For 150 lux average horizontal illuminance at floor level.

Mounting Height metres	Luminaire Spacing (centre to centre) metres	Minimum Run Length metres
4	6.00	12.0
5	4.80	14.4
6	4.00	16.0
7	3.40	17.0
8	3.00	18.0
9	2.70	21.6
10	2.40	24.0
11	2.20	26.4
12	2.00	28.0
13	1.90	30.4
14	1.70	32.3
15	1.60	35.2

For 300 lux average horizontal illuminance at floor level.

Mounting Height metres	Luminaire Spacing (centre to centre) metres	Minimum Run Length metres
4	3.00	9.2
5	2.40	11.6
6	2.00	13.9
7	1.71	16.2



Peak beam intensity 752 cd/1000 lumens

* Minimum run length is the shortest length of run for which the calculation of the luminaire spacing is valid.

The average horizontal illuminance has been taken along the centre line, over a distance equal to the luminaire spacing and positioned one quarter of the way along the aisle length.

A light loss factor (maintenance factor) of 0.8 has been applied in the calculations.

Beam angles Catalogue No.	Beam angle	Lamp type
GTX 201/158	2 x 16°	1 x TLD 58W
GTX 202/158	2 x 32°	1 x TLD58W
GTX 202/258	2 x 35°	2 x TLD 58W

ORDERING DATA

Catalogue No.	New Streamlite batten Cat. No.	Lamp type
GTX 201/158	S5N	1 x TLD 58W/*
GTX 202/158	S5N	1 x TLD 58W/*
GTX 202/258	S25N	2 x TLD 58W/*

* Specify lamp colour required.

Please order in the form given in the following example. Reflectors are individually packed.

Reflector: - Made in Holland

10 Philips New Streamlite battens S5N

10 Philips reflectors GTX 201/158

Lamps should be ordered separately. (Packing quantity 25).

TCS 312

Surface-mounted luminaires – bodies for use with interchangeable lighting attachments.

A range of surface-mounted luminaires of attractive design and advanced optical performance, for use in a wide range of lighting schemes. A choice of interchangeable lighting attachments is available, similar to the attachments for the TBS 300 range of recessed luminaires for suspended ceilings.

RANGE

Bodies

TCS 312/418 – Body for 4 x 18W 600mm TLD lamps; switchstart control gear.

TCS 312/232HF – Body for 2 x 32W 1200mm TLD HF lamps; high-frequency control gear.

TCS 312/136 – Body for 1 x 36W 1200mm TLD lamp; switchstart control gear.

TCS 312/236 – Body for 2 x 36W 1200mm TLD lamps; switchstart control gear.

TCS 312/336 – Body for 3 x 36W 1200mm TLD lamps; switchstart control gear.

TCS 312/250HF – Body for 2 x 50W 1500mm TLD HF lamps; high frequency control gear.

TCS 312/158 – Body for 1 x 58W 1500mm TLD lamp; switchstart control gear.

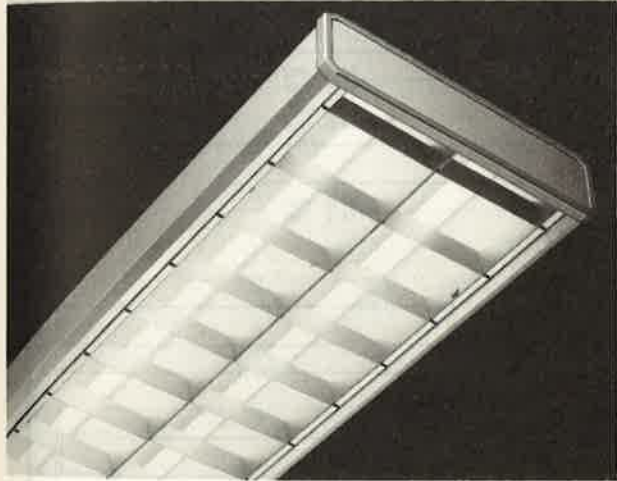
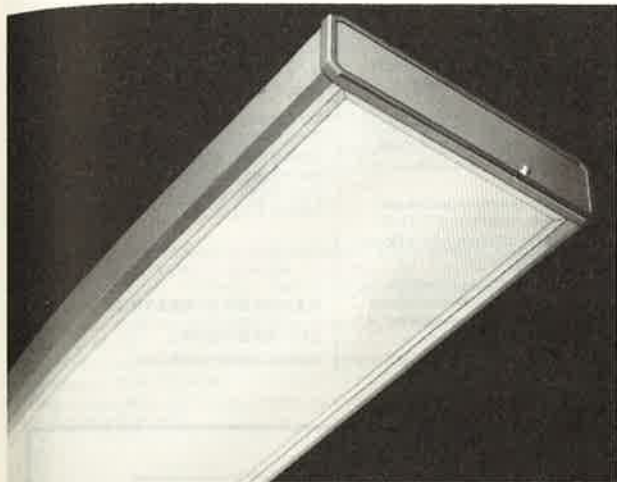
TCS 312/258 – Body for 2 x 58W 1500mm TLD lamps; switchstart control gear.

TCS 312/358 – Body for 3 x 58W 1500mm TLD lamps; switchstart control gear.

Lighting attachments

Prismatic controllers – See Data Sheet PL 3070

Mirror controllers – See Data Sheet PL 3071



To reorder this Data Sheet quote

PL 3069

Issued 9 B4

NEW

TCS 312 – SURFACE MOUNTED LUMINAIRES

APPLICATIONS

For most indoor applications, such as:

- Executive offices
- General offices
- Individual offices
- Banking halls
- Shops and department stores

Fitted with the M5 controller, the luminaire is especially suitable for use in modern electronic offices equipped with VDUs (not available for 3-lamp bodies).

FEATURES

- Attractive design enhances prestigious commercial decor.
- Framed end caps improve appearance and eliminate light leakage.
- Interchangeable controllers permit the same body type to be specified throughout a building. Controllers can later be up-graded, for example, prismatic can be replaced by mirror (where spacing suitable).
- Controller hangs on suspension cords for hands-free relamping.
- Slipfix mounting for simple, one-man installation.
- ▽ symbol – can be mounted direct on to suitable wooden surfaces.
- High-frequency argon-filled TLD lamps with high-frequency control gear can reduce energy consumption by up to 30 per cent compared with conventional luminaires.
- High-frequency control gear eliminates mains flicker and mains hum and gives fast, reliable starting even in cold conditions.
- High-frequency luminaire bodies are supplied complete with Philips TLD HF Colour 84 lamps to combine high efficacy with good colour rendering.
- Switchstart bodies are designed for PowerSlimmer TLD krypton-filled lamps which reduce energy consumption by around 8 per cent compared with conventional lamps.

MATERIALS AND FINISH

Body: Sheet steel, white stove-enamel finish.

Control gear: High-frequency – Philips HF ballast (one ballast for two lamps). Switchstart – Low-loss ballasts with PF capacitor and starters.

Terminal block: Push-wire type; capacity for 2.5mm² cable in each way.

Lampholders: Standard bi-pin rotor type; white urea mouldings.

SPECIFICATION

■ Type compliance with BS 4533 Ordinary Indoor Class I (electrical) – Earth required.

■ Radio interference: Complies with SI 1978 No. 1268: Regulation 6. Suppressed for use in residential areas.

■ ▽ symbol – can be mounted directly to suitable wooden surfaces.

To specify state:-

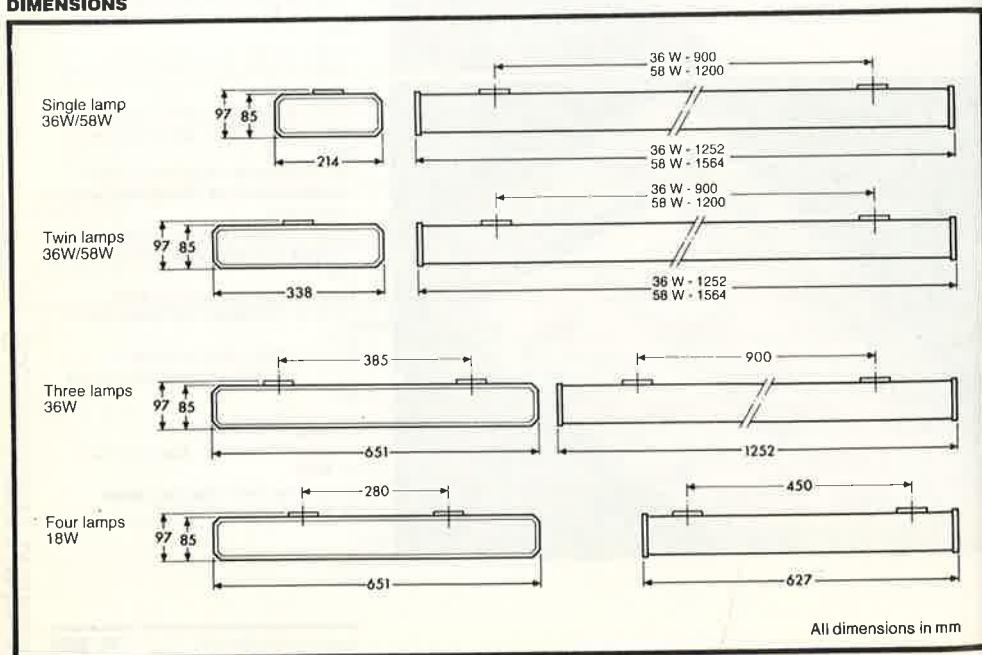
Surface-mounted luminaire of good appearance, with interchangeable controllers and choice of switchstart or high-frequency control gear. Similar to Philips TCS 312.

RANGE OF OPERATION

240V 50Hz supplies.

Normal indoor conditions.

DIMENSIONS



TCS 312 – SURFACE MOUNTED LUMINAIRES

1

DIMENSIONS AND ELECTRICAL DATA

Catalogue No.	Rating	Ballast	Starter	Circuit Watts (running)	Circuit current (amperes)
TCS 312/418	4 x 18W 600mm	2 x BTP40 L25	4 x S2	92	0.46
TCS 312/232HF	2 x 32W 1200mm	1 x BHF232	None	72	0.34
TCS 312/236	2 x 36W 1200mm	2 x BTP40 L25	2 x S10	92	0.46
TCS 312/336	3 x 36W 1200mm	3 x BTP40 L25	3 x S10	138	0.69
TCS 312/158	1 x 58W 1500mm	1 x BTP65 L25	1 x S10	70	0.34
TCS 312/250HF	2 x 50W 1500mm	1 x BHF250	None	111	0.52
TCS 312/258	2 x 58W 1500mm	2 x BTP65 L25	2 x S10	140	0.70
TCS 312/358	3 x 58W 1500mm	3 x BTP65 L25	3 x S10	210	1.04

ORDERING DATA

Catalogue No.	Rating	Description
TCS 312/418	4 x 18W 600mm	Switchstart control gear for TLD lamps.
TCS 312/232HF	2 x 32W 1200mm	High-frequency; supplied with lamps.
TCS 312/136	1 x 36W 1200mm	Switchstart control gear for TLD lamps.
TCS 312/236	2 x 36W 1200mm	Switchstart control gear for TLD lamps.
TCS 312/336	3 x 36W 1200mm	Switchstart control gear for TLD lamps.
TCS 312/250HF	2 x 50W 1500mm	High-frequency; supplied with lamps.
TCS 312/158	1 x 58W 1500mm	Switchstart control gear for TLD lamps.
TCS 312/258	2 x 58W 1500mm	Switchstart control gear for TLD lamps.
TCS 312/358	3 x 58W 1500mm	Switchstart control gear for TLD lamps.

Notes:

High-frequency luminaires are supplied complete with TLD Colour 84HF argon-filled lamps, and replacement lamps must be the same type. These lamps must not be used in luminaires not fitted with Philips HF control gear. TLD krypton-filled lamps must be ordered separately for switchstart luminaires.

Please order in the form given in the following example, in multiples of the packing quantity (bodies single, lamps 25).

25 Philips surface-mounting luminaire bodies TCS 312/336.

75 Philips lamps TLD 36W/84*

* Philips Colour 80 Series triphosphor lamps are recommended for use in these luminaires – Colour 84 (cool); Colour 83 (warm).

TCS 312 – SURFACE MOUNTED LUMINAIRES

Made in Holland.



GBS 312

Acrylic prismatic controllers –
for TCS 312 surface-mounted bodies.

A range of acrylic prismatic controllers for use with the TCS 312 range of energy-saving surface-mounting bodies.

RANGE

PS3 – Linsomatic panel giving WideSpread distribution for good illumination of vertical surfaces. Suitable for open-plan offices and shops.

GBS 312/418/PS3 – for TCS 312/418 body.

GBS 312/236/PS3 – for TCS 312/232HF and TCS 312/236 bodies.

GBS 312/336/PS3 – for TCS 312/336 body.

GBS 312/258/PS3 – for TCS 312/250HF and TCS 312/258 bodies.

GBS 312/358/PS3 – for TCS 312/358 body.

P3 – Prismatic controller panel giving normal distribution for general-purpose use.

GBS 312/418/P3 – for TCS 312/418 body.

GBS 312/136/P3 – for TCS 312/136 body.

GBS 312/236/P3 – for TCS 312/232HF and TCS 312/236 bodies.

GBS 312/336/P3 – for TCS 312/336 body.

GBS 312/158/P3 – for TCS 312/158 body.

GBS 312/258/P3 – for TCS 312/250HF and TCS 312/258 bodies.

GBS 312/358/P3 – for TCS 312/358 body.

Mirror controllers: A range of interchangeable mirror controllers for the TCS 312 body range is also available – see Data Sheet PL 3071
Details of TCS 312 bodies are on Data Sheet PL 3069

To reorder this Data Sheet quote

PL 3070

Issued 9.84

NEW

FLUORESCENT LUMINAIRE

GBS 312 – ACRYLIC PRISMATIC CONTROLLERS

APPLICATIONS

For most indoor applications:

- General offices
- Individual offices
- Corridors.
- Banking halls
- Shops and department stores

FEATURES

- Non-yellowing acrylic panel ensures high LOR with good maintenance.
- P3 panels have external pyramid prisms to give efficient light control.
- PS3 panels are Linsomatic, giving WideSpread distribution which permits wider spacing between rows of luminaires. This gives economic, aesthetic and lighting benefits.
- All types are interchangeable with other attachments in the range provided spacing is suitable; the same body type can be specified throughout a building, stockholding and ordering are simplified and prismatic controllers can be upgraded to mirror controllers during later refurbishment.


MATERIALS AND FINISH

Frame: Aluminium, stove-enamelled white, with light-proof framed end caps.

Controller panel: Acrylic

SPECIFICATION

(Complete luminaire)

- Type compliance with BS 4533 2.2 Ordinary Indoor Class I (electrical) – earth required.
-  symbol – can be mounted directly to suitable wooden surfaces.
- Radio interference: Complies with SI 1978 No. 1268: Regulation 6. Suppressed for use in residential areas.

To specify state:-

Surface-mounted luminaire of good appearance, with interchangeable lighting controllers and choice of switchstart or high-frequency control gear. Similar to Philips TCS 312.

RANGE OF OPERATION

240V 50Hz supplies.

Normal indoor conditions:

ORDERING DATA

Catalogue Nos.	
Controller	Body
GBS 312/418/PS3	TCS 312/418
GBS 312/418/P3	
GBS 312/136/P3	TCS 312/136
GBS 312/236/PS3	TCS 312/236
GBS 312/236/P3	
GBS 312/336/PS3	TCS 312/336
GBS 312/336/P3	
GBS 312/158/P3	TCS 312/158
GBS 312/258/PS3	TCS 312/258
GBS 312/258/P3	
GBS 312/358/PS3	TCS 312/358
GBS 312/358/P3	

Note:

Complete luminaires should be ordered by using this Data Sheet in conjunction with Data Sheet PL 3069 which contains detailed information on pre-wired bodies and suitable lamps for these controllers, including packing quantities for these items.

Mirror controllers are also available – See Data Sheet PL 3071.

Please order in the form given in the following example, in multiples of the packing quantities:

25 Philips surface-mounting luminaires bodies TCS 312/336.

25 Acrylic controller attachments GBS 312/336/PS3.

75 Philips lamps TLD 36W/84.

Philips Colour 80 Series triphosphor lamps are recommended for use in these luminaires – Colour 84 (cool); Colour 83 (warm).

Luminaire bodies with the suffix HF are fitted with high-frequency control gear and are supplied complete with Philips TLD HF argon-filled lamps with Colour 84 phosphors. Replacement lamps must be of the same HF type.

GBS 312 – ACRYLIC PRISMATIC CONTROLLERS

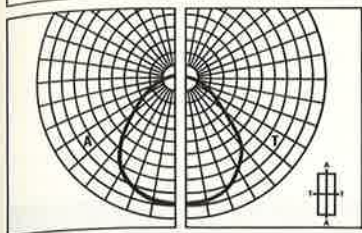
PHOTOMETRIC DATA

TCS 312

TWIN LAMP

P3 PRISMATIC PANEL

Mounting: SURFACE



Nadir Intensity 269cd/1000lm
CIE Flux Code 63 91 99 100 58

SHR MAX (Square) 1.54 (1.50 NOM)
SHR MAX TR (Continuous Rows) 1.69

ULORL 0.00 Multiply by
DLORL 0.58 each Service
LORL 0.58 Correction Factor

Glare Data (CIBS)

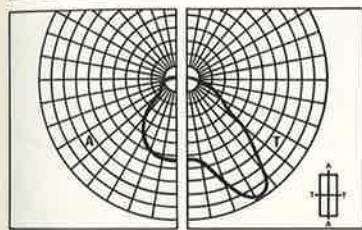
Flux Fraction Ratio 0.00
ACG Classification ACG0
Glare BZ (RI 2.5, SHR NOM) BZ2
Luminous Area (sq cm)
32/36W 50/58W
4100 5100

TCS 312

TWIN LAMP

PS3 PRISMATIC PANEL

Mounting: SURFACE



Nadir Intensity 176cd/1000lm
CIE Flux Code 55 85 95 100 58

SHR MAX (Square) 1.37 (1.25 NOM)
SHR MAX TR (Continuous Rows) 1.99

ULORL 0.00 Multiply by
DLORL 0.58 each Service
LORL 0.58 Correction Factor

Glare Data (CIBS)

Flux Fraction Ratio 0.00
ACG Classification ACG6
Glare BZ (RI 2.5, SHR NOM) BZ4
Luminous Area (sq cm)
32/36W 50/58W
4100 5100

Service Correction Factors

	32W/50W	36W/58W			
Length Factor	1.00	1.00			
Colours 80 Factor	1.01	1.01			
HF Factor	1.01	1.00			
Ballast Lumen Factor	1.00	1.00			

Utilization Factors UF (F) for SHR NOM

Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	42	47	50	53	56	58	60	61	63
	30		39	43	47	50	53	56	57	60	61
	10		36	41	44	47	51	54	56	58	60
50	50	20	41	46	49	51	54	56	57	59	60
	30		38	42	46	49	52	54	56	58	59
	10		36	40	44	47	50	52	54	57	58
30	50	20	41	45	48	50	53	54	56	57	58
	30		38	42	45	48	51	53	54	56	57
	10		36	40	43	46	49	51	53	55	56
0	0	0	35	39	42	44	47	49	51	52	54

Multiply by each Service Correction Factor

Test No. C963 Dated: 84.09.05
Measured in accordance with BS 5225
Calculations Based on CIBS TM5 and TR10

Service Correction Factors

	32W/50W	36W/58W			
Length Factor	1.00	1.00			
Colours 80 Factor	1.01	1.01			
HF Factor	1.01	1.00			
Ballast Lumen Factor	1.00	1.00			

Utilization Factors UF (F) for SHR NOM

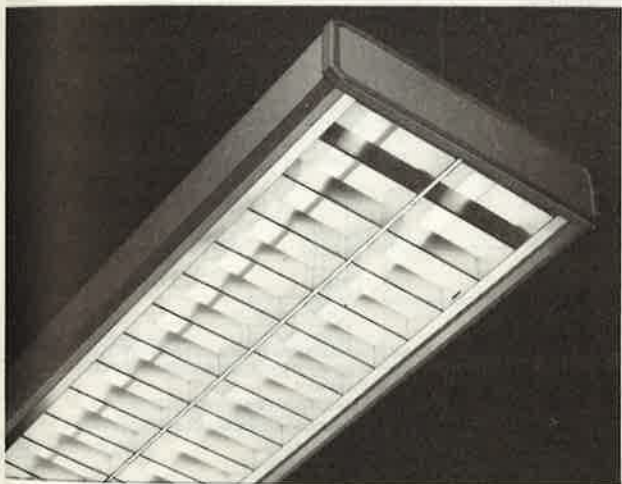
Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	35	41	45	48	52	55	57	59	61
	30		31	37	41	44	49	52	54	57	59
	10		28	34	38	41	46	49	52	55	57
50	50	20	34	40	44	47	50	53	54	57	58
	30		30	36	40	43	47	50	52	55	57
	10		28	34	38	41	45	48	50	53	55
30	50	20	33	39	43	45	49	51	53	55	56
	30		30	36	40	42	46	49	51	53	55
	10		27	33	37	40	44	47	49	52	53
0	0	0	26	32	36	38	42	45	47	49	51

Multiply by each Service Correction Factor

Test No. C964 Dated: 84.09.05
Measured in accordance with BS 5225
Calculations Based on CIBS TM5 and TR10

GBS 312 – ACRYLIC PRISMATIC CONTROLLERS

Made in Holland



GBS 312

Mirror controllers – for TCS 312 surface-mounted bodies.

A range of interchangeable mirror controllers of good appearance and advanced light technical performance, for use with the TCS 312 range of energy-saving surface-mounted bodies.

RANGE

M2 – Faceted mirror controller with profiled cross lamellae, for general-purpose use in offices.

GBS 312/418/M2 – for TCS 312/418 body.

GBS 312/236/M2 – for TCS 312/232HF and TCS 312/236 bodies.

GBS 312/336/M2 – for TCS 312/336 body.

GBS 312/258/M2 – for TCS 312/250HF and TCS 312/258 bodies.

GBS 312/358/M2 – for TCS 312/358 body.

M5 – Parabolic mirror controller with parabolic cross lamellae, with concentrated distribution and sharp cup-off to minimise glare and screen reflectance with VDUs.

GBS 312/418/M5 – for TCS 312/418 body.

GBS 312/136/M5 – for TCS 312/158 body.

GBS 312/236/M5 – for TCS 312/232HF and TCS 312/236 bodies.

GBS 312/158/M5 – for TCS 312/158 body.

GBS 312/258/M5 – for TCS 312/250HF and TCS 312/258 bodies.

GBS 312 – MIRROR CONTROLLERS

Range continued

M6 – Faceted mirror controller with WideSpread distribution and illuminance of vertical surfaces, for shop lighting.

GBS 312/418/M6 – for TCS 312/418 body.

GBS 312/136/M6 – for TCS 312/136 body.

GBS 312/236/M6 – for TCS 312/232HF and TCS 312/236 bodies.

GBS 312/158/M6 – for TCS 312/158 body.

GBS 312/258/M6 – for TCS 312/250HF and TCS 312/258 bodies.

Prismatic controllers: A range of prismatic controllers for the TCS 312 body range is also available – See Data Sheet PL 3070.

Details of TCS 312 bodies are on Data Sheet PL 3069.

APPLICATIONS

For most indoor applications:

- Executive offices
- General offices
- Banking halls
- Shops and department stores
- Offices equipped with visual display units.

FEATURES

■ Mirror-finish reflectors with anti-glare louvres provide exceptionally high LOR, low brightness for visual comfort and a prestige appearance.

■ Type GBS 312/M2 provides dispersive distribution for general-purpose applications.

■ Type GBS 312/M5 combines sharp cut-off and concentrated distribution to reduce glare and screen reflections of visual display units.

■ Type GBS 312/M6 provides WideSpread distribution to improve the lighting of vertical surfaces, such as goods or displays in shops.

■ All types are interchangeable with other attachments in the range; the same body type can be specified throughout a building, stockholding and ordering are simplified. Provided spacing is suitable controllers can be up-graded during later refurbishment (for example, prismatic controllers can be replaced with mirror controllers).

MATERIALS & FINISH


Frame: Aluminium, stove-enamelled white, with light-proof framed end caps.

Reflectors: Aluminium, polished to mirror finish and anodised.

Lamellae Louvres: Aluminium, polished or white stove enamel finish.

SPECIFICATION (complete luminaire)

■ Type compliance with BS 4533 2.2 Ordinary Indoor Class I (electrical) – Earth required.

■  symbol – can be mounted directly to suitable wooden surfaces.

■ Radio interference: Complies with SI 1978 No. 1268: Regulation 6. Suppressed for use in residential areas.

To specify state:- Surface-mounted luminaire of good appearance, with interchangeable lighting controllers and choice of switchstart or high-frequency control gear. Similar to Philips TCS 312.

RANGE OF OPERATION

240V 50Hz supplies.

Normal indoor conditions.

ORDERING DATA

Controller	Catalogue Nos.	
		Body
GBS 312/418/M2 GBS 312/418/M5 GBS 312/418/M6		TCS 312/418
GBS 312/136/M5 GBS 312/136/M6		TCS 312/136
GBS 312/236/M2 GBS 312/236/M5 GBS 312/236/M6		TCS 312/236 or TCS 312/232
GBS 312/336/M2		TCS 312/336
GBS 312/158/M5 GBS 312/158/M6		TCS 312/158
GBS 312/258/M2 GBS 312/258/M5 GBS 312/258/M6		TCS 312/258 or TCS 312/250
GBS 312/358/M2		TCS 312/358

Note:

Complete luminaires should be ordered by using this Data Sheet in conjunction with Data Sheet PL 3069, which contains detailed information on pre-wired bodies and suitable lamps for these controllers, including packing quantities for these items.

Acrylic prismatic controllers are available for the complete range. See Data Sheet PL 3070.

Please order in the form given in the following example, in multiples of the packing quantities:

25 Philips surface-mounting luminaires bodies TCS 312/336.

25 Philips mirror controller attachments GBS 312/336/M2.

75 Philips lamps TLD 36W/84.

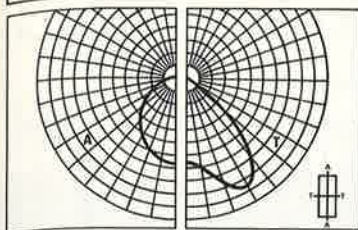
Philips Colour 80 Series triphosphor lamps are recommended for use in these luminaires – Colour 84 (cool); Colour 83 (warm).

Luminaire bodies with the suffix HF are fitted with high-frequency control gear and are supplied complete with Philips TLD HF argon-filled lamps with Colour 84 phosphors. Replacement lamps must be of the same HF type.

GBS 312 – MIRROR CONTROLLERS

PHOTOMETRIC DATA TCS 312 TWIN LAMP

M2 MIRROR
Mounting: SURFACE



Nadir Intensity 244cd/1000lm
CIE Flux Code 60 92 98 100 68

SHR MAX (Square) 1.45 (1.25 NOM)
SHR MAX TR (Continuous Rows) 1.95

ULORL 0.00 Multiply by each Service
DLORL 0.68 Correction Factor
LORL 0.68

Glare Data (CIBS)

Flux Fraction Ratio 0.00
ACG Classification ACG3
Glare BZ (Ri 2.5, SHR NOM) BZ3
Luminous Area (sq cm)
32/36W 50/58W
4100 5100

Service Correction Factors

	32W/50W	36W/58W			
Length Factor	1.00	1.00			
Colours 80 Factor	1.01	1.01			
HF Factor	1.01	1.00			
Ballast Lumen Factor	1.00	1.00			

Utilization Factors UF (F) for SHR NOM

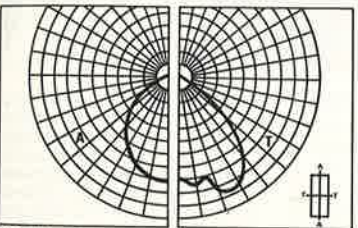
Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	44	51	56	59	64	66	68	71	72
	30		39	47	52	55	60	63	66	69	70
	10		36	43	48	52	57	61	63	67	69
50	50	20	43	50	54	57	61	64	66	68	70
	30		38	46	51	54	59	62	64	66	68
	10		35	43	48	51	56	59	62	65	67
30	50	20	42	49	53	56	60	62	64	66	67
	30		38	45	50	53	57	60	62	64	66
	10		35	42	47	50	55	58	60	63	65
0	0	0	34	41	45	49	53	55	57	60	61

Multiply by each Service Correction Factor

Test No. C966 Dated: 84.09.05
Measured in accordance with BS 5225
Calculations Based on CIBS TM5 and TR10

TCS 312 TWIN LAMP

M5 MIRROR
Mounting: SURFACE



Nadir Intensity 256cd/1000lm
CIE Flux Code 66 98 100 100 60

SHR MAX (Square) 1.66 (1.50 NOM)
SHR MAX TR (Continuous Rows) 1.85

ULORL 0.00 Multiply by each Service
DLORL 0.60 Correction Factor
LORL 0.60

Glare Data (CIBS)

Flux Fraction Ratio 0.00
ACG Classification ACG6
Glare BZ (Ri 2.5, SHR NOM) BZ1
Luminous Area (sq cm)
32/36W 50/58W
4100 5100

Service Correction Factors

	32W/50W	36W/58W			
Length Factor	1.00	1.00			
Colours 80 Factor	1.01	1.01			
HF Factor	1.01	1.00			
Ballast Lumen Factor	1.00	1.00			

Utilization Factors UF (F) for SHR NOM

Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	45	50	54	56	59	61	63	64	66
	30		41	47	50	53	57	59	61	63	64
	10		39	44	48	51	55	57	59	61	63
50	50	20	44	49	52	55	57	59	61	62	63
	30		41	46	50	52	55	57	59	61	62
	10		39	44	47	50	54	56	58	60	61
30	50	20	43	48	51	53	56	57	59	60	61
	30		40	45	49	51	54	56	57	59	60
	10		38	43	47	49	53	55	56	58	59
0	0	0	37	42	45	48	51	53	54	55	56

Multiply by each Service Correction Factor

Test No. C968 Dated: 84.09.05
Measured in accordance with BS 5225
Calculations Based on CIBS TM5 and TR10

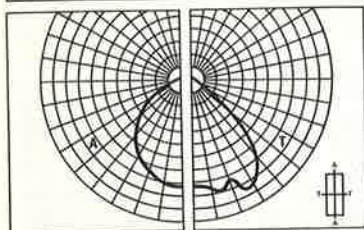
GBS 312 – MIRROR CONTROLLERS

PHOTOMETRIC DATA

TCS 312

SINGLE LAMP

M5 MIRROR	
Mounting:	SURFACE



Nadir Intensity 268cd/1000lm
CIE Flux Code 66 98 100 100 61

SHR MAX	(Square)	1.65 (1.50 NOM)
SHR MAX TR	(Continuous Rows)	1.80

ULORL	0.00	Multiply by each Service Correction Factor
DLORL	0.61	
LORL	0.61	

Glare Data (CIBS)

Flux Fraction Ratio	0.00
ACG Classification	ACGO
Glare BZ (RI 2.5, SHR NOM)	BZ1
Luminous Area (sq cm)	
36W	58W
2100	3100

Service Correction Factors

	36W	58W			
Length Factor	1.00	1.00			
Colours 80 Factor	1.01	1.01			
HF Factor	N/A	N/A			
Ballast Lumen Factor	1.00	1.00			

Utilization Factors UF (F) for SHR NOM

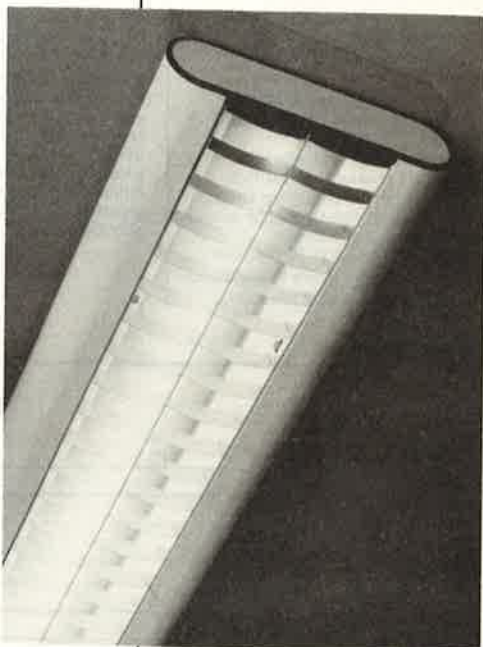
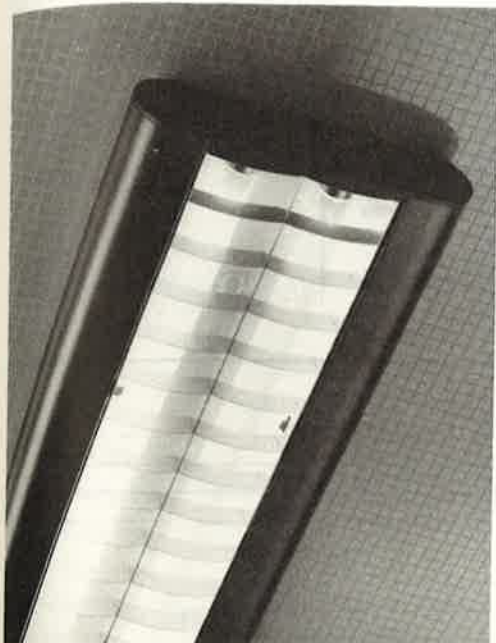
Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	45	50	54	56	60	62	63	65	66
	30		42	47	51	54	57	59	61	63	64
	10		39	45	49	51	55	58	59	62	63
50	50	20	44	49	53	55	58	60	61	62	63
	30		41	46	50	53	56	58	59	61	62
	10		39	44	48	51	54	56	58	60	61
30	50	20	44	48	51	54	56	58	59	60	61
	30		41	46	49	52	55	56	58	59	60
	10		39	44	47	50	53	55	56	58	59
0	0	0	38	42	46	48	51	53	54	56	57

Multiply by each Service Correction Factor

Test No. C967 Dated: 84.09.05
Measured in accordance with BS 5225
Calculations Based on CIBS TM5 and TR10

TCS 605 TCS 607

Surface-mounted luminaires



A range of mirror controller surface-mounted luminaires of slim, elegant design and with advanced optical features, for use in prestigious commercial lighting. Twin-lamp luminaires have symmetrical distribution and are available both with standard switchstart control gear for TLD krypton-filled energy-saving lamps, and with Philips HF high-frequency control gear which, in conjunction with Philips TLD HF lamps, can reduce energy usage by up to 30 per cent. Single-lamp versions have symmetrical or asymmetrical distribution (for corner mounting or wall washing).

RANGE

TCS 605/136 – Luminaire with WideSpread mirror optics. Switchstart gear for 1xTLD 36W 1200mm lamp.

TCS 605/158 – Luminaire with WideSpread mirror optics. Switchstart gear for 1xTLD 58W 1500mm lamp.

TCS 605/236 – Luminaire with WideSpread mirror optics. Switchstart gear for 2xTLD 36W 1200mm lamps.

TCS 605/258 – Luminaire with WideSpread mirror optics. Switchstart gear for 2xTLD 58W 1500mm lamps.

TCS 605/232 – Luminaire with WideSpread mirror optics. High frequency control gear. Supplied with 2xTLD 32W/84 HF 1200mm lamps.

TCS 605/250 – Luminaire with WideSpread mirror optics. High frequency control gear. Supplied with 2xTLD 50W/84HF 1500mm lamps.

TCS 607/136 – Luminaire with mirror system with asymmetrical optics. Switchstart control gear for 1xTLD 36W 1200mm lamp.

TCS 607/158 – Luminaire with mirror system with asymmetrical optics. Switchstart control gear for 1xTLD 58W 1500mm lamp.

Note: All luminaires are available in white or brown finish (suffix W or B).

FLUORESCENT LUMINAIRE

To reorder this Data Sheet quote

PL 3068

Issued 9.84

Replaces

NEW

TCS 605 TCS 607

APPLICATIONS

General commercial use, particularly where elegant appearance is of importance:

- Offices.
- Shops and department stores.
- Banking halls.
- Showrooms.
- Conference suites.
- Corridors and general circulation areas.

FEATURES

- Shallow depth, with control gear mounted alongside lamp, is combined with a rounded chassis and decorative end caps.
- ▽ symbol — can be mounted on suitable wooden surfaces.
- High LOR; anodised aluminium reflectors with brushed aluminium lamellae.
- Energy-saving: Available with switchstart control gear for TLD PowerSlimmer krypton-filled lamps, or with Philips high-frequency control gear which can cut energy consumption by up to 30 per cent.
- White or brown finish to suit decor.
- Installed by key-hole mounting.

MATERIALS & FINISH

Body: Sheet steel; white or brown stove-enamelled finish.

Control gear: Switchstart ballasts with PF capacitor and starters or Philips high-frequency control gear.

Mirror controllers: Anodised aluminium reflectors with brushed aluminium lamellae.

Lampholders: Standard bi-pin rotor type; white urea mouldings.

SPECIFICATION

Type compliance with BS 4533 Ordinary Indoor Class I (electrical) — earth required.

Normal indoor conditions.

▽ symbol marking for mounting on suitable wooden surfaces.

To specify state: Surface luminaire with high-efficiency mirror controller and SwitchStart control gear for krypton-filled TLD lamps (or high-frequency control gear). To have a slim, rounded profile. Similar to Philips TCS 605 (WideSpread distribution)/TCS 607 (asymmetrical distribution).

RANGE OF OPERATION

240V 50Hz single-phase supplies. Normal indoor conditions.

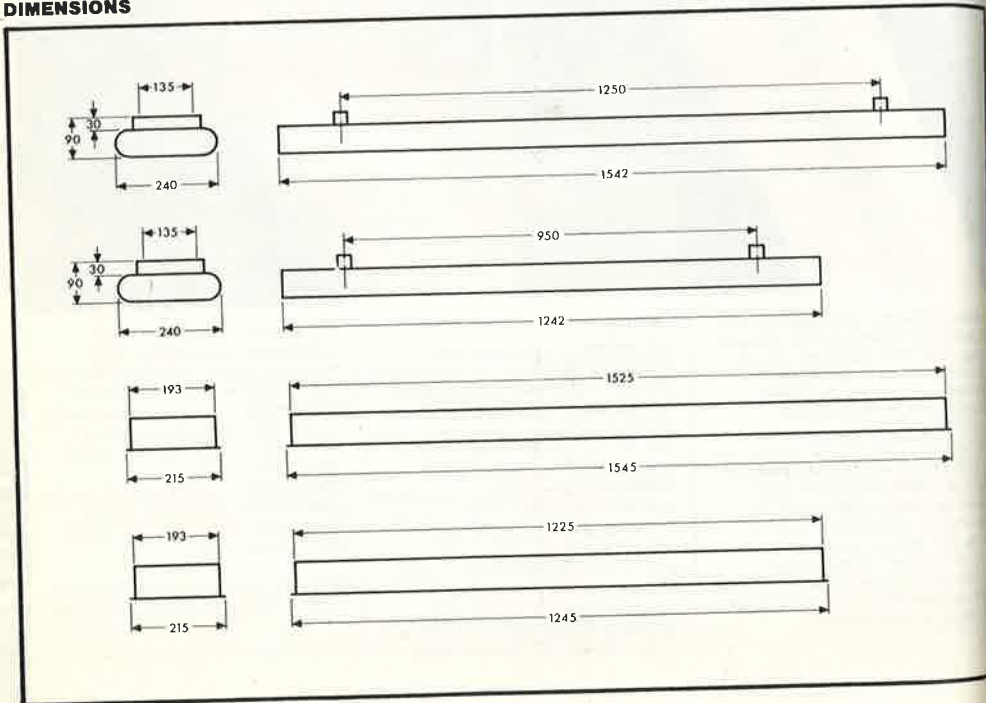
FIXING

Offset from ceiling on brackets with decorative shrouds. Keyhole slots in brackets enable the luminaire to be engaged with screws already entered in the ceiling, simplifying installation.

WIRING

Two-way screw terminal block with capacity for 2×2.5mm² or 1×4mm² conductor in each way. Separate earth terminal.

DIMENSIONS





TCS 605 TCS 607

WEIGHTS & ELECTRICAL DATA

Catalogue No.	Rating	Circuit Watts (Running)	Circuit Current (Amperes)	Ballast	Starter
TCS 605/136	1×36W 1200mm	46	0.23	BTP40 L25	S.10
TCS 605/158	1×58W 1500mm	70	0.35	BTP65 L25	S.10
TCS 605/236	2×36W 1200mm	92	0.46	2×BTP40 L25	2×S.10
TCS 605/258	2×58W 1500mm	140	0.70	2×BTP65 L25	2×S.10
TCS 605/232	2×32W HF 1200mm	72	0.34	HF232	None
TCS 605/250	2×50W HF 1500mm	111	0.50	HF250	None
TCS 607/136	1×36W 1200mm	46	0.23	BTP40 L25	S.10
TCS 607/158	1×58W 1500mm	70	0.35	BTP65 L25	S.10

ORDERING DATA

Catalogue No.	Description	Packing Qty
TCS 605/136 W	1×36W WideSpread TLD luminaire, white finish	1
TCS 605/136 B	1×36W WideSpread TLD luminaire, brown finish	1
TCS 605/158 W	1×58W WideSpread TLD luminaire, white finish	1
TCS 605/158 B	1×58W WideSpread TLD luminaire, brown finish	1
TCS 605/236 W	2×36W WideSpread TLD luminaire, white finish	1
TCS 605/236 B	2×36W WideSpread TLD luminaire, brown finish	1
TCS 605/258 W	2×58W WideSpread TLD luminaire, white finish	1
TCS 605/258 B	2×58W WideSpread TLD luminaire, brown finish	1
TCS 605/232HF B	2×32W WideSpread TLD HF luminaire, brown finish	1
TCS 605/232HF W	2×32W WideSpread TLD HF luminaire, white finish	1
TCS 605/250HF B	2×50W WideSpread TLD HF luminaire, brown finish	1
TCS 605/250HF W	2×50W WideSpread TLD HF luminaire, white finish	1
TCS 607/136 W	1×36W asymmetric TLD luminaire, white finish	1
TCS 607/136 B	1×36W asymmetric TLD luminaire, brown finish	1
TCS 607/158 W	1×58W asymmetric TLD luminaire, white finish	1
TCS 607/158 B	1×58W asymmetric TLD luminaire, brown finish	1

Please order in the form given in the following example, in multiples of the packing quantity:-

25 Philips luminaires TCS 605/232 HF B

Notes

Suffix W or B denotes colour of luminaire body (white or brown).

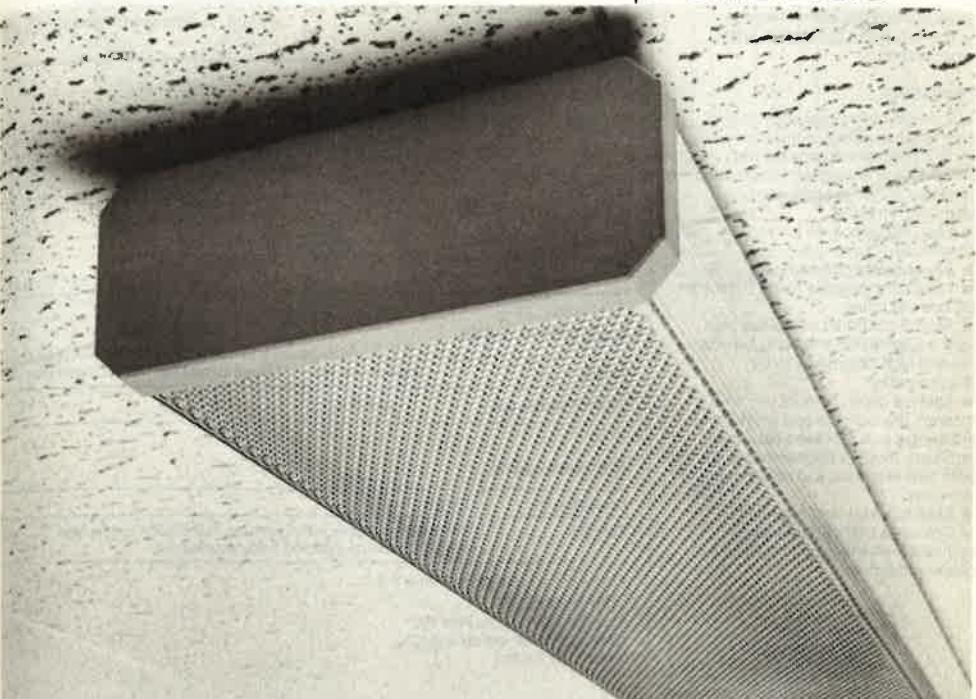
With the exception of high-frequency luminaires, which are supplied complete with the TLD HF Colour 84 lamps, lamps must be ordered separately. Philips TLD krypton-filled lamps with Colour 80 Series triphosphors (Colour 84 cool; Colour 83 warm) are recommended for use in switchstart luminaires. Philips TLD HF lamps *must* be used as replacements in luminaires with high-frequency ballasts.

Made in Holland



1

PSM 250



Surface luminaire with prismatic controller, high-frequency energy-saving control gear, and two 1500mm TLD 50W/84 Lamps.

Easily-Installed surface-mounted luminaire for Indoor Installations with energy-saving high-frequency control gear. The luminaire is supplied as a KombiPak complete with wired body, acrylic controller and 50W argon-filled Colour 84 triphosphor lamps.

HF high-efficiency control gear
Instead of the conventional ballast and starter, Philips high-frequency luminaires contain low-loss solid-state control gear which operates the lamp at a high frequency (28kHz, instead of the normal 50Hz mains supply).

At this high frequency, the lamp's efficacy is increased, this gain optimised by a specially-developed 26mm diameter argon-filled lamp of reduced wattage. These improvements plus lower ballast losses give up to a 30 per cent energy saving for the same lighting effect.

HF ballasts confer additional benefits: -

- Mains 'flicker' is completely eliminated, obviating 'strobing' of moving machinery.
- Fast, reliable starting is assured, even in cold conditions.
- Power factor is close to unity without capacitor correction.
- Warm start prolongs switching life of lamp.
- Circuit switches ballast off when lamp reaches end of its life.

The HF control gear therefore represents a considerable step forward in the application of fluorescent luminaires.

FLUORESCENT LUMINAIRE

To reorder this Data Sheet quote

PL 3057

Issued 5.84

New

PSM 250

RANGE

PSM 250 — Twin-lamp surface-mounting luminaire KombiPak complete with controller, pre-wired high-frequency control gear, 2 x TLD 50W/84HF lamps, 2 x Slipfix fixing plates and 2 x woodscrews and masonry plugs.

APPLICATIONS

For most indoor installations, such as:

- General offices.
- Individual offices.
- Banking halls.
- Shops and department stores.
- Corridors and circulation areas.
- Hospitals.

FEATURES

- Pre-wired high-frequency control gear reduces energy consumption by up to 30 per cent compared with conventional lamp/gear combination.
- Mains flicker is eliminated, obviating 'strobing'.
- Fast, starting, even in cold conditions.
- Power factor close to unity.
- Luminaire includes fixing details for BS box mounting.
- Acrylic controller combines high light transmission with long service life and high resistance to UV discoloration.
- Shallow depth permits use with modern, low ceilings and provides an alternative to a recessed luminaire.
- Smart, modern appearance suits both new schemes and refurbishing schemes.
- Easy to install and maintain.
- Colour 84 triphosphor lamps combine high efficacy with Deluxe colour rendering.

SPECIFICATION

- Type compliance with BS 4533 Ordinary Indoor Class I Electrical (Earth required).
- Marked with ∇ symbol (for mounting direct to suitable wooden surfaces).

To specify state:

Twin-lamp surface-mounting luminaire of low installed depth, with prismatic acrylic controller and pre-wired high-frequency control gear. To be supplied complete with HF 50W lamps and fixing accessories. Similar to Philips PSM 250 KombiPak.

RANGE OF OPERATION

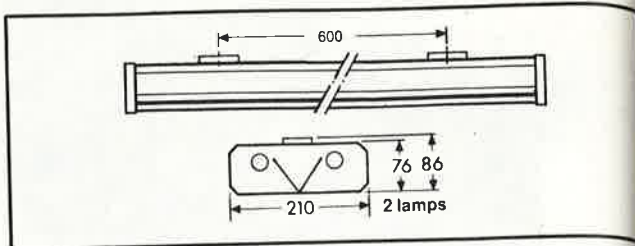
240V 50Hz supplies.
Normal indoor conditions.

MATERIALS AND FINISH

Control gear: Philips high-frequency ballast — BHF 250.
Controller: Clear acrylic extrusion with internal linear prisms on the sides and external pyramid prisms on the base.
Lampholders: Standard bi-pin rotor type.

DIMENSIONS & WEIGHT

Weight complete with lamps: 7.3 Kg.



ELECTRICAL DATA

Rating	Ballast Cat. No.	Circuit current (A)	Total circuit Watts
2 x 50W 1500mm (5ft)	BHF250	0.5	111

ORDERING DATA

Catalogue No.	Details
PSM 250	KombiPak complete with luminaire, TLD 50W/84 lamps, high-frequency control gear and fixing accessories.

Please order in the form given in the following example:

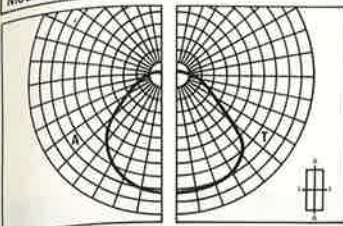
50 Philips KombiPaks PSM 250
Note: All KombiPaks are supplied individually packed.

Lamp: Made in Holland.
Luminaire: Made in Holland.

**PHOTOMETRIC DATA
POWERSLIMMER PSM 250
TWIN LAMP**

ACRYLIC CONTROLLER

Mounting: CEILING



Nadir Intensity 210cd/1000lm
CIE Flux Code 50 81 95 96 63

SHR MAX (Square) 1.78 (1.75 NOM)
SHR MAX TR (Continuous Rows) 2.06

ULORL	0.02	Multiply by each Service Correction Factor
DLORL	0.61	
LORL	0.63	

Glare Data (CIBS)

Flux Fraction Ratio 0.50
ACG Classification ACG5
Glare BZ (RI 2.5, SHR NOM) BZ4
Luminous Area (sq cm)
50W
3100

Service Correction Factors

	50W				
Length Factor	1.00				
Colours 80 Factor	1.00				
38mm Factor	N/A				
Ballast Lumen Factor	1.00				

Utilization Factors UF (F) for SHR NOM

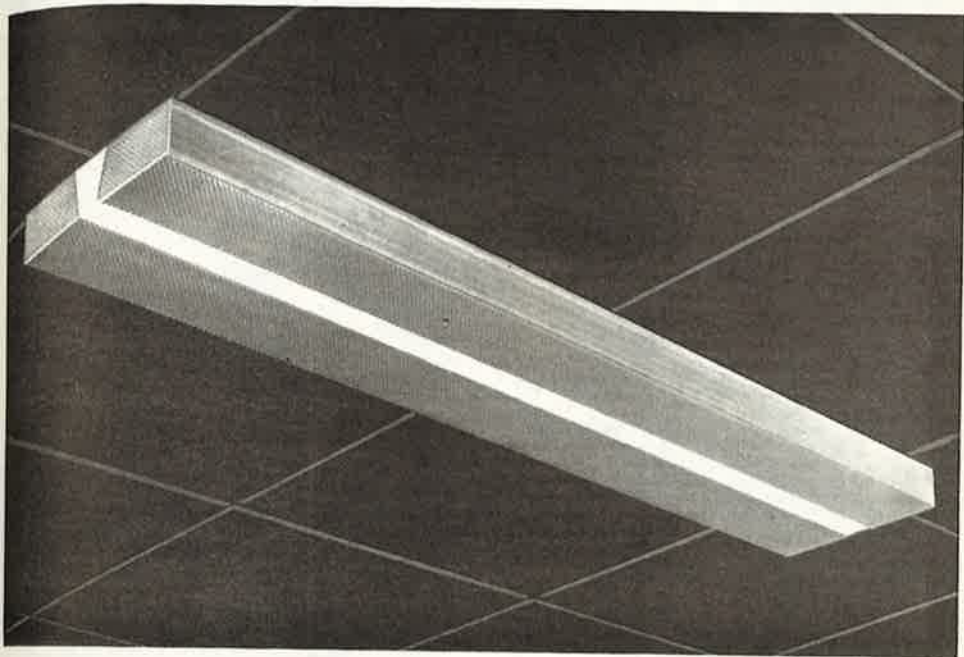
Room Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	NA	46	50	53	57	59	61	63	65
	30		NA	42	45	49	53	58	59	61	63
	10		NA	39	42	46	50	53	56	59	61
50	50	20	NA	44	48	51	54	57	58	61	62
	30		NA	41	44	47	51	54	56	59	60
	10		NA	38	42	45	49	52	54	57	59
30	50	20	NA	43	46	49	52	54	56	58	59
	30		NA	40	43	46	50	52	54	56	58
	10		NA	37	41	44	48	50	52	55	57
0	0	0	NA	36	39	42	45	48	49	52	53

Multiply by each Service Correction Factor

Test No. C902 Dated: 11.04.84
Measured in accordance with BS 5225
Calculations Based on CIBS TM5 and TR10

WIDESPREAD ZONALUX

Surface luminaires with
acrylic prismatic controllers



ZX12/240PC/S

Wide Spread: a family of high technology luminaires with 'spread' intensity distribution, offering greater economy and better visual conditions than ordinary luminaires.

A range of shallow surface luminaires with clear acrylic controllers for indoor installations. One-piece prismatic controllers have prismatic end caps and central opal stripe to enhance appearance. Controllers are gasketed to exclude dirt and dust.

RANGE

- 2-lamp 40W 1200mm (4ft) switchstart
- 2-lamp 65W 1500mm (5ft) switchstart
- 2-lamp 75W 1800mm (6ft) starterless (SRS)

Suitable for individual mounting, or (with ZSP1 spacer) for continuous mounting.

For energy saving replace 40W by 36W and 65W by 58W.

APPLICATIONS

Suitable for most indoor installations such as:-

- Boardrooms
- Offices
- Banking halls
- Shops and department stores

Although bold in appearance to suit spacious premises such as banks, the luminaires are shallow, making them also suitable for modern premises with low ceilings.

FLUORESCENT LUMINAIRE

To reorder this Data Sheet quote

PL 1854/7

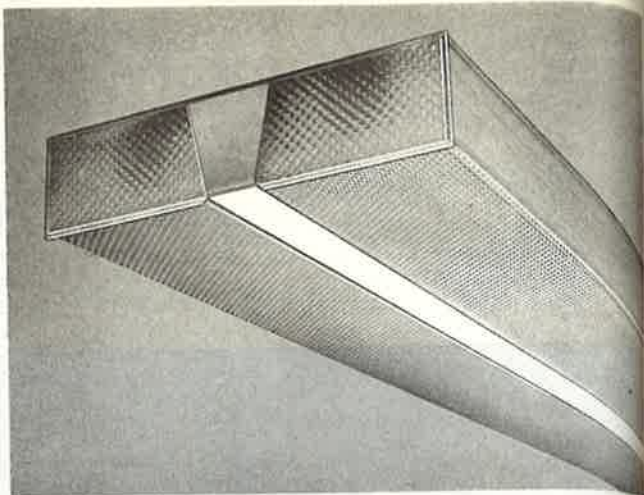
Issued 6/83

Replaces PL 1854/6

WIDESPREAD ZONALUX

FEATURES

- Shallow depth (77mm) permits use with modern, low ceilings and provides an alternative to a recessed luminaire.
- Easy to install and maintain.
- Two-tone acrylic controller combines distinguished appearance with high light output and glare control.
- Wide spacing makes possible reduced number of rows
- Gasket sealing of controller to body ensures a high maintenance factor.
- The controller is supported along its full length, and hinges down on either side to simplify lamp changing.
- Suitable for individual or (with ZSP1 spacer) continuous mounting. When luminaires are mounted continuously, individual controllers are easily removed for lamp changing.
- ZSP1 spacer makes a neat join between luminaires mounted end-to-end.



MATERIALS & FINISH

Batten: Sheet steel body. Durawhite stoved finish.

Control gear: Low-loss ballasts attached with nuts and studs, and fused terminal block with capacity for 2.5mm² cable in each way. Control gear and wiring are concealed by internal reflector.

Controller and end caps: Clear acrylic extruded controller with internal linear prisms on sides. Base contains central opal stripe co-extruded with well-defined pyramid prismatic base. Matching injection-moulded end caps are pre-attached.

SPECIFICATION

- Type compliance with BS 4533 2.2
- Ordinary Indoor Class I

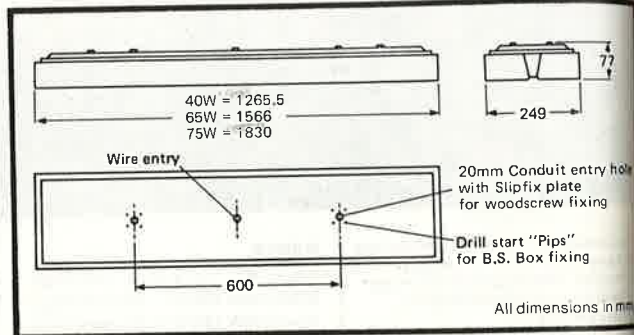
To specify state:

Two-lamp surface-mounted luminaires for fluorescent lamps, complete with acrylic controller, and with overall depth less than 80mm. Substantially as Philips Zonalux.

RANGE OF OPERATION

240V 50Hz. Normal indoor conditions.

DIMENSIONS



DIMENSIONS & WEIGHTS

Catalogue Numbers			Dimensions (mm)			Fixing Centres (mm)	Weight (kg)
Complete Luminaire	Batten Only	Controller Only	Length	Width	Depth		
ZX12/240PC/S	ZX12/240S	ZPC12	1265.5	249	75	600	5.8
ZX15/265PC/S	ZX15/265S	ZPC15	1566	249	75	600	8.4
ZX18/275PC/X	ZX18/275X	ZPC18	1830	249	75	600	9.2

Continuous mounting

A spacer, ZSP1, should be used, and provides a neat join between continuously-mounted controllers. It is not possible to through-wire continuous runs.

Individual mounting

Zonalux luminaires can be close-mounted to the ceiling by BS box, using the drill starts provided. Cable entry is central, and conduit tube suspensions/wood screw fixings, using stipfix plates provided, are at 600mm centres.



TALBOT PARTS DEPOT, COVENTRY

Phillips Streamlite battens with GTX 201 narrow-beam reflectors gives better lighting than the proposed trough reflector installation, and reduces power consumption by 123kW – paying back the capital cost within 2½ years. Registered contractor William Steward & Co. Ltd. Walsall.



TCS 605

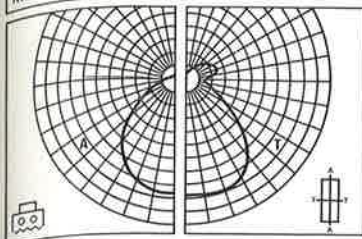
Philips new TCS 605 slim-profile luminaire with high-efficiency mirror optics enhances any prestigious commercial scheme. It can be close-ceiling, stand-off or suspension mounted, and is available with high-frequency control gear as well as standard switchstart energy-saving control gear.

PHOTOMETRIC DATA

ZONALUX WIDESPREAD

2 LAMP WITH ACRYLIC
PRISMATIC CONTROLLER

Mounting: SUSPENDED



Nadir Intensity 203cd/1000 total lm
Multiply by each Service Corr Factor

CIE Flux Number 284450

SHR MAX (Square) 1.69 (1.50 NOM)
SHR MAX TR (Transverse, end-end) 1.91

L/LORL 0.13
D/LORL 0.53
L/LORL 0.66

Multiply by each Service Correction Factor

Glare Data (CIBS)

Flux Fractions Ratio 0.25
ACG Classification ACG5
Glare BZ (RI 2.5, SHR = NOM) BZ4

Luminous Areas (sq cm)

40W(36)	65W(58)	75W
2900	3600	4200

Measured: BS 5225 Part 1 1975
Calculated: CIBS TM 5 and TR 10
Test No: B079 Dated: 78.11.08

Service Correction Factors

	40W 1200mm	65W 1500mm	75W 1800mm	
Lamp Factor	1.01	1.00	0.99	
Colours 80 Factor	1.00	1.00	1.00	
Ballast Lumen Factor	1.00	0.99	0.98	

Utilization Factors UF (F) for SHR NOM

Room Reflectances			Room Index								
C	W	F	0.75	1	1.25	1.5	2	2.5	3	4	5
70	50	20	38	43	47	50	54	57	59	62	64
	30		33	38	43	46	50	54	56	59	62
	10		30	35	40	43	47	51	53	57	60
50	50	20	36	40	44	47	50	53	54	57	59
	30		32	36	40	43	47	50	52	55	57
	10		29	33	38	40	45	48	50	53	55
30	50	20	34	37	41	43	47	49	50	52	54
	30		30	34	38	41	44	46	48	51	53
	10		28	32	36	38	42	45	47	49	52
0	0	0	25	29	32	34	38	40	41	43	46

CIBS Standard Presentation

Multiply by each Service Correction Factor

ELECTRICAL DATA

Rating	Ballast Catalogue No.	Capacitor	Total Circuit Watts	Circuit current (A) Approx.
2 x 40W 1200mm (4ft) SS	2 x BCS40	2 x 3.5 mfd 10% 250V	100	0.5
2 x 65W 1500mm (5ft) SS	2 x BCS65	2 x 5.5 mfd 10% 250V	154	0.7
2 x 75W 1800mm (6ft) XS	2 x BCX75	2 x 8.4 mfd 5% 250V	180	0.85

All information quoted relates to average luminaires on a 240V 50Hz supply at 25°C.

For energy saving replace 40W by 36W, and 65W by 58W.

WIDESPREAD ZONALUX

ORDERING DATA

Catalogue No.	Description	Batten only	Controller only
ZX12/240PC/S	2 x 40W 1200mm (4ft) SS	ZX12/240S	ZPC12
ZX15/265PC/S	2 x 65W 1500mm (5ft) SS	ZX15/265S	ZPC15
ZX18/275PC/X	2 x 75W 1800mm (6ft) XS	ZX18/275X	ZPC18

Accessory for continuous mounting

ZSP1 Spacer for continuous mounting

Please order in the form given in the following example, in multiples of the packing quantity:-

20 Philips Zonalux luminaires ZX15/265PC/S

20 Philips Zonalux spacers ZSP1

Note that lamps should be ordered separately.

Packing quantities

Battens: individually packed.

Controllers: individually packed.

Spacers: 5

Made in UK.

TCK 101 TCK 102

Fluorescent luminaires (fluorescent striplights)

Easy-to-install fluorescent luminaire KombiSets, supplied complete with lamp and clear reeded diffuser. The lampholders can be turned through 90° to either side before fixing to give a choice of mounting.

RANGE

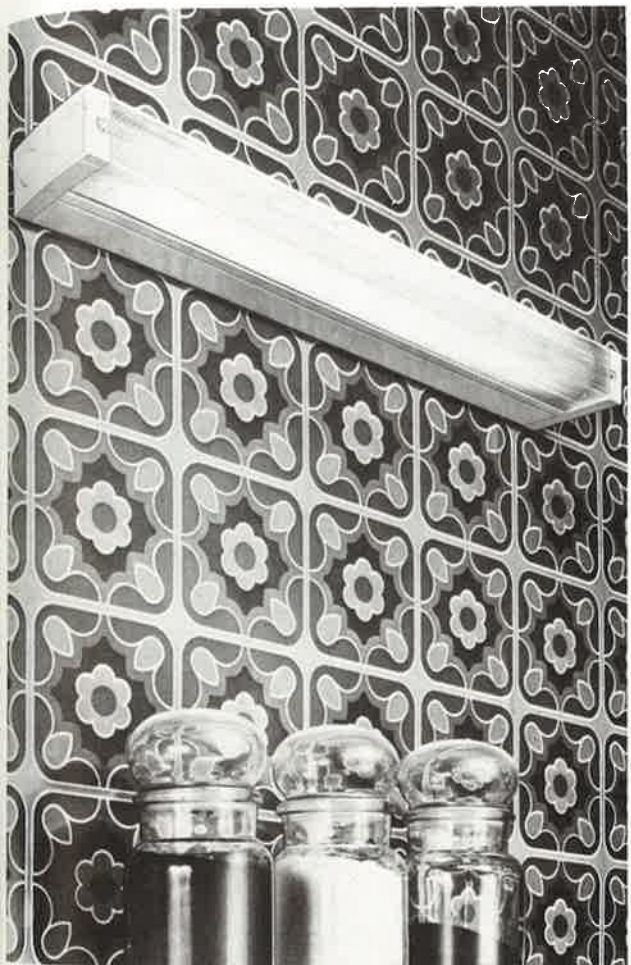
TCK 101 KombiSet – batten, diffuser and 15W 450mm (18in.) Softone 32 lamp.

TCK 102 KombiSet – batten, diffuser and 30W 900mm (3ft) Softone 32 lamp.

APPLICATIONS

Supplementary lighting:

- Hotel bedrooms (e.g. over mirrors)
- Hallways
- Mirror, shelf, cupboard, bar and cocktail cabinet lighting
- Domestic uses, especially the lighting of kitchen worktops, desks and worktables.



To reorder this Data Sheet quote

PL 1895/3

Issued 7/83

Replaces PL 1895/2

TCK 101, TCK 102 STRIPLIGHT

FEATURES

- Simple and quick installation with conventional tools.
- Body cover is positively secured until released by pushbuttons on end caps.
- Cable entry at rear (with dust-excluding seal) and terminal block to simplify connection to supply.
- Lampholders can be turned through 90° either side of body before fixing to permit choice of mounting arrangements.
- Lightweight, all-white body with clear reeded acrylic diffuser provides an elegant appearance.
- Rotor bipin lampholders isolate lamp from circuit before lamp is removed.
- Meets requirements for radio interference suppression.
- Available in 15W and 30W ratings – two different lengths.
- Meets V requirements – may be mounted on wooden surfaces.
- Energy-saving – the 15W lamp gives more light than a 40W filament lamp for a total power consumption of 25W; the 30W lamp gives as much light as a 100W filament lamp for a total power consumption of 40W.
- Fluorescent lamps last over 5 times as long as filament lamps.

MATERIALS & FINISH

- Body:** Sheet steel, white stoved finish
- Lampholders:** White urea mouldings with rotating bipin sockets
- Diffuser:** Clear reeded acrylic moulding with strengthening ribs to engage with lamp
- Control gear:** Integral, prewired to terminal block.

SPECIFICATION

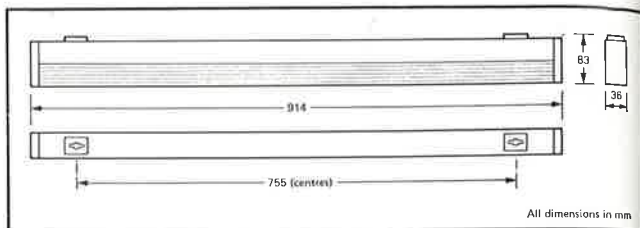
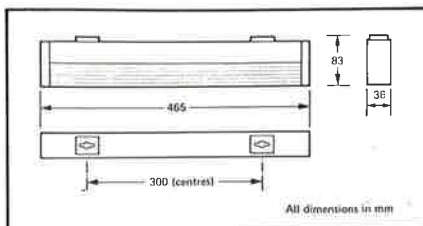
- Complies with BS 4533 2.2 Ordinary Indoor Class I (Earth required).
- Meets V requirements.

To specify state:

All-white fluorescent striplight with rotor lampholders and acrylic diffuser: Substantially as Philips TCK.

RANGE OF OPERATION

240V 50Hz.
Normal dry indoor conditions.
Surface-mounted.



DIMENSIONS & WEIGHTS

Catalogue No.	Overall length (mm/in.)	Overall depth (mm/in.)	Overall width (mm/in.)	Weight including lamp (kg/lb)
TCK 101	465/18.32	83/3.25	36/1.4	1.32/2.9
TCK 102	914/36	83/3.25	36/1.4	1.90/4.2

ELECTRICAL DATA

Rating	Circuit Watts (running)	Circuit current (A)	Starter Cat. No.
15W 450mm (18in)	25	0.35	S10
30W 900mm (3ft)	40	0.37	S10

ORDERING DATA

Catalogue No.	Description	Packing quantity
TCK 101	15W 450mm KombiSet, complete with lamp	10
TCK 102	30W 900mm KombiSet, complete with lamp	10
Spare lamps		
MCFE 15W/32	15W 450mm Softone 32 lamp	25
MCFE 30W/32	30W 900mm Softone 32 lamp	25

Please order in the form given in the following example, in multiples of the packing quantity:

50 Philips KombiSets TCK 102.

Lamp: Made in Holland.
Luminaire: Made in W. Germany.

STANDARD RECESSED LUMINAIRES

For exposed-tee ceilings
600×600mm and 600×1800mm



Five recessed luminaires for simple installation in metric exposed-tee ceiling systems of adequate strength. The luminaires utilise the energy-saving advantages of Philips new TLD krypton-filled 26mm diameter lamps.

RANGE

SRL 418 for 600×600 nom aperture
SRL 236 for 600×1200 nom aperture
SRL 436 for 600×1200 nom aperture
SRL 270 for 600×1800 nom aperture
SRL 470 for 600×1800 nom aperture

APPLICATIONS

Premises with exposed-tee ceilings, e.g.:

- Offices
- Shops and department stores
- Banking halls
- Showrooms
- Assembly and lecture areas.

FLUORESCENT LUMINAIRE

To reorder this Data Sheet quote

PL 3025/2

Issued 9.82

Replaces PL 3025.1

STANDARD RECESSED LUMINAIRES

FEATURES

- Uses PowerSlimmer TLD 26mm diameter krypton-filled lamps; energy consumption is around 8 per cent less than comparable 38mm diameter argon-filled lamps.
- Luminaire body rests directly on suspended ceiling structure – fixing is quick and easy, without the use of tools.
- The body is supported across its entire width, giving built-in security.
- Prismatic controller is installed from beneath; simply rests on tee-bar flats.
- Weight is taken by load-bearing grid; structure is not cut in any way.
- Electrical connection through terminal block (L, N & E) to prewired control gear.

MATERIALS & FINISH

Controller: Clear polystyrene sheet with moulded prisms.

Gear tray/reflector: Sheet steel, zinc coated and stove enamelled white. Unpainted metalwork is zinc protected.

SPECIFICATION

- Type compliance with BS 4533 2.2 Ordinary Indoor Class I (electrical).
- Radio interference: Complies with SI 1978 No. 1268: Regulation 6. Suppressed for use in residential areas.

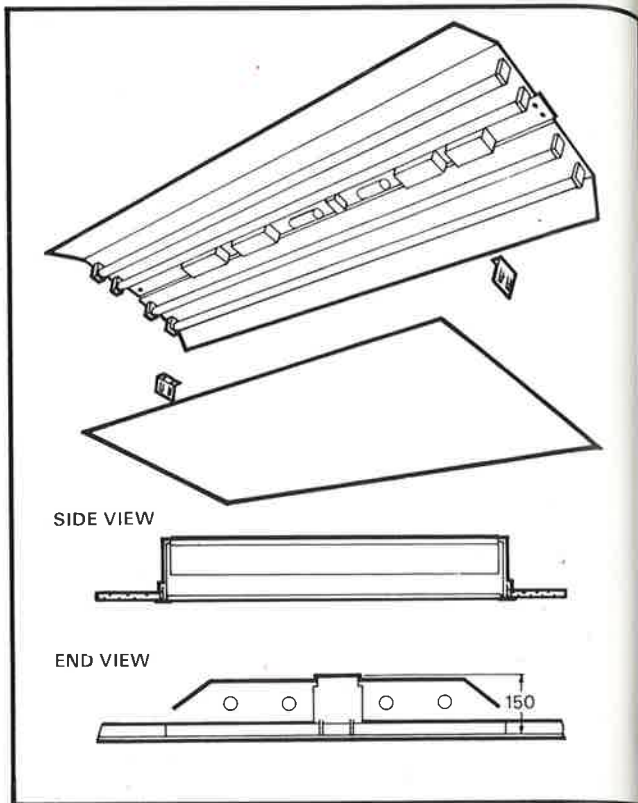
To specify state:

Lay-in luminaire for exposed-tee ceilings.

RANGE OF OPERATION

240V 50Hz supplies.

Normal indoor conditions.



DIMENSIONS & WEIGHTS

Catalogue No.	Rating	Nominal aperture (mm)	Depth (mm)
SRL 418	4×18W 600mm (2ft)	600×600*	100
SRL 236	2×36W 1200mm (4ft)	600×1200**	100
SRL 436	4×36W 1200mm (4ft)	600×1200**	100
SRL 270	2×70W 1800mm (6ft)	600×1800***	100
SRL 470	4×70W 1800mm (6ft)	600×1800***	100

*Actual controller size 594×594mm.

**Actual controller size 594×1194mm.

***Actual controller size 594×1794mm.

ELECTRICAL DATA

Rating	Circuit Watts (running)	Circuit current (A)	Minimum Power Factor	Catalogue Nos. for replacement Ballast	Starter	Capacitor
4×18W 600mm (2ft)	92	0.46	0.85	2×BTP40 L25	4×S2	2×H1640
2×36W 1200mm (4ft)	92	0.46	0.85	2×BTP40 L25	2×S10	2×H1640
4×36W 1200mm (4ft)	184	0.92	0.85	4×BTP40 L25	4×S10	4×H1640
2×70W 1800mm (6ft)	160	0.82	0.85	2×BTP70	2×S16	2×H1658
4×70W 1800mm (6ft)	320	1.64	0.85	4×BTP70	4×S16	4×H1658

All data are averages, and are measured under standard conditions.

STANDARD RECESSED LUMINAIRES

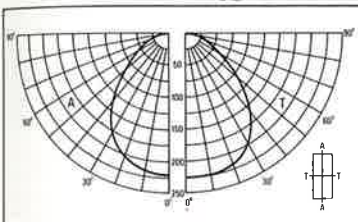
1

PHOTOMETRIC DATA

SRL

4 LAMP PRISMATIC CONTROLLER

Mounting: RECESSED



Nadir Intensity 222cd/1000 lm

CIE Flux Code 54 83 95 100 55

SHR MAX (Square) 1.57 (1.50 NOM)
SHR MAX TR (Continuous Rows) 1.78

ULORL 0.00
DLORL 0.55
LORL 0.55
Multiply by each Service Correction Factor

Glare Data (CIBS)

Flux Fractions Ratio 0.00
ACG Classification ACG3
Glare BZ (RI 2.5, SHR = NOM) BZ4
Luminous Areas (sq cm)
36W
6050

Service Correction Factors

	18W	36W	70W		
Length Factor	1.00	1.00	1.00		
Colours 80 Factor	1.02	1.02	1.02		
38mm Factor	0.97	0.97	0.97		
Ballast Lumen Factor	0.99	0.99	0.99		

Utilization Factors UF (F) for SHR NOM

Room Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	37	40	44	47	50	52	54	56	58
	30		33	37	41	43	47	49	51	54	56
	10		30	34	38	41	44	47	49	52	54
50	50	20	36	39	43	45	48	50	52	54	55
	30		32	36	40	42	46	48	50	52	54
	10		30	34	37	40	44	46	48	50	53
30	50	20	35	38	42	44	47	49	50	52	53
	30		32	36	39	41	45	47	48	50	52
	10		30	33	37	39	43	45	47	49	51
0	0	0	29	32	35	38	41	43	45	47	48

Multiply by each Service Correction Factor

Measured in Accordance with BS 5225
Calculations Based on CIBS TM 5 and TR 10
Test No: C200 Date: 81.06.29

STANDARD RECESSED LUMINAIRES

ORDERING DATA

Catalogue No.	Description	Packing Quantity
SRL 418	Luminaire for 600 x 600 mm aperture	1
SRL 236	Luminaire for 600 x 1200 mm aperture	1
SRL 436	Luminaire for 600 x 1200 mm aperture	1
SRL 270	Luminaire for 600 x 1800 mm aperture	1
SRL 470	Luminaire for 600 x 1800 mm aperture	1
Spares		
PP 66	600 x 600 mm prismatic panel	2
PP 612	600 x 1200 mm prismatic panel	2
PP 618	600 x 1800 mm prismatic panel	2
TLD 18W/..**	600 mm lamp for SRL 418	25
TLD 36W/..**	1200 mm lamp for SRL 236/436	25
TLD 70W/..**	1800 mm lamp for SRL 270/470	25

**Add colour number required - 84,83,35.

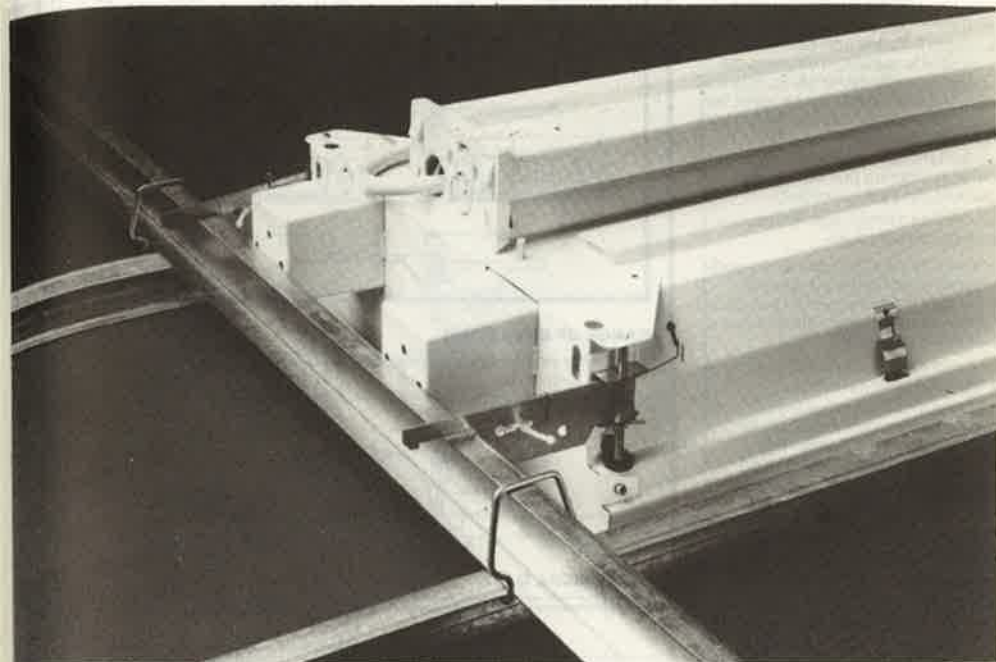
Please order luminaires in the form given in the following example, in multiples of the packing quantity:

25 Philips luminaires SRL 418

Luminaire: Made in Great Britain

TBS 300

Bodies with prewired control gear



A range of recessed luminaires for 300mm module suspended ceilings with exposed or concealed tee-bars. Standard bodies fit simply into nominal apertures 1200 x 300mm, 1500 x 300mm, 1200 x 600mm and 600 x 600mm; a choice of interchangeable lighting attachments is available.

All TBS 300 luminaires are designed specifically for Philips energy-saving TLD 26mm diameter krypton-filled lamps.

All TBS 300 luminaires are supplied with ZBS support brackets.

RANGE

Bodies

TBS 300/3 x 36 – 1200 x 600mm, for three 36W 1200mm lamps

TBS 300/4 x 18 – 600 x 600mm, for four 18W 600mm lamps

TBS 300/1 x 36 – 1200 x 300mm, for single 36W 1200mm lamp

TBS 300/1 x 58 – 1500 x 300mm, for single 58W 1500mm lamp

TBS 300/2 x 36 – 1200 x 300mm, for two 36W 1200mm lamps

TBS 300/2 x 58 – 1500 x 300mm, for two 58W 1500mm lamps

TBS 300/170 – 1800 x 300mm, for single 70W 1800mm lamp

TBS 300/270 – 1800 x 300mm, for two 70W 1800mm lamps

Lighting attachments

Prismatic controllers – see Data Sheet PL 3021.

Mirror controllers – see Data Sheets PL 3023 and PL 3046.

FLUORESCENT LUMINAIRE

To reorder this Data Sheet quote

PL 3020/4

Issued 7/83

Replaces PL 3020/3

TBS 300 RECESSED LUMINAIRES

APPLICATIONS

For metric modular suspended ceiling systems with exposed or concealed tees, in situations such as:

- Shops and department stores
- Offices and executive suites
- Municipal buildings
- Hospitals
- Restaurants and hotels
- Cinema and theatre foyers
- Banking and commercial halls

FEATURES

- Fits flush into ceiling apertures, with low installed depth for use with shallow voids.
- Simply installed from below. The luminaire is supported on swing-out supports positioned at 90° to, or in line with, the main axis of the housing; the supports are adjustable for height from within the luminaire.
- Standard housing fits both types of ceiling; ordering procedures and stockholding are simplified.
- Low-loss, control gear for reduced energy consumption.
- PowerSlimmer TLD 26mm diameter krypton-filled lamps use around 8 per cent less energy than comparable 38mm diameter argon-filled lamps of same nominal length.
- 1-lamp and 2-lamp luminaires have a 3A fused terminal block.
- 3-lamp and 4-lamp luminaires have two 3A fused terminal blocks; for inner lamps, outer lamps. The terminal blocks may be wired on separate switch-leads, or may be connected together.

MATERIALS & FINISH

Bodies: Roll-formed galvanised sheet steel, white enamel finish.

Gear trays: Sheet steel, white enamel finish; prewired control gear with low Watts loss.

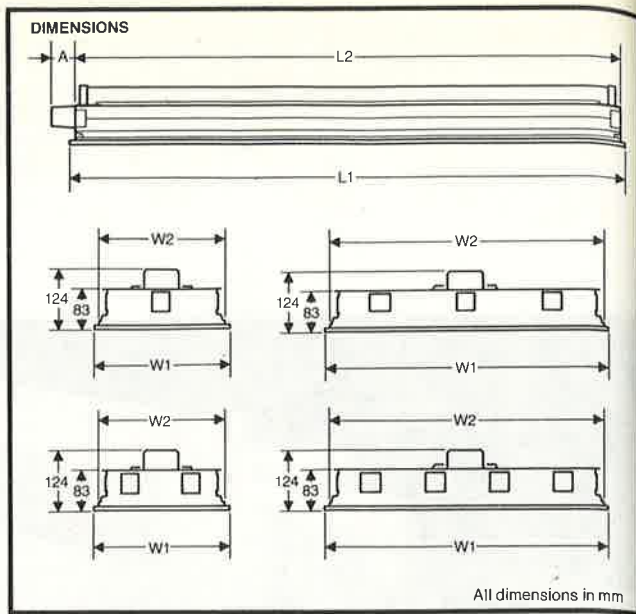
Swing-out supports: Steel, zinc-plated.

SPECIFICATION

- Type compliance with BS 4533 Ordinary Indoor Class I (Electrical).
- Radio interference: Complies with SI 1978 No. 1268: Regulation 6. Suppressed for use in residential areas.

To specify state:

Modular recessed luminaire, based on standard body with wide choice of interchangeable lighting attachments. To be suitable for use with TLD krypton-filled 26mm diameter lamps. Similar to Philips TBS 300.



RANGE OF OPERATION

240V 50Hz single-phase supplies.

For TLD lamps only.

Normal indoor conditions.

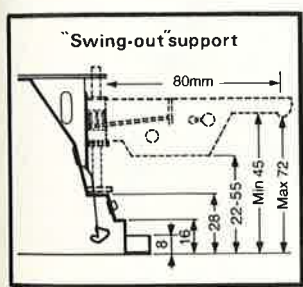
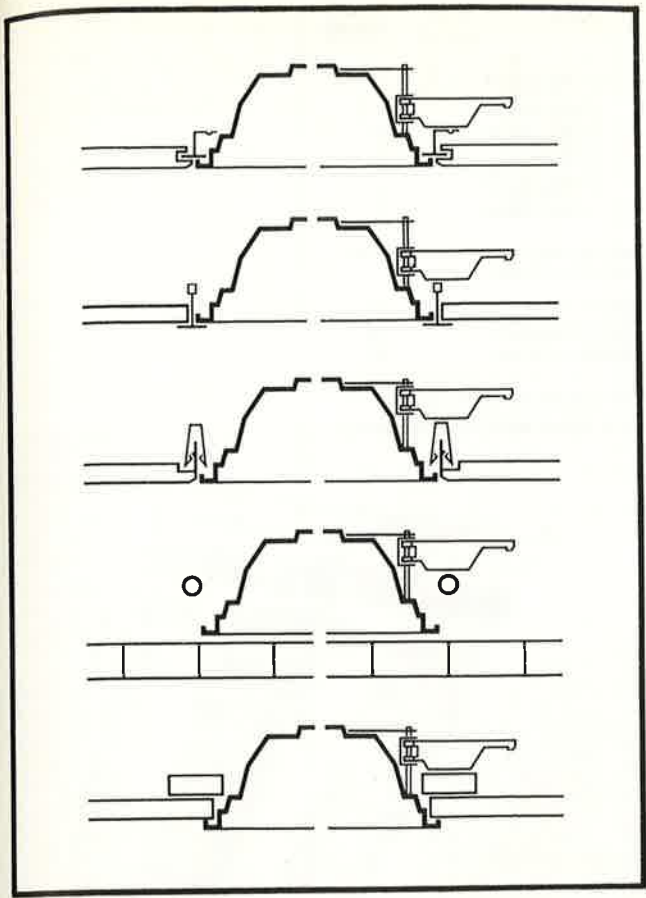
ELECTRICAL DATA

Rating	Circuit Watts (running)	Circuit current (A)	Ballast	Starter
1 x 36W 1200mm	46	0.23	BTP40 L25	S10
1 x 58W 1500mm	70	0.34	BTP65 L25	S10
1 x 70W 1800mm	80	0.41	BTP70 L25	S16
2 x 36W 1200mm	92	0.46	2 x BTP40 L25	2 x S10
2 x 58W 1500mm	140	0.70	2 x BTP65 L25	2 x S10
2 x 70W 1800mm	160	0.82	2 x BTP70 L25	2 x S16
3 x 36W 1200mm	138	0.70	3 x BTP40 L25	3 x S10
4 x 18W 600mm	92	0.46	2 x BTP40 L25	4 x S2
4 x 36W 1200mm	184	0.92	4 x BTP40 L25	4 x S10

All data are averages, and are measured under standard conditions Power Factor at least 0.85. Harmonics 3 x 16%.

DIMENSIONS & WEIGHTS (luminaire bodies)

Catalogue No.	Nominal size (mm)	Rating	Weight kg	Dimensions (mm)			
				L1	L2	A	W1 W2
TBS 300/136	1200 x 300	1 x 36W 1200mm (4ft)	4.6	1197	1175	50	297 274
TBS 300/158	1500 x 300	1 x 58W 1500mm (5ft)	5.9	1497	1475	50	297 274
TBS 300/170	1800 x 300	1 x 70W 1800mm (6ft)	7.2	1797	1775	50	297 274
TBS 300/236	1200 x 300	2 x 36W 1200mm (4ft)	5.5	1197	1175	50	297 274
TBS 300/258	1500 x 300	2 x 58W 1500mm (5ft)	7.2	1497	1475	50	297 274
TBS 300/270	1800 x 300	2 x 70W 1800mm (6ft)	8.9	1797	1775	50	297 274
TBS 300/336	1200 x 600	3 x 36W 1200mm (4ft)	8.9	1197	1175	50	597 574
TBS 300/418	600 x 600	4 x 18W 600mm (2ft)	5.5	597	574	50	597 575
TBS 300/436	1200 x 600	4 x 36W 1200mm (4ft)	10.5	1197	1175	50	597 575



TBS 300 RECESSED LUMINAIRES

ORDERING DATA

Catalogue No.	Nominal size	Rating	Packing Quantity
Prewired bodies			
TBS 300/136	1200 x 300mm	1 x 36W 1200mm	2
TBS 300/158	1500 x 300mm	1 x 58W 1500mm	2
TBS 300/170	1800 x 300mm	1 x 70W 1800mm	2
TBS 300/236	1200 x 300mm	2 x 36W 1200mm	2
TBS 300/258	1500 x 300mm	2 x 58W 1500mm	2
TBS 300/270	1800 x 300mm	2 x 70W 1800mm	2
TBS 300/336	1200 x 600mm	3 x 36W 1200mm	1
TBS 300/418	600 x 600mm	4 x 18W 600mm	2
TBS 300/436	1200 x 600mm	4 x 36W 1200mm	1
Accessory			
ZBS	Support bracket (one set of four supplied per luminaire: for concealed-tee ceilings)		1 (Set of 4)
Lamps			
TLD 18W/**	18W 600mm 26mm dia. krypton-filled lamp		25
TLD 36W/**	36W 1200mm 26mm dia. krypton-filled lamp		25
TLD 58W/**	58W 1500mm 26mm dia. krypton-filled lamp		25
TLD 70W/**	70W 1800mm 26mm dia. krypton-filled lamp		25

**Phillips PowerSlimmer lamps are made in the two tri-phosphor colours Colour 84 and Colour 83 - Colour 84 is for work areas and Colour 83 for social areas such as restaurants. TLD lamps are also made in White 35. Further details are on Data Sheets PL 1847 and PL 3005.

Luminaire: Made in Holland.

GBS 300/M5

'Low glare' mirror controllers for TBS 300 bodies for use in VDU areas.

A range of controllers to fit different versions of the TBS 300 body. The controllers use mirror reflectors with profiled cross-louvres which provide 55° cut-off both axially and transversely, reducing reflected images in VDU screens. The controller combines WideSpread light distribution with an exceptionally high LOR.

In conjunction with the appropriate body, the controllers form a range of recessed luminaires for 300mm module suspended ceilings with exposed or concealed tee-bars.

Details of TBS 300 bodies, complete with pre-wired control gear, are contained in Data Sheet PL 3020.

RANGE

GBS 300/236 M5 – Low glare controller with profiled cross-louvres for 1200 x 300mm 2-lamp body.

GBS 300/258 M5 – Low glare controller with profiled cross-louvres for 1500 x 300mm 2-lamp body.

GBS 300/270 M5 – Low glare controller with profiled cross-louvres for 1800 x 300mm 2-lamp body.

GBS 300/418 M5 – Low glare controller with profiled cross-louvres for 600 x 600mm 4-lamp body.

GBS 300/436 M5 – Low glare controller with profiled cross-louvres for 1200 x 600mm 4-lamp body.

APPLICATIONS

For metric modular suspended ceiling systems with exposed or concealed tees; specifically for use with VDU's.

To reorder this Data Sheet quote

PL 3046/1

Issued 6/83

Replaces PL3046

GBS 300/M5 – FLUORESCENT LUMINAIRE

FEATURES

- Profiled cross-louvers provide a low glare appearance both axially and transversely; reduce reflected images in VDU screens.
- Accurate mirror optics give WideSpread distribution which permits wider spacing between rows of luminaires. This reduces installation costs, and the sideways light distribution improves modelling and reduces both direct and indirect glare.
- Exceptionally high LOR gives operating economies that can pay for installation in a realistically short time.
- Fits flush into ceiling apertures; complete luminaire has low installed depth for use with shallow voids.
- Interchangeable with other lighting attachments in the range; common housings for both types of suspended ceiling simplify ordering procedures and stockholding.
- Prestige appearance to enhance the modern electronic office.
- Optional air handling on TBS 300 body permits the office environment to be totally controlled.

MATERIALS & FINISH

Frame:- Aluminium, stove-enamelled white.

Reflectors:- Aluminium, mirror finish.

Louvers:- Aluminium, stove-enamelled white.

SPECIFICATION (complete luminaire)

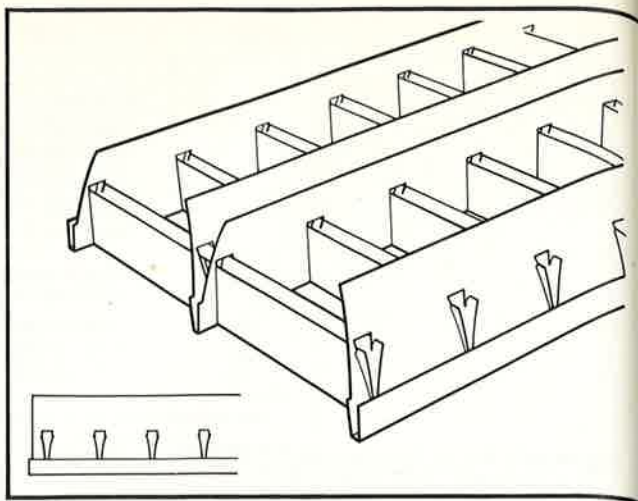
- Type compliance with BS 4533 102-2 Ordinary Indoor Class I (electrical).
- Radio interference: Complies with SI 1978 No. 1268: Regulation 6. Suppressed for use in residential areas.
- Complies with CIBS recommendations (TM6 – Lighting to meet the specific visual task requirements for visual display areas.)

To specify state:

Modular recessed luminaire with low-glare characteristics, complying with CIBS TM6. To be based on standard body with optional air handling facility, and wide choice of interchangeable lighting attachments. To give WideSpread distribution with LOR exceeding 0.60, and to be suitable for use with TLD krypton-filled 26mm diameter lamps. Similar to Philips TBS 300 with M5 controller.

RANGE OF OPERATION

240V 50Hz supplies.
Normal indoor conditions.



ORDERING DATA

Catalogue Numbers		Nominal size (mm)	Packing Quantity
Controller	Body		
GBS 300/236 M5	TBS 300/236	1200 x 300	4
GBS 300/258 M5	TBS 300/258	1500 x 300	4
GBS 300/270 M5	TBS 300/270	1800 x 300	4
GBS 300/418 M5	TBS 300/418	600 x 600	4
GBS 300/436 M5	TBS 300/436	1200 x 600	4

Notes:

Complete luminaires should be ordered by using this Data Sheet in conjunction with Data Sheet PL 3020, which contains detailed information on pre-wired bodies and suitable lamps for these controllers, including packing quantities.

The range also includes general-purpose mirror controllers with WideSpread distribution and high LOR (see Data Sheet PL 3023), and acrylic prismatic controllers (see Data Sheet PL 3021).

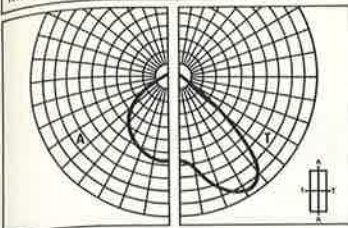
Please order in the form given in the following example, in multiples of the packing quantities:-

- 100 Philips recessed luminaire bodies TBS 300/418
- 100 Philips lighting attachments GBS 300/418 M5
- 400 Philips lamps TLD 18W/84.

PHOTOMETRIC DATA
TBS 300
Twin Lamp

LOW GLARE MIRROR (M5)

Mounting: RECESSED



Nadir Intensity 216cd/1000lm
CIE Flux Code 61 96 100 100 65

SHR MAX (Square) 1.66 (1.5 NOM)
SHR MAX TR (Continuous Rows) 1.85
Point-by-Point Calculation

ULORL 0.00 Multiply by
DLORL 0.65 each Service
LORL 0.65 Correction Factor

Glare Data (CIBS)

Flux Fraction Ratio 0.00
ACG Classification ACG0
Glare BZ (RI 2.5, SHR NOM) BZ2
Luminous Area (sq cm)
36W 58W 70W
3500 4380 5260

GBS 300/M5 – FLUORESCENT LUMINAIRE

Service Correction Factors

	36W	58W	70W		
Length Factor	1.00	1.00	1.00		
Colours 80 Factor	1.02	1.02	1.02		
38mm Factor	N/A	N/A	N/A		
Ballast Lumen Factor	1.00	1.00	1.00		

Utilization Factors UF (F) for SHR NOM

Room Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	43	49	54	57	61	64	66	68	70
	30		38	45	50	54	58	62	63	66	68
	10		35	42	47	51	56	59	61	64	66
50	50	20	42	48	53	56	60	62	64	66	67
	30		38	44	50	53	57	60	62	64	66
	10		35	41	47	50	55	58	60	62	64
30	50	20	41	47	51	54	58	60	61	63	65
	30		37	44	49	51	56	58	60	62	63
	10		35	41	46	49	54	57	58	61	62
0	0	0	33	40	45	48	52	54	56	58	59

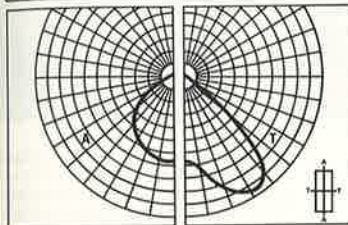
Multiply by each Service Correction Factor

Test No. C675 Dated: 83.03.03
Measured in accordance with BS 5225
Calculations Based on CIBS TM5 and TR10

PHOTOMETRIC DATA
TBS 300
Four Lamp

LOW GLARE MIRROR (M5)

Mounting: RECESSED



Nadir Intensity 216cd/1000lm
CIE Flux Code 61 96 100 100 65

SHR MAX (Square) 1.66 (1.5 NOM)
SHR MAX TR (Continuous Rows) 1.85
Point-by-Point Calculation

ULORL 0.00 Multiply by
DLORL 0.65 each Service
LORL 0.65 Correction Factor

Glare Data (CIBS)

Flux Fraction Ratio 0.00
ACG Classification ACG0
Glare BZ (RI 2.5, SHR NOM) BZ2
Luminous Area (sq cm)
18W
3300

Service Correction Factors

	18W				
Length Factor	1.00				
Colours 80 Factor	1.02				
38mm Factor	N/A				
Ballast Lumen Factor	1.00				

Utilization Factors UF (F) for SHR NOM

Room Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	43	49	54	57	61	64	66	68	70
	30		38	45	50	54	58	62	63	66	68
	10		35	42	47	51	56	59	61	64	66
50	50	20	42	48	53	56	60	62	64	66	67
	30		38	44	50	53	57	60	62	64	66
	10		35	41	47	50	55	58	60	62	64
30	50	20	41	47	51	54	58	60	61	63	65
	30		37	44	49	51	56	58	60	62	63
	10		35	41	46	49	54	57	58	61	62
0	0	0	33	40	45	48	52	54	56	58	59

Multiply by each Service Correction Factor

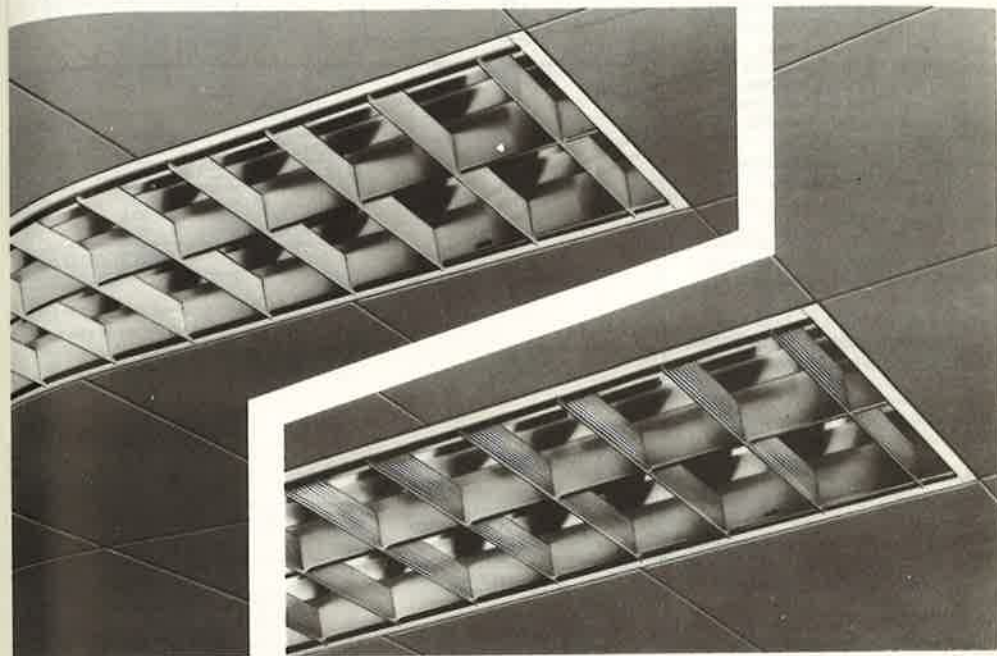
Test No. C675 Dated: 83.03.03
Measured in accordance with BS 5225
Calculations Based on CIBS TM5 and TR10

GBS 300/M5 – FLUORESCENT LUMINAIRE

Luminaire – Made in Holland

GBS 300/M1 & GBS 300/M2

Mirror controllers for TBS 300 bodies



Top illustration – GBS 300/M1

Lower illustration – GBS 300/M2

A range of controllers to fit different versions of the TBS 300 body. The controllers use mirror reflectors to provide WideSpread distribution combined with exceptionally high LOR, and have cross louvres to control glare and provide a pleasing appearance.

In conjunction with the appropriate body, the controllers form a range of recessed luminaires for 300mm module suspended ceilings with exposed or concealed tee-bars.

Details of TBS 300 bodies, complete with prewired control gear, are contained in Data Sheet PL 3020.

RANGE

GBS 300/236 M1 – controller with white cross louvres for 1200 x 300mm 2-lamp body.

GBS 300/236 M2 – controller with profiled louvres for 1200 x 300mm 2-lamp body.

GBS 300/258 M1 – controller with white cross louvres for 1500 x 300mm 2-lamp body.

GBS 300/258 M2 – controller with profiled louvres for 1500 x 300mm 2-lamp body.

GBS 300/418 M1 – controller with white cross louvres for 600 x 600mm 4-lamp body.

GBS 300/418 M2 – controller with profiled louvres for 600 x 600mm 4-lamp body.

GBS 300/436 M1 – controller with white cross louvres for 1200 x 600mm 4-lamp body.

GBS 300/436 M2 – controller with profiled louvres for 1200 x 600mm 4-lamp body.

FLUORESCENT LUMINAIRE

To reorder this Data Sheet quote

PL 3023/2

Issued 9/82

Replaces PL 3023/1 & PL 3024

GBS 300/M1 and GBS 300/M2 FLUORESCENT LUMINAIRES

APPLICATIONS

For metric modular suspended ceiling systems with exposed or concealed tees, in situations such as:

- Shops and department stores
- Offices and executive suites
- Municipal buildings
- Hospitals
- Restaurants and hotels
- Cinema and theatre foyers
- Banking and commercial halls

FEATURES

- Fits flush into ceiling apertures; complete luminaire has low installed depth for use with shallow voids.
- Accurate mirror optics give WideSpread distribution which permits wider spacing between luminaires. This gives economic, aesthetic and lighting benefits.
- Mirror-finish reflectors with anti-glare louvres combine to provide exceptionally high LOR, low brightness for visual comfort and a prestige appearance.
- Type GBS 300/M1 – white louvres – combines WideSpread benefits with high LOR for all general office applications.
- Type GBS 300/M2 – profiled mirror-finish louvres – for low brightness.
- Both types are interchangeable with other lighting attachments in the range; common housings for both types of suspended ceiling simplify ordering procedures and stockholding.

MATERIALS & FINISH

Frame: Aluminium, stove-enamelled white.

Reflectors: Aluminium, mirror finish.

Louvres: (Type GBS 300/M1) Aluminium, stove-enamelled white cross louvres.
(Type GBS 300/M2) Aluminium, mirror finish profiled cross louvres.

SPECIFICATION (complete luminaire)

- Type compliance with BS 4533 2.2 Ordinary Indoor Class I (electrical).
- Radio interference: Complies with SI 1978 No. 1268: Regulation 6. Suppressed for use in residential areas.

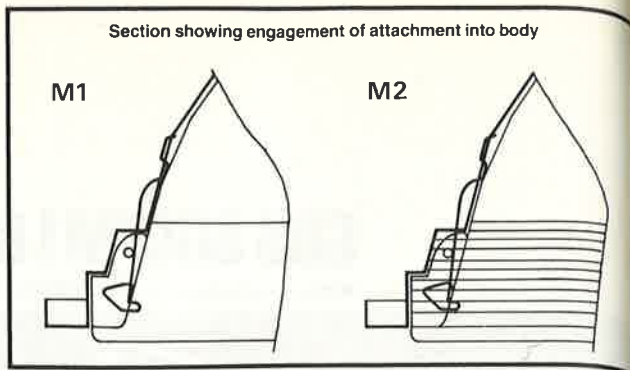
To specify state:

Modular recessed luminaire, based on standard body with wide choice of interchangeable lighting attachments. To give WideSpread distribution with LOR exceeding 0.65, and to be suitable for use with TLD krypton-filled 26mm diameter lamps. Similar to Philips TBS 300 with M1 (M2) controller.

RANGE OF OPERATION

240V 50Hz supplies.
Normal indoor conditions.

Section showing engagement of attachment into body



Luminaire: Made in Holland

ORDERING DATA

Catalogue Numbers Controller	Body	Nominal size	Packing quantity
GBS 300/236 M1	TBS 300/236	1200 x 300mm	4
GBS 300/236 M2	TBS 300/236	1200 x 300mm	4
GBS 300/258 M1	TBS 300/258	1500 x 300mm	4
GBS 300/258 M2	TBS 300/258	1500 x 300mm	4
GBS 300/418 M1	TBS 300/418	600 x 600mm	4
GBS 300/418 M2	TBS 300/418	600 x 600mm	4
GBS 300/436 M1	TBS 300/436	1200 x 600mm	Available to special order
GBS 300/436 M2	TBS 300/436	1200 x 600mm	Available to special order

Note:

Complete luminaires should be ordered by using this Data Sheet in conjunction with Data Sheet PL 3020, which contains detailed information on prewired bodies and suitable lamps, for these controllers including packing quantities for these items. Acrylic prismatic controllers are available for the complete range. See Data Sheet PL 3021

Please order in the form given in the following example, in multiples of the packing quantities:

- 100 Philips recessed luminaire bodies TBS 300/418
- 100 Philips lighting attachments GBS 300/418 M2
- 400 Philips lamps TLD 18W/84

GBS 300/M1 and GBS 300/M2 FLUORESCENT LUMINAIRES

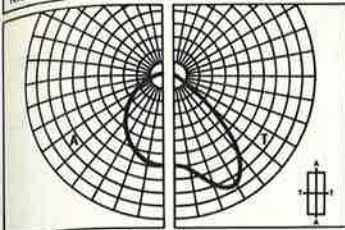
PHOTOMETRIC DATA

TBS 300

Twin Lamp

MIRROR WITH WHITE LAMELLAE (M1)

Mounting: RECESSED



Nadir Intensity 254cd/1000 lm
CIE Flux Code 57 91 98 100 72

SHR MAX (Square) 1.82 (1.75 NOM)
SHR MAX TR (Continuous Rows) 1.85

ULORL 0.00 Multiply by each Service
DLORL 0.72 Correction Factor
LORL 0.72

Glare Data (CIBS)

Flux Fraction Ratio 0.00
ACGO Classification ACGO
Glare BZ (RI 2.5, SHR NOM) B22
Luminous Area (sq cm)
58W
4380

Service Correction Factors

	36W	58W			
Length Factor	1.00	1.00			
Colours 80 Factor	1.02	1.02			
38mm Factor	NA	NA			
Ballast Lumen Factor	1.00	1.00			

Utilization Factors UF (F) for SHR NOM

Room Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	NA	58	62	65	69	72	73	76	77
	30		NA	54	58	62	66	69	71	74	75
	10		NA	51	55	59	63	67	69	72	74
				57	61	64	67	69	71	73	74
50	50	20	NA	57	61	64	67	69	71	73	74
	30		NA	53	57	60	64	67	69	71	73
	10		NA	50	54	58	62	65	67	70	72
				56	59	62	65	67	69	71	72
30	50	20	NA	56	59	62	65	67	69	71	72
	30		NA	52	56	59	63	65	67	69	70
	10		NA	50	54	57	61	64	65	68	69
				48	52	55	59	61	63	65	66

Multiply by each Service Correction Factor

Test No. C391 Dated: 82.01.27
Measured in accordance with BS 5225
Calculations Based on CIBS TM5 and TR10

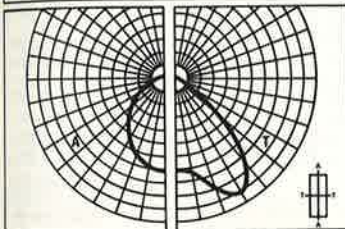
PHOTOMETRIC DATA

TBS 300

Four Lamp

MIRROR WITH WHITE LAMELLAE (M1)

Mounting: RECESSED



Nadir Intensity 261cd/1000 lm
CIE Flux Code 52 92 98 100 71

SHR MAX (Square) 1.87 (1.75 NOM)
SHR MAX TR (Continuous Rows) 1.91

ULORL 0.00 Multiply by each Service
DLORL 0.71 Correction Factor
LORL 0.71

Glare Data (CIBS)

Flux Fraction Ratio 0.00
ACGO Classification ACGO
Glare BZ (RI 2.5, SHR NOM) B21
Luminous Area (sq cm)
18W
3300

Service Correction Factors

	18W	36W			
Length Factor	1.00	1.00			
Colours 80 Factor	1.02	1.02			
38mm Factor	NA	NA			
Ballast Lumen Factor	1.00	1.00			

Utilization Factors UF (F) for SHR NOM

Room Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	NA	58	62	65	69	71	73	75	76
	30		NA	54	58	61	66	68	70	73	75
	10		NA	51	55	59	63	66	68	71	73
				57	60	63	67	69	70	72	74
50	50	20	NA	57	60	63	67	69	70	72	74
	30		NA	53	57	60	64	67	68	71	72
	10		NA	51	55	58	62	65	67	69	71
				56	59	62	65	67	68	70	71
30	50	20	NA	56	59	62	65	67	68	70	71
	30		NA	53	56	59	63	65	66	68	70
	10		NA	50	54	57	61	63	65	67	69
				49	52	55	59	61	62	64	65

Multiply by each Service Correction Factor

Test No. C389 Dated: 82.01.27
Measured in accordance with BS 5225
Calculations Based on CIBS TM5 and TR10

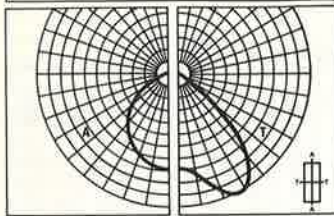
GBS 300/M1 and GBS 300/M2 FLUORESCENT LUMINAIRES

PHOTOMETRIC DATA

TBS 300

Twin Lamp

MIRROR WITH PROFILED LAMPELLAE (M2)	
Mounting:	RECESSED



Nadir Intensity 251cd/1000 lm
CIE Flux Code 63 95 99 100 67

SHR MAX (Square) 1.79 (1.75 NOM)
SHR MAX TR (Continuous Rows) 1.95

ULORL	0.00	Multiply by each Service Correction Factor
DLORL	0.67	
LORL	0.67	

Glare Data (CIBS)

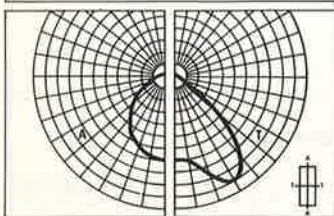
Flux Fraction Ratio	0.00
ACG Classification	ACGO
Glare BZ (r12.5 SHR NOM)	BZ1
Luminous Area (sq cm)	
58W	
4380	

PHOTOMETRIC DATA

TBS 300

Four Lamp

MIRROR WITH PROFILED LAMPELLAE (M2)	
Mounting:	RECESSED



Nadir Intensity 257cd/1000 lm
CIE Flux Code 61 95 99 100 69

SHR MAX (Square) 1.88 (1.75 NOM)
SHR MAX TR (Continuous Rows) 1.95

ULORL	0.00	Multiply by each Service Correction Factor
DLORL	0.69	
LORL	0.69	

Glare Data (CIBS)

Flux Fraction Ratio	0.00
ACG Classification	ACGO
Glare BZ (r12.5 SHR NOM)	BZ1
Luminous Area (sq cm)	
18W	
3300	

Service Correction Factors

	36W	58W			
Length Factor	1.00	1.00			
Colours 80 Factor	1.02	1.02			
38mm Factor	NA	NA			
Ballast Lumen Factor	1.00	1.00			

Utilization Factors UF (F) for SHR NOM

Room Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	NA	57	60	63	66	68	70	72	73
	30		NA	53	57	60	63	66	68	70	71
	10		NA	51	54	57	61	64	66	68	70
				NA	56	59	61	64	66	67	69
50	50	20	NA	56	59	61	64	66	67	69	70
	30		NA	52	56	59	62	64	66	68	69
	10		NA	50	54	57	60	63	64	66	68
				NA	54	57	60	62	64	65	67
30	50	20	NA	54	57	60	62	64	65	67	68
	30		NA	52	55	58	61	63	64	66	67
	10		NA	50	53	56	59	61	63	65	66
	0	0	0	NA	48	51	54	57	59	60	62

Multiply by each Service Correction Factor

Test No. C393 Dated: 82 01 27
Measured in accordance with BS 5225
Calculations Based on CIBS TM5 and TR10

Service Correction Factors

	18W	36W			
Length Factor	1.00	1.00			
Colours 80 Factor	1.02	1.02			
38mm Factor	NA	NA			
Ballast Lumen Factor	1.00	1.00			

Utilization Factors UF (F) for SHR NOM

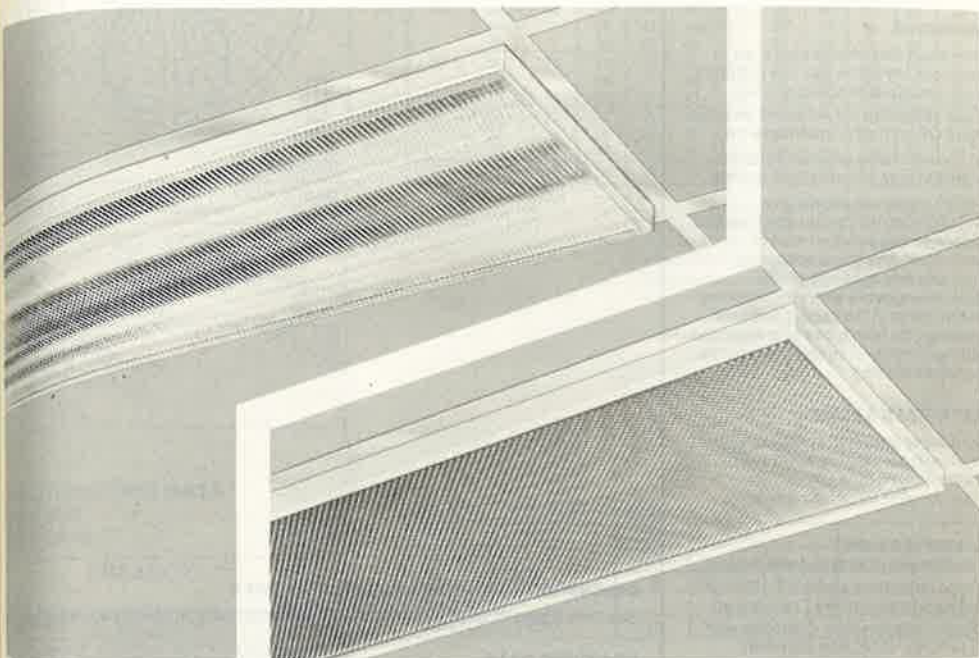
Room Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	NA	58	62	64	68	70	72	74	75
	30		NA	54	58	61	65	68	69	72	73
	10		NA	51	55	59	63	66	67	70	72
				NA	57	60	63	66	68	69	71
50	50	20	NA	57	60	63	66	68	69	71	72
	30		NA	53	57	60	64	66	67	70	71
	10		NA	51	55	58	62	64	66	68	70
				NA	56	59	61	64	66	67	69
30	50	20	NA	56	59	61	64	66	67	69	70
	30		NA	53	56	59	62	64	66	67	68
	10		NA	51	54	57	61	63	64	66	68
	0	0	0	NA	49	52	55	58	60	62	63

Multiply by each Service Correction Factor

Test No. C388 Dated: 82 01 27
Measured in accordance with BS 5225
Calculations Based on CIBS TM5 and TR10

GBS 300/P1 & GBS 300/PS2

Prismatic controllers for TBS 300 bodies



A range of controllers to fit different versions of the TBS 300 body. In conjunction with the appropriate body, the controllers form a range of recessed luminaires for 300mm module suspended ceilings with exposed or concealed tee-bars.

Type GBS 300/P1 has a prismatic panel in a white opal frame and provides controlled light distribution; Type GBS 300/PS2 has a Linsomatic panel in a clear frame to provide WideSpread distribution. Details of TBS 300 bodies, complete with prewired control gear, are contained in Data Sheet PL 3020.

RANGE

GBS 300/418 P1 – acrylic prismatic controller for 600 x 600mm 4-lamp body.
 GBS 300/418 PS2 – acrylic Linsomatic controller for 600 x 600mm 4-lamp body.
 GBS 300/336 P1 – acrylic prismatic controller for 1200 x 600mm 3 or 4-lamp body.
 GBS 300/336 PS2 – acrylic Linsomatic controller for 1200 x 600mm 3-lamp body.
 *GBS 300/436 PS2 – acrylic Linsomatic controller for 1200 x 600mm 4-lamp body.
 GBS 300/236 P1 – acrylic prismatic controller for 1200 x 300mm 1 or 2 lamp body.

*Top illustration – GBS 300/PS2
 Lower illustration – GBS 300/P1*

GBS 300/236 PS2 – acrylic Linsomatic controller for 1200 x 300mm 2-lamp body.
 GBS 300/136 PS2 – acrylic Linsomatic controller for 1200 x 300mm 1-lamp body.
 GBS 300/258 P1 – acrylic prismatic controller for 1500 x 300mm 1 or 2 lamp body.
 GBS 300/258 PS2 – acrylic Linsomatic controller for 1500 x 300mm 2-lamp body.
 GBS 300/158 PS2 – acrylic Linsomatic controller for 1500 x 300mm 1-lamp body.
 *Available to special order.

FLUORESCENT LUMINAIRE

To reorder this data sheet quote

PL 3021/5

Issued 7/83

Replaces PL 3021/4

GBS 300/P1 and GBS 300/PS2 PRISMATIC CONTROLLERS

APPLICATIONS

For metric modular suspended ceiling systems with exposed or concealed tees, in situations such as:

- Shops and department stores
- Offices and executive suites
- Municipal buildings
- Hospitals
- Restaurants and hotels
- Cinema and theatre foyers
- Banking and commercial halls

FEATURES

- Fits flush into ceiling apertures; complete luminaire has low installed depth for use with shallow voids.
- Non-yellowing acrylic panel ensures high LOR with good maintenance.
- P1 panels have external pyramid prisms to give efficient light control.
- PS2 Linsomatic panels give WideSpread distribution which permits wider spacing between rows of luminaires. This gives economic, aesthetic and lighting benefits.
- Interchangeable with other lighting attachments in the range; common housings for both types of suspended ceiling simplify ordering procedures and stockholding.

MATERIALS & FINISH

Controller panel: (P1) Acrylic, with external pyramid prisms.
Frame-Polystyrene.
(PS2) Acrylic Linsomatic moulding.

SPECIFICATION

(combination of body and attachment)

- Type compliance with BS 4533 2.2 Ordinary Indoor Class I (electrical).
- Radio interference: Complies with SI 1978 No. 1268: Regulation 6. Suppressed for use in residential areas.

To specify state:

Modular recessed luminaire, based on standard body with wide choice of interchangeable lighting attachments.

To have acrylic controller and to be suitable for use with TLD krypton-filled 26mm diameter lamps. Similar to Philips TBS 300 with P1 (PS2) controller.

RANGE OF OPERATION

(combination of body and attachment)

240V 50Hz supplies.
Normal indoor conditions.

DIMENSIONS, WEIGHTS & ELECTRICAL DATA

See Data Sheet PL 3020 for physical and electrical data on complete luminaires.

ORDERING DATA

Catalogue Numbers Controller	Body	Nominal size	Packing quantity
GBS 300/418 P1	TBS 300/418	600 x 600mm	4
GBS 300/418 PS2	TBS 300/418	600 x 600mm	4
GBS 300/336 P1	TBS 300/336	1200 x 600mm	4
	TBS 300/436		
GBS 300/336 PS2	TBS 300/336	1200 x 600mm	4
GBS 300/436 PS2	TBS 300/436	1200 x 600mm	4
GBS 300/236 P1	TBS 300/136	1200 x 300mm	4
	TBS 300/236		
GBS 300/236 PS2	TBS 300/236	1200 x 300mm	4
GBS 300/136 PS2	TBS 300/136	1200 x 300mm	4
GBS 300/258 P1	TBS 300/258	1500 x 300mm	4
	TBS 300/158		
GBS 300/258 PS2	TBS 300/258	1500 x 300mm	4
GBS 300/158 PS2	TBS 300/158	1500 x 300mm	4

Note:

Complete luminaires should be ordered by using this Data Sheet in conjunction with Data Sheet PL 3020, which contains detailed information on prewired bodies and suitable lamps for these controllers, including packing quantities for these items.

Please order in the form given in the following example, in multiples of the packing quantities:

100 Philips recessed luminaire bodies TBS 300/418
100 Philips lighting attachments GBS 300/418 PS2
400 Philips lamps TLD 18W/84

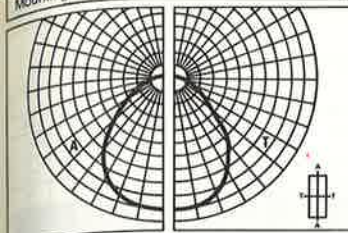
Luminaire: Made in Holland

GBS 300/P1 and GBS 300/PS2 PRISMATIC CONTROLLERS

PHOTOMETRIC DATA TBS 300 Twin Lamp

PRISMATIC (P1)

Mounting: RECESSED



Midair Intensity 277cd/1000 lm
CIE Flux Code 60 89 98 100 60

SHR MAX (Square) 1.52 (1.50 NOM)
SHR MAX TR (Continuous Rows) 1.66

LULORL 0.00 Multiply by
DLORL 0.60 each Service
LORL 0.60 Correction Factor

Glare Data (CIBS)

Flux Fraction Ratio 0.00
ACG Classification ACGO
Glare BZ (RI 2.5, SHR NOM) BZ2
Luminous Area (sq cm)
38W 58W
3230 4040

Service Correction Factors

	36W	58W			
Length Factor	1.00	1.00			
Colours 80 Factor	1.02	1.02			
38mm Factor					
Ballast Lumen Factor	1.00	1.00			

Utilization Factors UF (F) for SHR NOM

Room Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	43	47	51	53	57	59	61	63	64
	30		39	43	47	50	54	56	58	61	63
	10		36	40	44	47	51	54	56	59	61
50	50	20	42	46	49	52	55	57	58	60	62
	30		38	42	46	49	52	55	56	59	60
	10		36	40	44	47	50	53	55	57	59
30	50	20	41	45	48	50	53	55	56	58	60
	30		38	42	45	48	51	53	55	57	58
	10		36	40	43	46	49	52	53	56	58
0	0	0	35	38	42	44	47	50	51	53	55

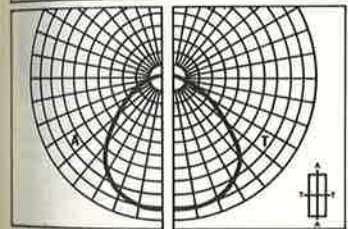
Multiply by each Service Correction Factor

Test No. C392 Dated: 82.01.25
Measured in accordance with BS 5225
Calculations based on CIBS TM5 and TR10

PHOTOMETRIC DATA TBS 300 Four Lamp

PRISMATIC (P1)

Mounting: RECESSED



Midair Intensity 279cd/1000 lm
CIE Flux Code 59 89 98 100 64

SHR MAX (Square) 1.63 (1.50 NOM)
SHR MAX TR (Continuous Rows) 1.86

LULORL 0.00 Multiply by
DLORL 0.64 each Service
LORL 0.64 Correction Factor

Glare Data (CIBS)

Flux Fraction Ratio 0.00
ACG Classification ACGO
Glare BZ (RI 2.5, SHR NOM) BZ2
Luminous Area (sq cm)
18W 3200

Service Correction Factors

	18W				
Length Factor	1.00				
Colours 80 Factor	1.02				
38mm Factor					
Ballast Lumen Factor	1.00				

Utilization Factors UF (F) for SHR NOM

Room Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	45	49	54	56	60	63	64	67	68
	30		41	45	50	53	57	60	62	64	67
	10		38	42	47	50	54	57	60	63	65
50	50	20	44	48	52	55	58	61	62	64	66
	30		40	45	49	52	56	58	60	62	64
	10		37	42	46	49	53	56	58	61	63
30	50	20	43	47	51	53	57	59	60	62	63
	30		40	44	48	51	54	57	58	60	62
	10		37	42	46	49	52	55	57	61	61
0	0	0	36	40	44	47	50	53	54	56	58

Multiply by each Service Correction Factor

Test No. C390 Dated: 82.01.25
Measured in accordance with BS 5225
Calculations based on CIBS TM5 and TR10

GBS 300/P1 and GBS 300/PS2 PRISMATIC CONTROLLERS

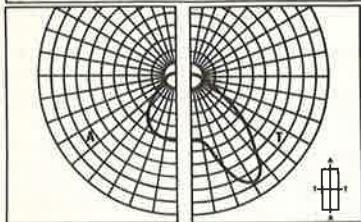
PHOTOMETRIC DATA

TBS 300

Single Lamp (PS2)

LINSOMATIC COVER WITH CLEAR SIDES

Mounting: RECESSED



Nadir Intensity 193cd/1000l m
CIE Flux Code 54 86 96 97 72

SHR MAX (Square) 1.95 (1.75 NOM)
SHR MAX TR (Continuous Rows) 1.96

ULORL	0.01	Multiply by each Service Correction Factor
DORL	0.71	
LORL	0.72	

Glare Data (CIBS)

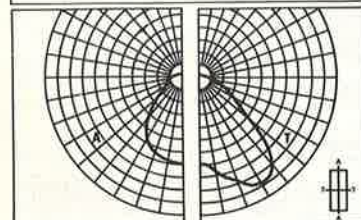
Flux Fraction Ratio	0.01
ACG Classification	AC90
Glare BZ (RI 2.5, SHR NOM)	BZ3
Luminous Area (sq cm)	
5W	
4040	

TBS 300

Twin Lamp (PS2)

LINSOMATIC COVER WITH CLEAR SIDES

Mounting: RECESSED



Nadir Intensity 190cd/1000l m
CIE Flux Code 54 84 96 97 63

SHR MAX (Square) 1.92 (1.75 NOM)
SHR MAX TR (Continuous Rows) 2.23

ULORL	0.02	Multiply by each Service Correction Factor
DORL	0.61	
LORL	0.63	

Glare Data (CIBS)

Flux Fraction Ratio	0.97
ACG Classification	ACGO
Glare BZ (RI 2.5, SHR NOM)	BZ3
Luminous Area (sq cm)	
5W	
4380	

Service Correction Factors

	58W	
Length Factor	1.00	
Colours 80 Factor	1.02	
38mm Factor	—	
Ballast Lumen Factor	1.00	

Utilization Factors UF (F) for SHR NOM

Room Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	NA	56	60	63	67	70	72	74	76
	30		NA	51	55	59	63	67	69	72	74
	10		NA	48	52	56	61	64	66	70	72
50	50	20	NA	54	58	61	65	67	69	71	73
	30		NA	50	54	57	62	65	66	69	71
	10		NA	47	51	55	59	62	64	67	69
30	50	20	NA	53	56	59	63	65	66	68	70
	30		NA	50	53	56	60	63	64	67	68
	10		NA	47	51	54	58	61	63	65	67
0	0	0	NA	45	49	52	55	58	60	62	63

Multiply by each Service Correction Factor

Test No. C426 Dated: 82.04.15
Measured in accordance with BS 5225

Service Correction Factors

	58W	
Length Factor	1.00	
Colours 80 Factor	1.02	
38mm Factor	—	
Ballast Lumen Factor	1.00	

Utilization Factors UF (F) for SHR NOM

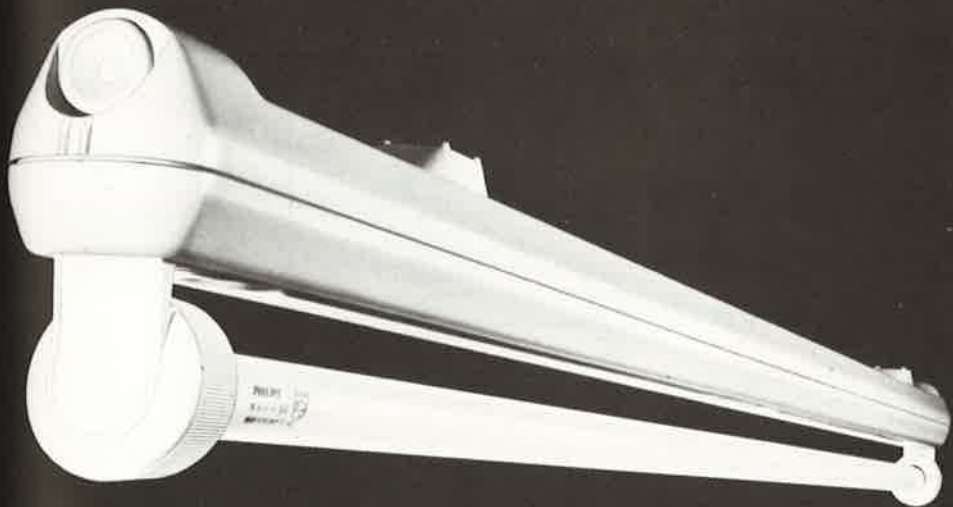
Room Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	NA	48	52	54	58	61	62	65	66
	30		NA	44	48	51	55	58	60	62	64
	10		NA	41	45	48	52	55	57	60	62
50	50	20	NA	47	50	52	56	58	60	62	63
	30		NA	43	47	49	53	56	57	60	62
	10		NA	41	44	47	51	54	56	58	60
30	50	20	NA	45	48	51	54	56	57	59	60
	30		NA	42	45	48	52	54	55	58	59
	10		NA	40	43	46	50	52	54	56	58
0	0	0	NA	38	41	44	47	50	51	53	55

Multiply by each Service Correction Factor

Test No. C427 Dated: 82.04.15
Measured in accordance with BS 5225

TMW 065 PROTECTOR GP

**Corrosion-resistant
fluorescent luminaires -
Category of Protection
IP65**



Protected luminaires for TLD fluorescent lamps. Category of Protection IP65. TMW 065 luminaires are for use in conditions of dust, moisture and corrosion where ordinary luminaires would not be suitable, but where there is no hazard requiring 'Flameproof' or 'Type N' luminaires.

RANGE

TMW 065/118 for one TLD 18W lamp.
TMW 065/158 for one TLD 58W lamp.
TMW 065/258 for two TLD 58W lamps.
Overtubes are available for both lamp lengths.

APPLICATIONS

Possible applications include:

- Loading bays.
- Multi-storey car parks.
- Bottling plant.
- Laundries.
- Food processing (with overtubes).
- Outbuildings.
- Transport stations.

PROTECTED LUMINAIRE

To reorder this Data Sheet quote

PL 3058

Issued

Replaces PL 3052

TMW 065-PROTECTOR GP

FEATURES

Durability

- GRP body is resistant to most corrosive atmospheres.
- Positive sealing of body halves with full-length gasket.
- Optional overtubes protect lamps and maintain lamp temperature in cold conditions.

Fast, easy installation

- Lightweight top plate is fixed to ceiling before gear tray is attached.
- Gear tray hangs from top plate while electrical connections are made.
- Gear tray is quickly fastened by peg-clips.
- ▽ symbol – may be mounted direct on to suitable wooden surfaces.
- Class II electrical – no Earth required.
- Optional acrylic overtubes have high light transmission and resistance to yellowing.

MATERIALS & FINISH

Body: Glass-fibre reinforced polyester, light grey.

Peg clips: Polycarbonate.

Overtubes: Acrylic 38mm diameter, for TLD lamps.

SPECIFICATION

■ Type compliance with BS4533 (IEC 598)

■ Enclosure IP65 ('Dust-tight' and 'Jet-proof' as defined in BS 4533).

■ Class II electrical (double insulation – no Earth required).

■ ▽ Symbol. Luminaires may be mounted on suitable wooden surfaces.

To specify state: Fluorescent lamp luminaire for arduous conditions using TLD lamps with provision for acrylic overtubes. The luminaire shall comply with IEC 598, and shall meet requirements for IP65, Class II electrical and ▽ symbol. Similar to Philips TMW 065.

RANGE OF OPERATION

- 240V 50Hz mains supplies.
- Rated service up to 25°C with excursions not exceeding 35°C. Bare battens operate down to approximately 0°C and battens with overtubes down to approximately minus 5°C.

FIXING AND WIRING

Accessories included are two of each: Screws, rubber washers, slip-fix plates. Pre-fix the screws with rubber washers. Offer up top plate, engage slip-fix plates and tighten. Introduce cable through one of the closed glands at the ends of the top plate, and connect to the two-pole terminal block.

DIMENSIONS & WEIGHTS

Catalogue No.	Dimensions (mm)				Weight (kg)
	A	B	C	D	
TMW 065/118	660	60	121	300	1.4
TMW 065/158	1270	60	121	1200	2.7
TMW 065/258	1270	126	121	1200	4.7

ELECTRICAL DATA

Rating	Circuit Watts (Running)	Circuit Current (Amps)	Minimum Power Factor
1 x TLD 18W 600mm	29	0.25	0.50 lagging
1 x TLD 58W 1500mm	70	0.35	0.95
2 x TLD 58W 1500mm	140	0.7	0.95

Circuits are switchstart with starters inside gear tray.

ORDERING DATA

Catalogue No.	Description
TMW 065/118	Protected luminaire for TLD 18W lamp.
TMW 065/158	Protected luminaire for TLD 58W lamp.
TMW 065/258	Protected luminaire for two TLD 58W lamps.

Optional overtubes

GMW 18TS	Overtube for 18W lamp.
GMW 58TS	Overtube for 58W lamp.

Overtubes are complete with replacement lampholder rings, and are for TLD lamps only. Two are required for the two-lamp batten.

Please order in the form given in the following example. All items are individually packed. Add Philips TLD lamps of colour required.

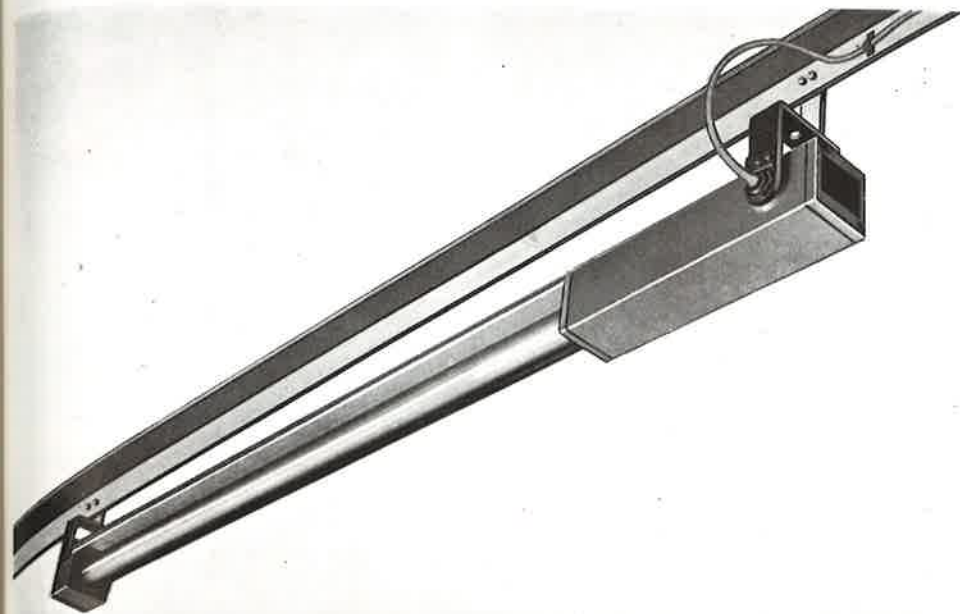
10 Philips TMW 065/258 Protector GP luminaires.

20 Philips GMW 58TS overtubes for TMW 065/258.

Luminaire: Made in W. Germany.

COMMANDO FLAMEPROOF fluorescent luminaire

Zone I IP65



A2480X

Fluorescent luminaires for Zone I, certified by BASEEFA, and with enclosure to IP65.

RANGE

One lamp 65W 1500mm (5ft)
Two lamp 65W 1500mm (5ft)
Starterless control gear.

APPLICATIONS

For use in areas designated as Zone I, where flammable gases as listed in BS229 Groups II and III are present. Not for use in methane or coal gas (Group M) atmospheres.

PROTECTED LUMINAIRE

To reorder this Data Sheet quote

PL 1801/4

Issued 8/83

Replaces PL 1801/3

COMMANDO FLAMEPROOF LUMINAIRE

FEATURES

- Main components are strong die-castings of corrosion-resistant LM4 aluminium alloy.
- Quickly and easily installed; the suspension brackets are fitted first and the body of the luminaire is lifted up and hung in position.
- Simple to relamp from the 'small' end of the luminaire, which may be lowered to assist the operation.
- Two-lamp luminaires consist of two one-lamp luminaires on the same suspension brackets, supplied complete with interconnections.
- Easily wired; access to the terminal block is gained by removal of the spigot-type end cover and sealing gasket. The terminal block is of the clamp type, for live, neutral and earth, and is removable. Terminals have capacity for up to two 4mm² conductors. Cables enter the terminal chamber via swivel bushes incorporating a weatherproof sealing ring.

Note: Bushes are normally earthed via the outer of MI cable; the luminaire must be earthed by separate connection to the earth terminal.

- In cold conditions, MCFA lamps with external earth strip may be used for improved starting.

RANGE OF OPERATION

For indoor or sheltered outdoor use on 240V 50Hz supplies in ambient temperatures from 0°C to 30°C. For horizontal mounting only.

Note: Ensure that there is sufficient clearance for the luminaire to be swung vertically downwards for relamping.

SPECIFICATION

- Class I electrical Earth required.
- Complies with BS229: 1957 and BS889: 1965.
- Certified Flameproof by the British Approvals Service for Electrical Equipment in Flammable Atmospheres. Certificate of Assurance No. EX.71011. For use in Zone I hazardous areas Groups II and III.
- Enclosure has protection to IP65.

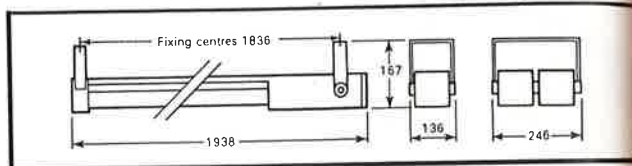
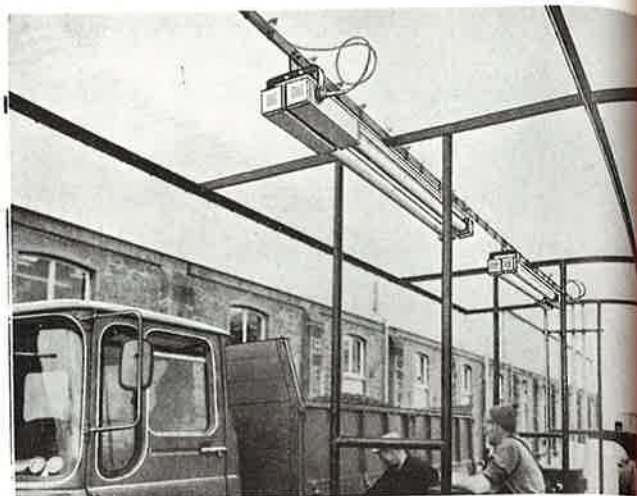
To specify state:

Fluorescent luminaire for use in Zone I hazardous areas, with endorsement to IP65. Similar to Philips Commando flameproof luminaires.

MATERIALS & FINISH

Body, glazing castings and end covers: Gravity die-castings, LM4 aluminium alloy to BS1490: 1970, stove-enamelled two-tone grey.

Protective sleeve for lamp: Borosilicate glass, cemented to glazing castings.



WEIGHTS & ELECTRICAL DATA

Catalogue No.	Rating	Circuit Watts (running)	Circuit Current (amperes)	Weight (kg/lb)	Packing quantity
A2480X	1 x 65W 1500mm (5ft)	76W	0.4	15/33	1
A2481X	2 x 65W 1500mm (5ft)	152W	0.8	30/66	1

ORDERING DATA

Please order in the form given in the following example, in multiples of the packing quantity:

Philips Commando flameproof A2480X luminaires.

Lamps should be ordered separately (Philips MCFE 65/80W/35).

Made in Great Britain.

SPECIAL PROJECT LUMINAIRES

Page

TBS100	99
Dimming Equipment	103
Recessed Undercanopy Luminaire	107

Non Stock

Special versions of standard stock luminaire types can be supplied to special order.

Typical deviations from standard include variations in:—

Operating voltage e.g. 220V

Operating frequency e.g. 60Hz

Light regulation (Dimmable) Control Gear

Special fixing arrangements

Electrical connections (e.g. large terminal blocks, flying leads etc.)

A guide to **MINIMUM** order quantities follows, but availability depends on technical feasibility and production economics. Enquiries to your local Lighting Sales Desk.

Description	M.O.Q.
New Streamlite	500
Feature	250
Featureline Trunking	100
Featureline Luminaires	200
Finesse	100
Zonalux	100
Planner	100
TCS429 Mirror Luminaires	50
Modifications to all Philips standard luminaires are possible subject to the above conditions. Please enquire.	

Custom Made

A number of High Output optical systems have been designed to fit into custom made metal work to suit a particular installation.

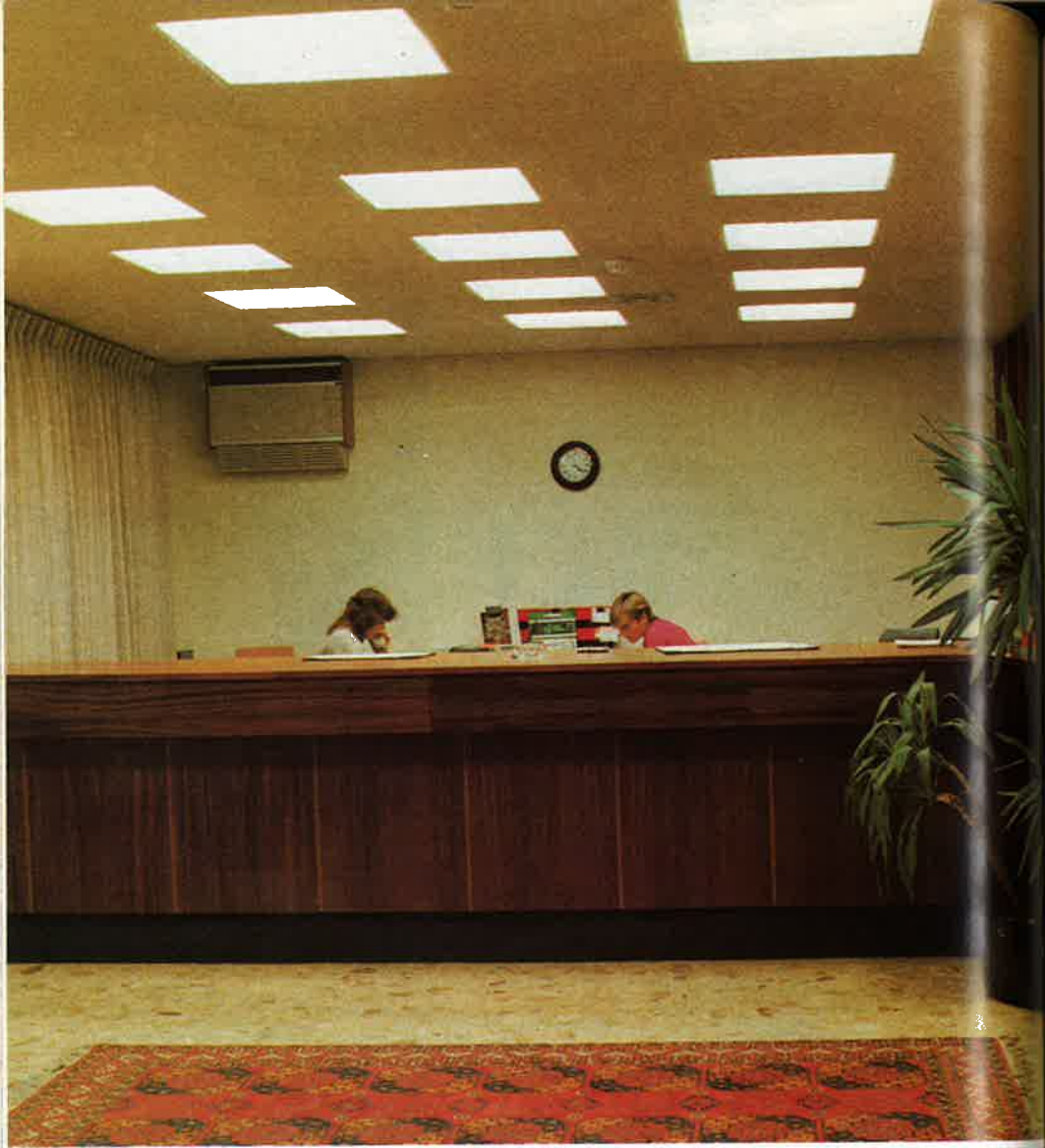
Types available are:—

Description	M.O.Q.
TBN284 VDU Mirror System	50
TCS: Batwing Mirror System	100
TBS100 Tailor Made Mirror Luminaires	50
CRYSTAL LOUVRE: Air Handling Prismatic Louvres	100

Special Design

Individual designs to Customer's own needs and specifications can be undertaken subject to M.O.Q.

Please see pages II and III of General Introduction for information on how to use this Handbook.



HONG KONG & SHANGHAI BANK

The Bank's new headquarters in St. Helier, Jersey, saves energy two ways – with 164 TBS 100 mirror optic luminaires using Colour 84 lamps, and with an energy control system to switch off unwanted luminaires. Average illuminance is 600 lux.

TBS 100

Custom-made product - built to special order

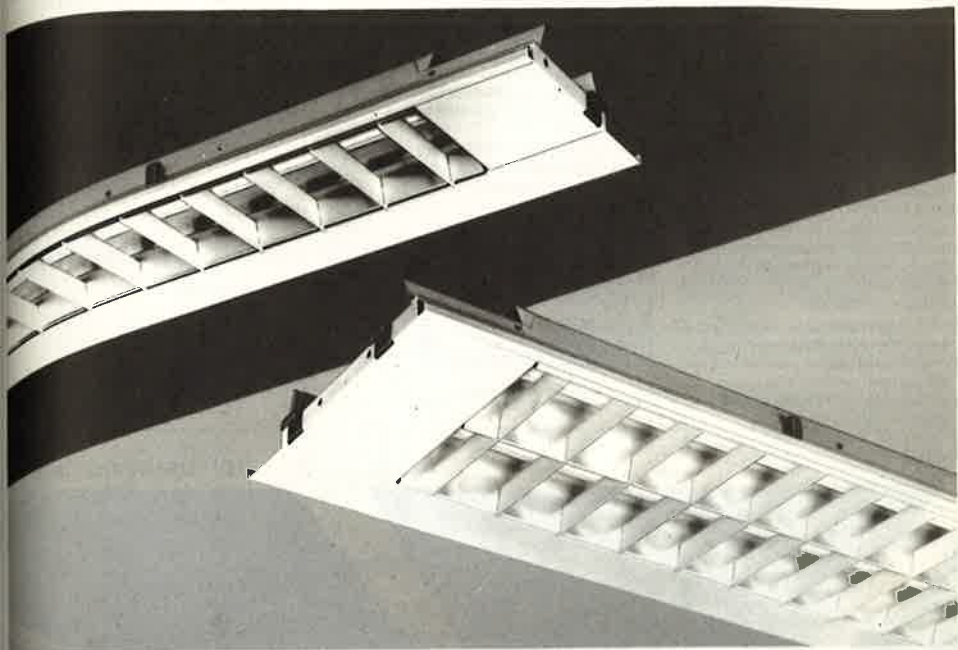


Illustration shows both the single lamp and twin lamp TBS 100 luminaires with an indication of the narrowest and a wider flange on the same luminaire. Normal arrangement is with equal width flanges on both sides and equal length end plates at each end.

Recessed fluorescent luminaires to fit all types of suspended ceiling system, with mirror louvre construction.

Available with normal dispersive or WideSpread distribution and, integral facilities for air handling.

An advanced range of recessed luminaires which combine high LOR with low brightness, specifically designed for use with Philips PowerSlimmer TLD krypton-filled energy-saving lamps.

Available in single and twin versions and designed for recessed mounting into ceiling systems where the ceiling tile planks are made to fit the building modules.

Luminaires can be supplied in any length between 1300 and 2500mm and any width between 170 and 600mm. Installed as single luminaires or in continuous lines which may incorporate infill spacer boxes (depending on length of luminaire) to carry services such as energy management control components and switches, ventilation, sound, standby lighting, fire detection and control.

RANGE

Can be supplied in the following switchstart ratings:

1 - lamp 36W (Minimum length 1300mm; minimum width 170mm)

2 - lamp 36W (Minimum length 1300mm; minimum width 295mm)

1 - lamp 58W (Minimum length 1600mm; minimum width 170mm)

2 - lamp 58W (Minimum length 1600mm; minimum width 295 mm)

Choice of lighting attachments:

Mirror with white lamellae -

WideSpread distribution

Lamellae louvre - normal dispersive distribution

SPECIAL PROJECT LUMINAIRES

To reorder this Data Sheet quote

PL 3030/2

Issued 6/83

Replaces PL 3030/1

TBS 100 – SPECIAL PROJECT LUMINAIRES

APPLICATIONS

For use with all types of suspended ceiling system, with virtually any size of module, in situations such as:

- Offices
- Shops and department stores
- Banking halls
- Showrooms
- Laboratories
- Assembly and lecture areas
- Hotels

FEATURES

- Fully recessed into ceiling to give clean, uncluttered appearance.
- Choice of lighting attachments, with high LOR and low brightness; WideSpread version uses mirror optics to spread the light sideways, giving economic, aesthetic and lighting benefits (see leaflet PL 1608).
- PowerSlimmer TLD 26mm diameter krypton-filled lamps use around 8 per cent less energy than comparable 38mm diameter argon-filled lamps of same nominal length.
- Tailor-made to fit any ceiling module in the range 1300 – 2500mm long by 170 – 600mm wide.
- Infill panels between luminaires provide space for building services energy management control components and switches (sound, fire detection, etc.) and partition heads.

■ Air slots are provided above luminaire; air can be exhausted either via the plenum or via an air box connected to an air exhaust duct. The exhaust air box is attached to the duct by means of an 'instant-clip' spigot.

■ Lighting attachments are retained by simple, snap-in locks and hinge down on one side for hands-free relamping.

■ Built-in support brackets can support luminaire between two suspension profiles while ceiling is still under construction.

■ When used with Philips GPS100 ceiling system and plank ceiling tiles of equal dimensions a very flexible and adaptable lighting installation is achieved.

■ Can be supported by Philips GPS 100 ceiling system without individual luminaire supports.

EXHAUST SLOT AREA

Rating	Slot area (cm ²)
1 × 36W	48
2 × 36W	96
1 × 58W	60
2 × 58W	120

MATERIALS & FINISH

Body: Sheet steel, 0.8mm thick, white stove enamel.

Mirror controller: Aluminium; matt anodised mirror with white louvres.

Lamellae louvre controller: Aluminium reflector and louvres, white finish.

SPECIFICATION

- Type compliance with BS 4533 Ordinary Indoor Class 1 (Electrical)
- Radio interference: Complies with SI 1978 No. 1268: Regulation 6. Suppressed for use in residential areas.

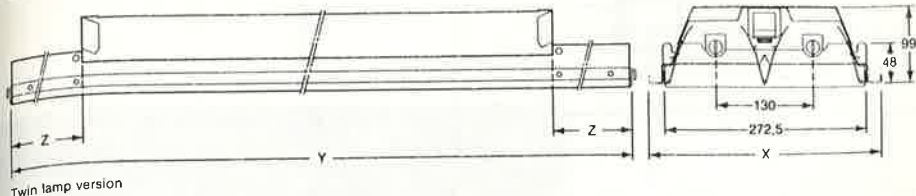
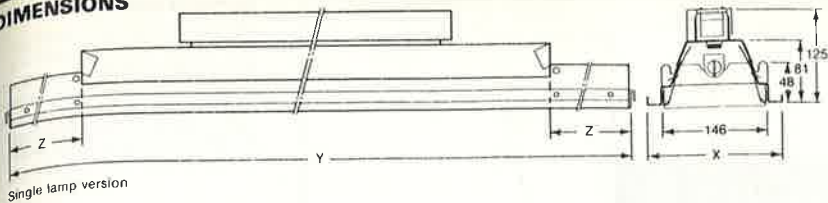
RANGE OF OPERATION

240V 50Hz supplies, or to special order.
Normal indoor conditions.



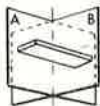
Air handling luminaires in Shell Centre Supermarket, London.

DIMENSIONS



LIGHTING DATA

cd/1000 lm



Single lamp version

Twin lamp version

Width X : 170 to 400 mm

Width X : 295 to 600 mm

Length Y : 1300 to 2500 mm

Length Y : 1300 to 2500 mm

36 W : 1300 to 2500 mm
58 W : 1600 to 2500 mm

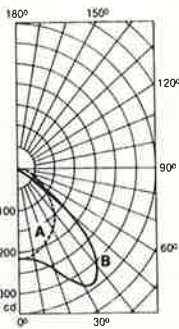
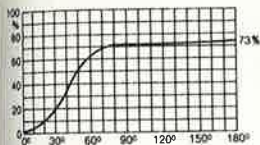
36 W : 1300 to 2500 mm
58 W : 1600 to 2500 mm

Note: Dimensions Z: lengths of infill panels

LIGHT DISTRIBUTION DIAGRAMS

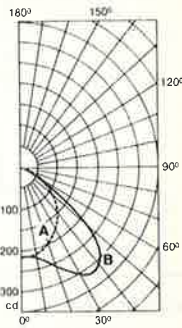
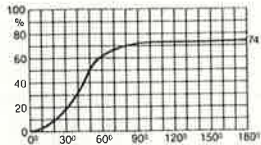
1 x "TL" D 36W with mirror

Zonal luminous flux diagram



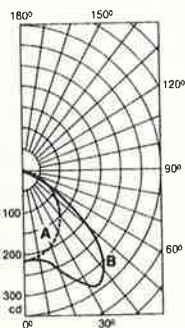
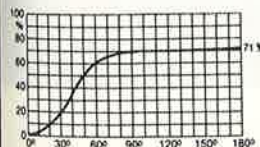
2 x "TL" D 36W with mirror

Zonal luminous flux diagram



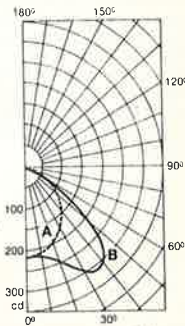
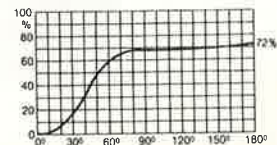
1 x "TL" D 58W with mirror

Zonal luminous flux diagram



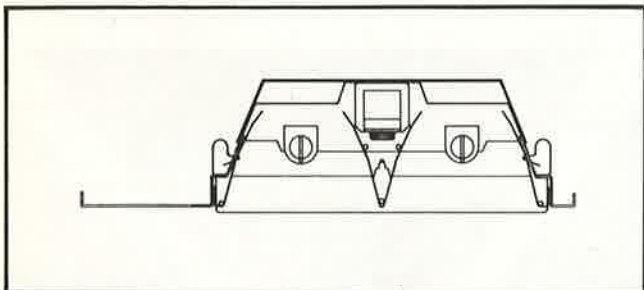
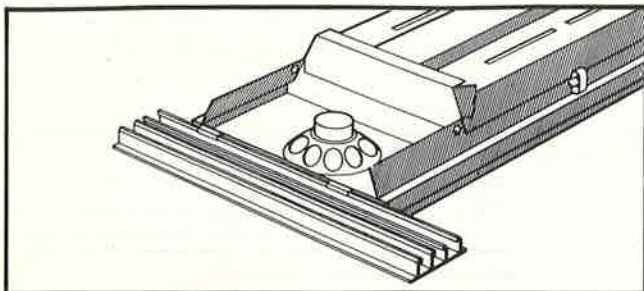
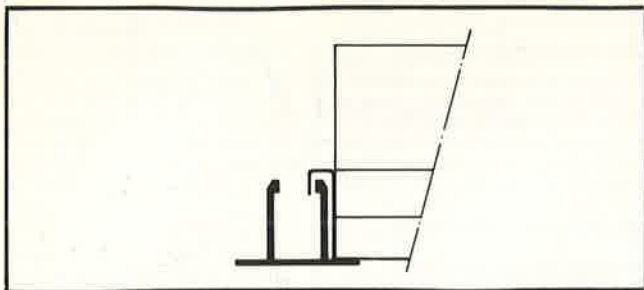
2 x "TL" D 58W with mirror

Zonal luminous flux diagram



TBS 100 – SPECIAL PROJECT LUMINAIRES

OPTIONAL VERSIONS



ORDERING DATA

Since Philips custom-made products are built to individual requirements, no stock is held and details such as product dimensions are finalised before manufacture. Enquiries for custom-made products should be directed to the Special Projects Department, Philips Lighting, PO Box 298, City House, London Road, Croydon CR9 3QR.

AIR SUPPLY

For air supply, the rims of the luminaire can be fitted with slots on one or both sides to allow linear air supply diffusers to be used.

AIR EXHAUST

Slots are provided in the top of the luminaire for returning air to a negative pressure plenum.

SUPPORT BRACKETS

The brackets which are fitted are intended to support the luminaire between two suspension profiles when the ceiling system is still being installed. The standard versions are designed to suit Philips GPS 100 ceiling systems. Support brackets to match other types of ceiling system can be ordered.

INFILL PANELS

The infill panels are well suited to the inclusion of any function which has to be integrated into the ceiling system, e.g. smoke detectors, electronic control gear for dimming or switching loudspeakers and energy management controls.

ASYMMETRIC VERSIONS

Normally the process of lengthening or widening the luminaires is carried out symmetrically on all sides. To special order, the housing can be located asymmetrically in the length and/or width in relation to the ceiling module to accommodate air supply diffusers.

Lamp: Made in Holland
Fitting: Made in Holland

DIMMING EQUIPMENT

for Fluorescent and Tungsten lamps

A range of electronic dimmers and controls for regulating the output of fluorescent and tungsten lamps with manual or automatic control.

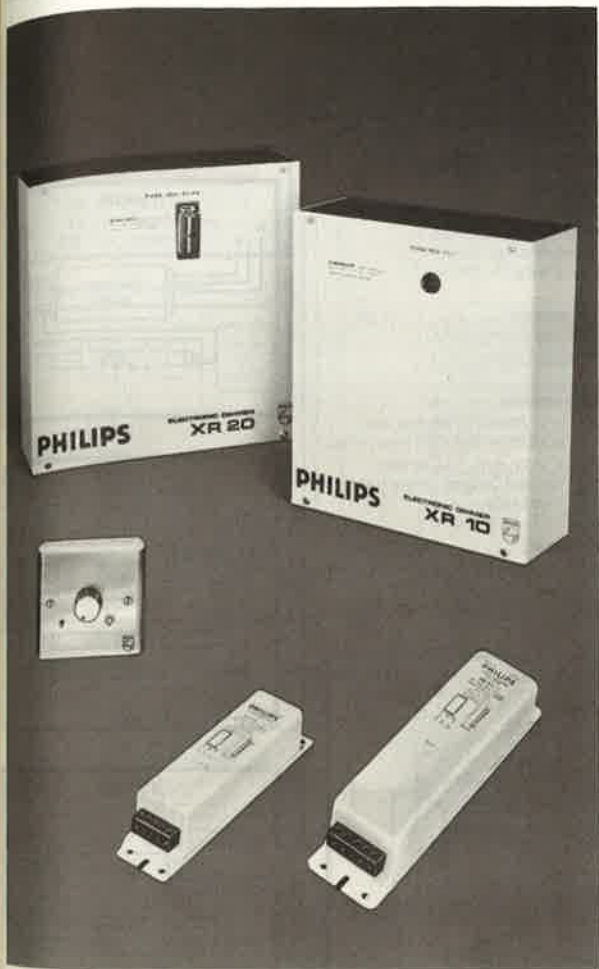
RANGE

For 240V AC operation
 XR 10 – 2kW 10A
 XR 20 – 4kW 20A
 Manual control
 Automatic control

APPLICATIONS

Possible applications include:

- Office lighting
- Display lighting
- Lecture theatres
- Conference rooms
- Board rooms
- Hospitals



To reorder this Data Sheet quote

PL 3034/3

Issued B 84

Replaces PL 3034/2

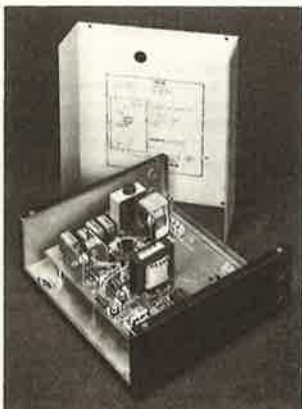
DIMMING EQUIPMENT

FEATURES

- Infinitely variable brightness control.
- Manual or automatic.
- Fluorescent or tungsten loads.
- Up to six dimmers can be operated by one control.
- Single or three phase 240V AC operation.
- Multi point control on automatic system.
- Dimmers are fitted with hard firing circuitry to reduce the D.C. component to less than 1 volt D.C. In addition they are also fitted with a contactor to isolate both the load and cathode heating circuit when dimmer is in the 'OFF' position. This contactor operates automatically, at the end of the down fade to zero.
- Ventilation - The heat emission from the dimmers is less than 2% of the connected load. The dimmers will operate at full load in ambient temperatures up to 40°C. Should the ambient temperature exceed 40°C the dimmers must be de-rated.
- Fusing and suppression - The 2kW (10A) dimmers are protected by 1½" 10 Amp cartridge fuse, and the 4kW (20A) by a BS88 20 Amp cartridge fuse. Provision is made for external protection instead, but such external protection must be capable of protecting thyristors.
- Interference - All dimmers are fitted with an R.F.I. suppressor network to reduce interference below the limits set down by BS800: 1977. However, audio and video system cables must not be installed in the same conduits or trunking as the dimmed load cables.

MATERIALS & FINISH

Dimmer cases: Constructed from aluminium with a 'Bondene' finish.
Lid: Constructed from aluminium, finished in a cream coloured semi-matt epoxy paint with black silk screened lettering.



SPECIFICATIONS

■ Supply: 240V 50Hz

Fluorescent loads:

Maximum number of lamps per dimmer

	2ft	4ft	5ft
XR 10	27*	22	14
XR 20	54*	45	29

* 2ft 20 watt lamps are operated 2 to a ballast
 Tungsten filament loads—240V rated
 XR 10-2kW
 XR 20-4kW

Note: Fluorescent lamps must be equipped with control gear suitable for dimming and need a 4 wire system - fixed live, variable live, neutral and earth.

Controls:

XC 10 - single switch plate mounting rotary control. Also see separate list.

RANGE OF OPERATION

240V AC 50Hz.

Weights:

XR 10 - 2.4Kg
 XR 20 - 3.4 Kg

Fixing centres:

XR 10 - 210 × 210
 XR 20 - 210 × 210

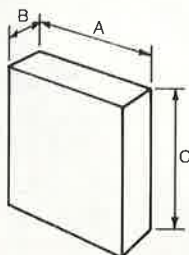
Conduit entries:

XR 10 - 2 × 20 mm in the top and bottom on the right hand side.
 XR 20 - 1 × 20 mm, 1 × 25 mm top and bottom on the right hand side.

Control gear:

XB 42/1 - Ballast operates 1 x 4ft 40W lamp or 2 x 20W lamps
 XB 65/1 - Ballast operates 1 x 5ft 65W lamp.

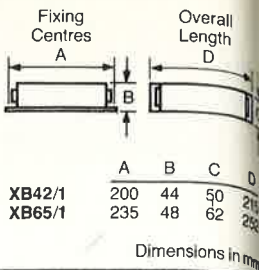
Dimensions



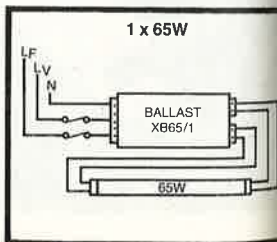
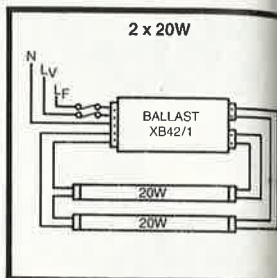
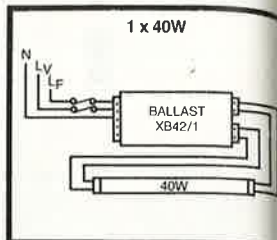
	A	B	C
XR10	250	95	280
XR20	280	120	280

Dimensions in mm

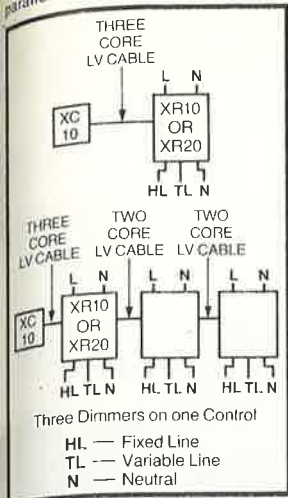
Dimensions



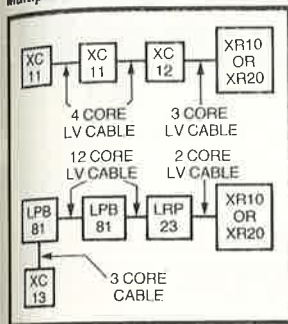
CONNECTIONS FOR:



Multiple dimmer installations:
Under no circumstances should the output (load) connections be paralleled.



Multiple control installation



The range is as follows:

XC 10	A basic turn control on a single flush mounted plate.
XC 11	As XC10 but with additional push switch and LED Up to 4 may be used together for multi-point control. A press of the switch gives control at that position.
XC 12	Re-set unit to take lighting to 100% on resumption of supply after power failure. One to be used with each installation of XC11.
XC 13	2 push to make switches. Mounted on a single flush mounted plate.
XC 14	As XC13 plus LED's
LRP 23	Electronic potentiometer unit (EPU). Connects with the XR regulators to provide automatic controls from a manual regulator when coupled with an LPB 81.
LPB 81	Control panel giving 8 automatic control functions plus LED level indication for use with LRP 23. Control functions are: ● On to max ● On to preset 1 ● On to preset 2 ● Off ● On & fade up ● Stop ● Down fade ● Down & off

Fluorescent luminaires:

Most standard and custom designed fluorescent luminaires can be modified to take dimming gear.

Fluorescent lamps:

Lamps must be T12 38mm MCFC.

Tungsten filament lamps:

Both the 10 and 20 Amp dimmers can be used to operate filament lamp installations up to their full load capacity. In these cases no connection is made to the HL terminal. These dimmers will also operate low voltage filament lamps that are transformer fed.

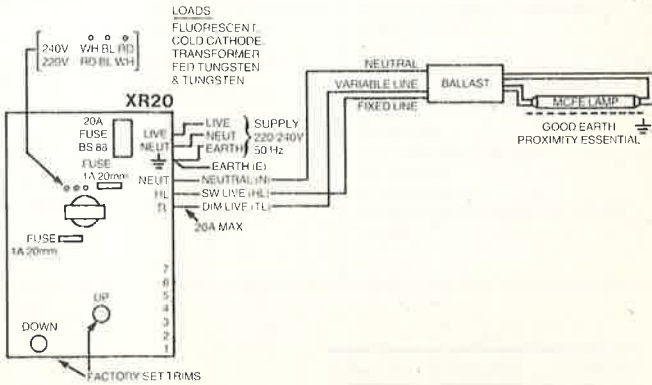
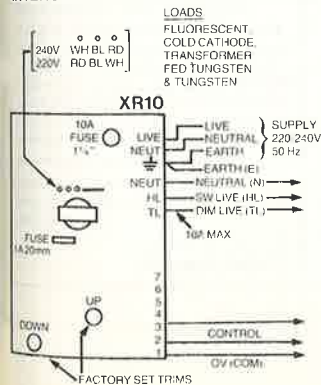
Note—Discharge lamps:

HPI, HPLN, SON and SOX lamps can not be dimmed with this equipment.

Suitable mounting boxes:

ITEM	MK ref
XP 10	891 ALM

INTERCONNECTIONS BETWEEN XR10/20 AND XP10



DIMMING EQUIPMENT

ORDERING DATA

Catalogue No.	Description	Packing Quantity
XR 10	2kW 10A electronic dimmer	1
XR 20	4kW 20A electronic dimmer	1
XB 42/1	40W dimming ballast (1 x 40W or 2 x 20W lamps)	6
XB 65/1	65W dimming ballast (for 1 x 1500mm lamp)	6
XC 10	Rotary control	1
XC 11	Rotary control with transfer facility	1
XC 12	Reset unit for XC11	1
XC 13	Twin push button set	1
XC 14	Twin push button set with LED	1
LRP 23	Electronic potentiometer	1
LPB 81	Control panel for LRP 23	1

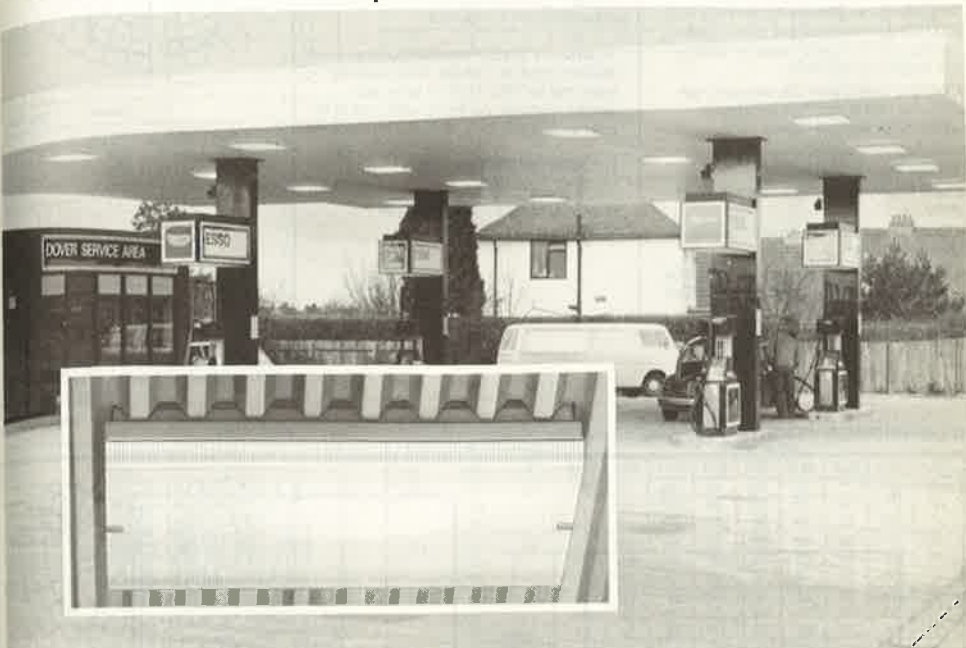
Please order in the form given in the following example, in multiples of the packing quantity:

- 1 Philips rotary control XC10
- 1 Philips electronic dimmer XR 10
- 6 Philips ballasts XB 65/1

Made in England

RECESSED UNDERCANOPY LUMINAIRE

Custom-made product-built
to special order



A high output luminaire for high ceilings indoors, or for use outdoors under canopies.

Recessed luminaire to fit 600mm module, assembled from a standard body and prismatic controller, and a wide range of prewired gear trays to accept high-efficacy SON high-pressure sodium and HPL-N mercury fluorescent lamps. High output combined with low brightness permits use on high ceilings without glare, and external use under canopies.

Luminaires are supplied to special order only, complete with appropriate gear tray and lamp.

RANGE

Supplied as a package, complete with body, acrylic prismatic controller, prewired gear tray for any of the following lamp types, and appropriate lamp:-

- High-pressure sodium (150W, 250W and 400W SON)
- Mercury fluorescent (250W and 400W HPL-N)

Gear trays can also be made up for the following lamp types:-
210W & 350W SON-H, 125W HPL-N and 400W HPI-H (metal halide)

APPLICATIONS

Indoors:

High output discharge lamp permits use in high suspended ceilings, as in:

- Entrance halls
- Banks
- Public concourses, etc

Optional wireguards are available to permit use in sports halls.

Outdoors:

Use under canopies over:

- Entrances
- Loading bays
- Garage service stations and similar areas.

SPECIAL PROJECT LUMINAIRES

To reorder this Data Sheet quote

PL 3036/1

Issued 6/83

Replaces PL.3036

RECESSED UNDERCANOPY LUMINAIRE SPECIAL PROJECT

FEATURES

- Fits into 600mm ceiling module to give appearance of handsome, shallow luminaire.
- Uses either HPL-N mercury fluorescent lamp for white light and good colour rendering, or energy-effective SON high-pressure sodium lamp for minimum running costs.
- High output permits mounting on high ceilings; bridges the gap between conventional fluorescent lighting and high-bay luminaires.
- Injection-moulded acrylic prismatic controller gives efficient light control with good lumen maintenance; side panels provide upward light to brighten ceiling and avoid 'tunnel' effect.
- White-painted gear tray ensures high LOR; the unit is supplied separately, prewired for lamp of choice.
- Applications include semi-exposed outdoor use (e.g. under canopies).
- Low brightness design reduces direct glare.
- Optional wireguards protect luminaire in sports halls, etc.
- Philips Projects luminaire – available in a wide choice of configurations, and with gear trays to suit many lamp types.

MATERIALS & FINISH

- Body:** 0.9mm sheet steel, Zintec pre-treated and stove enamelled Acrylic white.
- Gear tray:** Sheet steel, stove-enamelled white, with prewired low-loss control gear and three-way screw terminal block.
- Controller:** Injection-moulded clear acrylic, with external pyramid prisms.
- Lampholder:** (integral with gear tray) – GES porcelain.

SPECIFICATION

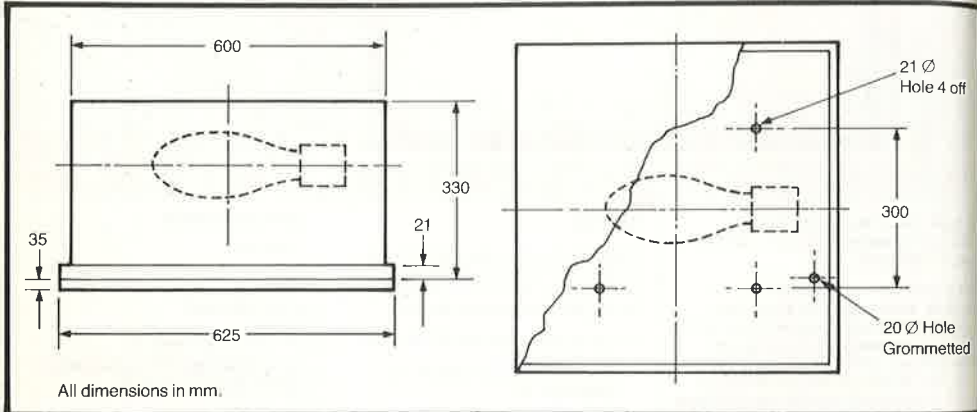
Type compliance with BS 4533 2.2 Class I insulation (earth required).

To Specify State: Recessed luminaire for 600mm module ceilings, with prewired gear tray for HPL-N/SON lamp and acrylic prismatic controller with LOR in excess of 0.66.

RANGE OF OPERATION

240V 50Hz supplies.
Indoor or semi-exposed outdoor conditions.

DIMENSIONS & WEIGHTS – Body and controller

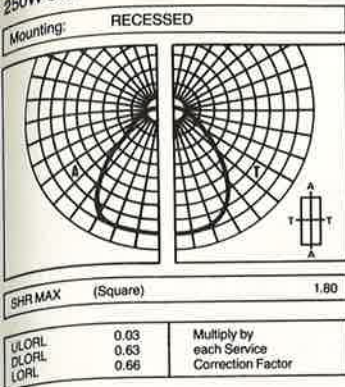


Weight of assembly 14.2Kg, 32lbs.

RECESSED UNDERCANOPY LUMINAIRE SPECIAL PROJECT

2

TYPICAL PHOTOMETRIC DATA RECESSED UNDERCANOPY LUMINAIRE 250W SON

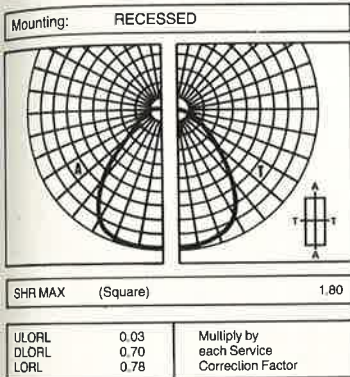


Utilization Factors UF (F) for SHR NOM

Room Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	42	47	52	55	59	62	64	66	68
	30		37	43	48	51	55	59	61	64	66
	10		34	39	44	47	52	56	58	62	64
50	50	20	40	46	50	53	57	59	61	63	65
	30		36	42	46	49	53	57	58	61	63
	10		33	39	43	46	51	54	56	59	61
30	50	20	39	44	48	51	54	57	58	60	62
	30		36	41	45	48	52	55	56	59	60
	10		33	38	43	45	50	53	54	57	59
0	0	0	31	36	40	43	47	50	51	54	53

Test No. 2298

RECESSED UNDERCANOPY LUMINAIRE 400W SON



Utilization Factors UF (F) for SHR NOM

Room Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	46	53	58	61	66	69	71	74	76
	30		41	48	53	56	62	66	68	71	74
	10		38	44	49	53	58	62	65	69	71
50	50	20	45	51	56	59	63	66	68	70	72
	30		40	46	52	55	60	63	65	68	70
	10		37	43	48	52	57	60	63	66	68
30	50	20	44	49	54	56	60	63	65	67	69
	30		40	45	50	53	57	61	62	65	67
	10		37	42	47	50	55	59	61	64	66
0	0	0	35	40	45	48	52	55	57	60	61

Test No. 2298

RECESSED UNDERCANOPY LUMINAIRE SPECIAL PROJECT

ELECTRICAL DATA

Type	Lamp Type	Lighting Design Lumens	Mains Current (Start)	Mains Current (Run)	Total Circuit Watts
P2728/150 SON	150W SON	13500	1.20	0.90	174
P2728/250 SON	250W SON	24000	1.80	1.30	280
P2728/400 SON	400W SON	45000	3.00	2.20	440
P2728/210 SON/H	210 SON/H	17250	3.50	1.55	228
P2728/350 SON/H	350W SON/H	32600	5.20	2.30	374
P2728/125 HPL-N	125W HPL-N	5800	1.10	0.70	137
P2728/250 HPL-N	250W HPL-N	12500	2.10	1.30	268
P2728/400 HPL-N	400W HPL-N	21300	3.50	2.10	424
P2728/400 HPI-H	400W HPI-H	29200	3.30	1.90	424

Values are averages, measured under standard conditions on 240V 50Hz supplies.

ORDERING DATA

Philips custom-made products are normally built to individual requirements, although a limited stock is held of Recessed Undercanopy Luminaire bodies and controllers, and of gear trays for the more popular lamp types.

Enquiries for all custom-made products should be directed to the Special Projects Department, at the address on this Data Sheet.

Lamp: Made in Great Britain & Holland
Luminaire: Made in Great Britain
Prismatic Controller: Made in W. Germany

COMMERCIAL INCANDESCENT FITTINGS

	Page
DCN 490	113
DCN 491	115
DCN 120	117
ACS Spotlight System	119
DCN 350	121
QCN 210	123
FCS 310/320	125
RCS 655 Two Way Track	127
W4001 Recessed Downlight Fittings	131
Swivel Downlight Fittings	133
Square Downlight Fittings	135
Round Downlight Fittings	137
Plant Lighting Set PLS 160	139
FWN 305	141
CWF 300 Chef Aid KombiPak	143

**Please see pages II and III of General
Introduction for information on how to use
this Handbook.**



3

DCN 490 MINISPOTS

**Adjustable minispots for
R39 30W, R50 40W
reflector lamps.**

Small spotlight which takes reflector lamps giving a well controlled beam, complementing the DCN 491 spotlight.

APPLICATIONS

Domestic

- Bedhead lighting
- Picture lighting
- Work surface lighting
- Mirror lighting
- Localised lighting for reading or sewing

Commercial

- Hotel bedrooms – bedhead console, dressing table
- Reception display areas
- Atmosphere lighting for restaurants
- Display cabinets
- Local effects in museums and art galleries
- Exhibitions
- Boutiques

RANGE

- DCN 490/20 white minispot
- DCN 490/42 brown minispot

INCANDESCENT FITTING

To reorder this Data Sheet quote **PL 3076**
Issued 9.84 **NEW**

DIRECT CONTACT SYSTEM

FEATURES

- Direct Contact System provides complete versatility of lighting; all luminaires can be interchanged between baseplate and lighting track in seconds and without wiring changes.
- Interchangeability of bodies, baseplates and adaptors simplifies stockholding; enables stockists to offer a wider range of luminaires from a reduced stores inventory and users to build up a versatile display lighting system with a small number of luminaires. Permits immediate addition of alternative future types.
- Co-axial plug permits uninterrupted 360° rotation, simplifying setting of beam throw.
- Luminaire is positively locked in position.
- Baseplates are quickly and simply installed on wall or ceiling; the system is Class II and the luminaires prewired, so that there are only two connections to make.
- Baseplate covers are invisibly retained by internal clips; presenting unbroken surface.
- Completely safe to touch when luminaire withdrawn.
- Baseplates also equipped with cable cleat and side entry knockout.
- Baseplates have fixing slots including 2 inch centres.

SPECIFICATION

To specify state:- Spotlight system with positively-locked co-axial break, permitting interchangeability between wall baseplate and lighting track adaptor. Similar to Philips Direct Contact System.

MATERIALS & FINISH

- Non-metallic components:-**
Glass-filled polyamide.
- Metallic components:-**
Nickel-plated brass.

RANGE OF OPERATION

240V supplies.
Normal indoor use.
Maximum loading 3A.



Slide the locking ring towards the luminaire body, and insert the co-axial plug into the baseplate or adaptor socket. Push the locking ring into the baseplate to effect a secure mechanical connection.



The co-axial plug and socket permit unlimited rotation of the luminaire for simple beam aiming, without any risk of cables twisting or breaking.

ACCESSORIES FOR DIRECT CONTACT SYSTEM



ORDERING DATA

Catalogue No.	Description	Outer Box Qty*
ZZX 010/20	White DCS baseplate (round - 80mm).	8
ZZX 010/40	Black DCS baseplate (round - 80mm).	8
ZZX 020/20	White DCS baseplate (square - 80mm).	8
ZZX 020/40	Black DCS baseplate (square - 80mm).	8
ZZX 006	Clamp fitting.	8
RCS 655/15	DCS lighting track adaptor (black).	8

* Accessories are individually packed, with Euroslot header, within outer box. Please order DCS accessories in the form given in the following example.
8 Philips DCS lighting track adaptors RCS 655/15.

Made in Holland

**DIRECT
CONTACT
SYSTEM**



DCN491 MINISPOTS

40W adjustable mini-spotlight

Small indoor spotlight fitting in white or brown to take the new 40W bowl reflector lamp, complementing the DCN 490 Minispot fitting.

APPLICATIONS

Suitable applications include:

Domestic

- Stereo console lighting
- Bedhead lighting
- Pictures
- Work surface lighting
- Localised lighting for reading, sewing, etc.

Commercial

- Shop windows or cabinet display
- Hotel bedrooms – bedroom console and dressing table
- Hotel reception display areas
- Localised spot lighting in museums, art galleries, restaurants and discotheques

FEATURES

- The DCN 491 spotlight body has a direct contact connector to take the mounting accessory of your choice, (see accessories).
- Compact dimensions in self-coloured white or brown polycarbonate to take either 30 Watt or 40 Watt "Ogive" bowl reflector lamp.
- This type of luminaire is best used where a narrow, sharply defined beam is needed, to brightly accentuate a display item.
- Wall mounting bases are extremely simple to mount, with 2 ins centres, and have a wiring cleat for surface cable.

3

INCANDESCENT FITTING

To reorder this Data Sheet quote

PL 3077

Issued 9.84

NEW

DCN 491 MINISPOTS

Features continued

- Direct Contact System. A unique, patented mounting system, now standard throughout the Philips display lighting range. All Direct Contact System luminaires terminate in a co-axial plug which simply pushes into the mounting plate or adaptor, and is securely held by a locking ring.
- Direct Contact System provides complete versatility of lighting: all luminaires in the system can be instantly interchanged between baseplates and track, for change of lighting emphasis.
- Installing is simple – only baseplates require fixing, thus obviating problems during decorating, for example.
- Interchangeability between baseplates and adaptors simplifier stockholding: enables the user to increase the versatility of non-track installations and enables stockists to offer a wider range of options for a reduced inventory.

SPECIFICATION

- Type complies with BS4533
- Class II insulation: No earth required
- For normal indoor use on 240V supplies
- Heat resisting synthetic materials, aluminium shield, ceramic lampholder.

To specify state:

Miniature, adjustable, narrow beam spotlight fitting in white or brown polycarbonate taking 40W bowl mirrored lamp. Double insulated, Similar to Philips CDGN (CDHN) 491.

MATERIALS & FINISH

Body and base: White or brown matt-finished polycarbonate.

Reflector: Spun aluminium, brightened and anodised inside, white or brown satin finish outside.

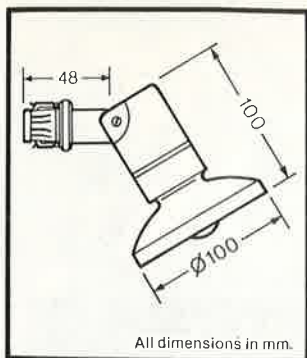
Lampholder: Ceramic.

RANGE OF OPERATION

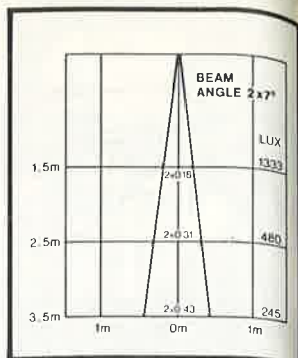
For indoor use on 240V nominal supplies.

Made in Holland.

DIMENSIONS



BEAM ANGLE* DATA



ORDERING DATA

Catalogue No.	Description	Watts	Suitable for lamp types	Outer Box qty.
DCN 491/20	White Minispot	40W	240/250V 40W SES Bowl Reflector Lamp	8
DCN 419/42	Brown Minispot	40W	240/250V 40W SES Bowl Reflector Lamp	8

ACCESSORIES

ZZX 010/20	White DCS baseplate (round) 80mm	1
ZZX 010/40	Black DCS baseplate (round) 80mm	1
ZZX 020/20	White DCS baseplate (square)	1
ZZX 020/40	Black DCS baseplate (square) 80mm	1
ZZX 006	Clamp	
RCS 655/15	DCS lighting track adaptor (black only)	

Replacement lamps

R39	240V 30W SES cap reflector lamp	25	—
R50	240V 40W SES cap reflector lamp	25	—

N.B. Lamps, DCS wallplates, DCS adaptors and DCS clamps, should be ordered separately. For details of Direct Contact System baseplates, track adaptor and clamp, see Data Sheet PL 3075.

ACCESSORIES FOR DIRECT CONTACT SYSTEM





DCN 120 MINISPOT

Adjustable Minispots for 30W/40W reflector lamps

A small spotlight which takes the R39 or R50 lamps, giving a well-controlled spotlight beam.

APPLICATIONS

Domestic

- Bedhead lighting or dressing table lighting
- Picture lighting
- Work surface lighting
- Localised lighting for reading or sewing

Commercial

- Hotel bedrooms - bedhead console, dressing table, display areas
- Atmosphere lighting for restaurants
- Jewellers' display cabinets
- Local effects in museums and art galleries

FEATURES

- The DCN 120 spotlight body has a direct contact connector to take the mounting accessory of your choice, (see accessories).
- Compact dimensions in self-coloured white or brown polycarbonate to take either 30 Watt (R39) or 40 Watt (R50) reflector lamp.
- The well recessed lamp together with a clip-in black microgroove baffle produces a well controlled beam with no side glare.
- Wall mounting bases are extremely simple to mount, with 2 ins centres, and have a wiring cleat for surface cable.
- Direct Contact System. A unique, patented mounting system, now standard throughout the Philips display lighting range. All Direct Contact System luminaires terminate in a co-axial plug which simply pushes into the mounting plate or adaptor, and is securely held by a locking ring.



INCANDESCENT FITTING

To reorder this Data Sheet quote

PL 3078

Issued 9.84

NEW

DCN 120 MINISPOT

Features continued

- Direct Contact System provides complete versatility of lighting: all luminaires in the system can be instantly interchanged between baseplates and track, for change of lighting emphasis.
- Installing is simple – only baseplates require fixing, thus obviating problems during decorating, for example.
- Interchangeability between baseplates and adaptors simplifies stockholding: enables the user to increase the versatility of non-track installations and enables stockists to offer a wider range of options from a reduced inventory.

MATERIALS & FINISH

Lamp housing, shield and base:

Polycarbonate.

Diaphragm: Black polyamide.

Lampholder: Ceramic SES.

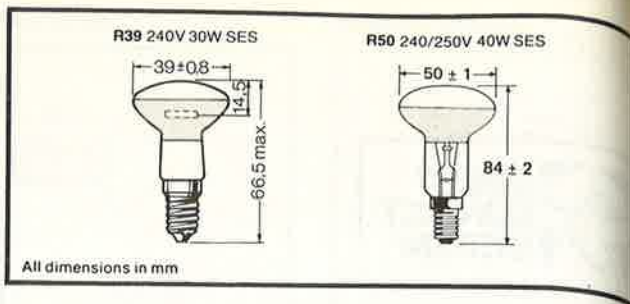
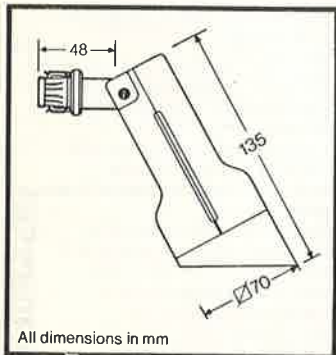
SPECIFICATION

- Type complies with BS4533
- Class II insulation: No earth required
- For normal indoor use on 240V supplies
- Heat resisting synthetic materials, aluminium shield, ceramic lampholder.

To specify state:

Miniature double-insulated spotlight fitting of square design, to incorporate a Philips 40W reflector lamp R39/R50. (R16). Philips CDGN 120 Kombi.

DIMENSIONS



ORDERING DATA

Catalogue No.	Description	Watts	For lamp types:	Box Qty
DCN 120/20	Minispot – white	30W/40W	R39/R50	4
DCN 120/42	Minispot – brown	30W/40W	R39/R50	4

ACCESSORIES

ZZX 010/20	White DCS baseplate (round) 80mm	8
ZZX 010/40	Black DCS baseplate (round) 80mm	8
ZZX 020/20	White DCS baseplate (square)	8
ZZX 020/40	Black DCS baseplate (square) 80mm	8
ZZX 006	Clamp	8
RCS 655/15	DCS lighting track adaptor (black only)	8

Replacement lamps

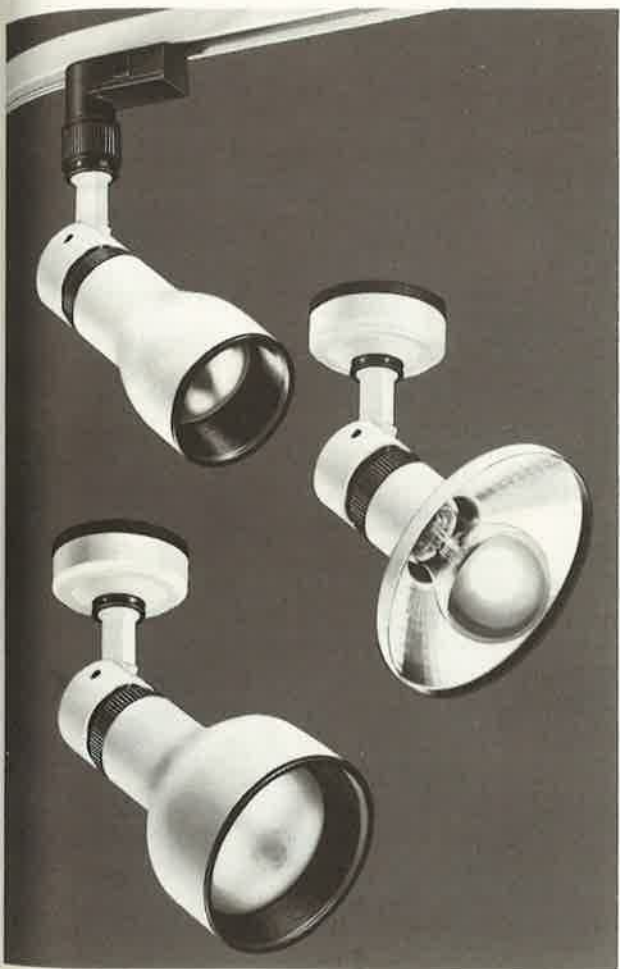
R39	240V 30W SES cap reflector lamp	25
R50	240V 40W SES cap reflector lamp	25

N.B. Lamps, DCS wallplates, DCS adaptors and DCS clamps, should be ordered separately. For details of Direct Contact System baseplates, track adaptor and clamp, see Data Sheet PL 3075.

ACCESSORIES FOR DIRECT CONTACT SYSTEM



**DIRECT
CONTACT
SYSTEM**



ACS SPOTLIGHTS

An indoor spotlight and attachments for use with a wide range of blown bulb and pressed glass reflector lamps

A comprehensive system of matching components to provide flexibility of application.

RANGE

ACS 20 – White spotlight with detachable collar for use with 100/150W PAR 38 pressed glass lamps.

ACS 42 – Brown spotlight as above.

GG5 01 – Screening shield for R63(R20) lamps (60W reflector lamps).

GG5 02 – Screening shield for R95(R30) lamps (100W reflector lamps).

GG5 04 – Parabolic reflectors for 100W bowl reflector lamps.

W9622 – Black screening ring attachment for PAR 38 lamps.

APPLICATIONS

- Shop window display
- Hotel reception areas – picture lighting, highlighting island display areas and plant groupings
- Museums and Art Galleries
- Entrance halls and foyers of offices, flats, public buildings, concert halls
- Domestic spotlighting in the R63(R20) version
- Prestige areas e.g. Boardrooms, Directors dining rooms, visitors exhibition areas

FEATURES

- The ACS spotlight body has a direct contact connector to take the mounting accessory of your choice, (see accessories).
- An elegantly simple design for PAR 38 or "Blown Bulb" reflector lamps, having choice of quick-change attachments with which an interesting range can be built up.

To reorder this Data Sheet quote

PL 3080

Issued 9 84

NEW

INCANDESCENT FITTING

3

ACS SPOTLIGHTS

Features continued

■ Converts to give a high intensity narrow beam when used with 100 Watt bowl reflector lamp and the GGS04 reflector.

■ Highly durable construction in self-coloured white or brown polycarbonate.

■ Direct Contact System. A unique, patented mounting system, now standard throughout the Philips display lighting range. All Direct Contact System luminaires terminate in a co-axial plug which simply pushes into the mounting plate or adaptor, and is securely held by a locking ring.

■ Direct Contact System provides complete versatility of lighting: all luminaires in the system can be instantly interchanged between baseplates and track, for change of lighting emphasis.

■ Installing is simple – only baseplates require fixing, thus obviating problems during decorating, for example.

■ Interchangeability between baseplates and adaptors simplifies stockholding: enables the user to increase the versatility of non-track installations and enables stockists to offer a wider range of options from a reduced inventory.

SPECIFICATION

- Type complies with BS4533
- Class II insulation: No earth required
- For normal indoor use on 240V supplies
- Heat resisting synthetic materials, aluminium shield, ceramic lampholder.

To specify state:

Double insulated, adjustable spotlight suitable for reflector lamps up to 150W with provision for focusing 100W bowl reflector lamps, or shielding reflector lamps up to 100W by means of accessories; similar to Philips ACS Spotlight.

MATERIALS & FINISH

Body and Base: Polycarbonate.

Weight: 0.22 kg.

PAR 38 collar: Aluminium.

R63(R20) & R95(R30) shields: Aluminium with black polyamide anti-glare diaphragm.

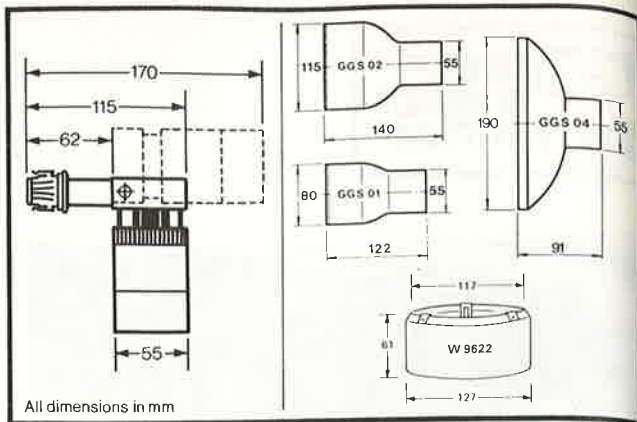
Parabolic reflector: Brightened hammer-finish aluminium with black internal rim; smooth, white or brown finish to rear.

Lampholder: Ceramic ES type.

Luminaire: Made in Holland.

RANGE OF OPERATION

For normal indoor use. For 100-240V nominal supply. Maximum 150 Watts 2 Amps.
Not suitable for 'Cool spot' PAR 38E/PAR 38 lamps.



ORDERING DATA

Catalogue number	Description	For lamp types		Box Qty.
ACS 20	Body – White (ES Lampholder)	150	PAR 38E/PAR 38	4
ACS 42	Body – Brown (ES Lampholder)	150	R63/R95	4
GGS 01/20	R63 Screening Shield White	60	R63	4
GGS 01/42	R63 Screening Shield White	60	R63	4
GGS 02/20	R95 Screening Shield White	100	R95	4
GGS 02/42	R95 Screening Shield Brown	100	R95	4
GGS 04/301	100W Reflector White/Clear	100	Bowl Reflector	4
GGS 04/304	100W Reflector White/Yellow	100	Bowl Reflector	4
GGS 04/501	100W Reflector Brown/Clear	100	Bowl Reflector	4
W9622	PAR 38E/PAR 38 Screening Ring Black	150	Par 38E/PAR 38*	4

*excluding 'Cool spot'. Note: Lamps should be ordered separately.

ACCESSORIES

ZZX 010/20	White DCS baseplate (round) 80mm	8
ZZX 010/40	Black DCS baseplate (round) 80mm	8
ZZX 020/20	White DCS baseplate (square)	8
ZZX 020/40	Black DCS baseplate (square) 80mm	8
ZZX 006	Clamp	8
RCS 655/15	DCS lighting track adaptor (black only)	8

N.B. Lamps, DCS wallplates, DCS adaptors and DCS clamps, should be ordered separately
For details of Direct Contact System baseplates, track adaptor and clamp, see Data Sheet PL 3075





3

DCN 350 SPOTLIGHTS

A spotlight for use with PAR 38E/PAR 38 lamps and with the addition of a reflector for 60 Watt bowl reflector lamps.

RANGE

DCN 350/20 White spotlight
DCN 350/40 Black spotlight
ZZZ 350/00 Aluminium reflector for 60 Watt bowl reflector lamps.

W9622 Black screening ring (for use with PAR 38E/PAR 38 lamps).

APPLICATIONS

- Exhibitions
- Displays
- Public buildings and halls
- Shops
- Home workshops
- Domestic lighting

INCANDESCENT FITTING

To reorder this Data Sheet quote

PL3079

Issued 9.84

NEW

DCN 350 SPOTLIGHT

FEATURES

- The DCN 350 spotlight body has a direct contact connector to take the mounting accessory of your choice, (see accessories).
- An ever-popular basic design for bare PAR 38 or "Blown Bulb" reflector lamps.
- Converts to give a high intensity narrow beam when used with 60 watt bowl reflector lamp and the ZZZ 350/00 reflector.
- Highly durable construction in self-coloured white or black polycarbonate.
- Direct Contact System. A unique, patented mounting system, now standard throughout the Philips display lighting range. All Direct Contact System luminaires terminate in a co-axial plug which simply pushes into the mounting plate or adaptor, and is securely held by a locking ring.
- Direct Contact System provides complete versatility of lighting: all luminaires in the system can be instantly interchanged between baseplates and track, for change of lighting emphasis.
- Installing is simple – only baseplates require fixing, thus obviating problems during decorating, for example.
- Interchangeability between baseplates and adaptors simplifies stockholding: enables the user to increase the versatility of non-track installations and enables stockists to offer a wider range of options from a reduced inventory.

MATERIALS & FINISH

Body and base: polycarbonate.
Reflector: Brightened anodised aluminium. Satin finished back
Lampholder: ceramic E.S.

WEIGHT

180 g (without lamp or reflector)

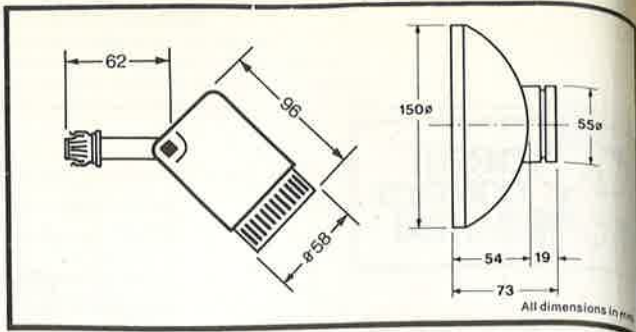
SPECIFICATION

- Type complies with BS4533
- Class II insulation: No earth required
- For normal indoor use on 240V supplies
- Heat resisting synthetic materials, aluminium shield, ceramic lampholder.

RANGE OF OPERATION

For indoor use on 240V nominal supply.

Luminaire: Made in Holland



ORDERING DATA

Catalogue number	Description	For Lamp Type	Box Qty.
DCN 350/20	White spotlight	150 PAR 38E/PAR 38* R95, R63	4
DCN 350/40	Black spotlight	150 PAR 38E/PAR 38* R95, R63	4
ZZZ 350/00	60W reflector alum/clear	60 60W ES Bowl Reflector	4
W9622	Screening ring	150 PAR 38E/PAR 38*	4

ACCESSORIES

ZZX 010/20	White DCS baseplate (round) 80mm	8
ZZX 010/40	Black DCS baseplate (round) 80mm	8
ZZX 020/20	White DCS baseplate (square)	8
ZZX 020/40	Black DCS baseplate (square) 80mm	8
ZZX 006	Clamp	8
RCS 655/15	DCS lighting track adaptor (black only)	8

*excluding "Cool Spot"

N.B. Lamps, DCS wall plates, DCS adaptors and DCS clamps, should be ordered separately. For details of Direct Contact System baseplates, track adaptor and clamp, see Data Sheet PL 3020.

ACCESSORIES FOR DIRECT CONTACT SYSTEM



DIRECT CONTACT SYSTEM



QCN 210

Halogen Spotlights

Pencil-beam spotlight luminaires with integral transformer and extra-low-voltage halogen lamp with integral reflector for precise long-throw display work or accent lighting. The luminaires incorporate Philips Direct Contact System which permits instant mounting to wall or ceiling baseplates or lighting track adaptors and allows unlimited rotation for easy beam aiming.

RANGE

QCN 210/35 – White spotlight with integral transformer and Direct Contact System co-axial plug, for 6V 35W tungsten halogen lamp.

QCN 210/15 – White spotlight with integral transformer and Direct Contact System co-axial plug, for 6V 15W tungsten halogen lamp.

APPLICATIONS

For use in long-throw display work, or wherever a pencil beam of white light is required, as in:-

- Display lighting (shops, shop windows, museums and exhibitions).
- Accent lighting (restaurants, bars, discotheques and night clubs).
- Lighting precision tasks (electronic assembly, opticians, watchmakers, jewellers and laboratories).

FEATURES

- Two versions giving the choice of 35 Watt or 15 Watt lamps.
- Pencil or Narrow Beam lamp options in QCN210/35 and QCN210/15L.
- Self-contained, with integral transformer, and Direct Contact System for total flexibility of installation.
- Functional and timeless design blends easily with any setting.
- Use pencil 4° or 6° beams to highlight displays at greater distance, without glare, in high ambient illumination.

To reorder this Data Sheet quote

PL 3041/2

Issued 10.84

Replaces PL3041/1

INCANDESCENT FITTINGS

3

QCN 210 – INCANDESCENT FITTINGS

Features continued

- Highly efficient halogen lamps cut running costs by maximizing the light utilization.
- All Philips halogen spot lamps have a protective front glass to keep their reflectors in perfect condition.
- Easy change small bayonet fitting.

DIRECT CONTACT SYSTEM

This highly flexible mounting system, becoming standardised throughout our range, offers benefits to both user and distributor.

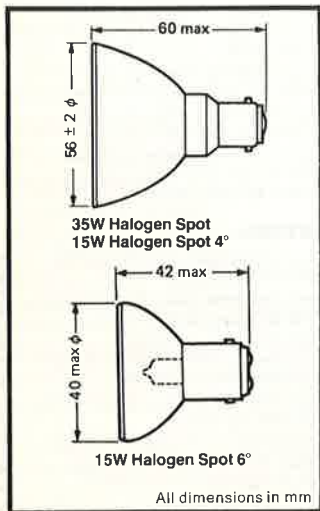
- Permits quick and simple mounting of lightweight baseplates.
- Interchangeability between track and separate positioning.
- Instant fixing or removal – for decorating for instance.
- Co-axial mounting allows 360° rotation, no wiring fatigue.
- Minimized stock holding of luminaire bodies.

SPECIFICATION

- Type compliance with BS 4533.
- Class II insulation (No earth required).
- Indoor use on 240V 50Hz.
- Unsuitable for most dimmers.

To specify state:

Spotlight luminaire for 6V 35W (6V 15W) tungsten halogen pencil-beam lamp, with integral continuously-rated mains transformer and Direct Contact System co-axial plug. Substantially as Philips QCN 210

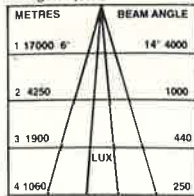


RANGE OF OPERATION

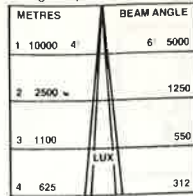
For use on 240V 50Hz supplies. For indoor use only. Not for use with dimmers.

BEAM ANGLE DATA

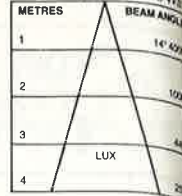
Halogen Spots 6 Volt 35 Watt



Halogen Spots 6 Volt 15 Watt



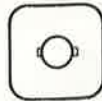
Halogen Spots 6 Volt 15 Watt



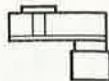
DIRECT CONTACT SYSTEM MOUNTING ACCESSORIES.



80mm Round Baseplate
ZZX 010/20 white.



100mm Square Baseplate
ZZX 011/20 white.



RCS 655 Track adaptor
RCS 655/15 black.

LAMP DATA

Lamp type	For luminaire	Luminous intensity (cd)	Beam spread	Lamp Diameter
6V 35W halogen spot 6°	QCN 210	17,000	2 x 3°	56mm
6V 35W halogen spot 14°	QCN 210	4,000	2 x 7°	56mm
6V 15W halogen spot 4°	QCN 210	10,000	2 x 2°	56mm
6V 15W halogen spot 6°	QCN 210	5,000	2 x 3°	37mm

ORDERING DATA

Catalogue No.	Description	Packing Qty
QCN 210/35	Spotlight luminaire with integral and Direct Contact System Plug, for 6V 35W 6° and 14° tungsten halogen lamp.	1
QCN 210/15L	Spotlight luminaire with integral transformer and Direct Contact System Plug, for 6V 15W 4° and 14° tungsten halogen lamp.	1
QCN 210/15S	Spotlight luminaire with integral transformer and Direct Contact System Plug, for 6V 15W 6° tungsten halogen lamp. Small diameter front bowl.	1

Accessories

ZZX 010/20	White baseplate (round)	1
ZZX 010/40	Black DCS baseplate (round) 80mm	1
ZZX 020/20	White baseplate (square)	1
ZZX 020/40	Black DCS baseplate (square) 80mm	1
ZZX 006	Clamp	1
RCS 655/15	Lighting track adaptor (black only)	1

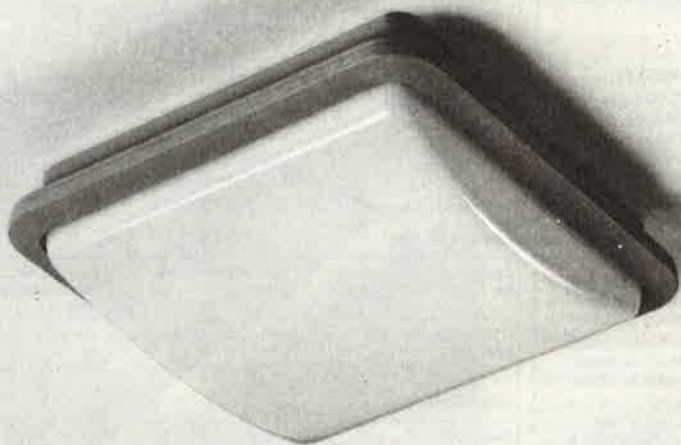
Lamps

Lamps	Cat No	
6V 35W 6°	Halogen spot	6429 10
6V 35W 14°	Halogen spot	6430 10
6V 15W 4°	Halogen spot	6425 10
6V 15W 6°	Halogen spot	6424 10
6V 15W 14°	Halogen spot	6426 10

Please order in the form given in the following example, in multiples of the packing quantity. Note that lamps, baseplates and adaptors must be ordered separately.

8 Philips halogen spotlights QCN 210/35
10 Philips 6V 35W halogen spot lamps 6°

FCS 310 FCS 320



Miniature fluorescent wall and ceiling luminaires

Enclosed luminaires of low installed depth, designed around Philips PL single-ended miniature fluorescent lamps for exceptionally low energy consumption and long lamp life.

The luminaires can be surface-mounted or semi-recessed.

RANGE

FCS 310/209 – White Light Tile with opal diffuser, supplied as a KombiPak complete with 2 x PL9 miniature fluorescent lamps, ballasts and fixing accessories.

FCS 320/211 – White Light Tile with opal diffuser, supplied as a KombiPak complete with 2 x PL11 miniature fluorescent lamps, ballasts and fixing accessories.

APPLICATIONS

For use wherever a decorative, functional light source is required, as in:-

- Amenity lighting.
- Toilets
- Entrance halls
- Corridors
- Cloakrooms
- Staircases
- Domestic applications

To reorder this Data Sheet quote

PL 3040/1

Issued 9.82

Replaces PL 3040

FCS 310, FCS 320 – INCANDESCENT FITTINGS

FEATURES

- Highly energy-effective – FCS 320/211 gives more light than a 100W GLS luminaire for a total circuit power of only 30W.
- Long lamp life – typically five times that of GLS equivalent – reduces maintenance costs and increases safety in corridor and staircase areas.
- Slim profile – under 50mm semi-recessed – permits unobtrusive mounting on low ceilings.
- Integral starters are automatically discarded at lamp replacement to ensure reliability.
- Lamp phosphor uses components from Philips Colour 80 Series to combine high efficacy with good colour rendering and a colour appearance similar to that of a GLS lamp.
- Easily installed.

DIRECT CONTACT SYSTEM

A unique patented mounting system, now standard throughout Philips display lighting range. All Direct Contact System luminaires terminate in a male co-axial plug which simply pushes into a baseplate or lighting track adaptor, and is securely held in place by a locking ring.

- Wireless co-axial connection permits unlimited rotation of luminaire.
- Spring holds luminaire securely in set position to provide accurate, fingertip adjustment.
- Luminaires are freely interchangeable between baseplates and track adaptors, permitting complete flexibility of display lighting arrangements.
- Baseplates are quickly and simply installed on wall or ceiling; the system is double-insulated and the luminaires prewired, so that there are only two push wire connections to make.
- Interchangeability of bodies, baseplates and adaptors simplifies stockholding; enables wholesale stockists to offer a wider range of luminaires from a reduced stores inventory.

MATERIALS & FINISH

- Body:** - White polycarbonate
- Opal diffuser:** - White polycarbonate

SPECIFICATION

- Type compliance with BS 4533.
- Class I electrical (Earth required).

To specify state:-

Close ceiling luminaire for single-ended miniature fluorescent lamps with integral starters. To be capable of recessed or semi-recessed mounting, with an installed depth under 50mm in recessed mode, and to be supplied complete with lamps in a single carton. Similar to Philips FCS.

RANGE OF OPERATION

For use on 240V 50Hz supplies.
For indoor use only.
Not for use with dimmers.

LAMP & CIRCUIT DATA

Catalogue No.	Circuit Power (Watts)	Lighting Design Lumens*
PL9	26	510
PL11	30	600

* Measured under reference conditions after 2,000 hours.

DIMENSIONS

Catalogue No.	Rating	Overall dimensions (mm)	Installed depth (semi-recessed) (mm).
FCS 310/209	2 x PL9	240 x 240 x 70	44
FCS 320/211	2 x PL11	240 x 240 x 75	49

ORDERING DATA

Catalogue No.	Description	Packing Qty
FCS 310/209	Light Tile KombiPak, complete with 2 x PL9 Lamps and fixing accessories	1
FCS 320/211	Light Tile KombiPak, complete with 2 x PL11 Lamps and fixing accessories	1

Spare lamps

PL9	Single-ended fluorescent lamp (9W)	50
PL11	Single-ended fluorescent lamp (11W)	50

Please order in the form given in the following example. Lamps must be ordered in multiples of the packing quantity.

Philips Light Tile KombiPaks FCS 320/211.

Luminaires and lamps: Made in Holland.

RCS 655

Two Way Lighting Track System Incorporating Direct Contact System

Three-conductor and earth track and accessories, with a versatile range of display luminaires.

Simply-installed surface-mounted track of small dimensions and shallow depth for use on single-phase supplies at up to 16 Amps. Three independent conductors and separate earth permit independent switching of two sets of luminaires on the same length of track.

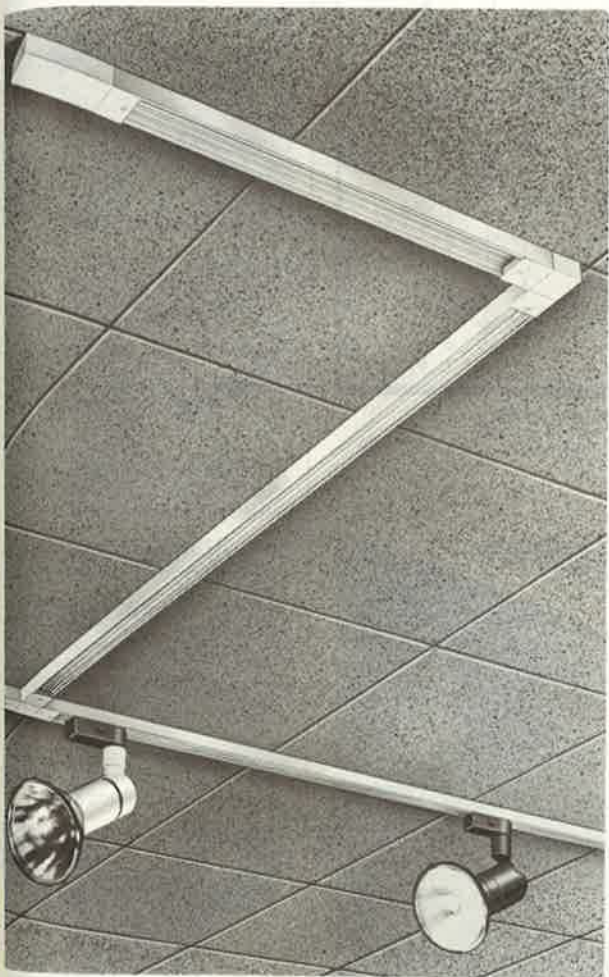
RANGE

Extruded aluminium track in three lengths of 1m, 2m and 3m, with connecting accessories (see P.3).

A comprehensive range of display luminaires for a wide variety of display lamps and PL lamps.

APPLICATIONS

- Shop window display
- Shop interior display
- Assembly areas and workshops
- Museums and art galleries
- Exhibition halls
- Foyers and reception areas
- Conference rooms
- Clubs, public houses and discotheques
- Restaurants
- Domestic effect lighting



INCANDESCENT FITTING

To reorder this Data Sheet quote

PL 1858/6

Issued 6/83

Replaces PL 1858/5

RCS 655

FEATURES

- Shallow depth track and couplers allow increased headroom.
- Three standard track lengths; easily cut to alternative sizes without the need for special tools for track preparation.
- Two-way system permits independent switching of two sets of luminaires.
- Except for straight coupler, track accessories are not polarised, greatly simplifying layout planning and installation.
- Simple to install; slotted track screws directly to ceiling, and conductor strip clips easily yet firmly into position.
- Strong U-section track.
- Each conductor rated at up to 16A, permitting loads up to 4000W at 250V.

DIMENSIONS

Track lengths:

RCS 655/100 – 1.0m

RCS 655/200 – 2.0m

RCS 655/300 – 3.0m

Fixing slots spaced 250mm.

Couplers:

RCS 655/08 Straight Coupler has an effective length of 2mm. Flexible coupler has an effective length of 272mm. RCS 655/11 has an effective length of 30mm. All other couplers have an effective length of 33mm.

Live end connector:

RCS 655/01 has an effective length of 86mm.

Central connector:

RCS 655/00 Ceiling Plate plus RCS 655/01 Live End Connector has an effective length of 130mm.

Dead End:

RCS 655/04 has an effective length of 3 mm.

Note: The effective length of these components must be added to the track length in order to obtain the overall length of an installation.

MATERIALS & FINISH

Track: Anodised aluminium extrusion, natural finish, with copper conductors in separate clip-in insulated mouldings; plated earth conductor bonded to the aluminium channel.

Couplers: Self-coloured light grey insulating material.

RANGE OF OPERATION

■ For normal indoor use only. Ceiling or wall mounting.

■ 240V 50Hz.

ELECTRICAL DATA

Single-phase two-circuit.

I (max) = 16A (see diagram)

Maximum load on 250V = 4000W

16A max. in neutral conductor.

Must be earthed.

Guide to fixing

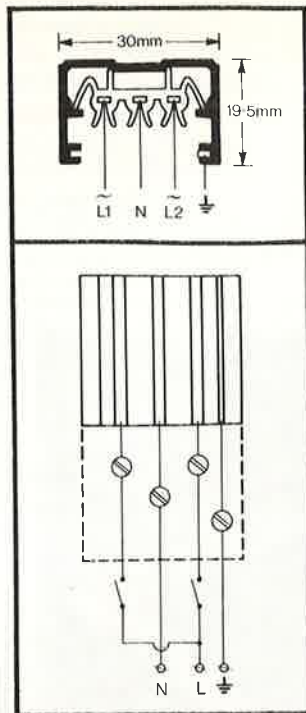
Maximum permitted load 10kg (22 lb) per metre run.

Recommended attachment points per

track length (4mm screws):-

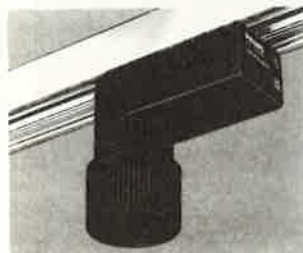
1m – 2 screws 3m – 4 screws

2m – 3 screws

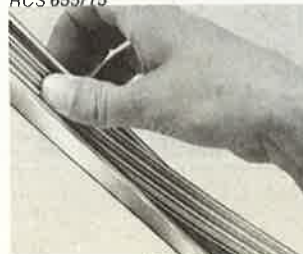


SPECIFICATION

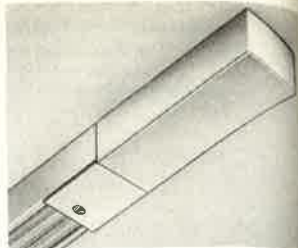
- Designed to comply with BS.4533 (IEC 570).



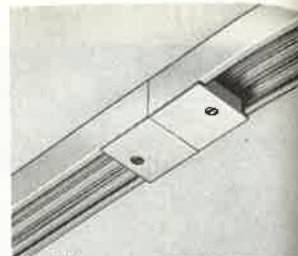
Direct Contact System Adaptor
RCS 655/15



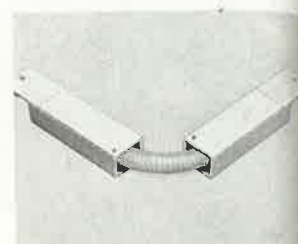
Conductor strip simply clips into channel.



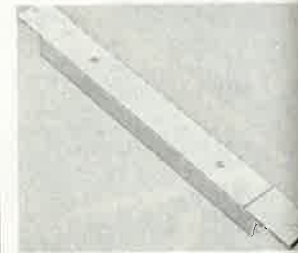
Live End Connector RCS 655/01



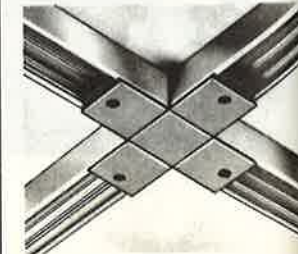
Straight Coupler RCS 655/08



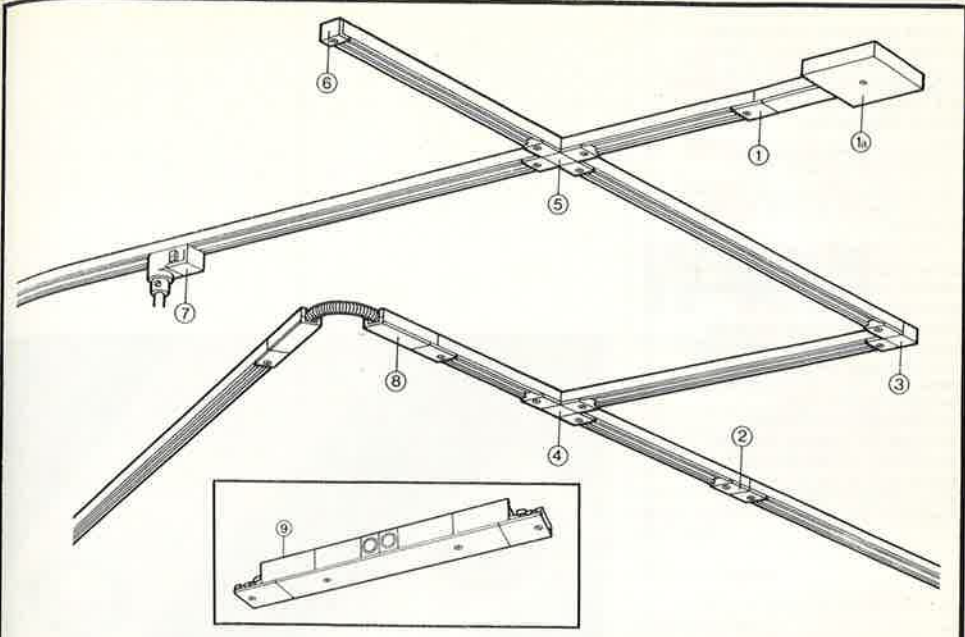
Flexible Coupler RCS 655/07



Double Junction Box RCS 655/02



X Coupler RCS 655/11



Installation viewed from below.

Guide to ordering

It is advisable to start installation from the Live End Connector (RCS 655/01) and ceiling plate/cover (RCS 655/00), if used.

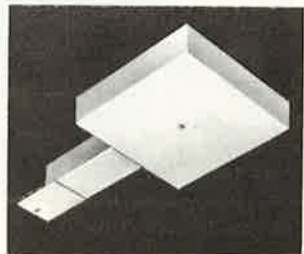
The installation should be planned using this diagram as a guide.

Ceiling Plate RCS 655/00 may be used to terminate the track to cover a large wiring aperture. It has internal locations for up to four Live End Connectors at 90°, and is neatly finished by a square cover. For use only with Live End Connectors RCS 655/01.

Key	Cat. No.	Description
1	RCS 655/01	Live end connector
1a	RCS 655/00	Ceiling plate
2	RCS 655/08	Straight coupler
3	RCS 655/06	L coupler
4	RCS 655/09	T coupler
5	RCS 655/11	X coupler
6	RCS 655/04	Dead end
7	RCS 655/12	Loose adaptor
8	RCS 655/07	Flexible coupler
9	RCS 655/02	Double junction box
(See page 2)	RCS 655/15	Direct contact system adaptor:
	RCS 655/100	Lighting track 1.0m
	RCS 655/200	Lighting track 2.0m
	RCS 655/300	Lighting track 3.0m



Dead End RCS 655/04



Ceiling plate RCS 655/00



Loose adaptor RCS 655/12 (including cord grip) is simply fitted by pressing adaptor at right angles onto track and turning it through 90° to left or right (depending on circuit required).

RCS 655

DIRECT CONTACT SYSTEM

A unique patented mounting system. All Direct Contact System luminaires terminate in a male co-axial plug which simply pushes into a baseplate or lighting track adaptor, and is securely held in place by a locking ring.

- Wireless co-axial connection permits unlimited rotation of luminaire.
- Spring holds luminaire securely in set position to provide accurate, fingertip adjustment.
- Luminaires are freely interchangeable between baseplates and track adaptors, permitting complete flexibility of display lighting arrangements.
- Baseplates are quickly and simply installed on wall or ceiling; the system is double-insulated and the luminaires prewired, so that there are only two push wire connections to make.
- Interchangeability of bodies, baseplates and adaptors simplifies stockholding; enables wholesale stockists to offer a wider range of luminaires from a reduced stores inventory.

ORDERING DATA (TRACK)

Catalogue No.	Description	Diagram Code	Packing quantity
RCS 655/100	Lighting track 1m	—	1
RCS 655/200	Lighting track 2m	—	1
RCS 655/300	Lighting track 3m	—	1
RCS 655/01	Live end connector	1	1
RCS 655/00	Ceiling plate	1a	1
RCS 655/08	Straight coupler	2	1
RCS 655/06	L coupler	3	1
RCS 655/09	T coupler	4	1
RCS 655/11	X coupler	5	1
RCS 655/04	Dead end	6	1
RCS 655/12	Loose adaptor	7	1
RCS 655/07	Flexible coupler	8	1
RCS 655/02	Double junction box	9	1
RCS 655/15	DCS adaptor		1

Track systems: Made in Holland.

W 4001

Recessed downlight

RANGE

Adjustable for PAR 38E/PAR 38, Blown Bulb Reflector Lamps, Cool Beam, PowerRay and the MLR plant lighting lamp.

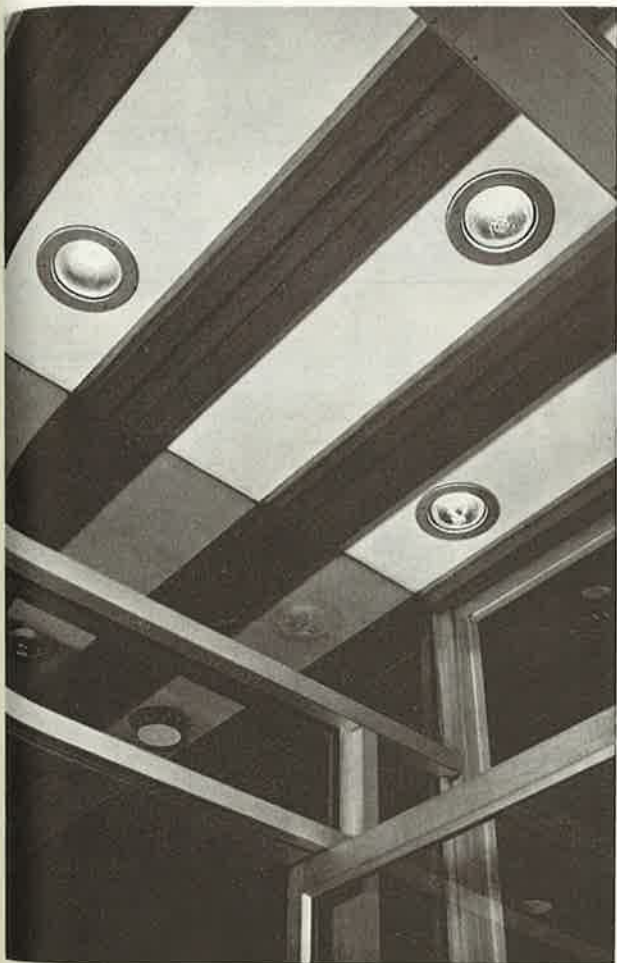
W4001 can be used with infra-red lamps, to maximum 375 watts, and MLR 160W.

APPLICATIONS

- Shop windows for display lighting
- Over counters
- Show cases, lighting from above
- Corridors
- Hotel halls
- Foyers
- Heat curtains to shop, hall and office entrances
- Plant lighting
- Process heating

FEATURES

- The W4001 is a simple yet versatile downlight which can easily be removed for access.
- The Downlight has an adjustable lampholder enabling various lamps to be used.
- The aluminium finish of the bezel is suited to modern decor.



INCANDESCENT FITTING

To reorder this data sheet quote

PL 1710/4

Issued 8/83

Replaces PL1710/3

W 4001 – INCANDESCENT LUMINAIRE

MATERIALS & FINISH

Fitting body: Clear anodised aluminium

Bracket: Zinc plated

Lampholder: Porcelain E,S.

FIXING

Three countersunk holes in flange on 166mm P.C.D. Top bracket pre-drilled for two height adjustment positions and for mounting a heat resistant junction box if required.

SPECIFICATION

- Type compliance with BS 4533
- Fully recessed luminaire for both downlighting and infra-red process applications, suitable for a variety of reflector lamps.

To specify state:

Fully recessed luminaire with bright aluminium bezel, having adjustable lampholder height for all reflector lamps up to 375W max, Philips W4001.

Luminaire: Made in UK



ELECTRICAL DATA

Class I electrical (Earth required) for 100/240V supply 3A max. Fitted with heat resisting tails and cleat.

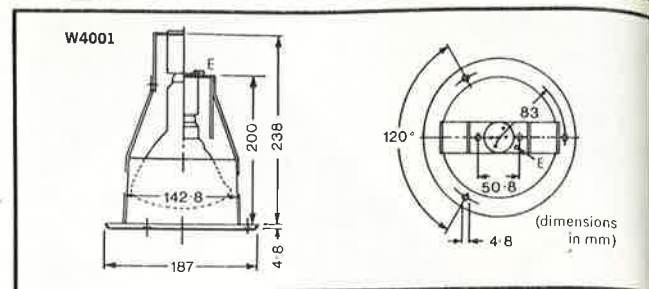
For 24V PAR 38 or R125 lamps replace tails supplied by heat resisting wiring of 6A current rating.

RANGE OF OPERATION

Normal indoor conditions.

DIMENSIONS & WEIGHT

Height adjustment (mm)	Diameter	Ceiling Cut-out	Flange	Weight	Cap
238 max., 200 min.	142.8 mm	146 mm dia	187 mm	650 g	ES



ORDERING DATA

Catalogue No.	Description	Packing Quantity
W4001	Recessed downlight	3

LAMP DATA

Lamp Type	Watts	Volts	Finish	Cap	Packing Qty.	Lamp Weight (g)
R95	75/100	240/250	Diffused/Colour	ES	10	70
PAR 38E/PAR 38	60/80/120	240	Spot/Flood/Colour	ES	15/9	325
R125	150	240/250	Diffused	ES	10	105
Infra-red, Reflector	250/300/375	230/250	Red/Clear	ES	9	150
*Power Ray HPLR	125	—	Diffused	ES	12	128
MLR	160	240	Diffused	ES	12	109
Coolspot	150	240	Spot	ES	15	325

*Appropriate control gear must be used with this lamp. See data sheet PL 1779.

Note that lamps should be ordered separately.

PHILIPS LIGHTING

P.O. Box 298 City House
London Road Croydon CR9 3OR

Philips Electronic and Associated Industries Limited

SWIVEL DOWNLIGHTS

A fully-recessed downlight eyeball type in white or brown that can be rotated to achieve the required lighting effect. For use with R95 blown bulb reflector lamps and PAR 38E/PAR 38 pressed glass reflector lamps.

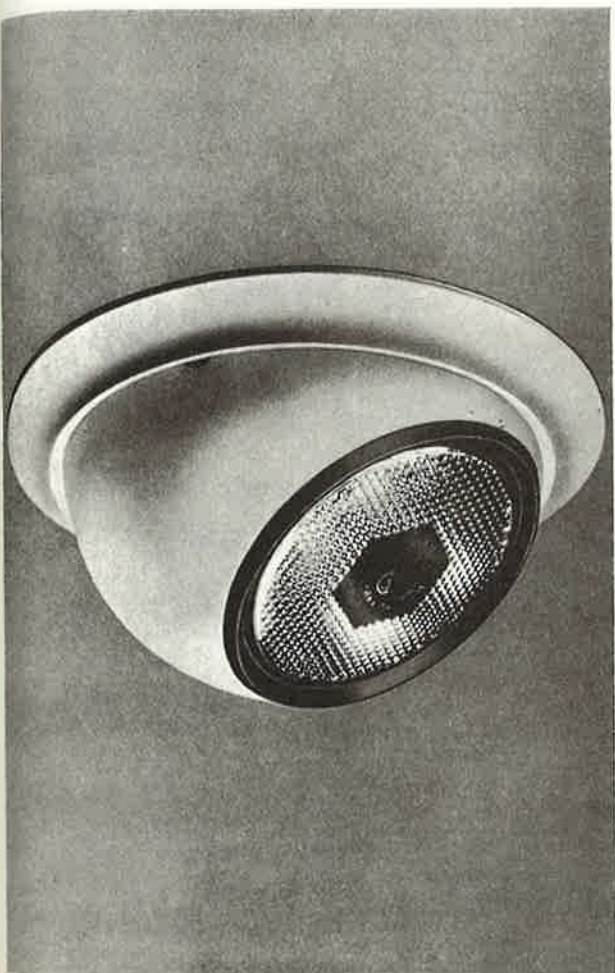
RANGE

Swivel fully-recessed for R95 and PAR 38E/PAR 38 lamps -

Swivel DBN 101/20 (white)
Swivel DBN 101/42 (brown).

APPLICATIONS

- Hotel reception areas, entrance halls and foyers
- Shops and boutiques
- Ballrooms and discotheques
- Exhibitions and museums
- Bars in public houses and clubs
- Boardrooms and executive offices
- Domestic effect lighting



INCANDESCENT FITTING

To reorder this Data Sheet quote

PL 1860/4

Issued 8/83

Replaces PL 1860/3

SWIVEL DOWNLIGHTS

FEATURES

- Easily swivelled by finger pressure.
- Easily installed and connected.
- Heat-resistant black aluminium diaphragm is shaped to accommodate R95 blown bulb or PAR 38 pressed glass lamps.
- Distinctive cove design to ceiling bezel/plate.
- Mark-resistant, tough polycarbonate/polyamide materials ensure easy cleaning and a long, trouble-free life.
- Popular white or brown colour is set off by smooth black diaphragm to reduce reflected glare.
- Luminaires are in individual cartons packed for protection.

Downlights are also available in matching square and round versions with optional wallwasher attachments. Details of Square Downlights are given in Data Sheet PL 1861.

Details of Round Downlights are given in Data Sheet PL 1862.

MATERIALS & FINISH

Ceiling base: Polycarbonate, self-coloured white or brown.

Lamphousing: Aluminium, white or brown.

Diaphragm: Black aluminium, removable. Smooth finish.

Lampholder: Porcelain ES.

Connector box: Polyamide.

Weight: 600g.

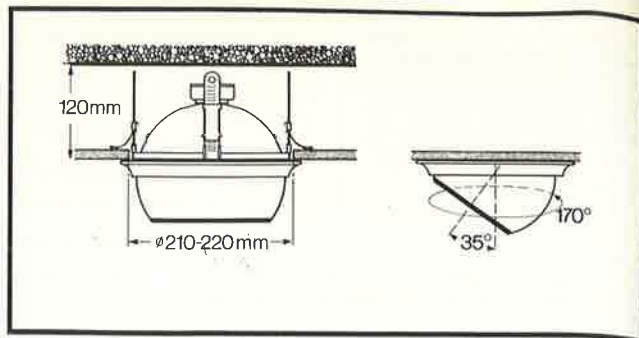
SPECIFICATION

- Type compliance with BS 4533.
- Class II electrical protection (double insulated—no earth required).

RANGE OF OPERATION

For indoor use on 240V nominal supply.

Luminaires: Made in Holland.



ORDERING DATA

Catalogue No.	Description	Box Qty.	Suitable for lamp type	Maximum Wattage
DBN 101/20	Swivel Downlight (white)	4	R95, PAR 38E/PAR 38*	150
DBN 101/42	Swivel Downlight (brown)	4	R95, PAR 38E/PAR 38*	150

* Excluding 150W Cool Spot lamp.

Please order luminaires in multiples of the packing quantity.

Note that lamps must be ordered separately.

SQUARE DOWNLIGHTS

A complementary range of recessed, semi-recessed and surface-mounted downlights for use with reflector lamps and pressed glass lamps.

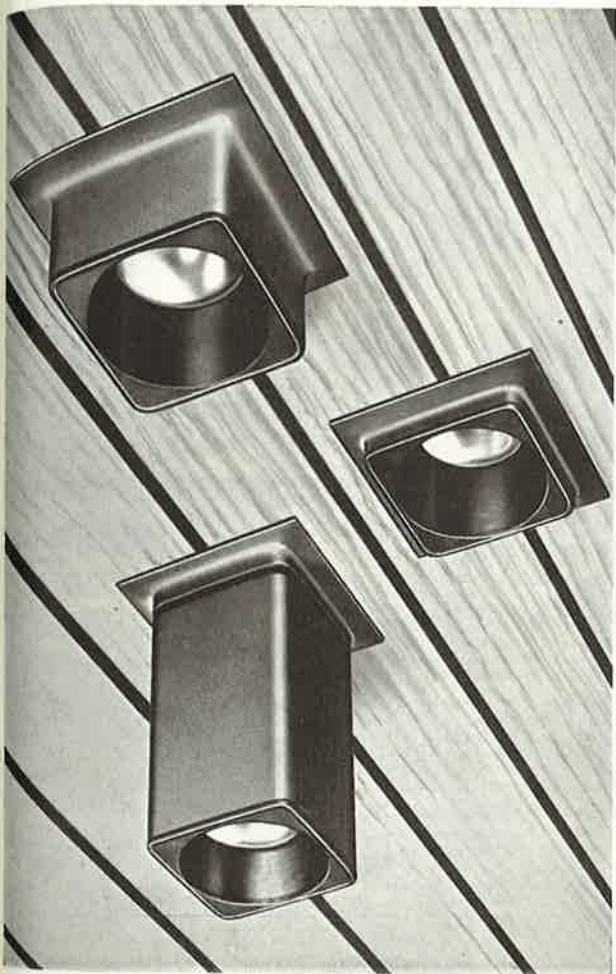
RANGE

Fully-recessed, semi-recessed and surface-mounted downlights, available in white or brown, and in three sizes to take the following lamps:-

	R63	R95	PAR38E/PAR38
Fully-recessed	DBS420	DBS421	DBS422
Semi-recessed	DSS420	DSS421	DSS422
Surface-mounted	DCS420	DCS421	DCS422

APPLICATIONS

- Hotel reception areas, entrance halls and foyers
- Shops and boutiques
- Ballrooms and discotheques
- Exhibitions and museums
- Bars in public houses and clubs
- Boardrooms and executive offices
- Domestic work surface lighting



To reorder this Data Sheet quote

PL 1861/6

Issued 7/83

Replaces PL 1861/5

SQUARE DOWNLIGHTS

FEATURES

Recessed and semi-recessed versions:

- Luminaires are simply pushed through ceiling apertures and are secured by strong concealed leaf springs which adjust to ceiling thicknesses up to 50mm; no fixing screws are visible.
- Quickly connected to pre-wired terminal block with cable clamps and heat-resistant wiring in covered box.
- Light weight.

Surface-mounted versions:

- Easy installation – once the ceiling plate is secured, the other components are fixed by a patented locking system.
- Colour-matched to recessed range, with contrasting black slotted diaphragm.
- No visible fixing screws.
- Quick electrical connection by means of heat-resistant pre-wired terminal block.

General features:

- Matching styling throughout the range.
- Distinctive cove design to ceiling/bezel plate.
- Mark-resistant, tough polycarbonate/polyamide materials ensure easy cleaning and a long, trouble-free life.
- Popular white or brown body colour is set off by black detachable grooved diaphragm which minimises reflected glare.
- Supplied in individual cartons for protection.

Downlight fittings are also available in matching square and round versions with optional wallwasher attachments. Details of Round Downlights are given in Data Sheet PL 1862.

MATERIALS & FINISH

Main body: Self-coloured polycarbonate, white or brown.
Diaphragm: Black ultramide, removable.
Connector box: Noryl.
Lampholder: Porcelain ES.

SPECIFICATION

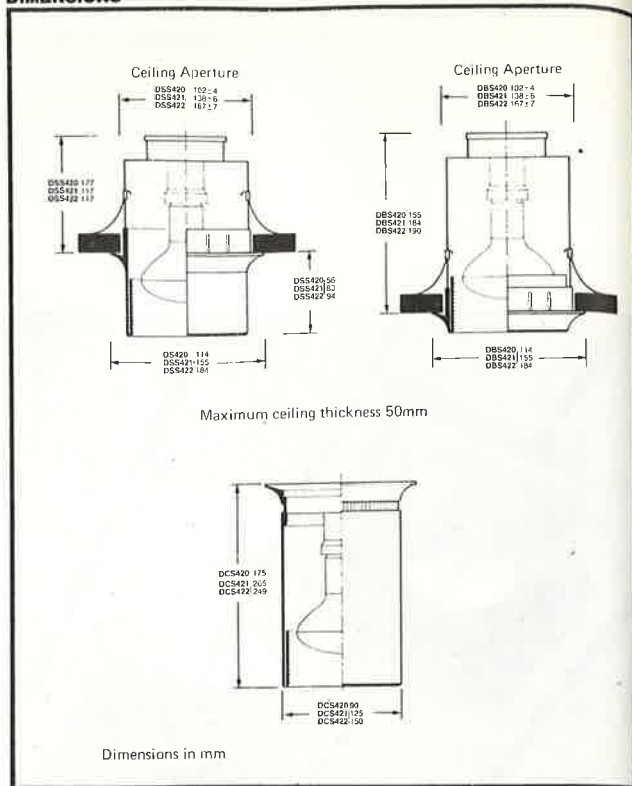
- Type compliance with BS 4533.
- Recessed and semi-recessed version: Class I electrical protection (earth required).
- Surface-mounted versions: Class II electrical protection (no earth required).

RANGE OF OPERATION

For indoor use on 240V nominal supply.

Luminaire: Made in Holland.

DIMENSIONS



ORDERING DATA

Catalogue No.	Description	Box Qty.	Suitable for lamp type	Maximum Wattage
DBS420/20	White square fully-recessed downlight	4	R63	60W
DBS421/20	White square fully-recessed downlight	4	R95	100W
DBS422/20	White square fully-recessed downlight	4	PAR 38E/PAR 38*	120/150W
DBS420/42	Brown square fully-recessed downlight	4	R63	60W
DBS421/42	Brown square fully-recessed downlight	4	R95	100W
DBS422/42	Brown square fully-recessed downlight	4	PAR 38E/PAR 38*	120/150W
DSS420/20	White square semi-recessed downlight	4	R63	60W
DSS421/20	White square semi-recessed downlight	4	R95	100W
DSS422/20	White square semi-recessed downlight	4	PAR 38E/PAR 38*	120/150W
DSS420/42	Brown square semi-recessed downlight	4	R63	60W
DSS421/42	Brown square semi-recessed downlight	4	R95	100W
DSS422/42	Brown square semi-recessed downlight	4	PAR 38E/PAR 38*	120/150W
DCS420/20	White square surface-mounted downlight	4	R63	60W
DCS421/20	White square surface-mounted downlight	4	R95	100W
DCS422/20	White square surface-mounted downlight	4	PAR 38E/PAR 38*	120/150W
DCS420/42	Brown square surface-mounted downlight	4	R63	60W
DCS421/42	Brown square surface-mounted downlight	4	R95	100W
DCS422/42	Brown square surface-mounted downlight	4	PAR 38E/PAR 38*	120/150W

* Excluding 150W Cool Spot lamp.

Please order luminaires and accessories in multiples of the packing quantity. Note that lamps must be ordered separately.

ROUND DOWNLIGHTS

A complementary range of recessed, semi-recessed and surface-mounted downlights for use with reflector lamps and pressed glass lamps. Clip-on wallwashers are available for the recessed and semi-recessed versions.

RANGE

Fully-recessed, semi-recessed and surface-mounting downlights, available in white or brown, and in three diameters to take the following lamps:-

	R63	R95	PAR38E/PAR38
Fully-recessed	DBS 430	DBS 431	DBS 432
Semi-recessed	DSS 430	DSS 431	DSS 432
Surface-mounted	DCS 430	DCS 431	DCS 432
Optional wall-washers	GGZ 430	GGZ 431	GGZ 432 (fully- and semi-recessed versions)

APPLICATIONS

- Hotel reception areas, entrance halls and foyers
- Shops and boutiques
- Ballrooms and discotheques
- Exhibitions and museums
- Bars in public houses and clubs
- Boardrooms and executive offices
- Domestic work surface lighting

INCANDESCENT FITTING

To reorder this Data Sheet quote

PL 1862/6

Issued 8/83

Replaces PL 1862/5

ROUND DOWNLIGHTS

FEATURES

Recessed and semi-recessed versions:

- Simple fixing by strong concealed leaf springs which will adjust to ceiling thicknesses up to 50mm; no visible fixing screws.
- Quickly connected to pre-wired terminal block with cable clamp and heat-resistant wiring in covered box.
- Wallwasher attachments simply clip into position, and can be rotated through full 360°.
- Light weight.

Surface-mounted versions:

- Quick electrical connections by means of heat-resistant pre-wired terminal block.
- Colour-matched to recessed range, with contrasting black slotted gallery.
- No visible fixing screws.

General features:

- Matching styling through the range, which includes the useful miniature R63 size.
- Distinctive cove design to ceiling bezel/plate.
- Interesting wallwasher attachment gives excellent glare cut-off and is ideal for shelf or counter display, or general wallwashing.
- Mark-resistant tough polycarbonate/polyamide materials ensure easy cleaning and a long, trouble free life.
- Popular white or brown colour is set off by black detachable grooved diaphragm which minimises reflected glare.
- Luminaires are supplied individually wrapped for protection.

Also available in Square and Swivel versions.

Details of Square Downlights are given in Data Sheet PL 1861.

Details of Swivel Downlights are given in Data Sheet PL 1860.

MATERIALS & FINISH

Surface-mounted luminaire:

Aluminium body, white or brown lacquered fittings, polycarbonate base.

Recessed fittings: White or brown polycarbonate body.

Diaphragm: Black polyamide, removable.

Wallwasher attachment: White or brown polycarbonate.

Connector box: Noryl.

Lampholder: Porcelain ES.

SPECIFICATION

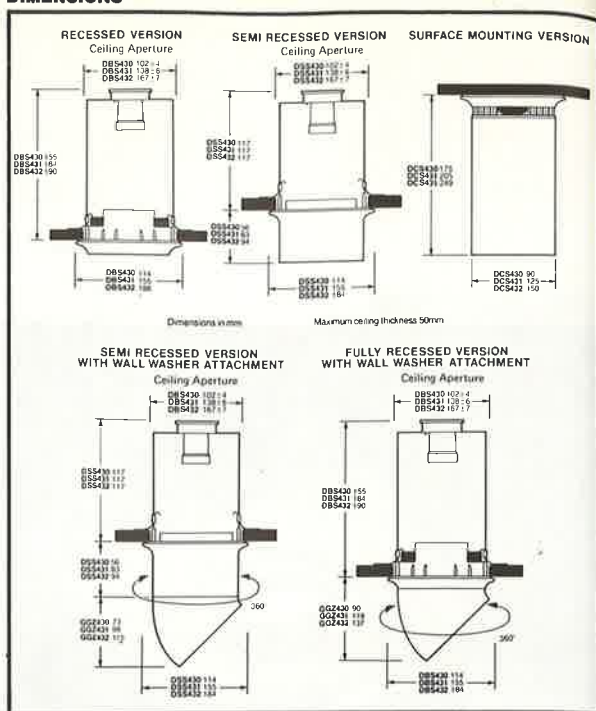
- Type compliance with BS 4533.
- Class I electrical protection (earth required).

RANGE OF OPERATION

For indoor use on 240V nominal supply.

Luminaire: Made in Holland.

DIMENSIONS



ORDERING DATA

Catalogue No.	Description	Box Qty.	Suitable for lamp type	Maximum Wattage
DBS430/20	White fully-recessed Downlight	4	R63	60W
DBS431/20	White fully-recessed Downlight	4	R95	100W
DBS432/20	White fully-recessed Downlight	4	PAR 38E/PAR 38*	120/150W
DBS430/42	Brown fully-recessed Downlight	4	R63	60W
DBS431/42	Brown fully-recessed Downlight	4	R95	100W
DBS432/42	Brown fully-recessed Downlight	4	PAR 38E/PAR 38*	120/150W
DBS430/20	White semi-recessed Downlight	4	R63	60W
DSS431/20	White semi-recessed Downlight	4	R95	100W
DSS432/20	White semi-recessed Downlight	4	PAR 38E/PAR 38*	120/150W
DSS430/42	Brown semi-recessed Downlight	4	R63	60W
DSS431/42	Brown semi-recessed Downlight	4	R95	100W
DSS432/42	Brown semi-recessed Downlight	4	PAR 38E/PAR 38*	120/150W
DCS430/20	White surface-mounted Downlight	4	R63	60W
DCS431/20	White surface-mounted Downlight	4	R95	100W
DCS432/20	White surface-mounted Downlight	4	PAR 38E/PAR 38*	120/150W
DCS430/42	Brown surface-mounted Downlight	4	R63	60W
DCS431/42	Brown surface-mounted Downlight	4	R95	100W
DCS432/42	Brown surface-mounted Downlight	4	PAR 38E/PAR 38*	120/150W
Optional wallwasher attachments				
GGZ 430/20	White wallwasher	4	R63	60W
GGZ 431/20	White wallwasher	4	R95	100W
GGZ 432/20	White wallwasher	4	PAR 38E/PAR 38*	120/150W
GGZ 430/42	Brown wallwasher	4	R63	60W
GGZ 431/42	Brown wallwasher	4	R95	100W
GGZ 432/42	Brown wallwasher	4	PAR 38E/PAR 38*	120/150W

*Excluding 150W Cool Spot lamp.

Please order fittings and accessories in multiples of the packing quantity. Note that lamps must be ordered separately.

PLANT LIGHTING SET KOMBIPAK

PLS 160

Pendant luminaire for 160W MLR mercury blended reflector lamp, for the display lighting of indoor plants.

The Plant Lighting Set includes a pendant luminaire, and the 160W MLR lamp which highlights the green tints of the plants, and assists growth.

RANGE

PLS 160W – Soft white luminaire complete with 160W MLR lamp

PLS 160B – Dark brown luminaire complete with 160W MLR lamp

APPLICATIONS

Plant displays in locations such as:

- Offices
- Exhibitions
- Public buildings
- Hotel reception areas
- Leisure centres
- Shops
- Bars, public houses and clubs
- Residences

INCANDESCENT FITTING

To reorder this Data Sheet quote

PL 1891/2

Issued 8/83

Replaces PL 1891/1

PLANT LIGHTING SET KOMBIPAK

FEATURES

- Mercury blended reflector lamp requires no control gear; combines the high luminous efficacy of mercury fluorescent lamps with the warm light of tungsten filament lamps.
- Installation and maintenance costs are low – the absence of control gear makes the luminaire easy to install, and the rated average lamp life is 6000 hours.
- The reflective internal coating of the lamp concentrates the light where it is required.
- Supplied as a KombiPak ready for installation, complete with lamp, 2 metres of cable, cable hanger, suspension hook and ceiling cone.
- Attractive easy to clean design with soft white or dark brown finish to complement most decors.

MATERIALS & FINISH

Body: Spun aluminium, soft white or dark brown external finish, matt black internal finish.

Lampholder: Heat-resisting phenolic.

SPECIFICATION

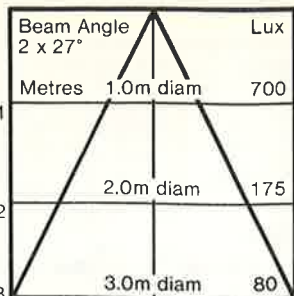
- Type compliance with BS 4533.
- Class II electrical, no earth required.

To specify state:

Pendant luminaire to take Phillips 160W MLR lamp.
Phillips PLS 160 Plant Lighting Set or equivalent.

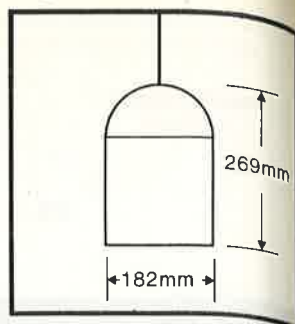
RANGE OF OPERATION

240V 50Hz supplies.
Normal indoor operation.

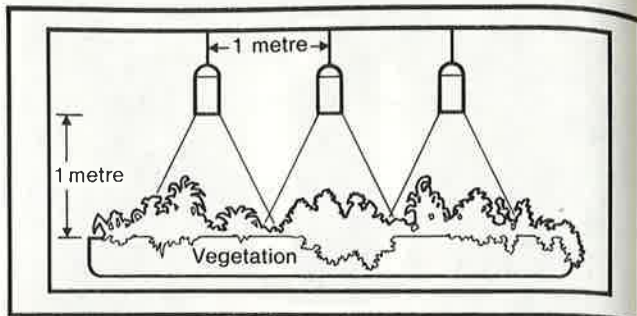


Nominal beam angle measured between 50% intensity values.

DIMENSIONS



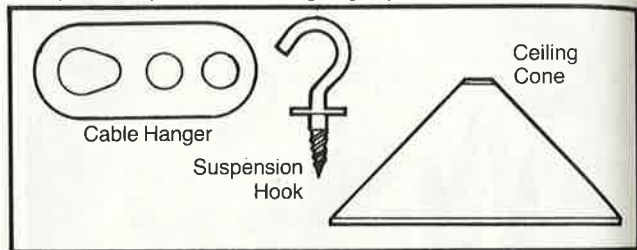
MOUNTING



The luminaire should be mounted so that the distance between the bottom of the luminaire and the average height of the plants is approximately 1 metre.

Note: In common with other discharge lamps the MLR 160 takes up to 5 minutes to re-start if switched off when hot.

ACCESSORIES (Included in Plant Lighting Set)



ORDERING DATA

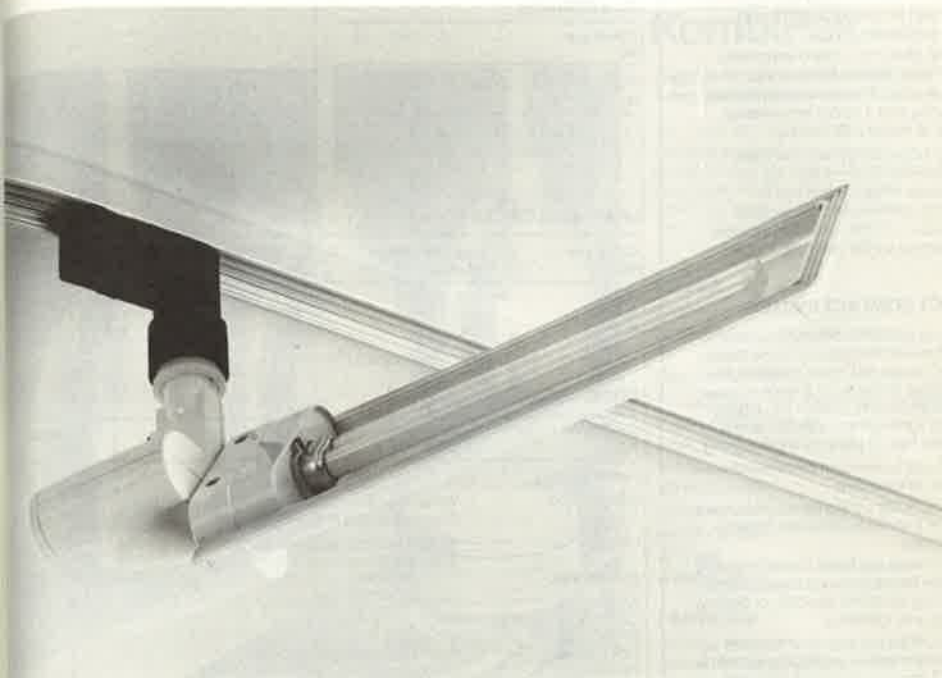
Catalogue No.	Description	Box Quantity
PLS 160W	Soft White Plant Lighting Set with lamp	1
PLS 160B	Dark Brown Plant Lighting Set with lamp	1

Replacement lamp					
Catalogue No.	Description	Voltage	Watts	Cap	Control gear
MLR 160W	Mercury blended reflector lamp	240/250	160	ES	None required

Lamp: Made in Holland.
Luminaire: Made in U.K.

FCN 305

Directional Luminaire For PL Lamps



Directional luminaire

Ultra-slim luminaires designed around Philips PL single-ended miniature fluorescent lamps. The screening heads rotate through 360° in relation to the body to permit the light to be directed as required. The luminaires incorporate Philips Direct Contact System which permits instant mounting to baseplates or lighting track adaptors, and allows unlimited rotation for easy beam aiming.

RANGE

FCN 305/109 – White directional luminaire for PL9 (or PL7) lamp, supplied without lamp or base plate.
FCN 305/11 – White directional luminaire for PL11 lamp. Supplied without lamp baseplate or track adaptor.

APPLICATIONS

- Hotels (bedhead, decorative and reading lighting).
- Shops and stores (display lighting).
- Offices and executive suites (decorative wallwashing).



To reorder this Data Sheet quote

PL 3042/3

Issued 7/83

Replaces PL 3042/2

FCN 305

FEATURES

- Highly energy-effective – PL11 provides more light than a 60W GLS lamp for a total circuit power of only 15Watts
- Long lamp life – five times that of GLS equivalent – reduces maintenance costs.
- Super-slim profile and clean lines blend with any decor.
- Rotating screening head and Direct Contact System feature provide fingertip adjustment of light in any direction.
- Integral starter is automatically discarded at lamp replacement to ensure reliability.
- Lamp phosphor uses components from Philips Colour 80 Series to combine high efficacy with good colour rendering and a colour appearance similar to that of a GLS lamp.
- Direct Contact System provides complete versatility of lighting; all luminaires in the system can be interchanged between baseplate supplied and lighting track in seconds and without wiring changes.

DIRECT CONTACT SYSTEM

A unique patented mounting system, now standard throughout Philips display lighting range. All Direct Contact System luminaires terminate in a male co-axial plug which simply pushes into a baseplate or lighting track adaptor, and is securely held in place by a locking ring.

- Co-axial connection permits unlimited rotation of luminaire.
- Spring holds luminaire securely in set position to provide accurate, fingertip adjustment.
- Luminaires are freely interchangeable between baseplates and track adaptors, permitting complete flexibility of display lighting arrangements.
- Baseplates are quickly and simply installed on wall or ceiling; the system is Class II and the luminaires prewired, so that there are only two push wire connections to make.
- Interchangeability of bodies, baseplates and adaptors simplifies stockholding; enables wholesale stockists to offer a wider range of luminaires from a reduced stores inventory.

SPECIFICATION

- Type compliance with BS 4533
- Class II electrical protection (no earth required).

To specify state:

Directional luminaire for single-ended miniature fluorescent lamp with integral starter, the luminaire to have integral ballast and Direct Contact System co-axial termination. Substantially as Philips FWN 305/FCN 305.

DIMENSIONS

Catalogue No.	L	W	H
FCN 305/109	285	x 115	x 95*
FCN 305/111	300	x 115	x 95*

* To height add 28mm for baseplate
60mm for track adaptor

RANGE OF OPERATION

For use on 240V 50Hz supplies. For indoor use only. Not for use with dimmers. Baseplate is not a lighting point.

LAMP AND CIRCUIT DATA

Catalogue No.	Lighting Design Lumens*	Circuit Power (Watts)	Circuit Current (mA)
PL7	370	11	180
PL9	510	13	170
PL11	800	15	160

* Measured under reference conditions at 2,000 hours.

ORDERING DATA

Catalogue No.	Description	Packing Qty.
Luminaire only		
FCN 305/109	White directional luminaire for PL9 (or PL7) lamp. Supplied without lamp or baseplate.	4
FCN 305/111	White directional luminaire for PL11 lamp. Supplied without lamp or baseplate.	4
Accessories		
ZZX 010/20	White DCS baseplate (round)	8
ZZX 010/40	Black DCS baseplate (round)	8
ZZX 020/20	White DCS baseplate (square)	8
ZZX 020/40	Black DCS baseplate (square)	8
RCS 655/15	DCS lighting track adaptor (black only)	8
ZZX 006	DCS lighting track adaptor (clamp)	8
Lamps		
PL7	Single-ended fluorescent lamp (7W)	50
PL9	Single-ended fluorescent lamp (9W)	50
PL11	Single-ended fluorescent lamp (11W)	50

Please order in the form given in the following example, in multiples of the packing quantity. Note that lighting track adaptors must be ordered separately. Also for FWN 305 luminaires.

- 4 Philips luminaires FCN 305/111
- 8 Philips DCS lighting track adaptors RCS 655/15

Luminaire and lamps – Made in Holland

CWF 300 Chef-Aid KombiPak

Copper-finish luminaires for heat lamp, for keeping cooked food hot.

The Chef-Aid is invaluable for keeping cooked food hot and appetising. It includes a hard glass heat lamp which gives a bright, warming beam to maintain the temperature of the food and to provide a good display light.

RANGE

CWF/300 luminaire complete with 300E/06 hard glass heat lamp.

APPLICATIONS

For use over food distribution points, in situations such as:-

- Public houses
- Bars and clubs
- Restaurants
- Self-service cafeterias
- Staff canteens
- Hotels
- Buffet areas

FEATURES

- Keeps cooked food and plates warm, reducing wastage and enabling more cooking to be done in advance.
- Discourages the formation of skins on soups, sauces and gravies.
- Gives instant heat when switched on; heating ceases immediately when switched off.
- Simple to install, either singly or in multiple units, to cover any application from a hot food counter in a pub to a large cafeteria area.
- Can be suspended either from cable or tubing.

continued

To reorder this Data Sheet quote

PL 1844/1

Issued 6/83

Replaces PL 1844

MISCELLANEOUS

GWF 300 – MISCELLANEOUS

Features continued

■ Safe to use – Philips hard glass heat lamps are resistant to thermal shock (caused, for example, by accidental splashing with water). It is essential to ensure that only hard glass heat lamps are used as replacements.

■ Attractive easy-clean design with polished copper finish matches most decors.

■ Brightly illuminates the food to display it in an appetising and eye-catching light.

MATERIALS & FINISH

Canopy and top cap: Spun and polished aluminium, anodised copper finish.

Lampholder: Porcelain ES.

SPECIFICATION

■ Type compliance with BS 4533. Class I electrical (earth required).

To specify state:

Polished copper-coloured food warming luminaire complete with 300W hard glass heat lamp with ES cap, Philips Chef-Aid CWF/300 or equivalent.

RANGE OF OPERATION

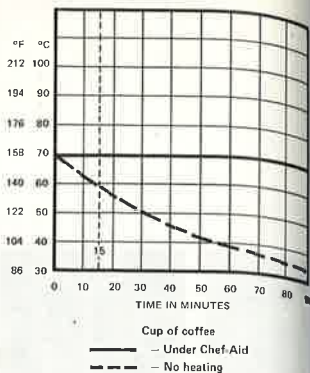
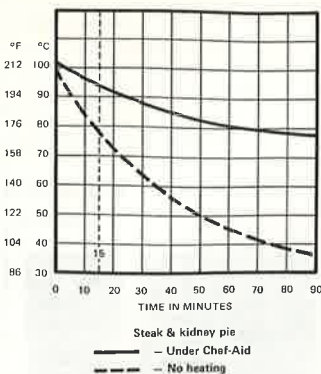
Supply voltage as for lamp, 300W maximum.

For indoor use only. Use only hard glass heat lamps.

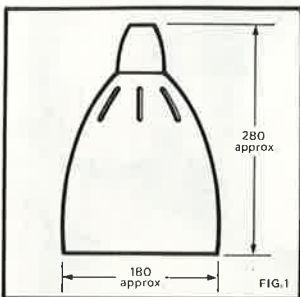
TYPICAL RESULTS

The graphs below are taken from a series of tests to measure how the Philips Chef-Aid maintains food

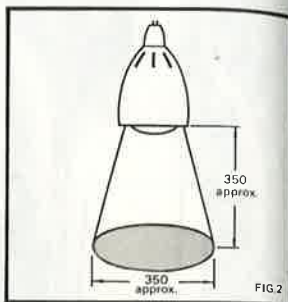
temperature. They also show how the temperature drops if no heating is used.



DIMENSIONS



All dimensions in mm.



ORDERING DATA

Catalogue No.	Description	Box quantity
CWF/300 Chef-Aid KombiPak	Food Warming Unit (complete with heat lamp)	1

Replacement lamp data

Catalogue No.	Description	Watts	Cap	Volts	Finish	Box quantity
300E/06	Hard glass heat lamp	300	ES	230/250	Clear	9

Please order in the form given in the following example.

25 Philips Chef-Aid KombiPak CWF/300 (complete with hard glass heat lamp).

Mounting:

(1) By means of suspension hook supplied.

(2) By means of tube, either screwed directly on to $\frac{1}{2}$ in. threaded nipple revealed when suspension hook is removed, or fixed to top cap by suitable nuts after removing cable grommet.

The fitting should be mounted so that the distance between the bottom and the food is 330–450 mm (see Figure 2). If large areas are to be heated, additional Chef-Aid fittings should be installed such that the edges of the heat/light circles merge.

WEIGHT

Complete with lamp: 0.45 kg.

Lamp: Made in Holland.

INDUSTRIAL DISCHARGE FITTINGS

	Page
Hermes 3 Fittings	147
Hermes 2 Gear Box	151
Hermes 3 Photometric Data	157
PowerSlimmer SDK High Bay Industrial	
KombiPaks	163
Low Bay Luminaires	167
Low Bay Photometric Information	169

Please see pages II and III of General Introduction for information on how to use this Handbook.

HERMES 3

High-bay luminaires for 150W-400W discharge lamps

A high-bay luminaire which accommodates SON, HPL-N or HPI discharge lamps in ratings from 150W to 400W. An adjustable lampholder assembly permits the user to set any required light distribution from Widespread through dispersive to concentrated, using the same reflector.

RANGE

The luminaires which includes the adjustable lampholder accommodate the following lamp types:-

150W SON	250W HPL-N
250W SON	400W HPL-N
400W SON	250W HPI/BUS
	400W HPI/BUS

Reflector

Wireguard for reflector

Dust-resistant cover for reflector



To recorder this Data Sheet quote

PL 1867/7

Issued 6/83

Replaces PL 1867/6

HERMES 3 – DISCHARGE FITTINGS

APPLICATIONS

For use wherever high-bay discharge lighting is appropriate, particularly at luminaire mounting heights over 5m and in high ambient temperatures, for situations such as:-

- Stores and warehouses
- Foundries and drop forging plants
- Factory production areas
- Railway and bus termini
- Loading bays
- Hypermarkets and Cash & Carries
- Indoor sports halls and complexes

FEATURES

- Simple lampholder adjustment in the gear box permits the user to accommodate a wide range of discharge lamps in the same reflector, and to set any required light distribution.
- Since the lampholder moves with respect to the reflector and gear, the adjustment can be made at any time after installation to suit changing requirements.
- The variable spacing/mounting height ratio provided by the adjustable distribution eliminates compromise. It permits the lighting designer to specify the correct number of luminaires for the required illuminance level and then set them to give the optimum uniformity of illumination. No more luminaires are used than are strictly necessary, thus saving energy, and the design of the installation is greatly simplified.
- Removing the knock outs in the lampholder housing allows a through current of air to render the luminaire self-cleaning. An optional dust cover and dust-resisting lampholder gaiter can be used to seal the universal reflector in very dirty environments.

Knock Outs Removed	Knock Outs Retained	
IP22	IP54	With Dust Cover
IP22	IP22	No Dust Cover

- Maximum ambient temperature 30°C for 400W rating, 35°C for other ratings.
- Two part gear unit with handle for easy carrying
- Low profile to keep luminaire height to a minimum.
- Simple, speedy installation; all components are positively supported before any wiring has to take place.
- Optional wireguard protects the lamp against knocks.
- Very few components complete the entire range, helping availability and greatly simplifying ordering by means of an easily-understood code.
- Mounting bracket enables reflectors with gear to be suspended from a single 20mm conduit drop.

SPECIFICATION

Type compliance with BS4533 Section 102.1.

Degree of Protection: See table

To specify state:

Industrial high-bay luminaire with adjustable lampholder to permit any light distribution to be set before or after installation and pre-wired gear box. Similar to Philips Hermes 3.

RANGE OF OPERATION

240V 50Hz supplies,
Normal indoor applications.

MATERIALS & FINISH

Gear box: Pre-wired potted ballast, housed in corrosion resistant aluminium alloy casting with capacitor and ignitor wired into rugged phenolic housing.

Reflector: Aluminium.

Lampholder: Porcelain GES.

Dust cover: Toughened glass.

DATA SHEET REFERENCE

PL 1869 – Photometric information on Hermes 2: 150W – 400W lamps.

Note: Mercury fluorescent lamps
UK marking MBF = Philips
International marking HPL-N
Metal halide lamps
UK marking MBI = Philips
International marking HPI.

HERMES 3 – DISCHARGE FITTINGS

GENERAL PHOTOMETRIC INFORMATION

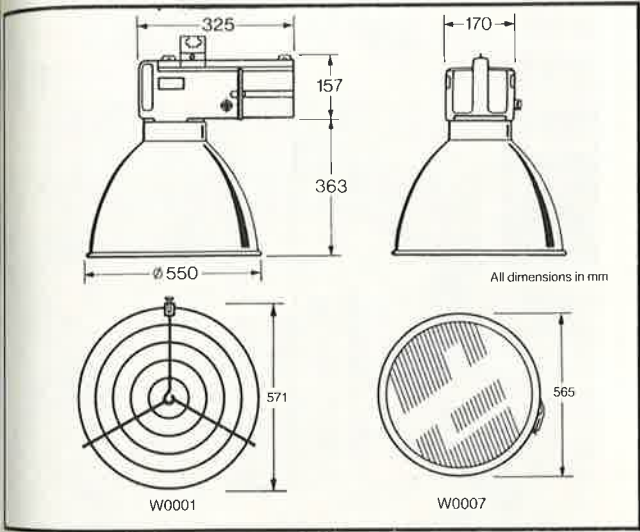
Information in this table is included to enable the specifier to gauge the general performance of the luminaire in relation to lamp type. Detailed photometric information on Hermes 3 luminaires including utilisation factors and polar curves, is given in Data Sheet PL 1869.

Light Source	SHR Max'	LORL	Recommended Lampholder Positions		
			Concentrating	Dispersive	Widespread
Universal Reflector					
400W SON	0.68 - 1.36	0.71 - 0.81	3	7	-
400W SON	0.72 - 1.45	0.76 - 0.83	3	5	7
400W SON	1.10 - 1.70	0.79 - 0.80	0	2	5
400W HPL-N	0.71 - 1.55	0.79 - 0.87	3	6	7
400W HPL-N	1.13 - 2.06	0.79 - 0.80	0	2	5
400W HPI/BUS	1.01 - 1.92	0.78 - 0.81	1	3	5

Notes:
 A complete Hermes 3 luminaire is ordered by means of a four-digit code number made up by straightforward addition of the catalogue numbers of the component parts. A prefix denotes the type of lamp (SD for sodium; HD for mercury).
 e.g. Gearbox SD 4000
 Reflector R 0070
 Dust cover W 0007
 Complete ordering code SD 4077

The discharge lamp must always be ordered separately.
 The luminaire in the example above is ordered as follows:-
 Philips Hermes 3 high-bay luminaire SD 4077 and 400W SON lamp.
 Individual parts and accessories can be ordered separately under the Catalogue Numbers given above.
 The values of SHR Max given in this Data Sheet are calculated in accordance with CIBS Technical Memorandum No. 5.

WEIGHTS & DIMENSIONS



All dimensions in mm

SD 1500	Gear Unit	6.9 Kg
SD 2500	Gear Unit	9.1 Kg
SD 4000	Gear Unit	9.8 Kg
HD 2500	Gear Unit	5.4 Kg
HD 4000	Gear Unit	6.3 Kg
R0070	Reflector	1.9 Kg
W0001	Wire Guard	0.6 Kg
W0007	Dust Cover	3.5 Kg

4

HERMES 3 – DISCHARGE FITTINGS

ORDERING DATA

Catalogue No.	Description	Packing Qty.	
Gear Units			
SD 1500	For 150W SON	} Supplied complete with suspension bracket	1
SD 2500	For 250W SON		1
SD 400	For 400W SON		1
HD 250	For 250W HPI-N		1
HD 400	For 400W HPL-N and HPI/BUS		1
Reflectors			
R 0070	Universal reflector for 150-400W lamps	3	
Accessories			
W 0001	Wireguard for 150-400W ratings	1	
W 0007	Dust Cover for 150-400W ratings	1	
System (Gear Box & Reflector) lamps to be ordered separately			
SON 150W	SD 1570		
SON 250W	SD 2570		
SON 400W	SD 4070		
HPL-N 250W	HD 2570		
HPL-N 400W	HD 4070		
HPI/BUS 250W	HD 2570		
HPI/BUS 400W	HD 4070		

Made in UK.

HERMES 2

Pre-wired gear box 150W - 400W

A range of 5 pre-wired cast alloy gear boxes, containing potted ballasts, for use with high-pressure sodium lamps 150W-400W, mercury fluorescent lamps 250W-400W and 250W-400W metal halide lamps.

RANGE

S.1500 (150W SON, 150W SON/T and SON/ST)

S.2500 (250W SON, 250W SON/T)

S.4000 (400W SON, 400W SON/T)

H.2500 (250W HPL-N, 250W HPL-R)

H.4000 (400W HPL-N, 400W HPL-R and HPI/BUS)

H.2500 + Ignitor Kit P0000/2 (250W HPI/T)

H.4000 + Ignitor Kit P.0000/2 (400W HPI/T)

APPLICATIONS

For use with remote-gear luminaires in a wide range of applications, including:-

- Area floodlighting (with HNF001, HNF003 and NNF010 luminaires)
- Stadia floodlighting (with HNF 001, HNF003, HNF206 and NNF010 luminaires)
- Security lighting (with HNF001, HNF003 and NNF010 luminaires)
- Road lighting (with MA30 luminaires)
- Replacement for old low loss gear.

DISCHARGE FITTINGS

To reorder this Data Sheet quote

PL 1868/4

Issued 7/83

: Replaces PL 1868/3

HERMES 2

FEATURES

- Sturdy, aluminium alloy housing for outdoor and indoor environments. The gear box is designed to comply with Degree of Protection IP54.
- Pre-wired and factory tested for easy, labour-saving installation.
- Low wattage losses from high-quality components reduce energy waste.
- Rated for ambient temperatures up to 45°C
- Easy installation—the hinged lid gives ready access to the simple wiring while connections are being made,
- Available for use with Philips mercury fluorescent (HPL-N) lamps up to 400W and high-pressure sodium (SON) lamps up to 400W; also for metal halide lamps (HPI/T and HPI/BUS) up to 400W.

MATERIALS & FINISH

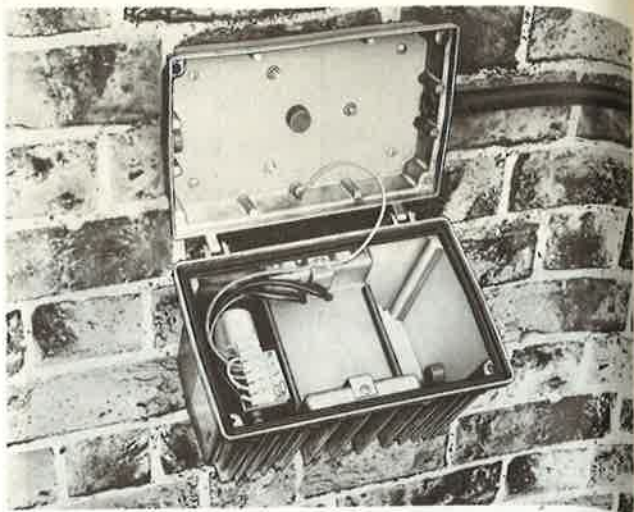
Gear box housing: Aluminium alloy casting with integral cooling fins.
Components: Pre-wired, with potted ballast and high-quality components.

SPECIFICATION

Degree of Protection designed to IP54.

RANGE OF OPERATION

240V 50Hz supplies.
Normal indoor and outdoor applications.

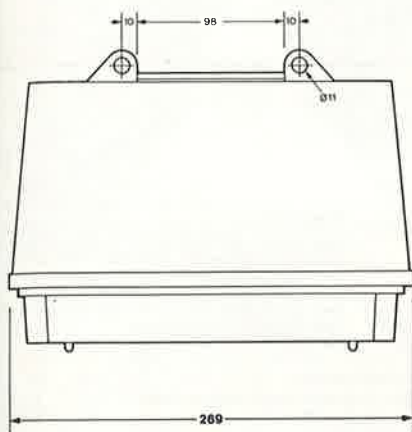
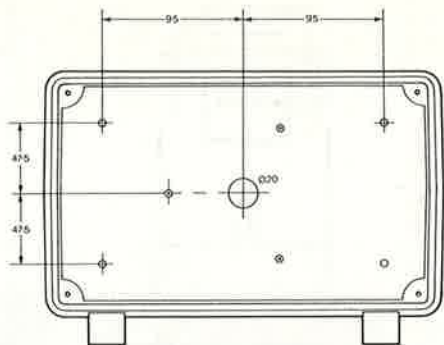


Wall mounted Hermes 2 gear box for use with floodlights, etc. Shown open to give details of conduit entries, earthing and internal wiring.

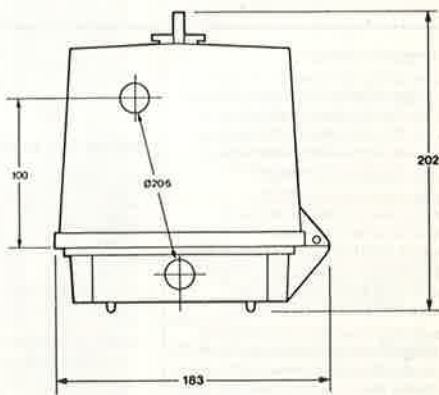


Hermes 2 gear boxes can be used with many of the Philips' range of floodlighting luminaires.

Gearbox Plan Underside



Side Elevation



End Elevation

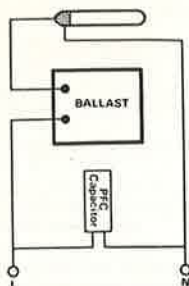
All dimensions in mm

4

DIMENSIONS, WEIGHTS & ELECTRICAL DATA

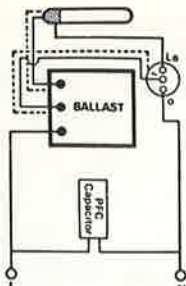
Catalogue No.	For lamp type	Lamp Voltage V	Lamp Current A	Circuit Current Start	Circuit Current Run	Total Circuit Watts	Weight (kg/lb)
13500	150W SON, SON/T & SON/ST	100	1.8	1.2	0.9	174	5.5
12500	250W SON, SON/T & SON/R	100	3.0	1.8	1.3	280	6.4
14000	400W SON, SON/T	105	4.4	3.0	2.2	440	8.7
12500	250W HPL-N & HPL-R	135	2.0	1.9	1.2	268	5.2
14000	400W HPL-N & HPL-R	140	3.2	3.0	1.8	427	6.0
14000	400W HPI/BUS	125	3.4	3.3	1.9	427	6.1
12500 + Ignitor Kit P.0000/2	250W HPI/T	125	2.1	1.9	1.3	268	5.2
14000 + Ignitor Kit P.0000/2	400W HPI/T	125	3.4	3.3	1.9	427	6.2

Circuit diagrams



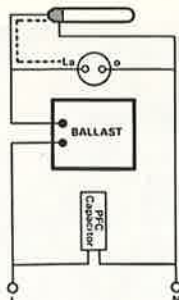
1

250W HPL-N & HPL-R
400W HPL-N, HPL-R & HPI/BUS



2

150W SON, SON/T & SON/ST
250W SON & SON/T
400W SON & SON/T



3

250W HPI/T
400W HPI/T

Cable length limitations

In circuits using ignitors, the maximum cable length between lamp and control gear is limited by the capacitance of the cable. This is obtained by adding together two values obtained in test.

The capacitance of the 'high' conductor (i.e. the conductor connecting the ballast to the lamp centre contact) and all other conductors bonded together.

The capacitance between the 'high' conductor and earth (usually the protective housing of the cable).

Tables giving maximum permissible cable lengths using typical cables in common applications are contained in Customer Information Sheet No. 80.

N.B. Mineral-insulated cables are not recommended for use in these parts of the ignition circuit.

ORDERING DATA

Catalogue No.	Description
S.1500	Gear box for 150W SON, SON/T & SON/ST Lamps
S.2500	Gear box for 250W SON, SON/T & SON/R lamps
S.4000	Gear box for 400W SON, SON/T lamps
H.2500	Gear box for 250W HPL-N & HPL-R lamps
H.4000	Gear box for 400W HPL-N, HPL-R & HPI/BUS lamps
H.2500 + Ignitor Kit P.0000/2	Gear box for 250W HPI/T lamp
H.4000 + Ignitor Kit P.0000/2	Gear box for 400W HPI/T lamp

Notes: All items are individually packed.

Please order in the form given in the following example:-
6 Philips pre-wired gear boxes S.2500

Made in UK.

HERMES 3

PHOTOMETRIC INFORMATION

4

Photometric information -- 150W - 400W discharge lamps, Polar diagrams, utilization factor tables and other essential photometric information for discharge lamps in the Hermes 3 high bay systems. The data included is chosen to meet the needs of the lighting designer.

Note: Mercury fluorescent lamps
UK marking MBF = Philips
International marking HPL-N
UK marking MBI = Philips
International marking HPI

RANGE

Photometric information is included to cover the following lamp types in 10 lampholder positions where applicable:

250W HPL-N and 250W HPI/BUS
400W HPL-N and 400W HPI/BUS
150W SON
250W SON
400W SON

Calculations based on CIBS Technical Memorandum No. 5 and Technical Report No. 10.

CIBS Standard Presentation.

To reorder this Data Sheet quote **PL 1869/5**

Issued 6/83

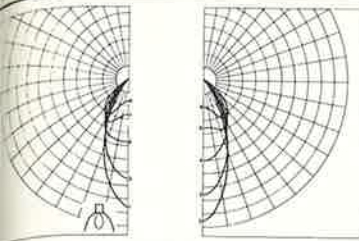
Replaces PL 1869/4

DISCHARGE FITTINGS

HERMES 3 PHOTOMETRIC INFORMATION – DISCHARGE FITTINGS

PHOTOMETRIC DATA

HERMES 3-250W HPL-N
WITH UNIVERSAL REFLECTOR R0070
Mounting: SUSPENDED



Position No.	0	1	2	3	4	5	6	7	8	9
CIE Flux Number	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SHR MAX	0.71	0.76	0.83	0.87	1.01	1.15	1.24	1.55	1.52	1.61
SHR MAXTR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ULORL	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02
DLORL	0.76	0.78	0.81	0.83	0.83	0.85	0.85	0.85	0.85	0.84
LORL	0.79	0.81	0.84	0.85	0.85	0.87	0.87	0.87	0.87	0.86

GLARE DATA

Flux Fraction Ratio	0.04	0.04	0.04	0.02	0.02	0.02	0.02	0.02	0.02	0.02
ACG	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Classification	1	1	1	1	1	1	1	1	1	1
BZ										
Classification	1	1	1	1	1	1	1	1	1	1
Luminous Area (sq. cm.) 2200										

Measured: BS 5225 Part 1 1975										
Dated: 6/3/79										
Test No.	B201	B200	B199	B198	B197	B196	B195	B194	B193	B192

LUMINOUS INTENSITIES cd/1000 lm.

Lamp Position Angle	Lamp Position				
	0	3	4	6	7
0	1281	909	721	431	324
5	1196	881	713	436	327
10	1029	809	672	442	338
15	855	725	624	452	360
20	656	626	574	469	400
25	454	510	505	469	429
30	284	385	410	433	423
35	165	265	300	360	379
40	114	177	211	276	308
45	74	116	141	199	232
50	36	65	80	124	154
55	16	30	38	62	83
60	10	13	17	27	36
65	7	8	9	12	15
70	4	5	5	6	7
75	4	3	3	4	4
80	3	1	2	2	2
85	2	1	1	1	1
90	2	1	1	1	1

Lamp Type: High Pressure Mercury

Position No. 3 SHR 0.870

Reflectance		Room Index								
C	W F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50 20	66	73	77	80	84	87	88	90	92
30	20	61	68	73	76	81	84	86	88	90
10	20	58	65	70	73	78	81	83	86	88
50	50 20	64	71	75	78	81	83	85	87	88
30	20	60	67	71	74	79	81	83	85	87
10	20	57	64	69	72	76	79	81	84	85
30	50 20	63	69	73	75	79	81	82	84	84
30	20	60	66	70	73	76	79	80	82	83
10	20	57	64	68	71	75	77	79	81	82
0	0 0	55	62	65	68	72	74	75	77	78

Position No. 4 SHR 1.010

Reflectance		Room Index								
C	W F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50 20	65	72	76	79	84	86	88	90	92
30	20	60	68	72	76	80	83	85	88	90
10	20	57	65	69	73	78	81	83	86	88
50	50 20	64	70	74	77	81	83	85	87	88
30	20	59	67	71	74	79	81	83	85	86
10	20	56	64	68	71	76	79	81	84	85
30	50 20	62	69	72	75	78	81	82	83	84
30	20	59	66	70	72	76	79	80	82	83
10	20	56	63	67	70	74	77	79	81	82
0	0 0	54	61	65	68	71	74	75	77	78

Position No. 6 SHR 1.240

Reflectance		Room Index								
C	W F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50 20	65	72	77	80	85	88	89	92	94
30	20	60	67	73	76	81	85	87	90	92
10	20	56	64	69	73	78	82	84	87	90
50	50 20	63	70	75	78	82	85	86	88	90
30	20	59	66	71	74	79	82	84	86	88
10	20	56	63	68	72	76	80	82	85	87
30	50 20	62	69	73	76	79	82	83	85	86
30	20	58	65	70	73	77	80	81	83	85
10	20	55	62	67	70	75	78	79	82	84
0	0 0	54	60	65	68	72	74	76	78	78

Position No. 0 SHR 0.710

Reflectance		Room Index								
C	W F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50 20	63	68	72	75	78	80	82	84	85
30	20	59	65	68	71	75	78	79	82	83
10	20	56	62	66	69	73	75	77	80	82
50	50 20	61	67	70	72	75	77	78	80	81
30	20	58	63	67	70	73	76	77	79	80
10	20	55	61	65	67	71	73	75	77	79
50	50 20	60	65	68	70	73	74	76	77	78
30	20	57	62	66	68	71	73	74	76	77
10	20	55	60	64	66	69	71	73	75	76
0	0 0	53	58	61	64	66	68	69	71	71

Position No. 7 SHR 1.550

Reflectance		Room Index								
C	W F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50 20	68	74	78	81	86	88	90	92	94
30	20	64	69	74	78	82	85	87	90	92
10	20	60	66	71	75	79	83	85	88	91
50	50 20	67	72	76	79	83	85	87	89	90
30	20	63	68	73	76	80	83	85	87	89
10	20	60	65	70	73	78	81	83	85	88
30	50 20	66	70	74	77	80	82	84	85	87
30	20	62	67	71	74	78	80	82	84	86
10	20	59	64	69	72	76	79	80	83	85
0	0 0	58	62	66	69	73	75	77	79	80

HERMES 3 PHOTOMETRIC INFORMATION – DISCHARGE FITTINGS

PHOTOMETRIC DATA



TYNE & WEAR P.T.E. MAINTENANCE DEPOT, GOSFORTH

The maintenance shop for Newcastle's new metropolitan railway has been converted from fluorescent lighting to 400W SON in Hermes high-bay luminaires. Light level is increased from 10 - 80 lux (non-uniform) to about 500 lux, with a reduction in installed load from 78kW to 65kW.



BRITISH OXYGEN COMPANY, SHOREHAM

The BOC Edwards plant at Shoreham, Sussex enjoys the benefits of SON lighting despite headroom restricted to 4.5 metres by using 400W SON/T lamps in Philips Lowbay luminaires. Average illuminance is 500 lux.

POWERSLIMMER SDK HIGH BAY KOMBIPAKS

4



High-bay luminaires for 250W and 400W SON discharge lamps

High-bay luminaires supplied as KombiPaks, ready for installation. Each KombiPak contains SON lamp, lampholder, pre-wired gear box, reflector, and suspension hanger.

RANGE

PowerSlimmer High Bay KombiPak SDK 250: luminaire complete with 250W SON lamp, control gear and fixing accessories.

PowerSlimmer High Bay KombiPak SDK 400: luminaire complete with 400W SON lamp, control gear and fixing accessories.

APPLICATIONS

For use wherever SON lighting is appropriate, particularly at mounting heights over 5m, in situations such as:-

- Stores and warehouses
- Factory production areas
- Foundries
- Rail and bus termini
- Loading bays
- Indoor sports halls

DISCHARGE FITTINGS

To reorder this Data Sheet quote

PL 3031/3

Issued 9/82

Replaces PL 3031/2

POWERSLIMMER SDK – DISCHARGE FITTING

FEATURES

- Low profile to keep luminaire height to a minimum
- Withstands ambient temperatures up to 40°C.
- Knockouts in the housing enable through ventilation over the reflector to minimise dirt deposition.
- Simple, speedy installation; all components are supported before any wiring has to take place.
- Two part gear unit with handle for easy carrying.
- Degree of protection IP22.
- Supplied as a KombiPak ready for installation; lamp and all necessary accessories are included.
- Simple instructions for designing lighting schemes are incorporated on the packaging; full installation instructions are enclosed.



ELECTRICAL DATA

For operation on 240V 50Hz supply.

Lamp Watts.	Circuit Watts	Circuit Current (amps)
250	280	1.3
400	440	2.2

LAMP COMPARISON TABLE

The PowerSlimmer High Bay KombiPaks are available with control gear to operate 250W and 400W high-pressure sodium (SON) lamps. These generate a warm white light with colour rendering properties that are suitable for most industrial applications.

The table below gives the wattage of HPL-N and SON lamps of comparable lumen output, and shows the significant savings in energy consumption that can be gained by changing to high-pressure sodium.

Lamp Watts	LDL
250W SON	24,000
400W SON	45,000
400W HPL-N	21,300
700W HPL-N	40,000

Note: Mercury fluorescent lamps UK marking MBF = Philips International marking HPL-N.

MATERIALS & FINISH

Gear box – Pre-wired potted ballast, housed in corrosion-resistant aluminium alloy casting, with capacitor and ignitor wired into rugged phenolic housing.

Reflector – Aluminium

Lampholder – Porcelain GES

SPECIFICATION

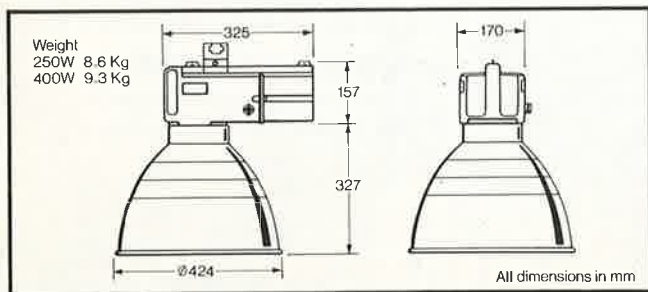
■ Type compliance with BS 4533 Section 102.1.

To Specify State:

Industrial high-bay luminaire for SON lamp, with pre-wired cast two part aluminium and black phenolic gear box with the Degree of Protection IP22. To be supplied as a KombiPak complete with lamp, gear and fixing accessories. Similar to Philips PowerSlimmer Industrial KombiPak.

RANGE OF OPERATION

240V 50Hz supplies
Normal indoor applications.



POWERSLIMMER SDK – DISCHARGE FITTING

STEP BY STEP DESIGN

To determine the number and type of luminaires required to achieve 300 or 500 lux:

STEP 1 Choose the appropriate table for 300 or 500 lux.

STEP 2 Locate the square which corresponds with your bay width and luminaire mounting height. If your bay width exceeds 30m, divide the width into the largest manageable size.

STEP 3 If the square is shaded use a 400W luminaire, if unshaded use a 250W luminaire.

STEP 4 The number on the top indicates the number of rows of luminaires across the bay. These rows should be equally spaced. The distance to the walls should ideally be half that between the rows.

STEP 5 The lower number is the spacing in metres between luminaires down the rows.

STEP 6 Divide the bay length (metres) by this spacing and round UP to the nearest whole number. Multiply this by the number of rows to arrive at the total luminaires required.

STEP 7 Space the luminaires equally down the rows. The distance from the end luminaires to the end wall should ideally be half the spacing down the rows.

EXAMPLE

An assembly shop has a bay width of 10m, a mounting height of 8m and a bay length of 42m. An illuminance of 300 lux is required on the floor.

STEP 1 Refer to table 1.

STEP 2

2
7.2

STEP 3 250 Watt luminaire.

STEP 4 2 Rows.

Spacing between rows = $10/2 = 5.0\text{m}$

Spacing to wall = $5/2 = 2.5\text{m}$

STEP 5 Spacing down rows (table) = 7.2m

STEP 6 Number per row

= $\frac{\text{Bay length}}{\text{Spacing}} = \frac{42}{7.2} = 5.83$

Spacing = 7.2

Rounding up, number per row = 6

No. of luminaires required

= $6 \times \text{No. of rows (2)}$

= 12

STEP 7 Spacing down row (practical)

= $\frac{\text{length of row}}{\text{no. of luminaires per row}} = \frac{42}{6} = 7.0\text{m}$

Spacing to wall = 3.5m

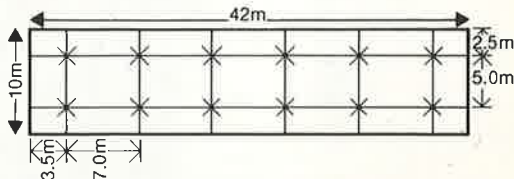


TABLE 1 — 300 LUX

Bay width (m)	Height (m)					
	6	7	8	10	12	15
10	2 7.8	2 8.0	2 7.2	2 8.0	2 7.2	2 6.5
12.5	2 7.2	2 7.2	2 6.5	2 6.5	2 6.0	2 5.5
15	2 6.0	2 6.0	2 6.0	2 5.5	2 9.0	2 9.0
17.5	3 7.8	3 8.0	3 8.0	2 9.0	2 8.0	2 8.0
20	3 7.2	3 7.2	3 7.2	2 8.0	2 7.2	2 7.2
22.5	3 6.5	3 6.5	3 6.0	3 10.3	3 10.3	3 10.3
25	4 7.8	4 7.2	4 7.2	3 9.0	3 9.0	3 9.0

TABLE 2 — 500 LUX

Bay width (m)	Height (m)					
	6	7	8	10	12	15
10	2 5.1	2 5.1	2 4.8	2 4.5	3 6.0	2 7.2
12.5	2 8.0	2 8.0	2 8.0	2 7.2	2 6.5	2 6.0
15	2 7.2	2 7.2	2 6.5	2 6.5	2 5.5	2 5.5
17.5	2 8.0	2 8.0	2 8.0	2 8.0	3 7.2	3 7.2
20	3 8.0	3 8.0	3 8.0	3 7.2	3 7.2	3 6.2
22.5	3 7.2	3 7.2	3 7.2	3 6.5	3 6.5	3 6.0
25	3 6.5	3 6.5	3 6.5	3 6.0	3 6.0	4 7.2
30	4 7.2	4 7.2	4 7.2	4 6.5	4 6.5	4 6.5

Upper Number : No. of Rows
Lower Number : Spacing Down Rows
Shaded : 400W
Unshaded : SDK 250
Shaded : SDK 400

Upper Number : No. of Rows
Lower Number : Spacing Down Rows
Shaded : 400W
Unshaded : SDK 250
Shaded : SDK 400

Typical Work Area Lighting Levels

Machine and Fittings Shops
Rough bench and machine work – 300 lux
Medium bench and machine work
Ordinary automatic machines
Buffing and polishing – 500 lux

Assembly Shops
Rough work e.g. frame and heavy machine assembly – 300 lux
Medium work e.g. engine assembly, vehicle body assembly – 500 lux

Inspection
Rough work e.g. counting, rough checking of stock parts – 300 lux
Medium work e.g. 'go' and 'no go' gauges, sub-assemblies – 500 lux
A wider range of recommended lighting levels is contained in the CIBS code for Interior Lighting.

4

THE ABOVE DESIGN METHOD IS BASED ON ACCEPTED DESIGN PROCEDURES. PHILIPS CAN ACCEPT NO RESPONSIBILITY FOR LIGHTING SCHEMES WHICH WHEN INSTALLED DO NOT CONFORM TO ACCEPTED DESIGN PRACTICE. FOR FURTHER ADVICE PLEASE CONTACT PHILIPS LIGHTING.

POWERSLIMMER SDK – DISCHARGE FITTING



FIXING & WIRING

Fixing is by means of a 20mm conduit drop or chain suspension. Wiring may be taken through or alongside the conduit and into the gear unit via a cable gland.

ORDERING DATA

Catalogue No.	Description	Packing quantity
SDK 250	PowerSlimmer Industrial KombiPak complete with 250W SON lamp, control gear and fixing accessories	Individually packed
SDK 400	PowerSlimmer Industrial KombiPak complete with 400W SON lamp, control gear and fixing accessories	Individually packed
Spare lamps		
250W SON		12
400W SON		6

Please order in the form given in the following example. Spare lamps must be ordered in multiples of the packing quantity.
12 Philips PowerSlimmer Industrial KombiPaks SDK 250

Lamp: Made in Belgium
Luminaire: Made in Holland.

LOW BAY LUMINAIRES

4

A series of low bay luminaires including SON/T and HPI/T lamps in ratings from 150W to 400W,

RANGE:

LB 150S 150W	SON/T luminaires
LB 250S 250W	
LB 400S 400W	
LB 250H 250	Metal halide luminaires.
LB 400H 400	
LB 250M	Mercury comfort luminaires

APPLICATIONS:

For use at mounting heights in the region 3m to 5m for industrial and commercial areas such as:-

- Warehouses
- Factories
- Engineering Workshops
- Garages
- Loading bays
- Sports Halls
- DIY premises
- Shopping centres
- Hypermarkets
- Entrance Halls

FEATURES

- Welded zinc treated steel fabrication primed and painted white for attractive appearance and corrosion resistance.
- Removable integral control gear on hinged lid for ease of wiring and mounting.
- Suitable for mounting on 20mm conduit, BS pendant dome, chain hook, trunking and on 600mm x 300mm exposed T ceiling mounting.
- Brightened and anodised high purity dimpled aluminium reflectors.
- High efficiency reflectors giving widespread distribution providing extended spacings for economic lighting solutions.
- Dimensions suitable for recessed ceiling mounting.
- Appropriate lamp included in the luminaire.
- Attachments include wire guard, aluminium louvres (for more commercial decorative presentation), polycarbonate dust cover suspended within the optical chamber.



To reorder this Data Sheet quote

PL 3048/3

Issued 8/83

Replaces PL 3048/2

DISCHARGE FITTINGS

LOW BAY LUMINAIRES

SPECIFICATION:

Type compliance with BS4533 Section 102.1

To specify state:-

Low bay luminaire with integral control gear and widespread distribution. Similar to Philips LB series.

RANGE OF OPERATION:

240V 50Hz supplies.
Normal indoor applications.

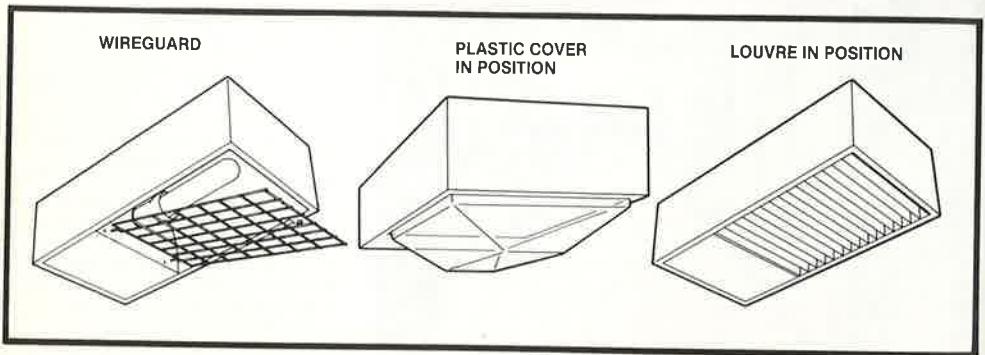
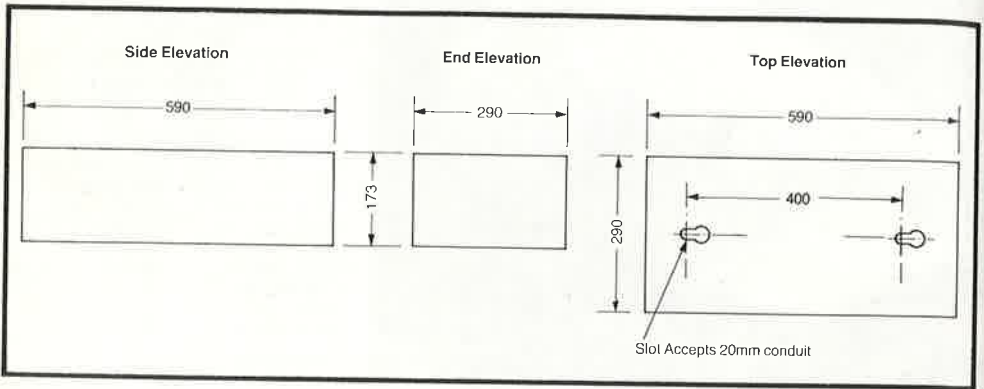
MATERIALS AND FINISH:

Luminaire body: Sheet steel white painted.

Reflector: Anodised and brightened dimpled high purity aluminium.

ORDERING DATA:

Catalogue No.	Description	Packing Quantity
Luminaires (including lamp)		
LB 150S	150W SON/T	1
LB 250S	250W SON/T	1
LB 400S	400W SON/T	1
LB 250H	250W HPI/T	1
LB 400H	400W HPI/T	1
LB 250M	250M HPL Comfort	1
Accessories		
LB 001	Wire Guard	1
LB 002	Plastic Cover	1
LB 003	Aluminium louvres	1
Replacement Gear		
LB 150SG	150W SON/T	1
LB 250SG	250W SON/T	1
LB 400SG	400W SON/T	1
LB 250HG	250W HPI/T	1
LB 400HG	400W HPI/T	1



For Photometrics see Data Sheet PL 3074.

LOW BAY

PHOTOMETRIC INFORMATION

Photometric information – 150W – 400W discharge lamps. Polar diagrams, utilization factor tables and other essential photometric information for discharge lamps in the low bay range. The data included is chosen to meet the needs of the lighting designer.

Note: Mercury fluorescent lamps
 UK marking MBF = Philips
 International marking HPL-N
 UK marking MBI = Philips
 International marking HPI

Photometric information is included to cover the following lamp types:-

250W HPI/T
 400W HPI/T
 150W SON/T
 250W SON/T
 400W SON/T

Together with the following attachments:

LB 001 wire guard
 LB 002 plastic cover
 LB 003 aluminium louvres

*Calculations based on CIBS Technical Memorandum No. 5 and Technical Report No. 10.
 CIBS Standard Presentation.*

To reorder this Data Sheet quote

PL 3074

Issued 10/84

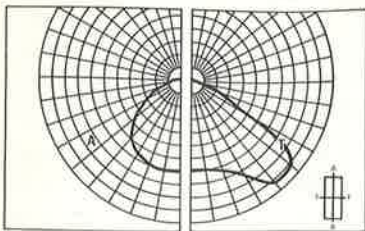
NEW

DISCHARGE FITTINGS

LOW BAY PHOTOMETRIC INFORMATION

PHOTOMETRIC DATA 150 SON/T LOW BAY

Mounting: SUSPENDED



Nadir Intensity 224cd/1000lm
CIE Flux Code 43 84 98 100 84

SHR MAX (Axial) 1.5
SHR MAX (Transverse) 2.9

ULORL 0.00
DLORL 0.84
LORL 0.84

Glare Data (CIBS)

Flux Fraction Ratio 0.00
Luminous Area (sq cm) 1015

Correction Factors

Dust Cover 0.89
Wire Guard 0.91

Utilization Factors UF (F) for SHR 2.20

Room Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	NA	NA	70	73	79	82	85	88	90
	30	20	NA	NA	65	69	75	79	81	85	87
	10	20	NA	NA	61	65	71	75	78	82	85
50	50	20	NA	NA	68	71	76	79	82	84	86
	30	20	NA	NA	63	67	73	76	79	82	84
	10	20	NA	NA	60	64	70	74	76	80	82
30	50	20	NA	NA	66	69	74	77	79	81	83
	30	20	NA	NA	62	66	71	74	77	79	81
	10	20	NA	NA	59	63	69	72	75	78	80
0	0	0	NA	NA	57	61	66	69	71	74	76

Luminous Intensities cd/1000lm

Elevation	Transverse	Axial
0	224	224
5	224	224
10	227	224
15	230	220
20	239	216
25	253	208
30	270	199
35	303	187
40	332	170
45	332	148
50	327	124
55	286	100
60	137	76
65	85	51
70	41	28
75	17	21
80	8	15
85	3	8
90	0	0

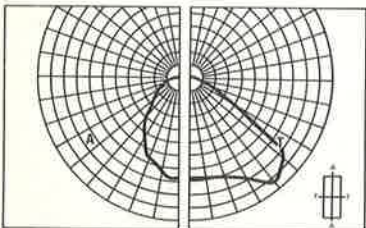
Test No. C923 Dated: 84.05.22

Measured in accordance with BS 5225

Calculations Based on CIBS TM5 and TR10

PHOTOMETRIC DATA 150 SON/T WITH LOUVRE LOW BAY

Mounting: SUSPENDED



Nadir Intensity 148cd/1000lm
CIE Flux Code 51 86 97 100 66

SHR MAX (Axial) 1.3
SHR MAX (Transverse) 2.3

ULORL 0.00
DLORL 0.66
LORL 0.66

Glare Data (CIBS)

Flux Fraction Ratio 0.00
Luminous Area (sq cm) 1015

Utilization Factors UF (F) for SHR 1.80

Room Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	NA	50	54	57	61	64	66	68	70
	30	20	NA	46	50	53	58	61	63	66	68
	10	20	NA	43	47	50	55	58	61	64	66
50	50	20	NA	49	53	56	59	62	63	66	67
	30	20	NA	45	49	52	57	59	61	64	65
	10	20	NA	43	47	50	54	57	59	62	64
30	50	20	NA	48	51	54	57	60	61	63	64
	30	20	NA	45	48	51	55	58	59	62	63
	10	20	NA	42	46	49	53	56	58	60	62
0	0	0	NA	41	44	47	51	53	55	58	59

Luminous Intensities cd/1000lm

Elevation	Transverse	Axial
0	248	248
5	248	245
10	251	234
15	253	222
20	259	209
25	269	186
30	283	164
35	311	139
40	332	111
45	322	90
50	305	76
55	213	64
60	121	52
65	77	42
70	48	32
75	29	23
80	19	14
85	11	6
90	0	0

Test No. C923 Dated: 84.05.22

Measured in accordance with BS 5225

Calculations Based on CIBS TM5 and TR10

LOW BAY PHOTOMETRIC INFORMATION

Utilization Factors UF (F) for SHR 2.20

Room Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	NA	NA	67	70	76	79	82	85	87
	30	20	NA	NA	61	66	72	76	78	82	84
	10	20	NA	NA	57	62	68	73	76	80	82
50	50	20	NA	NA	65	68	73	77	79	82	83
	30	20	NA	NA	60	64	70	74	76	79	81
	10	20	NA	NA	57	61	67	71	74	77	80
30	50	20	NA	NA	63	66	71	74	76	79	80
	30	20	NA	NA	59	63	68	72	74	77	79
	10	20	NA	NA	56	60	66	69	72	75	77
0	0	0	NA	NA	54	58	63	66	69	72	73

Luminous Intensities cd/1000lm

Elevation	Transverse	Axial
0	213	213
5	213	213
10	213	213
15	214	211
20	219	207
25	230	200
30	245	192
35	282	180
40	319	164
45	321	144
50	323	121
55	294	94
60	148	80
65	94	56
70	50	31
75	21	23
80	9	16
85	3	9
90	1	1

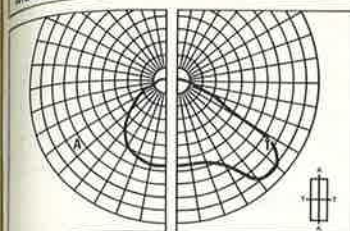
Test No. C471 Dated: 84.05.18

Measured in accordance with BS 5225

Calculations Based on CIBS TM5 and TR10

PHOTOMETRIC DATA 250W SON/T LOW BAY

Mounting: SUSPENDED



Major Intensity
CE Flux Code 213cd/1000lm
41 83 97 100 82

SHR MAX (Axial) 1.5
SHR MAX (Transverse) 2.9

LULORL 0.00
DLORL 0.82
LORL 0.82

Glare Data (CIBS)

Flux Fraction Ratio 0.00

Luminous Area (sq cm) 1015

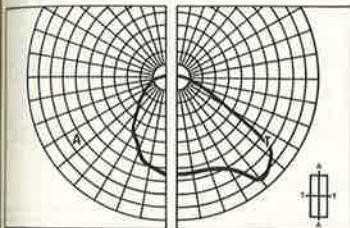
Correction Factors

Dust Cover 0.89

Wire Guard 0.91

PHOTOMETRIC DATA 250W SON/T WITH LOUVRE LOW BAY

Mounting: SUSPENDED



Major Intensity
CE Flux Code 240cd/1000lm
50 85 97 100 64

SHR MAX (Axial) 1.3
SHR MAX (Transverse) 2.3

LULORL 0.00
DLORL 0.64
LORL 0.64

Glare Data (CIBS)

Flux Fraction Ratio 0.00

Luminous Area (sq cm) 1015

Utilization Factors UF (F) for SHR 1.80

Room Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	NA	48	52	55	60	62	64	66	68
	30	20	NA	44	48	52	56	59	61	64	66
	10	20	NA	41	45	49	54	57	59	62	64
50	50	20	NA	47	51	54	58	60	62	64	65
	30	20	NA	44	48	51	55	58	59	62	64
	10	20	NA	41	45	48	52	55	58	60	62
30	50	20	NA	46	50	52	56	58	60	62	63
	30	20	NA	43	47	50	53	56	58	60	62
	10	20	NA	40	44	47	51	54	56	59	60
0	0	0	NA	39	43	45	49	52	54	56	57

Luminous Intensities cd/1000lm

Elevation	Transverse	Axial
0	240	240
5	240	235
10	240	225
15	240	214
20	243	200
25	250	180
30	262	160
35	296	139
40	327	112
45	318	91
50	305	77
55	245	65
60	128	54
65	81	42
70	50	33
75	31	24
80	19	15
85	10	7
90	1	0

Test No. C915 Dated: 84.05.18

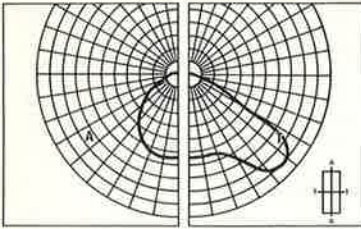
Measured in accordance with BS 5225

Calculations Based on CIBS TM5 and TR10

LOW BAY PHOTOMETRIC INFORMATION

PHOTOMETRIC DATA 400 SON/T LOW BAY

Mounting: SUSPENDED



Nadir Intensity 208cd/1000lm
CIE Flux Code 41 82 97 100 81

SHR MAX (Axial) 1.5
SHR MAX (Transverse) 2.9

ULORL 0.00
DLORL 0.81
LORL 0.81

Glare Data (CIBS)

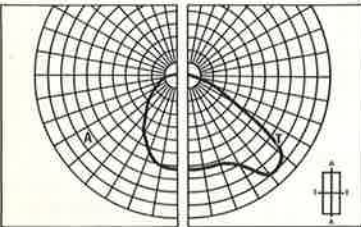
Flux Fraction Ratio 0.00
Luminous Area (sq cm) 1015

Correction Factors

Dust Cover 0.89
Wire Guard 0.91

PHOTOMETRIC DATA 400W SON/T WITH LOUVRE LOW BAY

Mounting: SUSPENDED



Nadir Intensity 234cd/1000lm
CIE Flux Code 49 85 97 100 64

SHR MAX (Axial) 1.3
SHR MAX (Transverse) 2.3

ULORL 0.00
DLORL 0.64
LORL 0.64

Glare Data (CIBS)

Flux Fraction Ratio 0.00
Luminous Area (sq cm) 1015

Utilization Factors UF (F) for SHR 2.20

Room Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	NA	NA	66	69	75	78	81	84	86
	30	20	NA	NA	60	64	71	75	77	81	83
	10	20	NA	NA	56	61	67	71	74	78	81
50	50	20	NA	NA	64	67	72	76	78	81	82
	30	20	NA	NA	59	63	69	72	75	78	80
	10	20	NA	NA	56	60	66	70	73	76	79
30	50	20	NA	NA	62	65	70	73	75	78	79
	30	20	NA	NA	58	62	67	71	73	76	78
	10	20	NA	NA	55	59	65	68	71	74	76
0	0	0	NA	NA	53	56	62	65	68	71	73

Luminous Intensities cd/1000lm

Elevation	Transverse	Axial
0	208	208
5	208	207
10	208	207
15	208	206
20	211	203
25	221	196
30	240	188
35	276	175
40	313	160
45	320	142
50	320	123
55	291	102
60	151	78
65	93	57
70	48	37
75	21	26
80	9	18
85	3	10
90	1	1

Test No. C925 Dated: 84.05.22

Measured in accordance with BS 5225

Calculations Based on CIBS TM5 and TR10

Utilization Factors UF (F) for SHR 1.80

Room Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	NA	48	52	55	59	62	63	66	67
	30	20	NA	44	48	51	56	59	61	64	65
	10	20	NA	41	45	48	53	56	59	62	64
50	50	20	NA	47	51	53	57	60	61	63	65
	30	20	NA	43	47	50	54	57	59	62	63
	10	20	NA	40	44	48	52	55	57	60	62
30	50	20	NA	46	49	52	55	58	59	61	62
	30	20	NA	42	46	49	53	56	57	60	61
	10	20	NA	40	44	47	51	54	56	58	60
0	0	0	NA	38	42	45	49	51	53	56	57

Luminous Intensities cd/1000lm

Elevation	Transverse	Axial
0	234	234
5	234	230
10	233	223
15	232	212
20	234	199
25	241	180
30	255	159
35	288	135
40	319	113
45	316	91
50	306	76
55	233	64
60	134	53
65	84	42
70	51	33
75	31	23
80	20	14
85	11	7
90	1	0

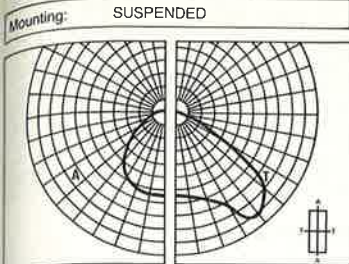
Test No. C926 Dated: 84.05.22

Measured in accordance with BS 5225

Calculations Based on CIBS TM5 and TR10

LOW BAY PHOTOMETRIC INFORMATION

PHOTOMETRIC DATA 250W HPI/T LOW BAY



Nadir Intensity 208cd/1000lm
CE Flux Code 44 85 97 100 80

SHR MAX (Axial) 1.5
SHR MAX (Transverse) 2.7

ULORL 0.00
DLORL 0.80
LORL 0.80

Glare Data (CIBS)

Flux Fraction Ratio 0.00

Luminous Area (sq cm) 1015

Correction Factors

Dust Cover 0.89

Wire Guard 0.91

Utilization Factors UF (F) for SHR 2.10

Room Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	NA	NA	66	70	75	78	81	83	85
	30	20	NA	NA	61	65	71	75	77	81	83
	10	20	NA	NA	57	62	68	72	75	78	81
50	50	20	NA	NA	64	68	73	76	78	80	82
	30	20	NA	NA	60	64	69	73	75	78	80
	10	20	NA	NA	57	61	66	70	73	76	79
30	50	20	NA	NA	63	66	70	73	75	77	79
	30	20	NA	NA	59	63	68	71	73	76	78
	10	20	NA	NA	56	60	65	69	71	74	76
0	0	0	NA	NA	54	57	63	66	68	71	72

Luminous Intensities cd/1000lm

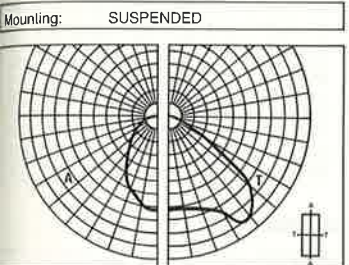
Elevation	Transverse	Axial
0	208	208
5	209	208
10	212	209
15	218	207
20	230	204
25	244	198
30	268	190
35	317	177
40	325	159
45	312	138
50	290	117
55	232	91
60	119	72
65	71	55
70	33	35
75	13	28
80	6	19
85	2	10
90	0	1

Test No. C930 Dated: 84.05.25

Measured in accordance with BS 5225

Calculations Based on CIBS TMs and TR10

PHOTOMETRIC DATA 250W HPI/T LOW BAY



Nadir Intensity 228cd/1000lm
CE Flux Code 52 86 97 100 62

SHR MAX (Axial) 1.3
SHR MAX (Transverse) 2.2

ULORL 0.00
DLORL 0.62
LORL 0.62

Glare Data (CIBS)

Flux Fraction Ratio 0.00

Luminous Area (sq cm) 1015

Utilization Factors UF (F) for SHR 1.75

Room Reflectances			Room Index								
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	NA	47	51	54	57	60	62	64	65
	30	20	NA	43	47	50	54	57	59	62	63
	10	20	NA	40	44	47	52	55	57	60	62
50	50	20	NA	46	49	52	56	58	59	61	63
	30	20	NA	42	46	49	53	55	57	60	61
	10	20	NA	40	44	47	51	53	55	58	60
30	50	20	NA	45	48	51	54	56	57	59	60
	30	20	NA	42	45	48	52	54	56	58	59
	10	20	NA	39	43	46	50	52	54	57	58
0	0	0	NA	38	41	44	48	50	52	54	55

Luminous Intensities cd/1000lm

Elevation	Transverse	Axial
0	228	228
5	228	225
10	229	217
15	233	206
20	242	193
25	253	174
30	271	153
35	314	130
40	316	105
45	295	85
50	266	72
55	175	61
60	104	50
65	64	40
70	41	31
75	25	22
80	17	14
85	10	6
90	0	0

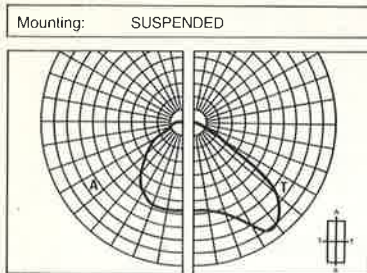
Test No. C931 Dated: 84.05.25

Measured in accordance with BS 5225

Calculations Based on CIBS TMs and TR10

LOW BAY PHOTOMETRIC INFORMATION

PHOTOMETRIC DATA 400W HPI/T LOW BAY



Nadir Intensity 217cd/1000lm
CIE Flux Code 46 86 97 100 80

SHR MAX (Axial)	1.5
SHR MAX (Transverse)	2.5

ULORL	0.00
DLORL	0.80
LORL	0.80

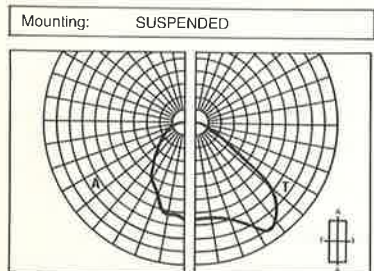
Glare Data (CIBS)

Flux Fraction Ratio	0.00
Luminous Area (sq cm)	1015

Correction Factors

Dust Cover	0.89
Wire Guard	0.91

PHOTOMETRIC DATA 400W HPI/T WITH LOUVRE LOW BAY



Nadir Intensity 238cd/1000lm
CIE Flux Code 54 87 97 100 62

SHR MAX (Axial)	1.3
SHR MAX (Transverse)	2.1

ULORL	0.00
DLORL	0.62
LORL	0.62

Glare Data (CIBS)

Flux Fraction Ratio	0.00
Luminous Area (sq cm)	1015

Utilization Factors UF (F) for SHR 2.00

Room Reflectances	Room Index											
	C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	NA	62	66	66	70	75	79	81	84	85
	30	20	NA	57	61	65	71	75	77	81	81	83
	10	20	NA	53	58	62	68	72	75	79	79	81
50	50	20	NA	60	64	68	73	76	78	80	80	82
	30	20	NA	56	60	64	70	73	75	78	78	80
	10	20	NA	52	57	61	67	70	73	76	76	79
30	50	20	NA	59	63	66	71	73	75	78	78	79
	30	20	NA	55	59	63	68	71	73	76	76	78
	10	20	NA	52	56	60	65	69	71	74	74	76
0	0	0	NA	50	54	58	63	66	68	71	72	72

Luminous Intensities 217cd/1000lm

Elevation	Transverse	Axial
0	217	217
5	217	215
10	219	216
15	224	215
20	238	213
25	258	207
30	290	198
35	323	185
40	322	167
45	303	146
50	271	123
55	161	102
60	88	74
65	52	50
70	24	35
75	11	27
80	5	19
85	2	9
90	0	1

Test No. C933 Dated: 84.05.25

Measured in accordance with BS 5225

Calculations Based on CIBS TM5 and TR10

Utilization Factors UF (F) for SHR 1.70

Room Reflectances	Room Index											
	C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
70	50	20	NA	48	51	54	58	60	62	64	66	66
	30	20	NA	44	48	51	55	58	60	62	64	64
	10	20	NA	41	45	48	52	55	57	60	62	62
50	50	20	NA	46	50	53	56	58	60	62	63	63
	30	20	NA	43	47	50	54	56	58	60	62	62
	10	20	NA	40	44	47	51	54	56	59	60	60
30	50	20	NA	45	49	51	54	56	58	60	61	61
	30	20	NA	42	46	49	52	55	56	58	60	61
	10	20	NA	40	44	47	50	53	55	57	59	59
0	0	0	NA	39	42	45	48	51	52	54	56	56

Luminous Intensities cd/1000lm

Elevation	Transverse	Axial
0	238	238
5	238	233
10	238	228
15	242	213
20	253	198
25	269	178
30	296	160
35	322	137
40	312	111
45	286	88
50	239	72
55	129	60
60	77	50
65	53	40
70	35	30
75	24	22
80	17	13
85	9	5
90	0	0

Test No. C934 Dated: 84.05.25

Measured in accordance with BS 5225

Calculations Based on CIBS TM5 and TR10

LOW BAY PHOTOMETRIC INFORMATION

4

LOW BAY PHOTOMETRIC INFORMATION

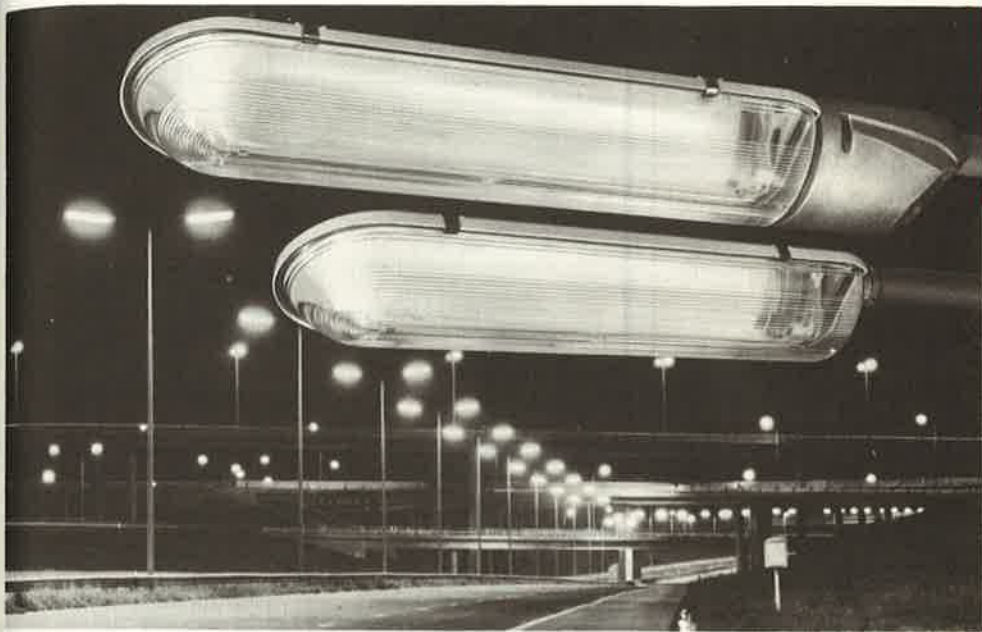
ROADLIGHTING

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Please see pages II and III of General Introduction for information on how to use this Handbook.

MA SOX RANGE Roadlighting Lanterns

5



Group A roadlighting lanterns with GRP canopies and acrylic refractor bowls for use with low pressure sodium lamps.

RANGE

Side entry lanterns for SOX-E66 and 90W SOX, SOX-E91 and 135W SOX, SOX-E131 and 180W SOX lamps with or without NEMA socket and with or without integral control gear. All lanterns can be adjusted to provide 'cut-off' or 'semi cut-off' light distribution in compliance with British Standards requirements.

APPLICATIONS

Major roads
Motorways
Road junctions

To reorder this Data Sheet quote

PL 1266/7

Issued 7/84

Replaces PL 1266/6

MA SOX RANGE — ROADLIGHTING LANTERNS

FEATURES

Optical

■ Unique dual purpose optics providing both 'cut-off' and 'semi cut-off' distribution from one lantern.

A simple lampholder and lamp support bracket provide both distributions with no additional components.

■ Injection moulded acrylic reflector with high quality interior prisms and smooth outer surface for easy maintenance.

Electrical

■ Removable gear tray for SOX-E66/90W SOX and SOX-E 91/135W SOX and removable and hinged gear shoe for SOX-E 131/180W SOX.

■ High quality control gear components and heat resistant wiring.

■ For SOX-E66/90W SOX and SOX-E91/135W SOX gear is in the optical chamber to maintain aesthetic appearance.

Mechanical

■ White glass re-inforced polyester (GRP) canopy, UV stabilised to resist chemical and weather influences and with excellent strength and properties.

■ Smooth canopy for easy maintenance.

■ Low profile to provide low windage area and force coefficient properties so reducing column stress.

■ Stainless steel bolts, screws and clips to resist corrosion. The clips allow the bowl to be hinged for easy maintenance.

■ Die cast aluminium side entry spigot suitable for 42mm/48mm entry for all but SOX-E131 180W SOX integral gear lanterns, giving improved strength and corrosion resistance.

■ Die cast aluminium gear shoe for 42/48mm entry in SOX-E 131/180W SOX integral gear lantern with excellent strength and corrosive properties.

■ Extruded neoprene gasket between the bowl and canopy for long life resilience and excellent sealing giving a degree of protection to IP54.

Modular Concept

■ The canopy, bowl and skeleton spigot have been designed on a modular concept to help in scheme standardisation.

■ Removable gear trays help reduce maintenance costs.

■ Spigot entry module, made from die-cast non-corrosive aluminium alloy, designed for side entry mounting configuration for 42 to 48mm spigots.

■ Extruded neoprene gasket between canopy and bowl provides resilient seal. Spring clips ensure an even pressure all round.

■ Kite marked to BS 1788. Type compliance with BS 4533 Section 102.3.

■ Department of Transport acceptance reference TE/AD/6.

MATERIALS & FINISH

Reflector bowl: Injection moulded acrylic.

Canopy: Glass fibre re-inforced polyester (GRP) pressing.

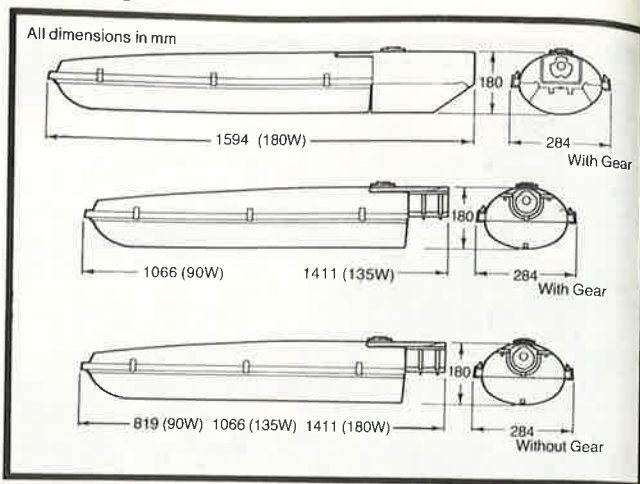
Spigot: Die-cast non-corrosive alloy.

Gasket for housing: Extruded neoprene rubber.

Fixing clips: Spring stainless steel.

Internal wiring: Heat resistant PVC.

DIMENSIONS



SPECIFICATION

To specify state:

■ Lanterns shall be certified by the British Standards Institution as type compliance with BS 1788.

■ Lanterns shall be suitable for use in group A10, A12 and B8 installations as specified in BS 5489: Part 2 and Part 3.

■ Lanterns shall be of a type currently acceptable to the Department of Transport.

■ The Lantern shall be totally enclosed, side entry mounting on 42/48mm o.d. spigots 100 mm long and suitable for use with SOX and SOX-E low pressure sodium lamps.

■ The Lantern shall have, as an integral part of the design, adjustment for both 'semi cut-off' light distribution and 'cut-off' light distribution.

■ The Lantern shall have International Protection category IP54.

■ The Lantern shall be similar to Philips MA SOX range.

MA SOX RANGE – ROADLIGHTING LANTERNS

LANTERN DATA

Ordering Code	Rating	Dimensions		Weight	Windage		Force Coefficient	Light Output Ratio	
		Length	Depth		Plan m ²	Elevation m ²		LOR	DLOR
MA90-OOS	90W SOX	819mm	180mm	5.2kg	0.20	0.12	0.40	0.78	0.76
MA90-OO*1	90W SOX	819mm	180mm	5.4kg	0.20	0.12	0.40	0.78	0.76
MA90-GOS	90W SOX	1066mm	180mm	8.4kg	0.27	0.16	0.50	0.78	0.76
MA90-GO*1S	90W SOX	1066mm	180mm	8.6kg	0.27	0.16	0.50	0.78	0.76
MA50-OOS	135W SOX	1066mm	180mm	6.6kg	0.27	0.16	0.50	0.78	0.76
MA50-OO*1S	135W SOX	1066mm	180mm	6.8kg	0.27	0.16	0.50	0.78	0.76
MA50-GOS	135W SOX	1411mm	180mm	10.7kg	0.37	0.22	0.45	0.79	0.77
MA50-GO*1S	135W SOX	1411mm	180mm	10.9kg	0.37	0.22	0.45	0.79	0.77
MA60-OOS	180W SOX	1411mm	180mm	8.5kg	0.37	0.22	0.45	0.79	0.77
MA60-OO*1S	180W SOX	1411mm	180mm	8.7kg	0.37	0.22	0.45	0.79	0.77
MA60-GO	180W SOX	1594mm	180mm	17.2kg	0.42	0.27	0.46	0.79	0.77
MA60-GO*1	180W SOX	1594mm	180mm	17.4kg	0.42	0.27	0.46	0.79	0.77

For full photometric data, refer to Sheet No. PL 8204.

ELECTRICAL DATA

Lamp	Ballast	Capacitor	Ignitor	Mains Voltage	Mains Current (amps)	Lamp Current (amps)	Circuit Watts
90W SOX	BSX 90	L4010	SX76	240V	0.50	0.95	104W
135W SOX	BSX 135	L5007	SX74	240V	0.67	0.95	159W
180W SOX	L4135	L5020	—	220/240V	1.00	0.90	220W
SOX-E66	BSX 90	L4010	SX76	240V	0.40	0.62	83
SOX-E91	BSX 135	L5007	SX74	240V	0.57	0.62	129
SOX-E131	L4135	L5020	—	220/240V	0.80	0.62	176

For full lamp data, refer to Sheet No. PL 1757.

For full control gear data, refer to Sheet No. PL 1777.

ORDERING DATA

For 90W SOX

MA90-OOS	Lantern	} for loose gear
MA90-OO*1S	Lantern with NEMA socket	
MA90-GOS	Lantern	} for integral gear
MA90-GO*1S	Lantern with NEMA socket	

For 135W SOX

MA50-OOS	Lantern	} for loose gear
MA50-OO*1S	Lantern with NEMA socket	
MA50-GOS	Lantern	} for integral gear
MA50-GO*1S	Lantern with NEMA socket	

For 180W SOX

MA60-OOS	Lantern	} for loose gear
MA60-OO*1S	Lantern with NEMA socket	
MA60-GO	Lantern	} for integral gear†
MA60-GO*1	Lantern with NEMA socket	

†When ordering integral gear lantern, gear unit must be ordered separately as follows:

R8021 135/180W gear unit

Example: 24 MA60-GO*1 lanterns

+24 R8021 gear units

Spare Refractor Bowls

Catalogue No.	Description	Packing Qty.
R8154	Bowl for 90W lantern with clips	10
R8155	Bowl for 135W lantern with clips	10
R8156	Bowl for 180W lantern with clips	10

See Road lantern spares sheet for other replacement parts.

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MA SOX RANGE – ROADLIGHTING LANTERNS



MA 30

Group A Roadlighting Lanterns

Roadlighting lantern for Group A and area lighting for use with high pressure sodium and mercury fluorescent lamps.

Note: Mercury fluorescent lamps
UK marking MBF = Philips
International marking HPL-N

RANGE

Remote control gear operated lantern with or without NEMA socket for use with SON 150W, 250W or 400W or HPL-N 250W or 400W lamps.

APPLICATIONS

Possible applications include:

- Motorways
- Highways
- Secondary roads
- Area lighting
- Security lighting
- Factory perimeter lighting
- Garage forecourts

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ROADLIGHTING

To reorder this Data Sheet quote

PL 1822/6

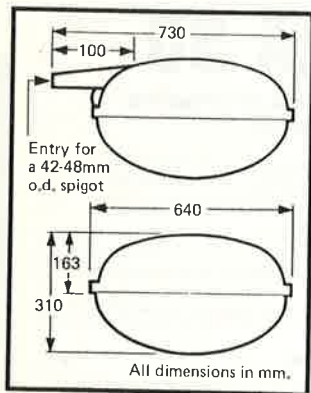
Issued 6/84

Replaces PL 1822/5

MA 30 – ROADLIGHTING

FEATURES

- Lightweight lantern canopy, of spun aluminium construction, pre-treated stove-enamelled white, both outside and inside.
- Spigot entry corrosion resistant die-cast aluminium alloy (LM6M).
- One piece acrylic bowl attached to the body with stainless steel clips.



- No clips on bowls ensuring easy storage without scratching bowls.
- Nylon bowl retaining straps – unclip easily to allow full access for maintenance.
- Neoprene gasket ensures dust and weatherproof seal.
- Lanterns pre-wired with heat resistant cables to terminal block and GES lampholder with separate cable clamp.
- Lantern to accept NEMA sockets or two part photocell supplied if required.
- Optical system uses highly polished side reflectors, made from super purity aluminium alloy, chemically brightened and anodised.
- Cut-off and semi cut-off light distribution achieved by simple adjustment of the lampholder position and the mirrors.
- Department of Transport acceptance reference TE/AD/6 June 1979.

MATERIALS & FINISH

- **Canopy:** Spun aluminium finished white stove enamelled.
- **Bowl:** Acrylic plastic.
- **Sealing gasket:** Neoprene seal.
- **Spigot entry:** Cast aluminium LM6M.
- **Reflectors:** Super purity aluminium alloy. Chemically brightened and anodised.

SPECIFICATION

- Kite marked to BS 1788. Type compliance with BS 4533 Section 102.1.
- Lantern shall be suitable for use in group B8, A10 and A12 installations as specified in BS 5489 Part 2 and 3.
- Degree of protection IP23.

To specify state:

Roadlighting lantern which fully complies with the requirements of BS 4533. The lantern shall have, as an integral part of its construction, the facility for providing either cut-off or semi cut-off light distribution by simple adjustment of the lampholder and mirror and shall be Philips MA 30 or similar.

LANTERN DATA

Ordering Code	Rating	Dimensions		Weight	Windage		Shape Factor	Light Output Ratio	
		Length	Depth		Plan m ²	Elevation m ²		LOR	DLOR
MA 30	150W SON 250W SON 400W SON 250W HPL-N 400W HPL-N	730mm	310mm	5.0kg	0.32 m ²	0.17 m ²	0.34	78% to 85%	74% to 84%
Depending on lamp type and distribution									

For full photometric data refer to Data Sheet No. PL 8202.

ELECTRICAL DATA

Lamp	Ballast	Capacitor	Ignitor	Mains Voltage	Mains Current (amps)	Lamp Current (amps)	Circuit Watts
150W SON	BSN150	L4016	SN 50	240	0.9	1.8	174W
250W SON	BSN250	2 x L4016	SN 50	240	1.3	3.0	280W
400W SON	BSN400	2 x L4020	SN 50	240	2.2	4.4	440W
250W HPL-N	BHL250	L4020	—	240	1.2	2.0	268W
400W HPL-N	BHL400	L4025	—	240	1.8	3.2	424W

For full lamp data refer to Data Sheet Nos. PL 1776 – SON
PL 1768 – HPL-N

ORDERING DATA

Catalogue number	Description	Packing Quantity
MA 30	Side entry lantern for loose control gear	1
MA 30*1	Side entry lantern with NEMA socket for loose control gear	1

Made in Great Britain.



MI 50 MI 55

Lanterns for Group B roadlighting

Group B roadlighting lanterns with aluminium canopy and vandal resistant bowl, for low and high pressure sodium lamps.

RANGE

For 35W SOX, SOX-E26, side or top entry lanterns with or without NEMA socket and with or without integral gear.

For 70W SON, side entry lanterns with or without NEMA socket and with or without integral gear.

APPLICATIONS

The lantern is suitable for:

- Group B roadlighting
- Security lighting
- Residential lighting
- Car parks
- Hotel forecourts
- Shopping precincts
- Railway stations

FEATURES

- Canopy is in high pressure die-cast aluminium to provide rigidity and durability.
- Bowl is vandal resistant, and is easily removable for maintenance.
- Ignitor circuit in SOX integral gear lanterns provides fast re-ignition and minimises watts losses.
- Control gear in integral gear types is mounted on a hinged tray for easy access.
- Top and side entry, integral and loose gear versions have same external appearance.

5

ROADLIGHTING

To reorder this Data Sheet quote

PL 1774/6

Issued 9.82

Replaces PL 1774/5

MI 50 MI 55 – ROADLIGHTING

MATERIALS & FINISH

Canopy: High-pressure die-cast aluminium LM6M.

Bowl: Vandal resistant material.

Bowl clips: Stainless steel.

Gear tray: White precoated sheet steel.

SPECIFICATION

Type compliance with BS 4533

section 102.3 and 103.1.

Degree of protection IP54.

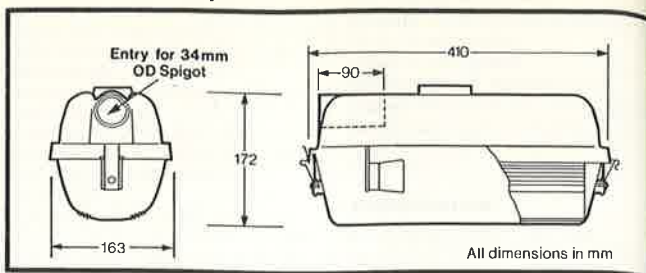
To specify state:

Group B roadlighting lantern which accommodates with one housing versions for 35W SOX, SOX-E26 or 70W SON lamps with integral or for remote control gear, with or without NEMA socket.

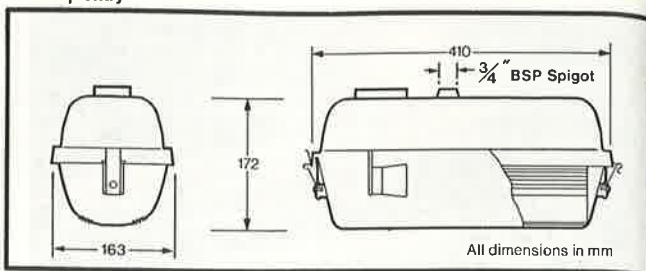
Top entry lanterns retain the same appearance.

For use in Group B5/6 installations

MI 50 and MI 55 side entry



MI 50 top entry



LANTERN DATA

Ordering Code	Rating	Dimensions		Weight	Plan m ²	Windage Elevation m ²	Light Output Ratio	
		Length	Depth				LOR	DLOR
MI 50-OO	35W SOX, SOX-E26	410mm	172mm	2.6kg	0.067	0.063	> 0.65	> 0.63
MI 50-GO	35W SOX, SOX-E26	410mm	172mm	4.5kg	0.067	0.063	> 0.65	> 0.63
MI 55-OO	70W SON	410mm	172mm	2.6kg	0.067	0.063	0.69	0.63
MI 55-GO	70W SON	410mm	172mm	4.7kg	0.067	0.063	0.69	0.63

For full photometric data, refer to sheet no. PL 8201.

ELECTRICAL DATA

Lamp	Ballast	Capacitor	Ignitor	Mains Voltage	Mains Current (amps)	Lamp Current (amps)	Circuit Watts
35W SOX, SOX-E26	BSX 355	L4008	SX72	240	0.22	0.6	48
70W SON	BSN70	L4010	Integral	240	0.4	1.0	85

For full lamp data, refer to: PL 1757 – SOX
PL 1776 – SON

ORDERING DATA

For 35W SOX

MI 50-OO	Side entry lantern	} for loose gear
MI 50-OO*1	Side entry lantern with NEMA socket	
MI 50-OT	Top entry lantern	} with integral gear
MI 50-OT*1	Top entry lantern with NEMA socket	
MI 50-GO	Side entry lantern	} with integral gear
MI 50-GO*1	Side entry lantern with NEMA socket	
MI 50-GT	Top entry lantern	} with integral gear
MI 50-GT*1	Top entry lantern with NEMA socket	

For 70W SON

MI 55-OO	Side entry lantern	} for loose gear
MI 55-OO*1	Side entry lantern with NEMA socket	
MI 55-GO	Side entry lantern	} with integral gear
MI 55-GO*1	Side entry lantern with NEMA socket	

Lanterns are individually packed.

There are various versions of each lantern type available against a stated lead time, which can be identified from the ordering codes. The following suffixes have the following meanings.

- No Asterisk .. No Photocell Option
- *1 NEMA Socket fitted and wired
- *2 14mm hole for two part cell
- *3 NEMA Socket with Fog Override fitted and wired
- *4 2 part cell fitted and wired
- *5 Hole for single part electronic cell
- *6 Single part electronic cell fitted

Made in U.K.



MI 80

Lantern for Group B roadlighting

Group B roadlighting lantern with aluminium canopy and vandal resistant bowl for low pressure sodium lamps.

RANGE

For SOX-E36 and 55W SOX, side entry lantern with or without NEMA socket and with or without integral gear. Top entry version available on request.

APPLICATIONS

The lantern is suitable for:

- Group B roadlighting
- Security lighting
- Residential lighting
- Car parks
- Hotel forecourts
- Shopping precincts
- Railway stations

5

ROADLIGHTING

To reorder this Data Sheet quote

PL 3003/3

Issued 9 82

Replaces PL 3003/2

MI 80 – ROADLIGHTING

FEATURES

- Canopy is a high-pressure aluminium die-casting to provide rigidity and durability.
- Bowl is vandal resistant and easily removable for maintenance.
- Integral control gear is mounted on a hinged gear tray for easy access.
- Ignitor circuit on integral gear lanterns provides fast re-ignition and minimises watts losses.
- Integral and loose gear types have the same external appearance.

MATERIALS & FINISH

Canopy: High-pressure die-cast aluminium LM6M.

Bowl: Vandal resistant material.

Bowl clips: Stainless steel.

Gear tray: Pre-coated sheet steel.

SPECIFICATION

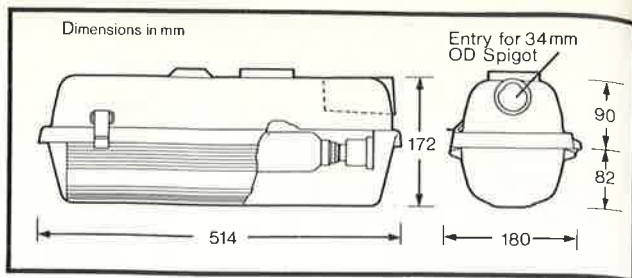
Type compliance with BS 4533 Section 102.3 and 103.1.

Degree of protection IP54.

To specify state:

Group B roadlighting lantern for 55W SOX lamps which accommodates with one housing versions with integral or for loose control gear, top or side entry mounting with or without NEMA socket.

For use in Group B6 installations



LANTERN DATA

Ordering Code	Rating	Dimensions		Weight	Windage		Light Output Ratio	
		Length	Depth		Plan m ²	Elevation m ²	LOR	DLOR
MI 80-00	SOX-E36 and 55W SOX	514mm	182mm	2.9kg	0.093	0.083	0.68	0.63
MI 80-GO	SOX-E36 and 55W SOX	514mm	182mm	4.6kg	0.093	0.083	0.68	0.63

For full photometric data, refer to sheet no. PL 8201.

ELECTRICAL DATA

Lamp	Ballast	Capacitor	Ignitor	Mains Voltage	Mains Current (amps)	Lamp Current (amps)	Circuit Watts
SOX-E36 and 55W SOX	BSX355	L4008	SX72	240	0.22	0.35	51
55W SOX	BSX 355	L4008	SX72	240	0.3	0.6	68

For full lamp data, refer to PL 1757.

ORDERING DATA

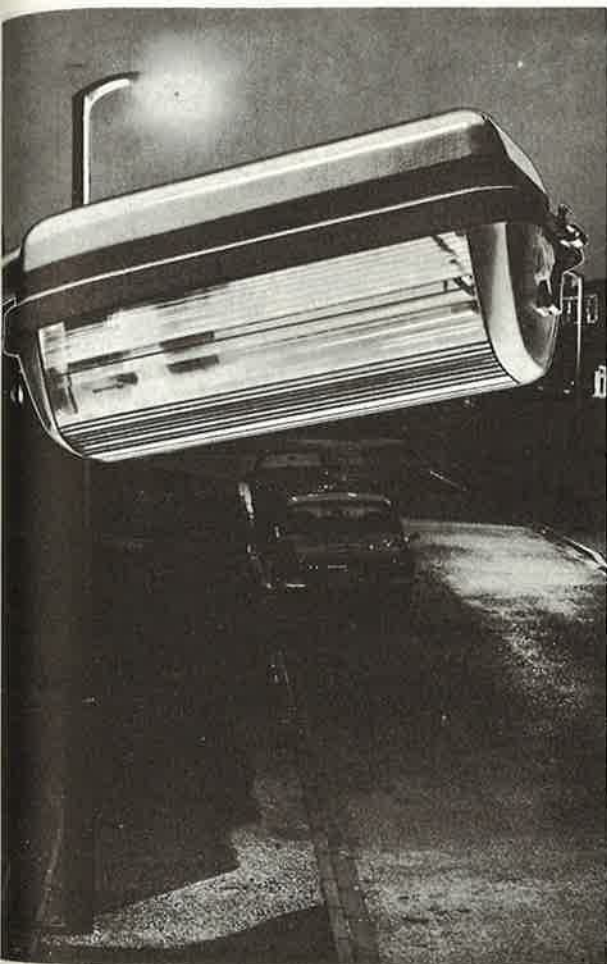
For 55W SOX

MI 80-00	Side entry lantern	} for loose gear
MI 80-00*1	Side entry lantern with NEMA socket	
MI 80-GO	Side entry lantern	} with integral gear
MI 80-GO*1	Side entry lantern with NEMA socket	

For top entry lanterns, address enquiries to Philips Lighting.

Lanterns are individually packed.

Made in U.K.



MI 51

Lantern for SOX-E18

Lantern with aluminium canopy and vandal resistant bowl for SOX-E18 low-pressure sodium lamps.

RANGE

Lanterns complete with integral control gear for SOX-E18 lamps, available in side or top entry versions with or without NEMA socket.

APPLICATIONS

- Side roads
- Footpaths
- Security lighting
- Car parks
- Residential lighting

Available to special order only

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ROADLIGHTING

To reorder this Data Sheet quote

PL 3004/2

Issued 9 82

Replaces PL3004/1

MI 51 – ROADLIGHTING

FEATURES

- Canopy is in high-pressure die-cast aluminium to provide rigidity and durability.
- Bowl is vandal resistant and is easily removable for maintenance.
- Control gear is mounted on a tray which hinges downwards for easy maintenance.
- SOX-E18 circuit is highly energy effective, dissipating only 25 watts.
- Top and side entry versions have similar appearance and overall dimensions.

MATERIALS & FINISH

Canopy: High-pressure die-cast aluminium LM6M.

Bowl: Vandal resistant material.

Bowl clips and hinges: Stainless steel.

Gear tray: White precoated sheet steel.

SPECIFICATION

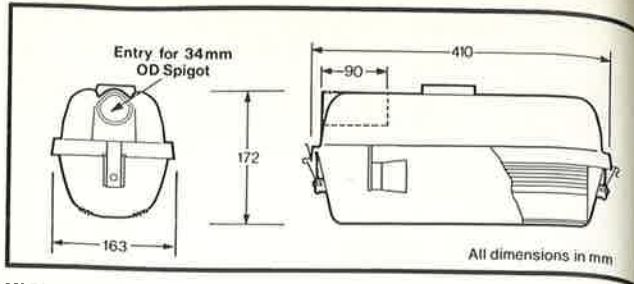
Type compliance with constructional requirements of BS 4533 Section 102-3.

Degree of Protection IP54.

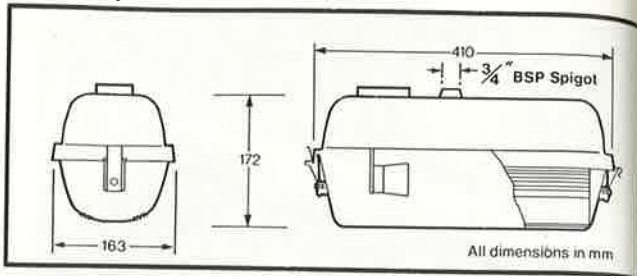
To specify state:

Aluminium lantern for use with SOX-E18 lamp with integral control gear in top or side entry versions each with similar appearance.

MI 51 side entry



MI 51 top entry



LANTERN DATA

Cat No.	Rating	Dimensions		Weight kg.	Windage	
		Length	Depth		Plan m ²	Elevation m ²
MI 51	SOX-E18	410mm	172mm	3.5	0.067	0.063

ELECTRICAL DATA

Lamp	Ballast	Capacitor	Ignitor	Mains Voltage	Mains Current (Amps)	Lamp Current (Amps)	Circuit Watts
SOX-E18	BSX18	L4005	N/A	240	0.14	0.35	25

For full lamp data, refer to PL 1757.

ORDERING DATA

Cal. No.	Description
MI 51-GO	Side entry lantern with integral control gear
MI 51-GO*1	Side entry lantern with integral control gear and NEMA socket
MI 51-GT	Top entry lantern with integral control gear
MI 51-GT*	Top entry lantern with integral control gear and NEMA socket

Lanterns are individually packed.

Lamps must be ordered separately.

Lantern: Made in UK
Ballast: Made in Holland

SGS 203

**Lanterns for group
A and B roadlighting**

RANGE

Integral gear luminaires
50W 70W 100W SON
100W SON/T 150W SON/ST
250W SON/T
80W 125W HPL-N lamps,
Side or post top entry, with or without
NEMA socket.

APPLICATIONS

- Major Roads
- Minor Roads
- Road Junctions
- Security Lighting

FEATURES

Optical

- Patented 'POT' faceted one piece reflector in high purity chemically anodised aluminium for precise control of SON/T lamps.
- Two high purity chemically anodised aluminium reflectors for elliptical lamps.
- Light distribution designed to take maximum advantage of the luminance design system.
- Optional NEMA socket available.
- Toe in angle 10° for SON/T, 15° or 20° for elliptical lamps.

Mechanical

- Sturdy die cast aluminium bracket frame.
- Die cast aluminium rotatable spigot entry for side or post top entry and suitable for 34/42/48mm.
- Optional 76mm spigot for post top mounting.
- Light weight glass fibre reinforced polyester housing.
- Vandal proof polycarbonate bowl fitted with high quality rubber gasket.
- Stainless steel screws.



SGS 203

MAINTENANCE

- IP54 degree of protection for extended maintenance periods.
- Easy access to optical and gear chamber by single quick release clip.
- Lockable hinged up canopy action for "work bench" installation and servicing in situ.
- Smooth surface bowl for easy cleaning.
- Bowl easily removed.
- Snap fixing gear tray incorporating lampholder for easy servicing.

MATERIALS & FINISH

- Reflector:** High purity aluminium
Canopy: Glass reinforced polyester
Bowl: Injection moulded polycarbonate
Frame: Die cast aluminium

LANTERN DATA

Windage

- Plan 0,17m²
- Elevation 0,096m²

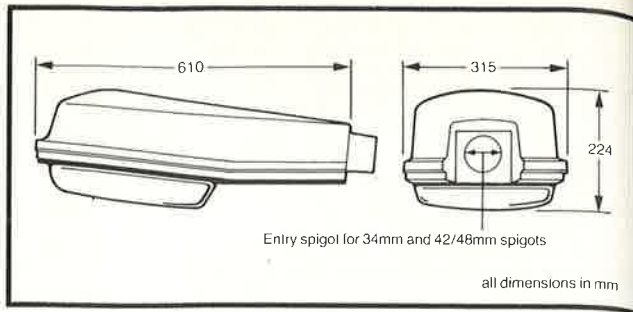
Weights

- 35W SOX/SOX-E 26	5,3kg
50W SON	5,8kg
70W SON	6,0kg
100W SON/SON/T	6,6kg
150W SON/SON/ST	7,1kg
250W SON/T	7,3kg
80W HPL-N	5,8kg
125W HPL-N	5,8kg

SPECIFICATION

Type compliance with BS4533 section 102.3 Class I Electrical Protection (earth required).

DIMENSIONS



ELECTRICAL DATA

Lamp	Ballast	Capacitor	Ignitor	Mains Voltage (volts)	Mains Current (amps)	Circuit Watts
50W SON	BSN50	L4008		240	0.38	61
70W SON	BSN70	L4010		240	0.4	85
100W SON/SON/T	BSN100	L4010	SN55	240	0.6	115
150W SON/ST	BSNF150	L4020	SN50	240	0.9	174
250W SON/T	BSNF250	2 x L4016	SN50	240	1.3	280
80W HPL-N	BHL80	L4008		240	0.4	88
125W HPL-N	BHL125	L4008		240	0.64	137

ORDERING DATA

	Side Reflectors	POT Optics	With NEMA Socket	Without NEMA Socket
For 50W/SON SGS 203/050 G SGS 203/050 G*1	■ ■		■	■
For 70W SON SGS 203/070 G SGS 203/070 G*1	■ ■		■	■
For 100W SON SGS 203/100 G SGS 203/100 G*1	■ ■		■	■
For 100W SON/T SGS 203/100 GT SGS 203/100 GT*1		■ ■	■	■
For 150W SON/ST SGS 203/150 GT SGS 203/150 GT*1		■ ■	■	■
For 250 SON/T SGS 203/250 GT SGS 203/250 GT*1			■	■
For 80W HPL-N HGS 203/080 G HGS 203/080 G*1	■ ■		■	■
For 125W HPL-N HGS 203/125 G HGS 203/125 G*1	■ ■		■	■
For 35W SOX/SOX-E 26 XGC 203/035 G XGS 203/035 G*1	■ ■		■	■

XGS 201/35 SGS 201/70 HGS 201/125

Lanterns for group B roadlighting

Group B roadlighting lanterns with glass-fibre reinforced polyester canopy and polycarbonate bowl for low or high pressure sodium or high pressure mercury lamps.

Note: Mercury fluorescent lamps
UK marking MBF = Philips
International marking HPL-N

RANGE

One housing for side or bottom entry use, available with reflectors and integral control gear for 35W SOX, 70W SON or 125W HPL-N.

APPLICATIONS

These lanterns are suitable for use in:

- Group B roadlighting
- Residential lighting
- Security lighting
- Car parks
- Hotel forecourts
- Shopping precincts
- Railway stations
- Site lighting

FEATURES

- Strong, lightweight glass-fibre reinforced polyester canopies.
- Vandal-resistant polycarbonate bowls.
- Integral control gear simplifies maintenance.
- Special bracket provides the option of bottom entry or side entry mounting.
- Super high purity aluminium reflectors ensure high reflectivity and light output ratio.
- Available with NEMA socket for photocell control.

To reorder this Data Sheet quote

PL 1775/6

Issued 9 82

Replaces PL 1775/5

ROADLIGHTING

5

XGS HGS SGS

KEY TO ILLUSTRATION

1. Housing
2. Closing clip
3. Gasket
4. Reflector (2x)
5. Lamp support (XGS only)
6. Bowl
7. Lampholder
8. Cover-plate
9. Mast-fixing bracket

MATERIALS & FINISH

Canopy: Lightweight glass-fibre reinforced polyester (GRP) grey

Bowl: Polycarbonate (vandal resistant)

Reflectors: Super high purity aluminium.

Bowl clips: Stainless steel

Control gear cover: Anodised aluminium.

RANGE OF OPERATION

240 volts 50 Hz.

SPECIFICATION

Group B roadlighting lantern with grey GRP canopy and fitted with integral control gear. The lantern housing is designed to accept 70W High Pressure Sodium, 35W Low Pressure Sodium and 125W Mercury Fluorescent lamps with the appropriate control gear. The lantern has the facility for accepting bottom or side entry spigots of 76 mm o.d. or 42/48 mm o.d. respectively.

Degree of Protection IP23.

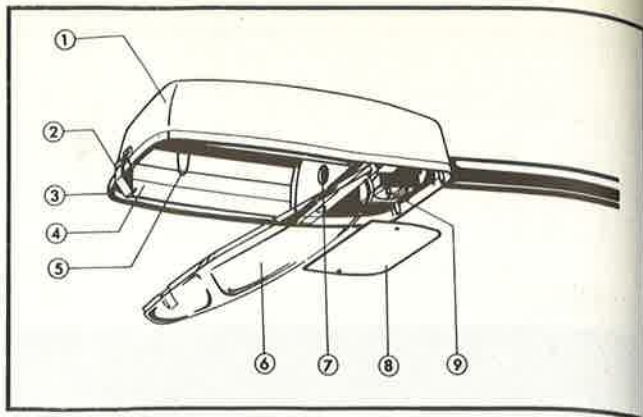
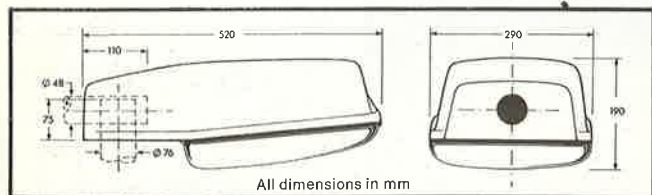
Type compliance with BS 4533 Section 102.3.

Meets the requirements for Group B5/6 installation as specified in BS 5489 Part 3.

To specify state:

Group B roadlighting lantern for use with 35W SOX/125W HPL-N/70W SON with integral gear. The lantern shall have the facility for mounting as a post top or on side entry spigots. Philips Type XGS 201/035, HGS 201/125, SGS 201/070, or similar.

DIMENSIONS



LANTERN DATA

Ordering Code	Rating	Dimensions		Weight	Windage		Light Output Ratio	
		Length	Depth		Plan m ²	Elevation m ²	LOR	DLOR
XGS 201/035	35W SOX	520mm	190mm	5.8kg	0.15	0.09	0.69	0.68
SGS 201/070	70W SON	520mm	190mm	5.5kg	0.15	0.09	0.77	0.74
HGS 201/125	125W HPL-N	520mm	190mm	5.5kg	0.15	0.09	0.77	0.75

For full photometric data refer to sheet no. PL 8201.

ELECTRICAL DATA

Lamp	Ballast	Capacitor	Ignitor	Mains Voltage	Mains Current (amps)	Lamp Current (amps)	Circuit Watts
35W SOX	BSX 355	L4008	SX72	240	0.22	0.6	48
70W SON	BSN 70	L4010	Internal	240	0.4	1.0	85
125W HPL-N	BHL 125	L4008	—	240	0.64	1.2	137

For full lamp data refer to sheets: PL 1757 -- SOX PL 1776 -- SON PL 1768 -- HPL-N

ORDERING DATA

Catalogue No. Description

For 35W SOX

XGS 201/035 Side or bottom entry lantern with integral control gear

XGS 201/035*1 Side or bottom entry lantern with integral control gear with NEMA socket

FOR 70W SON

SGS 201/070 Side or bottom entry lantern with integral control gear

SGS 201/070*1 Side or bottom entry lantern with integral control gear with NEMA socket

For 125W HPL-N

HGS 201/125 Side or bottom entry lantern with integral control gear

HGS 201/125*1 Side or bottom entry lantern with integral control gear with NEMA socket

Lanterns are individually packed.

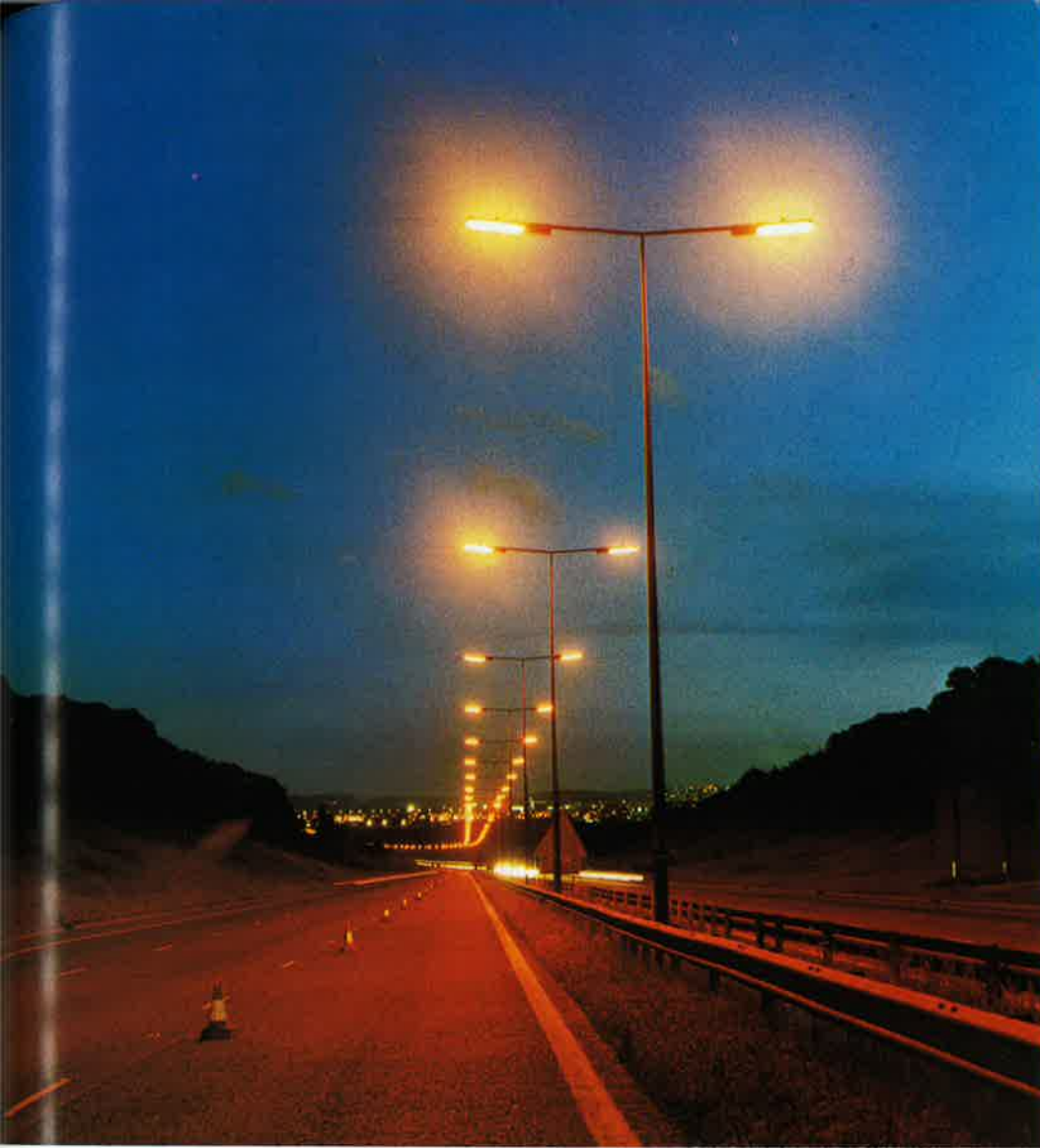
Note: Mercury fluorescent lamps:
UK marking MBF = Philips
International marking HPL-N.

Lamp: SOX Made in UK.
SON/HPL-N Made in Belgium

Lantern: Made in U.K.

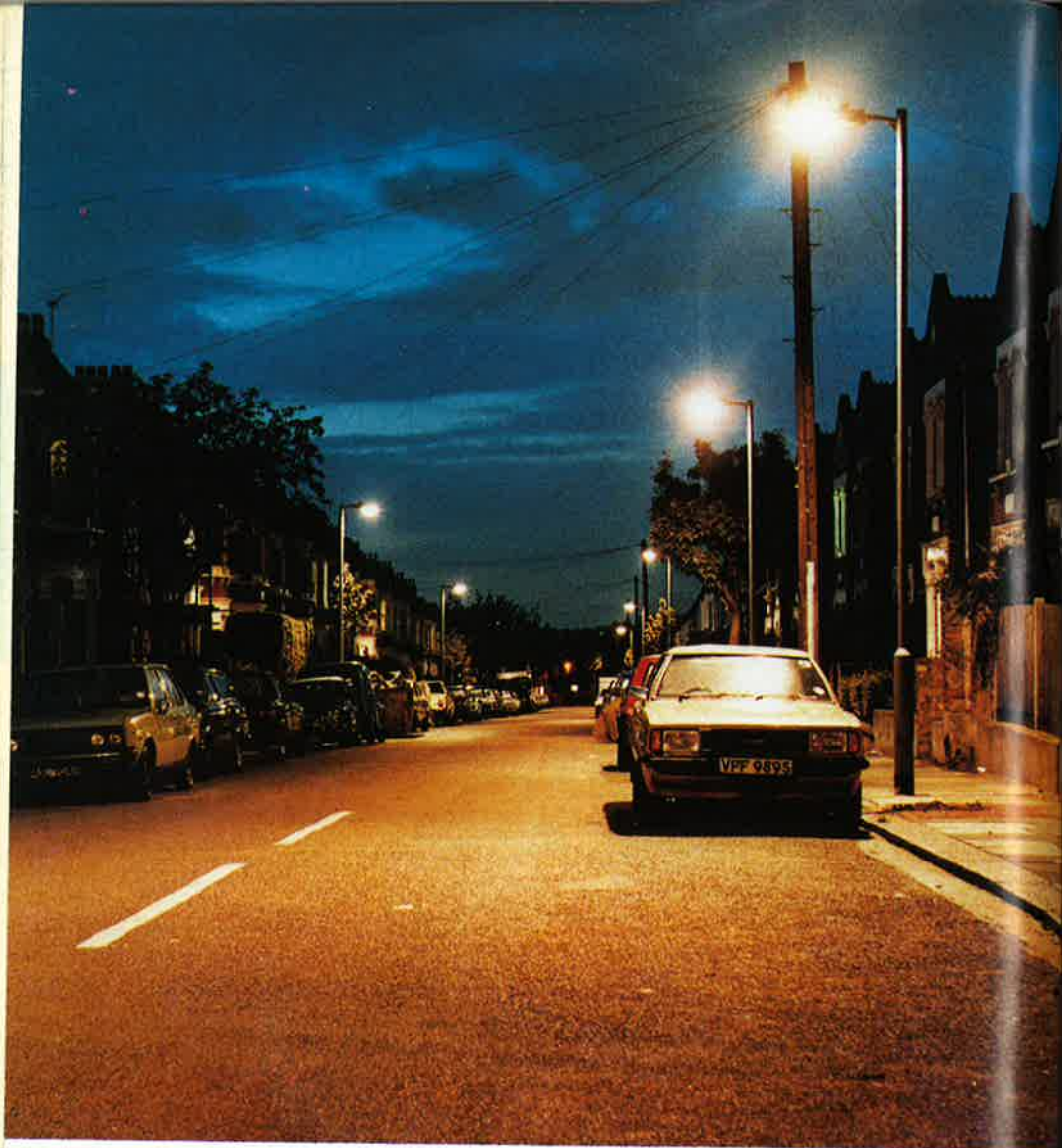
Control gear: Made in U.K.

Ignitor: Made in Holland



M5 MOTORWAY, AVON

The energy-saving potential of Philips SOX-E lamps is clearly shown by this motorway conversion of 200W SL1 lamps to SOX-E 131 lamps in MA60 lanterns. Average illuminance is more than doubled, and measured load is reduced from 504kW to 370kW.



WANDSWORTH

Philips SGS 203 Group B road lighting lantern, with patented high-efficiency optics, not only improves kerbside illumination but can reduce the cost of road lighting by up to 40 per cent.

ROADLIGHTING LANTERNS

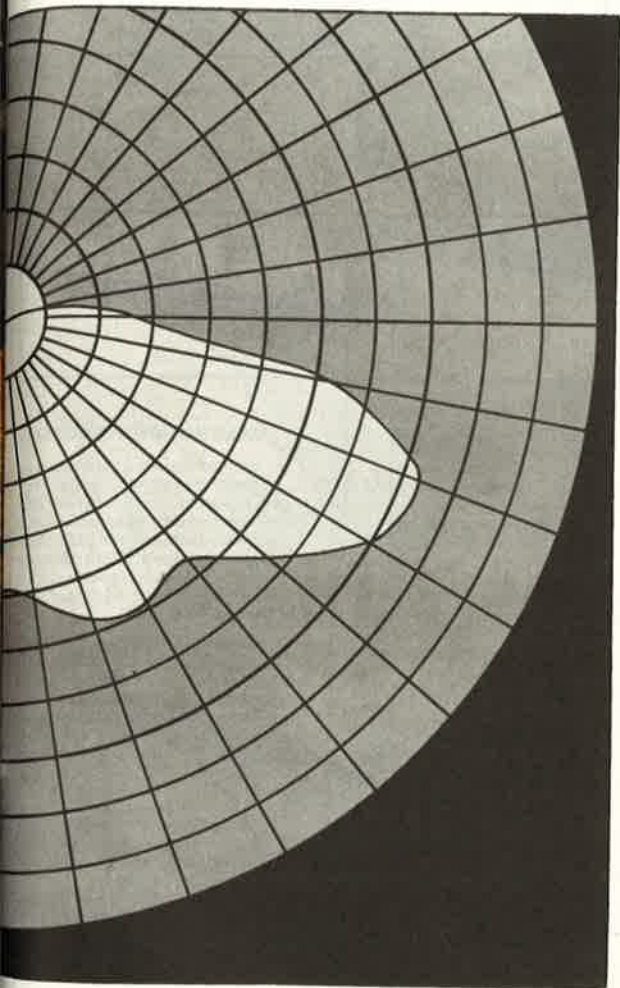
GENERAL PHOTOMETRIC INFORMATION

List of lanterns covered
Interpretation of data
Roadlighting reference documents
Tabulated data and polar curves

Separate data sheets are available giving specific details of lantern performance obtained from the various permutations of lamping and configuration possible with the Philips range of roadlighting lanterns.

To order these data sheets refer to list overleaf quoting the appropriate PL No. shown in bold type.

The data is chosen in accordance with B.S. and CIE recommendations to give the user adequate lantern information for the design of complete roadlighting schemes. The tabulated data and polar curves contain the information called for in B.S. and CIE documents.



5

ROADLIGHTING

To reorder this Data Sheet quote

PL 8180/3

Issued 9/82

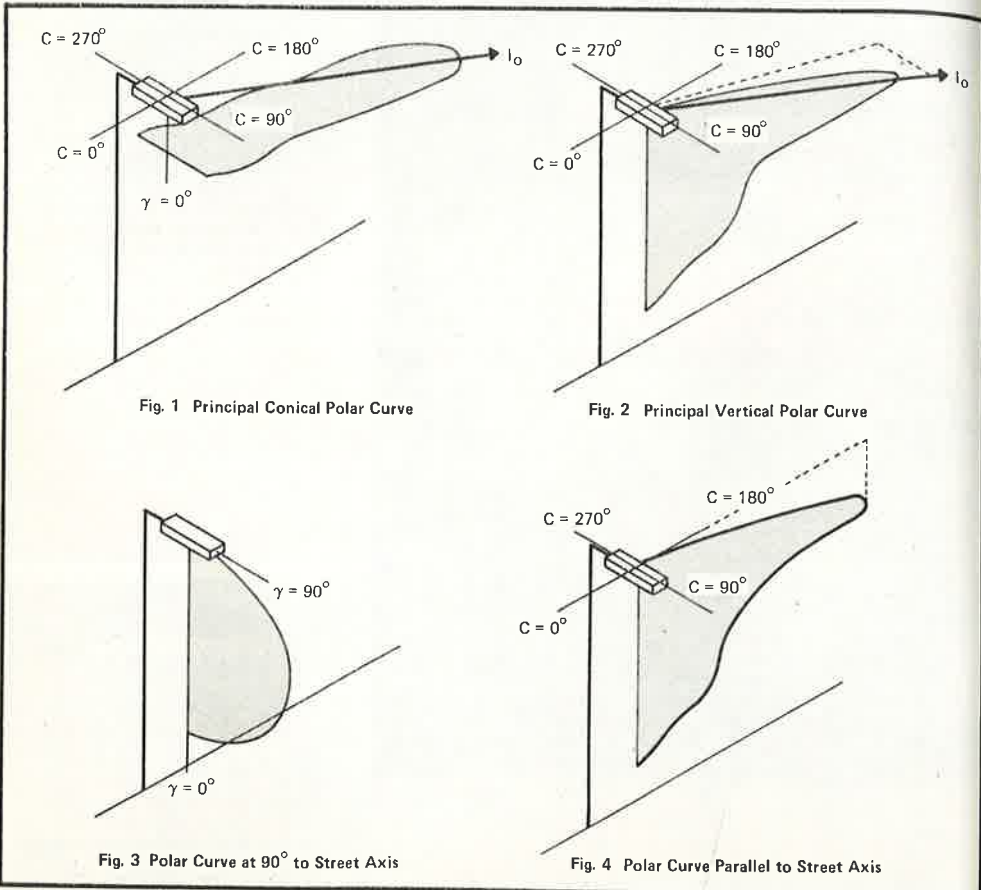
Replaces PL 8180/2

GENERAL PHOTOMETRIC INFORMATION – ROADLIGHTING

LIST OF LANTERNS COVERED

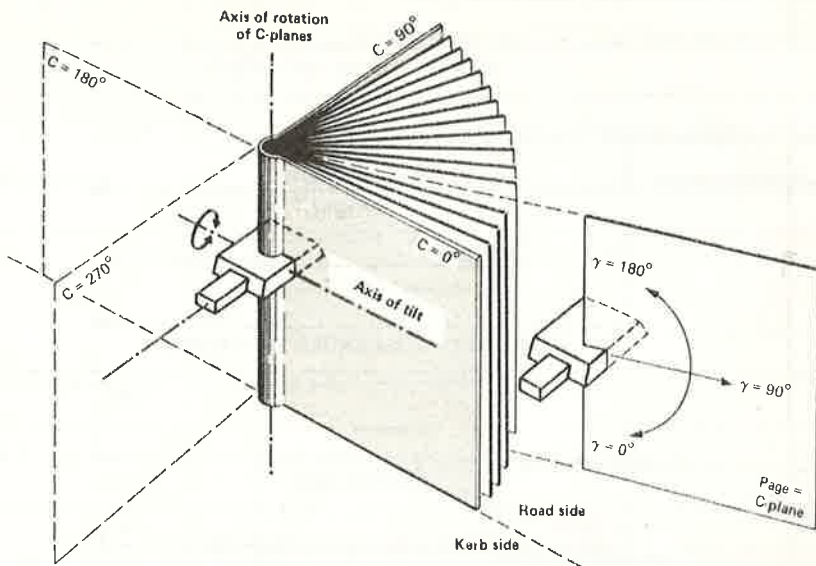
PL No.	Sheet No.	Lantern	Lamp	Configuration
8201	1	MI 55	70W SON	—
	2	MI 50	35W SOX	—
	3	MI 80	55W SOX	—
	4	XGS 201/035	35W SOX	—
	5	SGS 201/070	70W SON	—
	6	HGS 201/125	125W HPL-N	—
8202	7	MA 30	150W SON	CO
	8	MA 30	150W SON	SCO
	9	MA 30	250W SON	CO
	10	MA 30	250W SON	SCO
	11	MA 30	400W SON	CO
	12	MA 30	400W SON	SCO
	13	MA 30	250W HPL-N	CO
	14	MA 30	250W HPL-N	SCO
	15	MA 30	400W HPL-N	CO
	16	MA 30	400W HPL-N	SCO

PL No.	Sheet No.	Lantern	Lamp	Configuration
8204	27	MA 90	90W SOX	CO
	28	MA 90	90W SOX	SCO
	29	MA 50	135W SOX	CO
	30	MA 50	135W SOX	SCO
	31	MA 60	180W SOX	CO
	32	MA 60	180W SOX	SCO
	33	SGS 203/050	50W SON	—
	34	SGS 203/070	70W SON	—
	35	SGS 203/100T	100W SON/T	—
	36	SGS 203/150T	150W SON/ST	—
	37	SGS 203/250T	250W SON/T	—
	38	SGS 203/150TFG	150W SON/ST	—



GENERAL PHOTOMETRIC INFORMATION – ROADLIGHTING

Fig. 5 C- γ -System of Coordinates



INTERPRETATION OF DATA

The tabulated data gives a brief description of the lantern together with the type of light source, mirror and lampholder **setting positions** where applicable and **mounting orientation** for which the data was calculated. This is followed by details of specific distribution performance.

The flux in the lower hemisphere is divided into roadside and kerbside, in order to give the user a guide to the percentage of flux the lantern directs on to the road. Total light output ratio is determined by adding the total upper and total lower hemisphere light output ratio.

The BS data given enables the performance of a lantern to be compared with the distribution requirements of BS 4533, Section 102-3. This distribution is required for certain classes of installation as described in BS 5489.

In the latest edition of CIE 12-12.2 1977 the concept of cut-off and semi cut-off distributions for limiting glare is moved away from. They are replaced by parameters that determine disability and discomfort glare directly. To describe the luminous intensity

distribution, three terms have been introduced. Throw, Spread and Control.

THROW can be classified as short, intermediate or long and is determined by the extent to which the light from the lantern is distributed along the road.

SPREAD can be classified as narrow, average or broad and is determined from the sideways spread of light across the road.

CONTROL can be classified as limited, moderate or tight and depends on the amount of glare control the lantern gives.

Throw and Spread can be determined from the isocandela diagram. Control is determined from the Specific Lantern Index (SLI). This is the part of the glare mark (G) formula which relates only to the lantern performance.

A summary of the parameters used in the CIE design method is given below.

L_{av} – Average Road Surface Luminance

U_o – Overall Uniformity $\frac{L_{min}}{L_{av}}$

TI – Threshold Increment $65 \frac{L_{veil}}{L_{av}^{0.8}}$

UI – Longitudinal Uniformity $\frac{L_{min}}{L_{max}}$

G – Glare Control Mark = $SLI + 0.97 \log L_{av} + 4.41 \log h' - 1.46 \log p$
 where h' = distance between eye level and lantern mounting height.
 p = No. of lanterns per km.

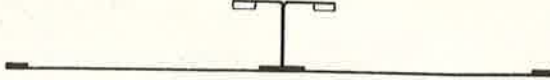
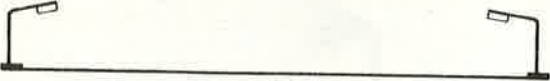
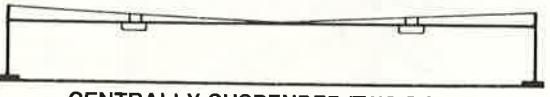
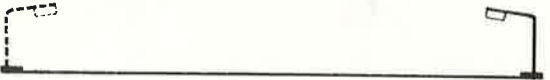




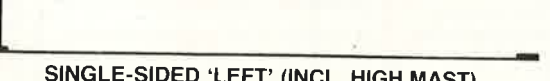
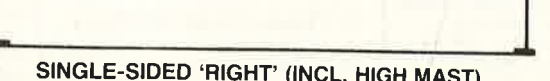
Performance tables which list the above parameters for four standard road surface classifications R1-R4 and two mounting heights are available on request. The lantern, light source and distribution should be specified together with one of the standard road sections, and one of the standard column arrangements shown overleaf.

The co-ordinate system of measurement for the graphical plots is C- γ , C being vertical planes in azimuth and γ being angles of elevation within these planes as shown in Figure 5. Figures 1-4 show in three-dimensional form the planes used for the four polar curves on the individual sheets in terms of the C- γ system.

The contours on the Isocandela diagrams are at 90%, 70%, 50%, 30%, 10% and 2% of the peak intensity. These values were chosen to provide adequate information while retaining the clarity of the plot.

GENERAL PHOTOMETRIC INFORMATION – ROADLIGHTING


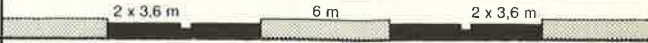

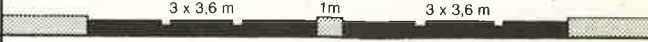





Code Standard Lighting Arrangements

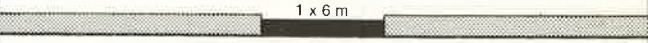

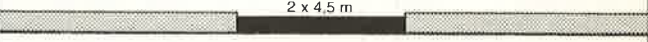
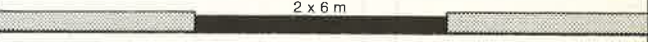
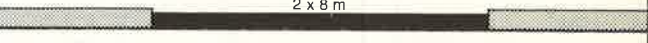





.. 01	 <p style="text-align: center;">CENTRAL TWIN BRACKETS</p>
.. 02	 <p style="text-align: center;">OPPOSED</p>
.. 03	 <p style="text-align: center;">CENTRALLY SUSPENDED TWO ROWS</p>
.. 04	 <p style="text-align: center;">STAGGERED</p>
.. 05	 <p style="text-align: center;">STAGGERED SUSPENDED</p>
.. 06	 <p style="text-align: center;">CENTRAL NO BRACKETS (INCL. HIGH MAST)</p>
.. 07	 <p style="text-align: center;">CENTRAL CATENARY SYSTEM</p>
.. 08	 <p style="text-align: center;">CENTRALLY SUSPENDED ONE ROW</p>
.. 09	 <p style="text-align: center;">SINGLE-SIDED 'LEFT' (INCL. HIGH MAST)</p>
.. 10	 <p style="text-align: center;">SINGLE-SIDED 'RIGHT' (INCL. HIGH MAST)</p>

GENERAL PHOTOMETRIC INFORMATION – ROADLIGHTING

Lighting Schemes

Code Standard Cross Sections of Road

Lighting Schemes	Code	Standard Cross Sections of Road
TYPE A: DUAL CARRIAGEWAYS	01 ..	
	02 ..	
	03 ..	
	04 ..	
	05 ..	
	06 ..	
	07 ..	
	08 ..	
	09 ..	

TYPE B: SINGLE CARRIAGEWAYS	10 ..	
	11 ..	
	12 ..	
	13 ..	
	14 ..	
	15 ..	
	16 ..	
	17 ..	
	18 ..	
19 ..		

ROADLIGHTING REFERENCE DOCUMENTS

Documents relevant to the information contained in this Data Sheet are:-

- | | |
|---------------------------------|---|
| BS 4533 Section 102:3 and 103:1 | Road lighting lanterns. |
| BS 5489 Parts 1 to 9 | Code of Practice for roadlighting (formerly CP1004). |
| CIE Publication No. 12 | Recommendations for the lighting of roads for motorised traffic. |
| CIE Publication No. 30 | Calculation of luminance and illuminance in road lighting. |
| CIE Publication No. 31 | Glare and uniformity in road lighting installations. |
| CIE Publication No. 34 | Road lighting lantern and installation data – photometrics, classification and performance. |

Further information on Luminance Calculation is given in the technical section at the rear of this handbook.

5

GENERAL PHOTOMETRIC INFORMATION – ROADLIGHTING

(EXAMPLE OF PHOTOMETRIC DATA AVAILABLE ON REQUEST)

Lantern type	MA 50
Lamp type	135W SOX
Reflector type	Injection Moulded Acrylic
Reflector type	NA
Tilt angle	4°
Lampholder position	Position No1
Mirror angle	NA
Light distribution	Cut-off

Peak intensity 285 cd/1000lm

Light output ratios

Upper hemisphere -	
Total	3%
Lower hemisphere -	
Roadside	37.5%
Kerbside	37.5%
Total	75%

B.S. DATA

In plane of principal polar curve
 Beam limits upper 67.0°
 Beam limits lower 58.8°

In plane parallel to street axis

Elevation where
 $I = 130 \text{ cd}/1000\text{lm}$ 72.6°
 Intensity at 80° elevation
 38.0 cd/1000lm
 Intensity at 90° elevation
 15.0 cd/1000lm

In cone from downward vertical to
 30° elevation

I_{MAX} 173.0 cd/1000lm
 I_{MIN} 105.0 cd/1000lm

CIE DATA

Glare control

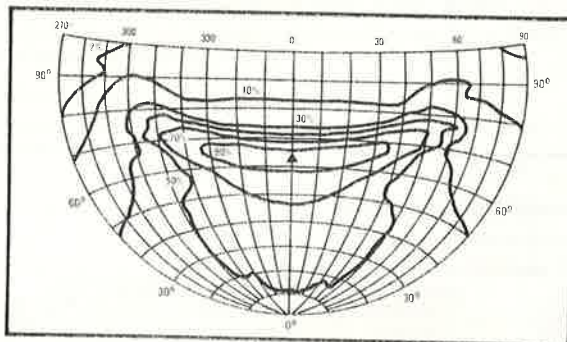
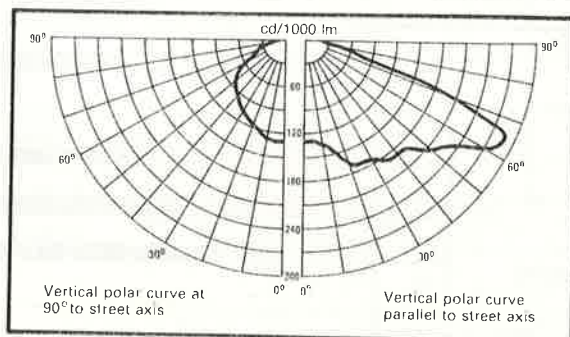
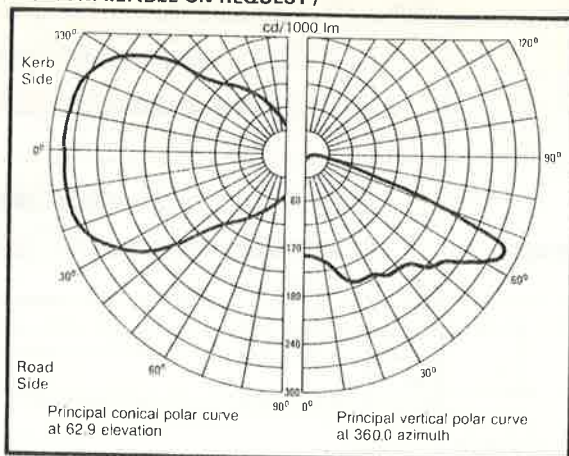
I_{80} 38.0 cd/1000lm
 I_{80} / I_{80B} 2.11
 F 0.1190 m²
 C -0.4
 SLI 3.7

Distribution

Throw Intermediate
 Spread Broad
 Control Moderate

KEY

I - Intensity
 I_a - Intensity at a° elevation
 F - Flashed area
 C - Colour factor
 SLI - Specific Lantern Index



Measured to: BS 5225 part 1 1975. Complies with: BS 5489 part 2 for group A10 A12
 Data supplied in accordance with: recommendations in British Standards and CIE
 publication No.34

Test No. B454 Photoset direct from Computer output

Date 31/07/79

DISCHARGE LUMINAIRES

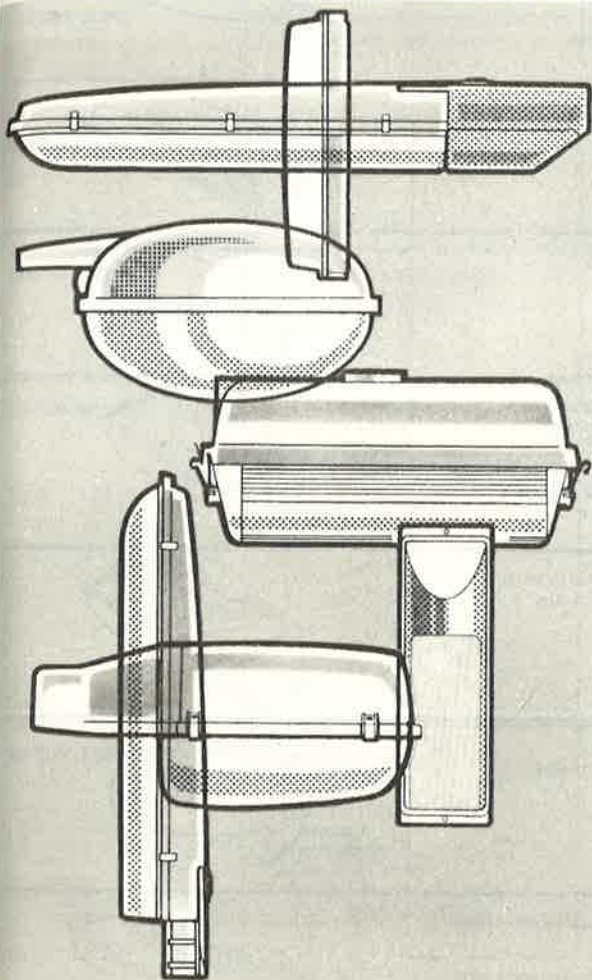
5

Roadlighting Spare Parts

A range of spares and accessories for Philips roadlighting lanterns.

RANGE

Replacement Bowls
Replacement Clips
Replacement Lampholders
Spare packs: MA SOX with photocell,
MA SOX without photocell,
Spigot adaptors
Photocell,
Shorting plug.



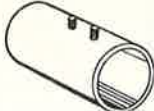

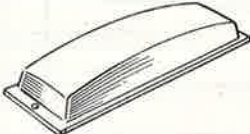
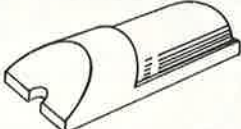
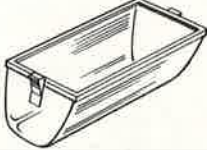
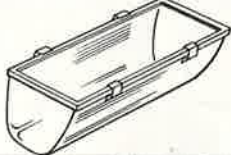
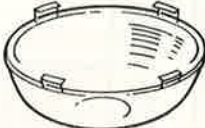
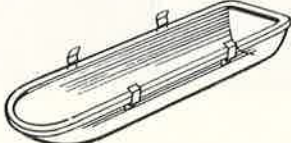
To reorder this Data Sheet quote

PL 3062

Issued 10.84


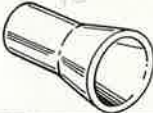
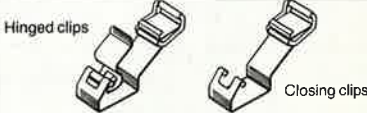


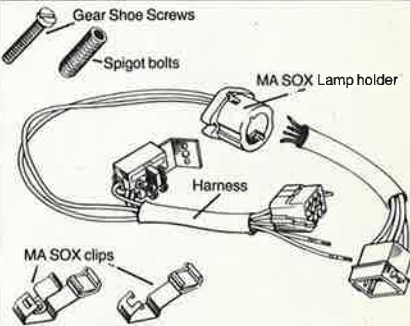
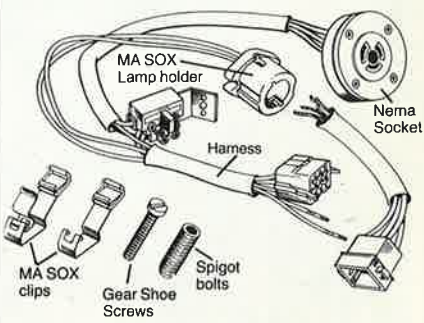
NEW

ROADLIGHTING SPARES

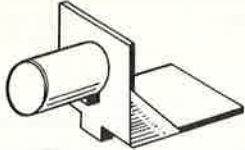


Type No.	Description	
SGS 201070 SA	Spigot adaptor to use on SGS 201/070 on a 34mm spigot.	
XGS BOWL	Bowl for XGS 201/035 Bowl for XGS 201/070 Supplied with clips	
SGS 201 150 BOWL	Bowl for SGS 201/150 Supplied with clips	
SGS 201 400 BOWL	Bowl for SGS 201/400 Supplied with clips	
MSB 18 BOWL	Diffuser for MSB 18	
MSB 18L BOWL	Diffuser for MSB 18L	
MI 50 BOWL	Vandal Resistant Bowl for MI 50 Supplied with 1 set of clips	
MI 55 BOWL	Polycarbonate Bowl for MI 50/MI 55 Supplied with 1 set of clips	
MI 80 BOWL	Vandal resistant Bowl for MI 80 Supplied with 1 set of clips	
MA 30 BOWL	Bowl for MA 30 Supplied with 1 set of clips	
MA 50 BOWL	Bowl for MA 50. Supplied with 1 set of clips.	
MA 90 BOWL	Bowl for MA 90. Supplied with 1 set of clips.	
MA 60 BOWL	Bowl for MA 60. Supplied with 1 set of clips.	

ROADLIGHTING SPARES

5

Type No.	Description	
MA SOX LHR	BC Lampholder for MA SOX and MI SOX lanterns.	
MA 30 LHR	E40 Lampholder for MA 30 lanterns.	
MA SOX CLIPS	Pack of 12 hinge and 24 closing clips for MA SOX lantern with clip seals.	
MI 50 CLIPS	Pack of 20 clips for MI 50 and MI 55 lanterns.	
MI 80 CLIPS	Pack of 20 clips for MI 80 lantern	
MA SOX SPARES	Spares pack for, without Photocell MA lantern: 1 x MA SOX CLIPS 6 x MA SOX LHR 6 x Harnesses 12 x Gear Shoe Screws 12 x Spigot Bolts	
MA SOX *1 SPARES	Spares pack for, with Photocell MA lantern: 1 x MA SOX CLIPS 6 x MA SOX LHR 6 x Harnesses 6 x Nema Sockets 12 x Gear Shoe Screws 12 x Spigot Bolts	

ROADLIGHTING SPARES

Type No.	Description	
ZGP 76	76mm Spigot for SGS 203 lantern	
SH PLUG	Shorting Plug	
SS4	Photocell	

RESIDENTIAL AND AMENITY

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Lampada	225
W4321	227

SECURITY LIGHTING

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MSB 18 Mini SOX KombiPak	231
FGC 100	233
PLB 111	235
PLW 011	237
SXK 36-E Security KombiPak	239
SNK 70 Security KombiPak	241

Please see pages II and III of General Introduction for information on how to use this Handbook.

DECORATIVE POST TOP LANTERNS

International decorative range

Vandal resistant post-top lanterns for decorative and residential lighting for use with high pressure sodium and mercury lamps tungsten filament lamps and SL Lamps.

Note: Mercury fluorescent lamps
UK marking MBF = Philips
International marking HPL-N
UK marking MBTF = Philips
International marking ML

RANGE

Three decorative units and eleven bowl styles compatible with electrical units for 50W and 70W SON, 80W and 125W HPL-N, HPL-B comfort, mercury blended, tungsten filament and SL lamps.

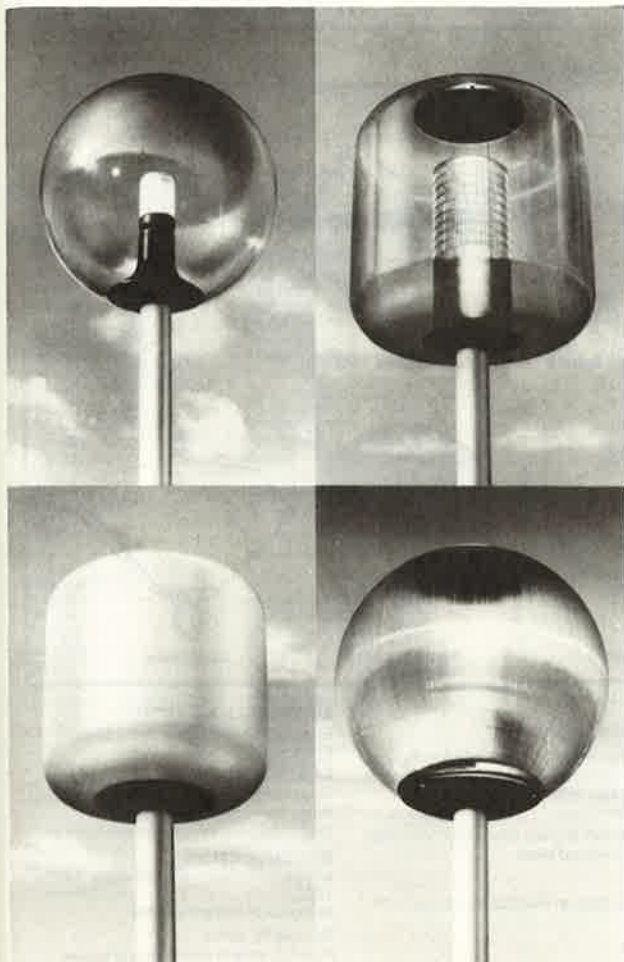
APPLICATIONS

Suitable for use wherever the environment demands a high standard of lantern design, with particular applications in:

- Residential areas
- Shopping precincts
- Public parks and gardens
- Leisure centres
- Hotel forecourts
- Hospitals
- Car parks

FEATURES

- Bowls, gear units and decorative units are designed to combine aesthetically with each other.
- Acrylic bowls are vandal-resistant and allow high light transmission.
- Elegant shape of base continues contour of bowls.
- Bowls are easily removed for maintenance and replacement.
- All bowls and decorative units are interchangeable (except Agate).



6

RESIDENTIAL & AMENITY

To reorder this Data Sheet quote

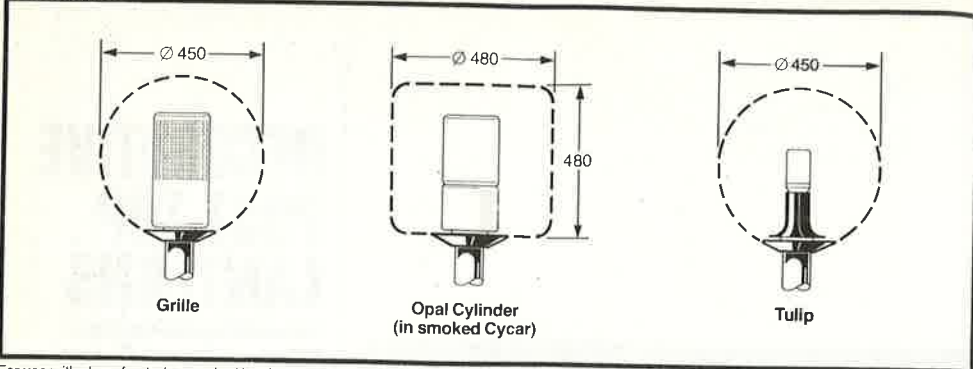
PL 1889/6

Issued 9 84

Replaces PL 1889/5

DECORATIVE POST TOP LANTERNS – RESIDENTIAL & AMENITY

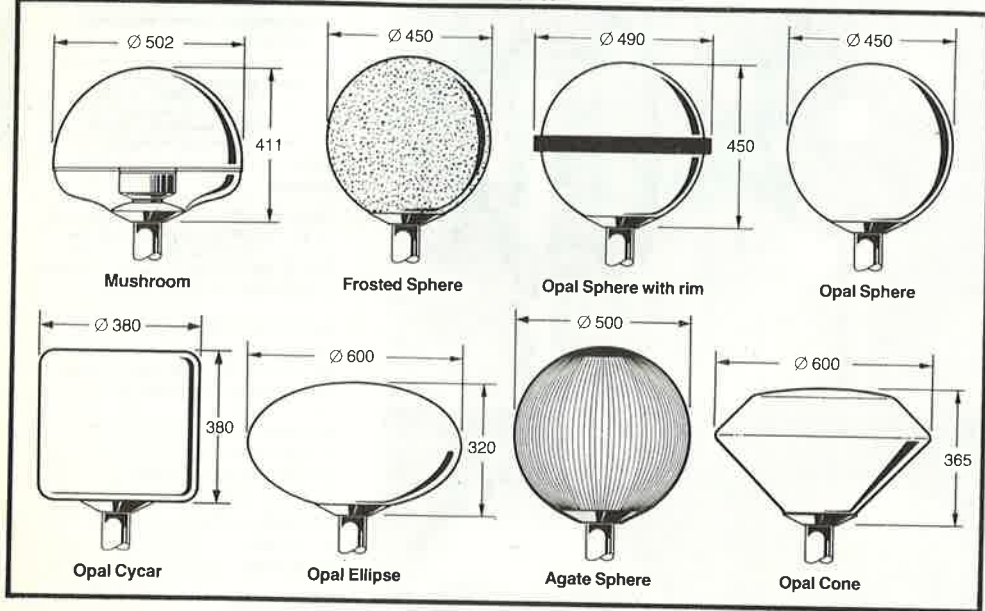
DECORATIVE UNITS



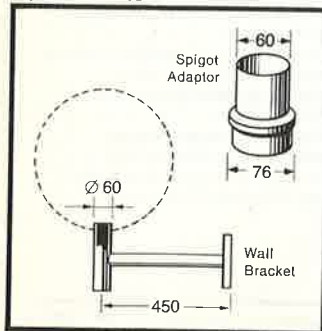
For use with clear, frosted or smoked bowls

All dimensions in mm

BOWLS WHICH CAN BE USED WITHOUT A DECORATIVE UNIT



ACCESSORIES



Features continued

■ Lanterns are designed to fit directly onto 60mm poles, or to 76mm poles by means of a spigot adaptor which is almost invisible in use.

■ Gear tray is glass reinforced Polyamide body coloured black.

For full data on electrical units refer to PL 1890.

MATERIALS & FINISH

Base plate: Black glass reinforced Polyamide.

Lampholders: Porcelain

Gear components: Standard Philips range (see Lighting Handbook for catalogue Nos. of replacement spares).

SPECIFICATION

■ Type compliance with BS 4533, Section 102.1

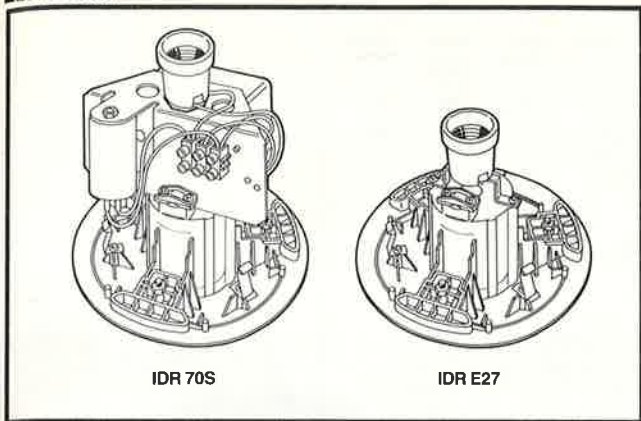
■ Degree of Protection IP54.

To specify state:

Post-top lantern with choice of eleven bowl styles and three internal decorative units, all to be interchangeable with control gear and electrical units (except agate) for HPL, SON, GLS or ML lamps. Similar to Philips NPP, HPP or SPP.

DECORATIVE POST TOP LANTERNS – RESIDENTIAL & AMENITY

ELECTRICAL UNITS



'A typical IDR Electrical Unit'

6

WEIGHTS, MATERIALS & ORDERING DATA

Catalogue No.	Description	Weight kg	Materials	
Bowls				
H/N/SPP 131	Opal sphere with rim	2.4	Low pressure polythene	†
H/N/SPP 133	Opal sphere	2.0	Low pressure polythene	†
H/N/SPP 134	Opal ellipse	2.3	Low pressure polythene	†
H/N/SPP 136	Opal cone	2.3	Low pressure polythene	†
H/SPP 137	Mushroom bowl	3.2	GRP and polycarbonate	†
H/N/SPP 133/ACC	Clear sphere	1.1	Acrylic	†
H/N/SPP 133/ACT	Frosted sphere	1.1	Acrylic	†
H/N/SPP 133/ACS	Smoked sphere	1.3	Acrylic	†
H/N/SPP 133/PCC	Clear sphere	1.7	Polycarbonate	†
H/N/SPP 133/PCT	Frosted sphere	1.7	Polycarbonate	†
H/N/SPP 133/PCS	Smoked sphere	1.8	Polycarbonate	†
Cycar Opal	Opal cylinder	2.8	Acrylic	**
Cycar CF	Smoked cylinder	5.0	Acrylic	**
Agate	Ribbed sphere	6.0	Oroglass DR	**
Decorative Units				
Tulip	Black Painted Spinning	0.3	Aluminium	**
Opal Cylinder	Cylinder	1.2	Glass	**
Grille	Louvre	0.5	Aluminium	**
Electrical Units				
IDR 50S	For 50W SON lamps	2.6		*
IDR 70S	For 70W SON lamps	2.8		*
IDR 80H	For 80W HPL lamps	2.5		*
IDR 125H	For 125W HPL lamps	2.7		*
IDR E27	For GLS, ML and SL lamps	0.8		*
Agate 70S	For 70W SON in Agate Bowl	2.8		*
Agate 80H	For 80W HPL in Agate Bowl	2.5		*
Accessories				
ZPP/08	Spigot adaptor	0.3	Cast aluminium	*
ZPP/09	Wall bracket	4.6	Coated steel	*

All items are individually packed.

Made in Holland †
 Made in UK *
 Made in France **

DECORATIVE POST TOP LANTERNS – RESIDENTIAL & AMENITY

ELECTRICAL & ORDERING DATA

Electrical Unit	Lamp Type	Ballest	Capacitor	Mains Voltage	Mains Current (ampe)	Circuit Watts	
	IDR 50S	50W SON	BSN 50	L4008	240	0.38	61
Agate 70S/IDR 70S	70W SON	BSN 70	L4010	240	0.42	85	
Agate 80H/IDR 80H	80W HPL-N	BHL 80	L4008	240	0.40	88	
	IDR 125H	125W HPL-N	BHL 125	L4008	240	0.70	137
	IDR E27	GLS max 150W	—	—	240	—	—
		ML max 160W	—	—	—	—	—
		SL 25 max	—	—	—	—	—

All items are individually packed.

For full lamp data refer to PL 1776 – SON, PL 1768 – HPL-N, PL 1789 – GLS, PL 1772 – ML.

For full control gear data refer to PL 1778 – SON, PL 1779 – HPL-N

HPP, NPP & SPP ELECTRICAL UNITS

International decorative range

Electrical Units for International
Decorative Range of Post Top
Lanterns.

Note: Mercury fluorescent lamps
UK marking MBF = Philips
International marking HPL-N
UK marking MBTF = Philips
International marking ML

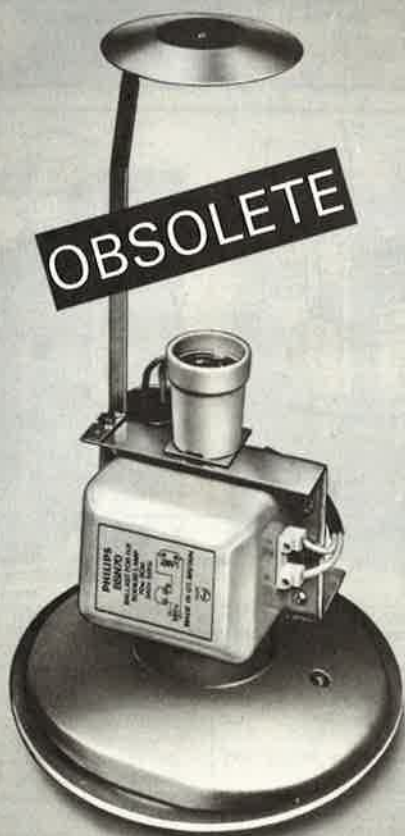
RANGE

Electrical units complete with control
gear (where applicable) for 50W and
70W SON, 50W, 80W and 125W
HPL-N lamps and GLS or ML lamps.

APPLICATIONS

For use in the H/N/SPP range of
post-top lanterns, in situations such
as:

- Residential areas
- Shopping precincts
- Public parks and gardens
- Leisure centres
- Hotel forecourts
- Hospitals
- Car parks



To reorder this Data Sheet quote

PL 1890/5

Issued 7/83

Replaces PL 1890/4

HPP, NPP & SPP – RESIDENTIAL & AMENITY

ELECTRICAL UNITS



Electrical unit for SON and HPL-N lamps with cylinder



Electrical unit for SON and HPL-N lamps up to 80W with dome



Electrical unit for SON and HPL-N lamps with louvre



Electrical unit for GLS and ML lamps with spinning

FEATURES

- All electrical units fit any of the decorative units in the range.
- Easy to assemble and install.
- Standard Philips control gear components ensure good availability of replacement spares.
- Elegant shape of base continues contour of bowls.
- Designed to fit directly to 60mm poles, or to 76mm poles with spigot adaptor which is almost invisible in use.

MATERIALS & FINISH

Base plate: Anodised aluminium

Lampholders: Porcelain

Gear components: Standard Philips range (see Lighting Handbook for catalogue Nos. of replacement spares).

SPECIFICATION

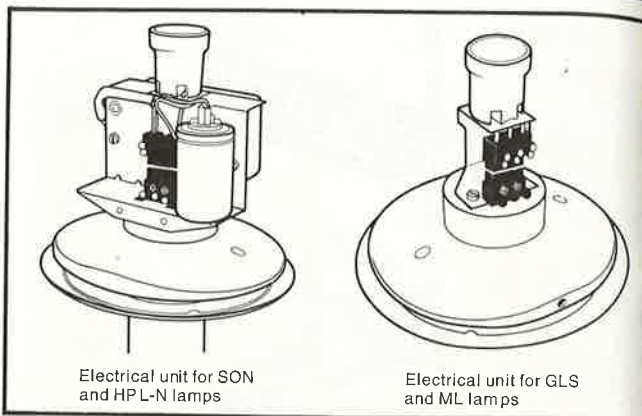
- Type compliance with BS 4533, Section 102-2 Class I. This fitting must be earthed.
- With appropriate bowls Degree of Protection is IP54.

To specify state:

Post-top lantern with choice of eight bowl styles and three internal decorative units, all to be interchangeable with control gear and electrical units for HPL, SON, GLS or ML lamps. Similar to Philips NPP, HPP or SPP.

Made in Holland.

Ballasts made in UK.



Electrical unit for SON and HPL-N lamps

Electrical unit for GLS and ML lamps

ELECTRICAL & ORDERING DATA

Electrical Unit	Lamp Type	Ballast	Capacitor	Mains Voltage	Mains Current (amps)	Circuit Watts
SPP-50W	50W SON	BSN 50	L4008	240	0.38	61
SPP-70W	70W SON	BSN 70	L4010	240	0.42	85
HPP-50W	50W HPL-N	BHL 50	L4008	240	0.37	62
HPP-80W	80W HPL-N	BHL 80	L4008	240	0.40	88
HPP-125W	125W HPL-N	BHL 125	L4008	240	0.70	137
N>P/00	GLS max 150W	—	—	240	—	—
	ML max 160W	—	—	—	—	—
	SL 25 max	—	—	—	—	—
N>P/01	GLS max 100W	—	—	240	—	—
	ML max 100W	—	—	—	—	—
	With spinning	—	—	—	—	—

All items are individually packed.

For full lamp data refer to PL 1776 – SON PL 1768 – HPL-N PL 1789 – GLS PL 1772 – ML

For full control gear data refer to PL 1778 – SON PL 1779 – HPL-N

For full data on decorative unit and bowls for International Decorative Range Post-top Units, refer to PL 1889.

PHARO PROFILONG

International Decorative
Range SL and PL amenity
luminaires



A range of stylish, vandal-resistant luminaires for decorative and amenity lighting. The luminaires utilise Philips SL and PL compact fluorescent lamps, which provide light which matches filament lamps in colour and quality, and provide equivalent light output for one quarter the energy consumption and five times the life. For Pharo a range of attachments is available for ground or wall mounting, or for mounting two luminaires back-to-back on a bracket.

RANGE

Pharo

FGP 510/109

- Luminaire supplied as a KombiPak complete with 2 x PL9 lamp.

LGP 510/118

- Luminaire with ES lampholder for up to SL18 lamps.

GGP 510/Ground - Pillar for ground mounting.

GGP 510/Wall - Back-to-back wall bracket.

Profilong

FGP 500/209 - Wall-mounting slimline luminaire supplied as a KombiPak complete with 2 x PL9 lamps.

FGP 501/209 - Floor-mounting slimline luminaire supplied as a KombiPak complete with 2 x PL9 lamps.

6

RESIDENTIAL & AMENITY

To reorder this Data Sheet quote

PL 3065

Issued 9/84

New

PHARO PROFILONG

APPLICATIONS

For outdoor use, where a stylish luminaire is required for energy-effective low-level lighting:

- Building environs.
- Camping grounds.
- Parks and gardens.
- Private gardens and drives.
- Footpaths.
- Pool surrounds.
- Car parks.

FEATURES

Pharo

- Die-cast aluminium bodies, painted black, for stylish appearance and resistance to vandalism and corrosion.
- Thick pressed glass refractors complement styling and strength.
- Modular concept: Bulkheads and bollards of various heights can be assembled from only two basic components.
- Die-cast aluminium wall bracket provides attractive tandem bulkhead arrangement.
- Both bulkheads have fixing rawbolts, PL includes lamp.
- Fixing plate for anchoring ground mounting pillar.

Profilong

- Slim-line die-cast aluminium bodies, painted black, combine exciting design with vandal resistance.
- Tough, vandal-resistant polycarbonate refractors.
- Bulkhead Profilong has wall bracket and cable gland for easy installation.
- Slimline bollard has integral square base with anchoring holes.
- Both Profilongs are supplied as KombiPaks, complete with 2 x PL9 lamps and fixing rawbolts.

MATERIALS & FINISH

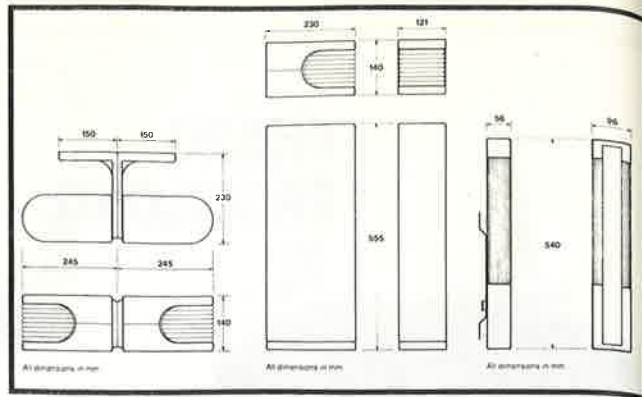
Body: Die-cast aluminium, painted black.

Refractors: Pharo – Pressed glass.
Profilong – Polycarbonate.

Lampholders: SL – Porcelain ES
PL – Pocan 4235
(glass-reinforced polyester, special type).

SPECIFICATION

- Type compliance with BS 4533 Section 102.3 Class I.
- Degree of Protection: Pharo IP 44
Profilong IP 44



ORDERING DATA

Catalogue No. Description

Pharo

FGP 510/109	Bulkhead luminaire KombiPak with 1 x PL9 lamp and rawbolts.
LGP 510/118	Bulkhead luminaire with ES holder for up to SL18 lamps.
GGP 510/Ground	Bollard assembly with anchoring plate.
GGP 510/Wall	Bracket for back-to-back mounting of twin units.

Profilong

FGP 500/209	Wall-mounting slimline luminaire KombiPak with 2 x PL9 lamps.
FGP 501/209	Floor-mounting slimline luminaire KombiPak with 2 x PL9 lamps.

Please order luminaires in the form given in the following example. Note that SL lamp must be ordered separately (packed in boxes of 6):

- 6 Philips bulkhead luminaires LGP 510/118
- 6 Philips lamps SL18

DIMENSIONS & WEIGHTS

Catalogue No.	Rating	Dimensions (mm)			Weight (kg)
		Depth	Width	Height	
Pharo					
FGP 510/109	1 x PL9	230	120	140	3.6
LGP 510/118	1 x SL18	230	120	140	3.2
GGP 510/Ground	–	230	300	120	7.8
GGP 510/Wall	–	230	120	570	1.4
(see diagrams for dimensions of bracket and ground plate)					
Profilong					
FGP 500/209	2 x PL9	98	57	540	3.3
FGP 501/209	2 x PL9	98	57	651	4.5

ELECTRICAL DATA

Lamp	Ballast	Lamp Watts	Circuit Watts
SL18	–	18	18
1 x PL9	BPL 10L	9	13
2 x PL9	BPL 10L	18	26

LUCE MANDOLINE

International Decorative Range aesthetic luminaires

Lanterns of good appearance, with integral gear for SON and HPL-N lamps.

RANGE

Luce – Decorative lantern with reflector and glass cover.

Mandoline – Decorative lantern with reflector and acrylic bowl. Both available with integral gear for 70W SON and 125W HPL-N lamps.

APPLICATIONS

Residential and Amenity in locations such as:

- Avenues and drives.
- Commercial office surrounds and roads.
- Parks.
- Town squares and malls.
- Car parks.
- Community and sports centres.



RESIDENTIAL & AMENITY

To reorder this Data Sheet quote

PL 3066

Issued 9.84

NEW

LUCE MANDOLINE

FEATURES

Luce

- Impact-resistant UV-stabilised polypropylene housing for vandal resistance and aesthetic appearance.
- Aluminium spigot for 60mm entry.
- Chemically polished and anodised potted reflector for good light control.
- Toughened flat glass cover combines good sealing with attractive appearance.
- Cover is retained for easy relamping.
- Integral gear for ease of installation.

Mandoline

- Chassis of injection-moulded GRP, self-coloured black, forms racquet to integrate gear assembly and spigot entry.
- Canopy of injection-moulded polypropylene, self-coloured white, is UV-resistant and hinges upwards from the racquet for easy gear maintenance.
- Opal vandal-resistant acrylic bowl hinges downwards from racquet for easy relamping.
- Chemically polished and potted optic for good light control.
- Die-cast aluminium spigot entry for 60mm side or post top entry.
- Stainless steel bowl clips ensure that all exposed parts are corrosion-resistant.
- Integral gear for ease of installation.

MATERIALS & FINISH

Canopy: UV-stabilised polypropylene, self-coloured white.

Chassis (Mandoline): Injection-moulded glass-reinforced polyamide, self-coloured black.

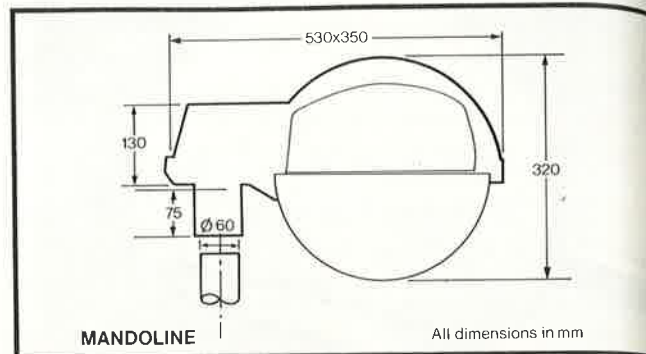
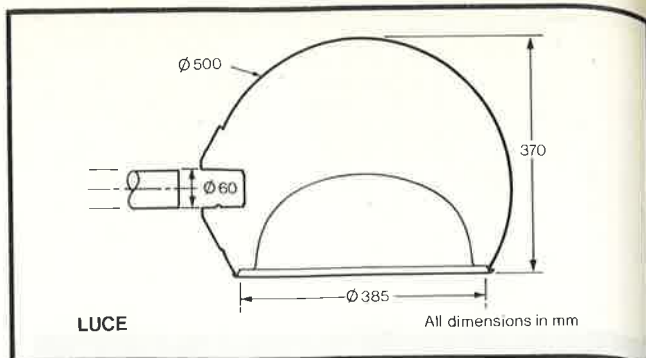
Reflector: Chemically-polished anodised aluminium.

Bowl: Luce – Toughened glass.
Mandoline – Acrylic, opal finish.

Spigot entry: Die-cast aluminium.

SPECIFICATION

- Type compliance with BS 4533 Section 102.3 Class I.
- Degree of protection: Luce IP44
Mandoline IP54



ORDERING DATA

Catalogue No.	Description	Packing Quantity
Luce 70	Lantern with integral gear for 70W SON lamp.	1
Luce 125	Lantern with integral gear for 125W HPL-N lamp.	1
Mandoline 70	Lantern with integral gear for 70W SON lamp.	1
Mandoline 125	Lantern with integral gear for 125W HPL-N lamp.	1

Please order lanterns in the form given in the following example. Note that lamps must be ordered separately, in multiples of the packing quantity:

40 Phillips lanterns Mandoline 70
40 Phillips lamps 70W SON.

LUMINAIRE DATA

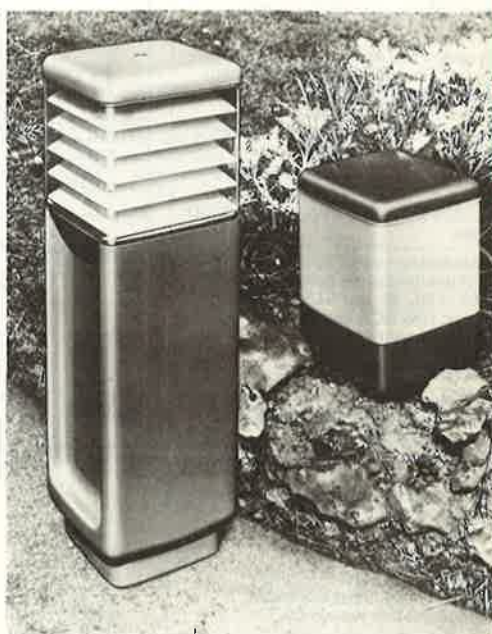
Catalogue No.	Rating	Dimensions(mm)		Weight kg	Windage		DLC
		Length	Depth		Plan m ²	Elevation m ²	
Luce 70	70W SON	480 (spherical)	—	6.3	0.18	0.18	0.64
Luce 125	125W HPL-N	480 (spherical)	—	6.3	0.18	0.18	0.72
Mandoline 70	70W SON	530	350	5.0	0.055	0.055	0.38
Mandoline 125	125W HPL-N	530	350	5.0	0.055	0.055	0.37

ELECTRICAL DATA

Lamp	Ballast	Capacitor	Mains Voltage (V)	Mains Current (A)	Lamp Current (A)	Circuit Watts (W)
70W SON	BSN 70	L4010	240	0.4	1.0	85
125W HPL-N	BHL 125	L4008	240	0.64	1.2	137

BOLLARDS AND MINI BOLLARDS

6



Vandal-resistant decorative luminaires for use with SON, HPL-N, ML, SL and GLS lamps.

Reinforced polyester bollards and mini-bollards in choice of three colours (green, brown and black) and two types (opal cube and clear cube with louvre). Available for 50W and 70W SON, 80W and 125W HPL-N, 100W ML, SL up to 25W and GLS up to 150W.

Reinforced concrete bollard with opal diffuser, for 70W SON and 125W HPL-N lamps.

APPLICATIONS

Low-level lighting in areas such as:

- Parks and greens.
- Footpaths.
- Pedestrian walkways.
- Car parks.
- Feature gardens.
- Prestige premises.
- Private gardens and drives.

RESIDENTIAL & AMENITY

To reorder this Data Sheet quote

PL 3067

Issued 9.84

NEW

BOLLARDS AND MINI BOLLARDS

FEATURES

Mechanical

GRP Range

- GRP body in choice of three colours, giving stylish appearance with resistance to corrosion and vandalism.
- Modular construction for easy maintenance.
- Securely anchored by stud mounting into concrete (4x15mm OD for bollards; 3x10mm OD for mini-bollards).
- UV-stabilised polycarbonate light cubes in opal or clear with louvres for long life.
- Allen-key entry in top plate provides easy servicing and deters vandals.
- Optional black lacquered die-cast aluminium wall bracket for mini-bollard.

Concrete bollard

- Smooth reinforced concrete body with integral UV-stabilised opal polycarbonate cylindrical diffuser combines extreme vandal resistance with stylish appearance.
- Four-point fixings for diffuser are easily removed for servicing.
- Stud anchoring using 4x10mm OD holes.

Technical

- Interchangeable gear trays: SON, HPL-N ML, SL and GLS for GRP range; 70W SON and 125W HPL-N only for concrete bollard.

MATERIALS & FINISH

GRP Range

Column and top louvre: Glass-reinforced polyester.

Light cube: Polycarbonate (opal or clear).

Light controller: Aluminium louvres, white lacquered finish.

Lampholder: Porcelain ES.

Concrete bollard

Column: Reinforced concrete.

Diffuser: Opal polycarbonate.

Lampholder: Porcelain ES.

SPECIFICATION

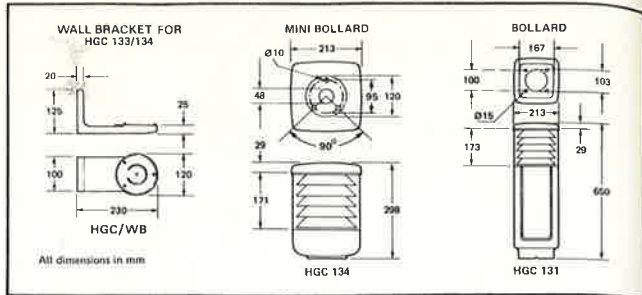
- Type compliance with BS 4533 Section 102.2 Class I.
- Degrees of protection: GRP range IP43
Concrete bollard IP44

To specify state:

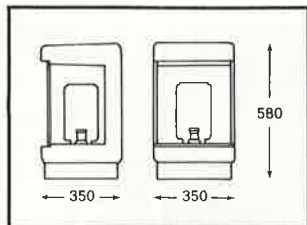
(GRP range) Vandal-resistant low-level lighting bollards with non-corrosive finish and choice of opal diffusing light cube and clear cube with louvre controllers. Degree of Protection IP33. Similar to Philips HGC 130/131 series.
(Concrete range) Vandal-resistant low-level lighting bollard of reinforced concrete construction with opal diffuser. Degree of Protection IP44. Similar to Philips CBD series.

DIMENSIONS

GRP Range



Concrete Range



ELECTRICAL DATA

Lamp Type	Ballast	Capacitor	Mains Voltage	Mains Current (Amps)	Lamp Current (Amps)	Circuit Watts
50W SON	BSN 50	L4008	240	0.38	0.75	61
70W SON	BSN 70	L4010	240	0.42	1.0	85
80W HPL-N	BHL 80	L4008	240	0.4	0.8	88
125W HPL-N	BHL 125	L4008	240	0.7	1.2	137
ML 100W	—	—	240/250	0.45	0.45	100

For full lamp data refer to PL 1776 - SON
PL 1768 - HPL-N
PL 1772 - ML
PL 3001 - SL
PL 1789 - GLS

BOLLARDS AND MINI BOLLARDS

ORDERING DATA - BOLLARDS AND MINI-BOLLARDS

Catalogue No.	Description	Weight (kg) excl. gear	Packing Qty.
GRP Range			
HGC 130/02	Bollard with opal cube - olive green	6.5	1
HGC 130/03	Bollard with opal cube - black	6.5	1
HGC 130/06	Bollard with opal cube - metallic brown	6.5	1
HGC 131/**	Bollard with clear cube and louvre*	7.0	1
HGC 133/**	Mini-bollard with opal cube*	2.6	1
HGC 134/**	Mini-bollard with clear cube and louvre*	3.0	1
Concrete range			
CBD 70S	Bollard with Gear for 70W SON	65.0	1
CBD 125H	Bollard with Gear for 125W HPL	65.0	1

*Colours for all GRP bollards and mini-bollards are designated by the two digit codes shown above.

ORDERING DATA - GEAR UNITS

Catalogue No.	Description	Weight (kg) excl. gear	Packing Qty.
GRP Range			
HGC 130/131 50W SON	Gear unit including ballast and capacitor for 50W SON.	1.70	1
HGC 130/131 70W SON	Gear unit for bollard including ballast and capacitor for 70W SON	1.70	1
HGC 130/131 80W HPL-N	Gear unit for bollard including ballast and capacitor for 80W HPL-N	1.90	1
HGC 130/131 125W HPL-N	Gear unit for bollard including ballast and capacitor for 125W HPL-N	1.90	1
HGC 133/134 50W SON	Gear unit for mini-bollard including ballast and capacitor for 50W SON	1.85	1
HGC 133/134 70W SON	Gear unit for mini-bollard including ballast and capacitor for 70W SON	1.85	1
HGC 133/134 50W HPL-N	Gear unit for mini-bollard including ballast and capacitor for 50W HPL-N	1.85	1
HGC 133/134 80W HPL-N	Gear unit for mini-bollard including ballast and capacitor for 80W HPL-N	1.80	1
Optional wall bracket - mini-bollards			
HGC/WB	Wall bracket for HGC 133/134	0.6	1

Please order bollards in the form given in the following example, in multiples of the packing quantities. Note that lamps must be ordered separately:-

- 40 Philips bollards HGC 130/02
- 40 Philips bollard gear units HGC 130/131 85
- 40 Philips lamps 80W HPL-N

BOLLARDS AND MINI BOLLARDS



H/SPC

Lanterns for municipal lighting

A range of post-top lanterns consisting of electrical units for 150W and 250W high-pressure sodium lamps or 250W mercury fluorescent lamps, and a choice of three bowl styles to fit the electrical unit.

Note: Mercury fluorescent lamps
UK marking MBF = Philips
International marking HPL-N

RANGE

SPC 150/250 – Electrica unit with control gear for 150W SON, 190W SON, 250W SON or HPC 250 250W Mercury.
H/SPC 143 – Spherical bowl.
H/SPC 144 – Elliptical bowl.
H/SPC 145 – High cone bowl.

APPLICATIONS

Suitable for use in situations where appearance and high light output is important, such as:

- Residential areas
- Shopping precincts
- Walkways
- Leisure centres
- Public parks and gardens
- Hospitals and industrial premises

To reorder this Data Sheet quote

PL 1827/4

Issued 7/83

Replaces PL 1827/3

RESIDENTIAL & AMENITY

6

H/SPC LANTERNS

FEATURES

- Precision-made electrical unit with high-pressure die-cast body.
- Gear consists of ballast, power factor correction capacitor(s), (ignitor on SON lamps only) terminal block and porcelain GES lampholder.
- Bowls are made from vandal-resistant low-pressure polythene with spun-aluminium canopies; the underbowl material resists UV light. Canopies are lacquered white inside, grey outside to resist corrosion.
- Lanterns are rain-proof and insect-proof; chloroprene gaskets seal the canopy to the under bowl and the complete bowl assembly to the electrical unit. A foam plastic sealing ring surrounds the incoming cables where the lantern is mounted on the post.
- Simply installed on post-top columns with 76mm o.d. spigots. The neck of the electrical unit is accurately aligned by means of two ridges and the assembly is secured by two locking screws.

- Canopy is firmly secured by means of a single centrally-mounted cap nut. The canopy can be inverted and rested on the cap nut stud to give ample working clearance for servicing or relamping.
- Ideal for higher mountings of 8-10 metres.

MATERIALS & FINISH

Electrical unit: High-pressure die-cast aluminium, corrosion-resistant grey finish, complete with control gear components.

Lampholder: Porcelain GES.

Bowls: Spun aluminium canopy, lacquered white inside, grey outside, sealed to low-pressure polythene under bowl with chloroprene gasket.

RANGE OF OPERATION

240V 50Hz supplies.

Normal outdoor operation.

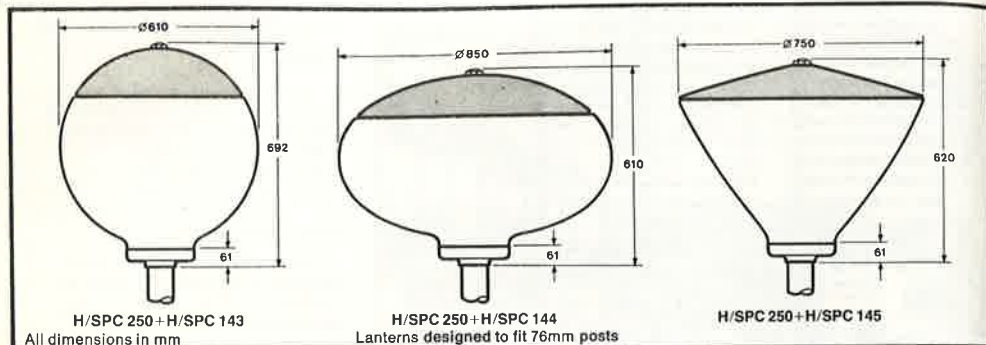
SPECIFICATION

- Residential post-top lantern with choice of three vandal-resistant bowls.
- Integral control gear for 150W or 250W high-pressure sodium lamps, or 250W mercury fluorescent lamp.
- Bowls are UV-resistant; all metal parts are corrosion-resistant.
- Type compliance with BS 4533 Section 102-1 Class II electrical appliances (earth not required).

To specify state:

Post-top lantern with choice of three bowl styles and integral control gear for use with 150W or 250W high-pressure sodium lamps or 250W mercury fluorescent lamp. Lantern must be insect-tight, and must be built from vandal-resistant and corrosion-resistant materials. Substantially as Philips H/SPC.

DIMENSIONS



WEIGHTS

Catalogue No.	Weight (kg)
SPC 150	8.0
SPC 250	8.9
HPC 250	5.4
H/SPC 143	5.0
H/SPC 144	6.5
H/SPC 145	5.1

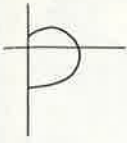
LAMP DATA

Lamp type	Circuit Current	total Circuit Watts	Cap	Packing quantity
150W SON	0.9	174	GES	9
250W SON	1.3	280	GES	9
250W HPL-N	1.3	268	GES	9

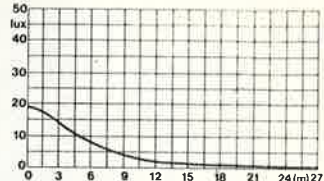
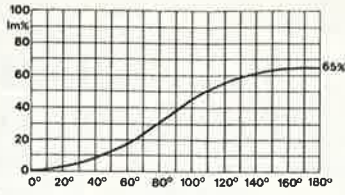
Light Distribution Diagrams

Zonal luminous flux diagrams

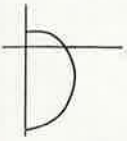
Illuminance diagrams



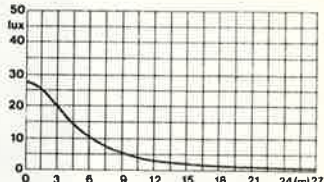
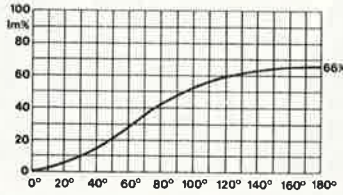
H/SPC 13



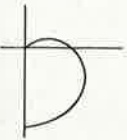
H = 6 m



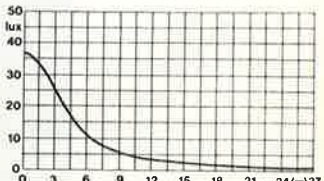
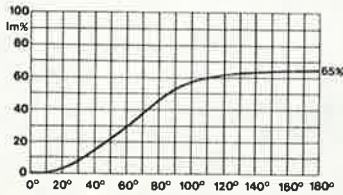
H/SPC 144



H = 7 m



H/SPC 145



H = 6 m

6



H/SPC 143



H/SPC 144

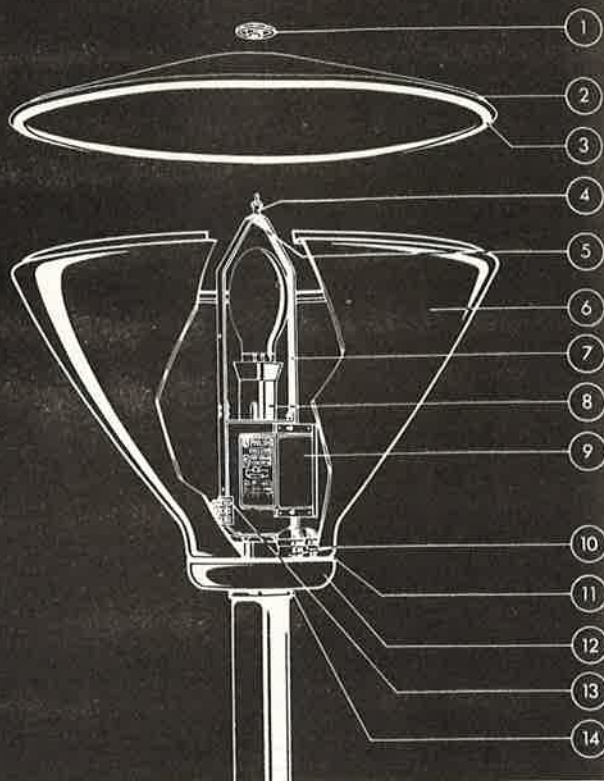


H/SPC 145

H/SPC LANTERNS

Cut Away View

1. Cap nut
2. Canopy
3. Chloroprene rubber gasket
4. Spacer and nut
5. Fixing bolt
6. Diffuser
7. Unit-bracket
8. E40 lampholder
9. Built-in ballast
10. Capacitors
11. Chloroprene rubber gasket
12. Electrical unit
13. Terminal block
14. Post fixing screw



SPC250 + H/SPC145

ORDERING DATA

Gear Units	Description
SPC 150	Electrical unit for 100W SON Lamp
SPC 150	Electrical unit for 150W SON Lamp
SPC 250	Electrical unit for 250W SON Lamp
HPC 250	Electrical unit for 250W HPL-N Lamp

Bowls

H/SPC 143	Spherical Bowl
H/SPC 144	Elliptical Bowl
H/SPC 145	High Cone Bowl

Please order lanterns in the form given in the following example:
25 Philips lanterns SPC 250 + H/SPC 145 + 250W SON.

Note that lamps should be specified with electrical units to ensure that the correct control gear is supplied.

Lanterns and components are supplied individually packed.

Note: Mercury fluorescent lamps
UK marking MBF = Philips
International marking HPL-N

Made in Holland.

LAMPADA TAKEO B

Decorative post-top luminaires

Conical post-top lanterns for decorative lighting, with integral gear for SON and HPL-N lamps.

RANGE

Lampada – Conical decorative lantern with non-overlapping top canopy.

Takeo B – Conical decorative lantern with overlapping top canopy. Both available with integral gear for 70W SON and 125W HPL-N lamps.

APPLICATIONS

Suitable for use wherever the environment demands a high standard of lantern design:

- Residential areas.
- Shopping precincts.
- Public parks and gardens.
- Leisure centres.
- Hotel forecourts.
- Hospitals.
- Car parks.



6

RESIDENTIAL & AMENITY

To reorder this Data Sheet quote

PL 3064

Issued 9.84

New

LAMPADA TAKEO B

FEATURES

- Vandal-resistant acrylic opal diffuser with integral spun aluminium canopy for good appearance and long life.
- Diffuser assembly is secured by a bayonet catch; a simple twist gives access for relamping or gear maintenance.
- Aluminium spigot for 60mm post-top entry.
- Integral gear for ease of installation.
- All exposed parts are corrosion-resistant.
- Choice of styles: Lampada has non-overlapping canopy; Takeo B has overlapping canopy.

MATERIALS & FINISH

Diffuser: Acrylic, opal finish.

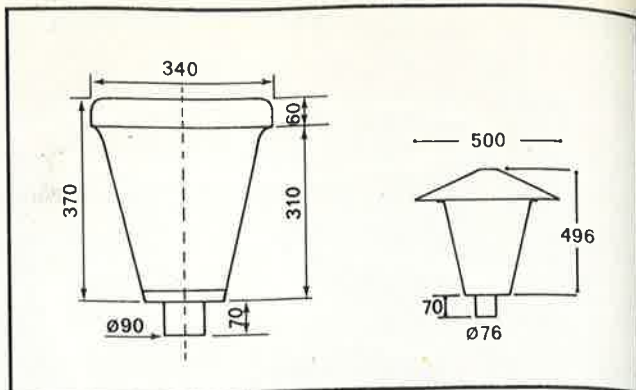
Canopy: Spun aluminium, painted black and crimped to diffuser in the case of Lampada.

Lampholder: Porcelain ES.

Spigot entry: Die-cast aluminium.

SPECIFICATION

- Type compliance with BS 4533 Section 102.3 Class 1.
- Degree of protection: Lampada IP44
Takeo B IP44



ORDERING DATA

Catalogue No.	Description
Lampada 70	Lantern with integral gear for 70W SON lamp.
Lampada 125	Lantern with integral gear for 125W HPL-N lamp.
Takeo B 70	Lantern with integral gear for 70W SON lamp.
Takeo B 125	Lantern with integral gear for 125W HPL-N lamp.

Please order lanterns in the form given in the following example. Note that lamps must be ordered separately, in multiples of the packing quantity.

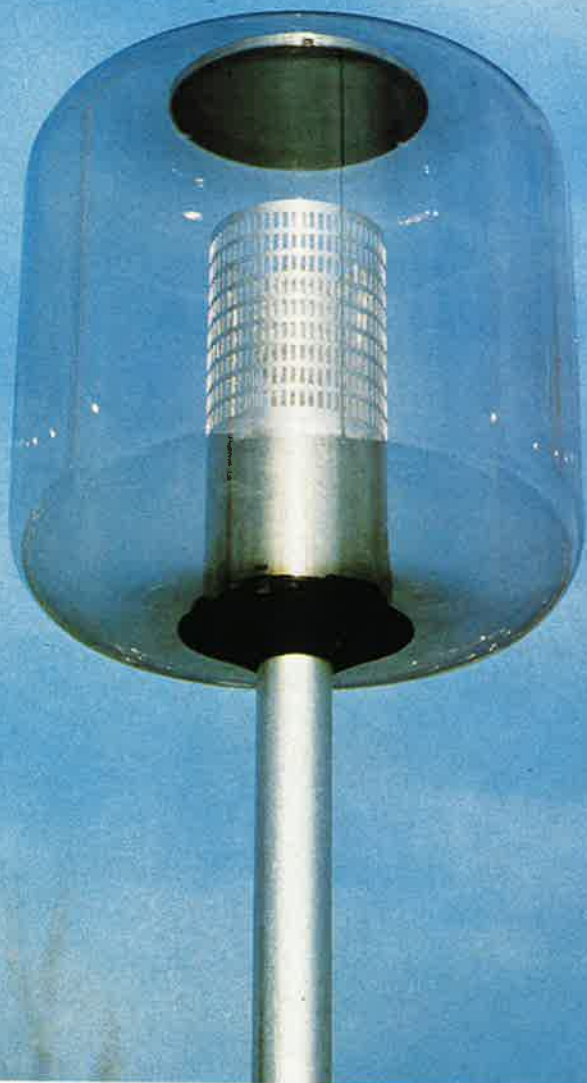
40 Philips lanterns Lampada 70
40 Philips lamps 70W SON.

LUMINAIRE DATA

Catalogue No.	Rating	Dimensions(mm)		Weight kg	Windage		
		Depth	Diam.		Plan m ²	Elevation m ²	DLOR
Lampada 70	70W SON	370	340	4.0	0.091	0.087	0.76
Lampada 125	125W HPL-N	370	340	4.0	0.091	0.087	0.76
Takeo B 70	70W SON	496	500	3.75	0.134	0.196	0.77
Takeo B 125	125W HPL-N	496	500	3.75	0.134	0.196	0.77

ELECTRICAL DATA

Lamp	Ballast	Capacitor	Mains Voltage (V)	Mains Current (A)	Lamp Current (A)	Circuit Watts (W)
70W SON	BSN 70	L4010	240	0.4	1.0	85
125W HPL-N	BHL 125	L4008	240	0.64	1.2	137



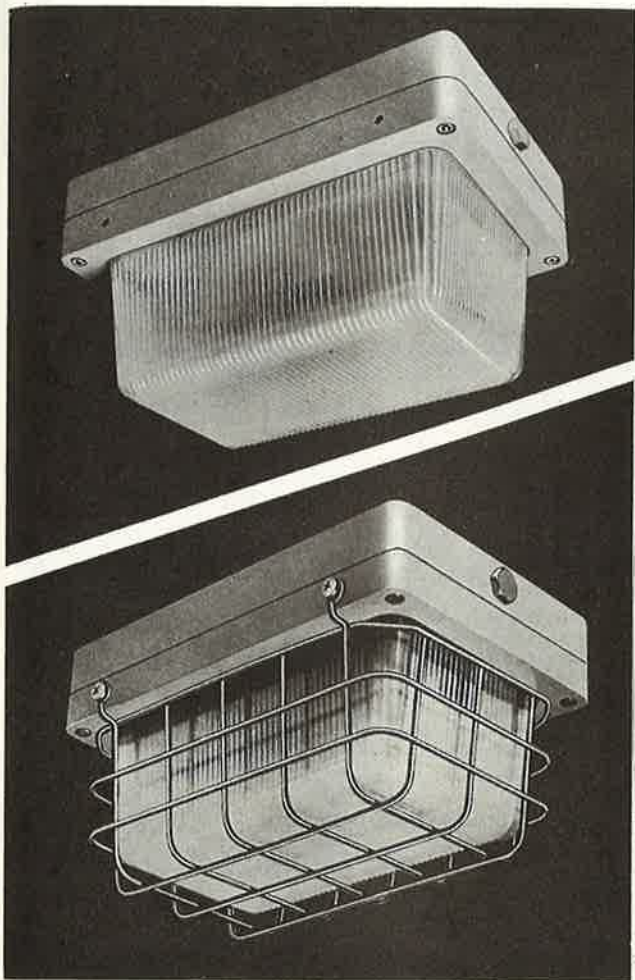
DECORATIVE POST-TOP LANTERNS

The striking smoked Cycar opal cylinder is one of a choice of three decorative units for use inside the bowls of Philips International Decorative Range. The permutations of bowl, cylinder and lamp type permit a vast range of effects for decorative and residential lighting.



DECORATIVE POST-TOP LANTERNS

The International Decorative Range includes eight bowls which can be used without decorative units. This is the Agate Sphere (see Page 164).



W4321 W4326

Heavy-duty bulkhead luminaires

Two heavy-duty bulkhead luminaires for indoor or outdoor use, one for normal industrial use and the other for use in Zone II hazardous areas. The luminaires use high-efficacy mercury fluorescent lamps, and are supplied complete with integral control gear.

Note: Mercury fluorescent lamps
UK marking MBF = Philips
International marking HPL-N

RANGE

W4321 – Standard luminaire for 80W mercury fluorescent lamp.

W4326 – Division 2 luminaire for 80W mercury fluorescent lamp.

A heavy-duty galvanised steel wire-guard is supplied with both luminaires.

APPLICATIONS

For use wherever a heavy-duty bulkhead luminaire for wall or ceiling mounting is required, in situations such as:-

- Indoor and outdoor factory areas
- Industrial lifts
- Pedestrian subways and walkways
- Public lavatories
- PetroChemical industries
- Marine applications

*Top: W4321 standard fitting
Bottom: W4326 Division 2 fitting*

To reorder this Data Sheet quote

PL 1845/4

Issued 9/82

Replaces PL 1845/3

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RESIDENTIAL & AMENITY

W4321, W4326 – RESIDENTIAL & AMENITY

FEATURES

- Die-cast corrosion-resistant aluminium body with epoxy resin stoved finish gives excellent protection against arduous environments.
- Double wall construction provides an open fixing channel and an enclosed control gear compartment.
- Ballast, power factor correction capacitor and two-way porcelain terminal block are securely fixed to the base of the casting and are protected against the heat of the lamp by a 20 SWG anodised aluminium reflector.
- Ribbed glass diffuser is carried in a die-cast aluminium front frame assembly, hinged to the body and secured by means of four stainless steel socket head captive screws. A U-shaped silicone rubber gasket seals the luminaire against dust and moisture.
- Luminaire for use in Zone II areas incorporates Klippon two-way terminal blocks for looping two 7/029 cables, and spark-proof locking lampholder.
- Heavy-duty guard made from 14 SWG galvanised steel wire supplied with both types.
- High-efficiency mercury fluorescent lamp gives high lumen output for low energy consumption; lamp life can be six times that of tungsten equivalent.

MATERIALS & FINISH

Body and front frame: Die-cast corrosion-resistant LM6 aluminium alloy, epoxy resin stoved finish.

Cover fasteners: Two stainless steel wire retaining hinges; four 6mm stainless steel socket head captive screws.

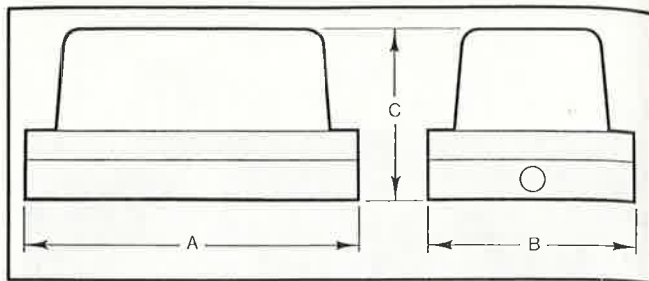
Sealing gasket: Silicone rubber.

Lampholder: Porcelain ES (spark-proof locking type on Division 2 luminaire).

DIMENSIONS & WEIGHTS

Catalogue No.	Overall dimensions (mm)			Maximum Ambient temp. (°C)	Weight (kg)	Lampholder
	A	B	C			
W4321	297	189	157	35	6.3	ES
W4326	297	199	172	35	6.3	ES

DIMENSIONS



LAMP DATA

Lamp type	Lighting Design Lumens	Lamp Voltage V	Lamp current A	Total circuit Watts
80W HPL-N	3650	115	0.8	88

ORDERING DATA

Catalogue No.	Description	Packing quantity
W4321	Bulkhead luminaire for 80W HPL-N lamp	1
W4326	Division 2 bulkhead luminaire for 80W HPL-N lamp	1
Spare		
W4330	Prismatic glass diffuser	1
W4331	Heavy-duty wireguard	1

Please order luminaires in the form given in the following example.

Note that lamps should be ordered separately:—

25 Philips heavy-duty bulkhead luminaires W4326

40 Philips 80W HPL-N mercury fluorescent lamps

SPECIFICATION

- Heavy-duty bulkhead luminaires for indoor or outdoor use, complete with integral control gear for operating mercury fluorescent lamps. Type for use in Zone II areas is approved by HM Factory Inspectorate for use in these areas as defined by BS Code of Practice CP 1003: 1964.
- Degree of Protection IP54.

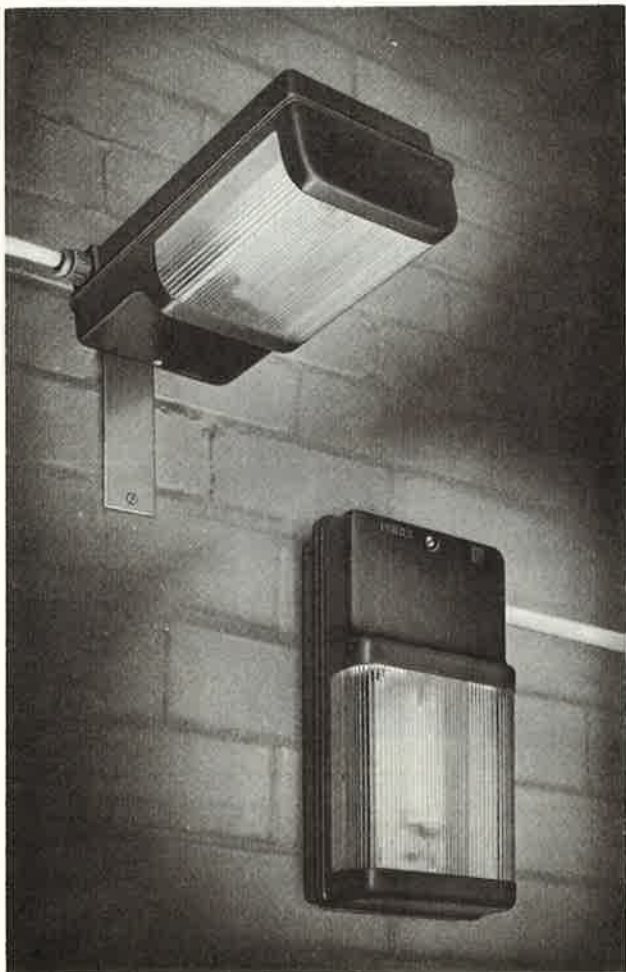
To specify state:

- Heavy-duty bulkhead luminaire for indoor and outdoor use, with corrosion-resistant die-cast aluminium body and integral control gear for mercury fluorescent lamp. Substantially as Philips W4321 series.

RANGE OF OPERATION

240V 50Hz continuous operation.
For indoor or outdoor use.

Luminaire: Made in UK.
Lamp: Made in Belgium.



MINI SOX KOMBIPAK XGC 001

Lantern/bulkhead luminaire

A high-quality luminaire, supplied as a KombiPak complete with SOX-E18 lamp and all fixing accessories, for use as a ceiling or wall-mounted luminaire for security or amenity lighting.

APPLICATIONS

Suitable for use in domestic, public, commercial and industrial premises, in situations such as:-

- Parking areas
- Factory gates
- Banks
- Perimeter areas
- Loading bays
- Building sites
- Footpaths
- Schools
- Supermarkets
- Farmyards
- Museums

FEATURES

- Gives 40% more light than a typical 100W GLS bulkhead; yet the total circuit dissipates only 25W.
- Vandal-resistant prismatic controller enhances light distribution, enabling the luminaire to be used as an effective mini-lantern.
- When used as a bulkhead luminaire, a detachable side reflector directs light downwards, further improving efficiency.
- Modern, smart appearance.

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RESIDENTIAL & AMENITY

To reorder this Data Sheet quote

PL 1882/5

Issued 9/82

Replaces PL 1882/4

XGC 001 KOMBIPAK — RESIDENTIAL & AMENITY

Features continued

- Suitable for indoor or outdoor use.
- High-efficiency low-pressure sodium lamp with low-loss integral control gear permits all-night burning, all the year round, for as little as 10p a week.
- Supplied as KombiPak, complete with all fixing accessories including lantern bracket.
- Familiar yellow sodium light gives excellent visual acuity and fog penetration.
- Three position cable entry side top or back wiring.

MATERIALS & FINISH

Body: Black polyamide.

Prismatic controller: Polycarbonate, UV stabilised, vandal-resistant.

Gear tray: Steel, stove-enamelled white, with anodised aluminium reflector.

Sealing gasket: Silicone rubber, labyrinth type.

SPECIFICATION

■ Type compliance with BS 4533 Section 102-2.

■ Degree of Protection IP54.

To specify state:

Luminaire with prismatic controller and integral control gear, suitable for Philips SOX-E18 lamp and supplied as KombiPak for wall, ceiling or bracket mounting. Similar to Philips XGC 001.

RANGE OF OPERATION

240V 50Hz.

Suitable for ambient temperatures up to 30°C.

WEIGHT

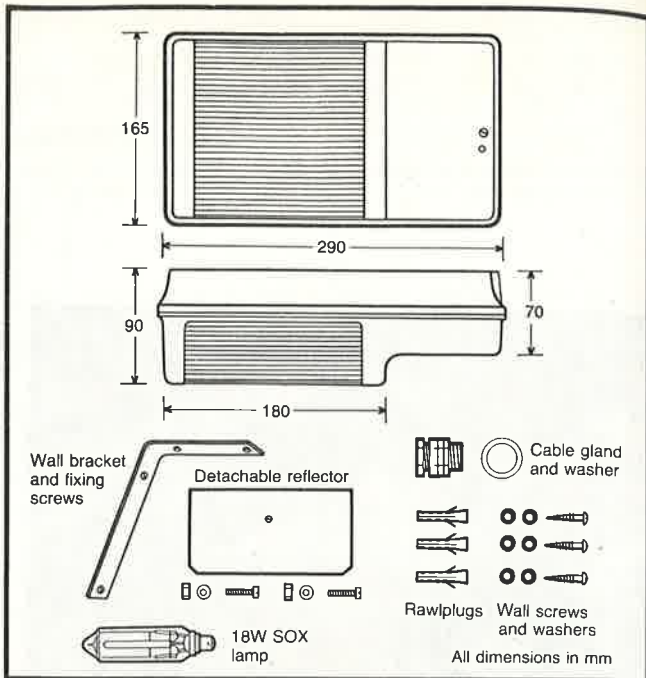
Luminaire 1.8 kg (complete with packing, bracket, accessories, etc.)
Bracket 0.2 kg.

Note: When mounted vertically, the prismatic controller must be at the bottom so that the lamp cap is uppermost.

Lamp: Made in Belgium.

Luminaire: Made in Holland.

DIMENSIONS



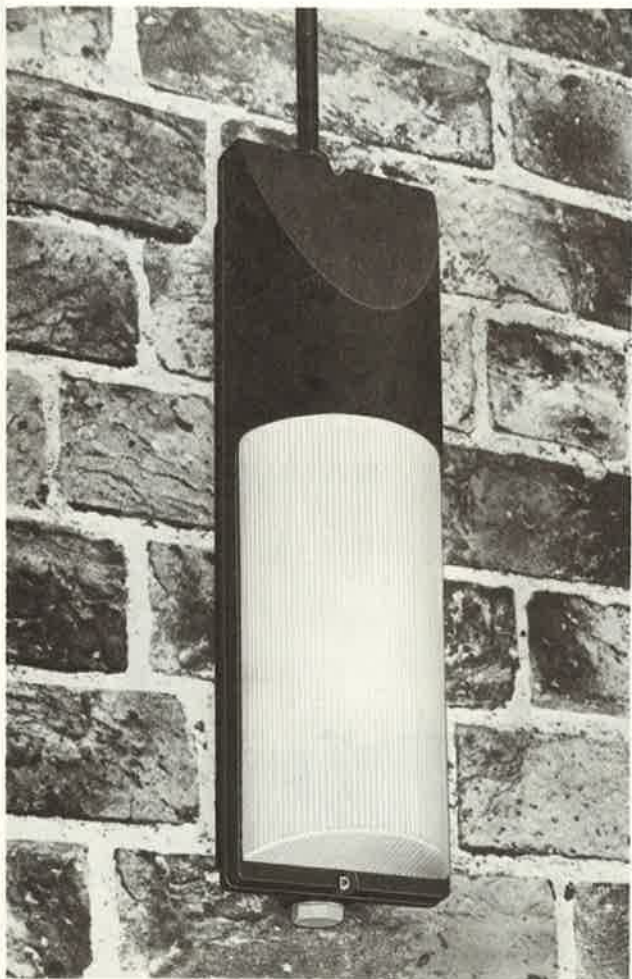
ELECTRICAL DATA

Lamp	Ballast	Capacitor	Ignitor	Mains voltage	Mains current (amps)	Circuit Watts
SOX-E18	BSX18	L 4005	—	240	0.14	25

ORDERING DATA

Catalogue No.	Description	Packing quantity
XGC 001	Luminaire with prismatic controller complete with SOX-E18 lamp and all accessories	Individually packed

Please order in the form given in the following example:—
10 Philips KombiPaks XGC 001.



MSB 18 MINI SOX BULKHEAD KOMBIPAK

A sturdy, high-quality luminaire, supplied as a KombiPak complete with SOX-E18 lamp and all fixing accessories, for use as a ceiling or bulkhead luminaire for security or amenity lighting.

APPLICATIONS

Suitable for use in domestic, public, commercial and industrial premises, in situations such as:-

- Parking areas
- Factory gates
- Banks
- Perimeter areas
- Loading bays
- Building sites
- Schools
- Supermarkets
- Farmyards
- Museums

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RESIDENTIAL & AMENITY

To reorder this Data Sheet quote

PL 1881/5

Issued 6/83

Replaces PL 1881/4

MSB 18 MINI SOX BULKHEAD KOMBIPAK —

FEATURES

- Gives 40% more light than a typical 100W GLS bulkhead; yet the total circuit dissipates only 25W.
- Sturdy cast aluminium body painted black with a matching vandal-resistant cover and reeded diffuser combine smart appearance with durability.
- High-efficiency low-pressure sodium lamp with integral control gear permits all-night burning, all the year round, for as little as 10p a week.
- Supplied as KombiPak, complete with all fixing accessories.
- Familiar yellow sodium light gives excellent visual acuity and fog penetration.
- Cover secured by hexagon screw to prevent unauthorised tampering
- Ideal for indoor use, either surface mounted or recessed.

MATERIALS & FINISH

Body: Die-cast corrosion-resistant aluminium alloy.

Diffuser: Opal acrylic, vandal-resistant.

Gear tray: Steel, zinc-plated.

SPECIFICATION

- Degree of Protection IP23.
- Type compliance with BS 4533 Section 102-2.

To specify state:

Luminaire with die-cast aluminium housing and integral control gear, suitable for Philips SOX-E18 lamp and supplied as KombiPak for ceiling or wall mounting. Similar to Philips MSB 18.

RANGE OF OPERATION

230/250V 50 Hz.

Indoor or outdoor operation.

Suitable for ambient temperatures from minus 20°C to 20°C.

WEIGHT

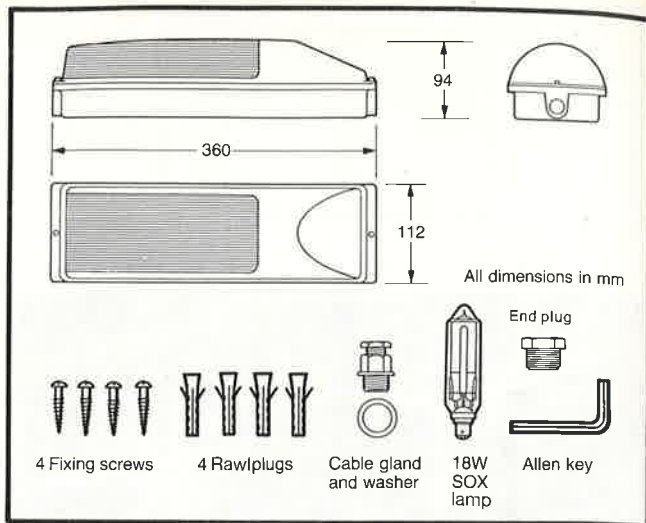
2.3 kg.

Note: When the luminaire is mounted vertically, the gear tray must be at the top so that the lamp cap is uppermost. Cable entry is provided from either end or from the underside.

Lamp: Made in Belgium.

Luminaire: Made in UK.

KOMBIPAK CONTENTS SHOWING DIMENSIONS IN MM



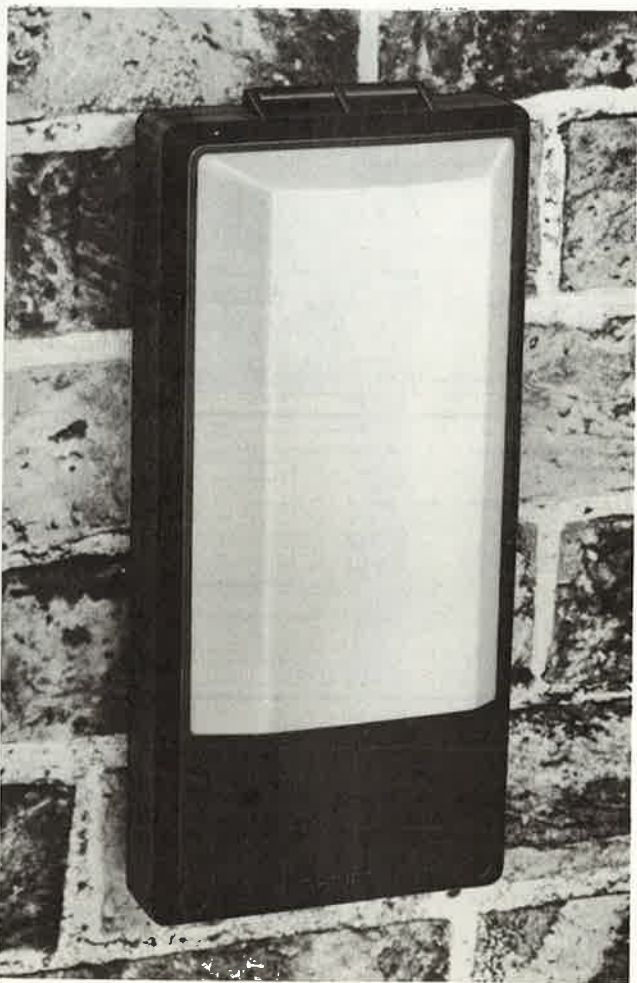
ELECTRICAL DATA

Lamp	Ballast	Capacitor	Ignitor	Mains voltage	Mains current (amps)	Circuit Watts
SOX-E18	BSX18	L 4005	—	240	0.14	25

ORDERING DATA

Catalogue No.	Description	Packing quantity
MSB 18	Luminaire with opal diffusers complete with SOX-E18 lamp and all accessories	Individually packed

Please order in the form given in the following example:—
10 Phillips KombiPaks MSB 18.



FGC 100

PL* Bulkhead Luminaire

An elegant bulkhead luminaire, using Philips PL single-ended fluorescent lamp. Supplied as a KombiPak, complete with lamp, control gear and fixing parts.

RANGE

FGC 100/109 – KombiPak luminaire with one PL9 lamp.

FGC 100/111 – Kombipak luminaire with one PL11 lamp.

APPLICATIONS

For use indoors and outdoors, surface-mounted on ceilings and walls. For direction lighting, security and sign lighting in situations such as:

- Parking areas
- Office buildings
- Shops & Supermarkets
- Schools and colleges
- Passageways and corridors
- Public stairways
- Factory buildings and warehouses
- Pedestrian underpasses
- Precincts and public enclosures of all kinds
- Homes – Porches, drives, garages

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RESIDENTIAL & AMENITY

To reorder this data sheet quote

PL 3045

Issued 9.83

New

FGC 100

FEATURES

■ PL9 lamp has light output between that of 40W and 60W filament lamps, but total circuit power is only 13W. It lasts typically five times longer than filament lamps. PL11 has light output comparable to a 75W filament lamp: circuit power 15W.

■ New PL lamp combines high efficacy with good colour rendering (Ra8 = 82) and warm colour appearance. Small size has led to slim, elegant luminaires.

■ Polyester housing and vandal-resistant polycarbonate opal diffuser combine durability and corrosion resistance.

■ Luminaire enclosure has Degree of Protection IP 54 (dust-proof; splash-proof).

■ Cover with diffuser is easily opened for relamping; is secured with hexagon-head socket screws to deter tampering.

■ FSC 100/109 also takes PL7 lamp without modification to give light output equivalent to 40W filament lamp for a total circuit power of 11W.

■ KombiPak format simplifies ordering and stockholding, and ensures that all parts are on site when needed.

MATERIAL & FINISH

Body: Polyester, self-coloured black.

Cover: Black polycarbonate frame with opal translucent polycarbonate diffuser. Neoprene gasket. Cover is hinged, and is secured by stainless steel screws.

Reflector: Steel, galvanised and painted white.

SPECIFICATION

■ Degree of Protection IP 54

■ Designed to comply with BS 4533 Class I (electrical) – Earth required.

To specify state:

Bulkhead luminaire with control gear and lampholder for PL lamp. To be supplied as a kit, with all fixing accessories and lamp. Similar to Philips FGC 100.

KombiPak Kit

Two zinc-plated wood screws and two masonry plugs are included in kit; also polyamide sealing gland for side hole, and hexagon key.

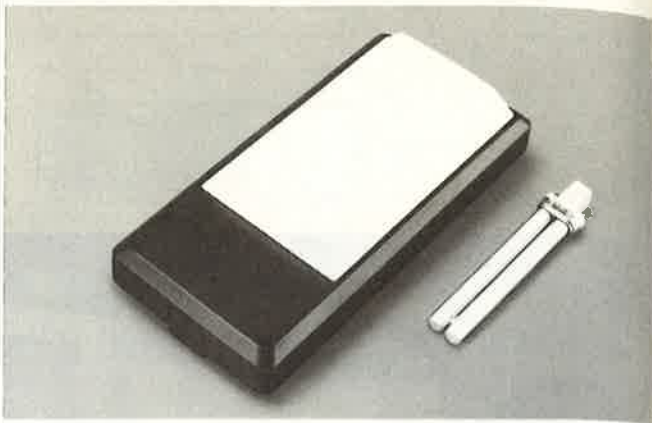
Lamp: Made in Holland
Luminaire: Made in Holland

Fixing and Wiring

Cable is fed through hole in top or side of housing and connected to three-terminal screw terminal block.

RANGE OF OPERATION

240V 50Hz.
Enclosure degree of Protection IP 54.
Indoor or outdoor operation.
Horizontal or vertical fixing.



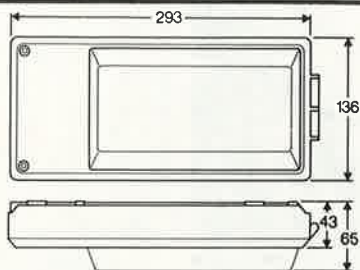
ELECTRICAL DATA

Description	Lamp Watts	Lamp Lumens 2000 hrs	Circuit current Amps	Total circuit Watts
FGC 100/109 (with PL7 with PL9)	7 9	370 510	0.18 0.17	11) 13
FGC 100/111 with PL11	11	800	0.16	15

Data refer to average lamp and to standard conditions

DIMENSIONS & WEIGHT

Weight with lamp: 1.2kg.



ORDERING DATA

Catalogue No.	Description	Packing Qty
FGC 100/109	Luminaire with PL9 lamp in KombiPak	Individually packed
FGC 100/111	Luminaire with PL11 lamp in KombiPak	Individually packed
Spare lamps		
PL7	Fluorescent lamp	50
PL9	Fluorescent lamp	50
PL11	Fluorescent lamp	50

Please order in the form given in the following example. Spare lamps should be ordered in multiples of the packing quantity:

25 Philips bulkhead luminaires FGC 100/109

PLB 111 PLB 211

PL* KombiPak bulkhead luminaires

Sturdy luminaires with Degree of Protection IP 23, fitted with Philips PL11 lamps. Low operating costs and long lamp life. Both luminaires are supplied as KombiPaks, complete with PL11 lamp(s) and fixing accessories. Light matches filament lamp in colour and quality.

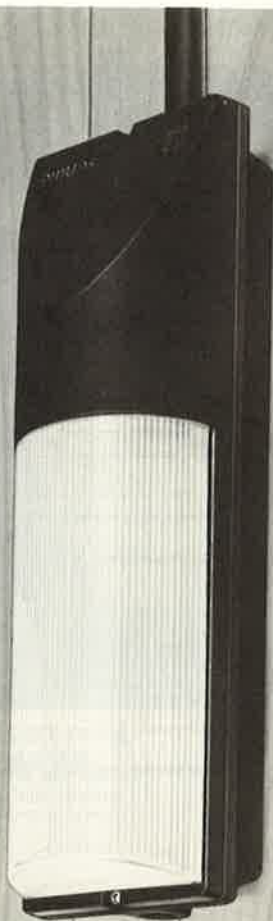
RANGE

PLB111 – PL bulkhead KombiPak complete with one PL11 lamp.
PLB211 – PL bulkhead KombiPak complete with two PL11 lamps.

APPLICATIONS

Domestic, public, commercial and industrial premises, for long lamp life and low operating costs:-

- Parking areas
- Office buildings
- Shops and supermarkets
- Schools and colleges
- Passageways and corridors
- Public stairways
- Factory buildings and warehouses
- Vehicle and pedestrian underpasses
- Precincts and public areas



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RESIDENTIAL & AMENITY

To reorder this Data Sheet quote

PL 3051

Issued 9.83

NEW

PLB111/PLB211

FEATURES

- Energy-effective: Two lamps have light output comparable with a 150W filament lamp for total consumption of 30W; one lamp has light output comparable with a 75W filament lamp for total consumption of 15W.
- Light matches filament lamp in colour and quality.
- Rated lamp life five times that of filament lamp equivalent.
- Sturdy cast aluminium body painted black with a matching vandal-resistant cover and reeded diffuser combine smart appearance with durability.
- Enclosure rated IP 23; indoor or outdoor use.
- Can be recessed or surface-mounted.
- Cover secured by hexagon screws to deter tampering.
- Supplied as a KombiPak, complete with fixing accessories.

MATERIALS & FINISH

Body: Die-cast corrosion-resistant aluminium alloy, painted black.

Diffuser: Opal acrylic, vandal-resistant.

Gear tray: Steel, zinc-plated.

SPECIFICATION

- Degree of protection IP 23
- Type compliance with BS 4533 Class I (electrical) – Earth required.

To specify state:

Luminaire with die-cast aluminium housing, control gear and lampholder(s) for one (two) PL 11 lamp(s). Similar to Philips PLB luminaires.

RANGE OF OPERATION

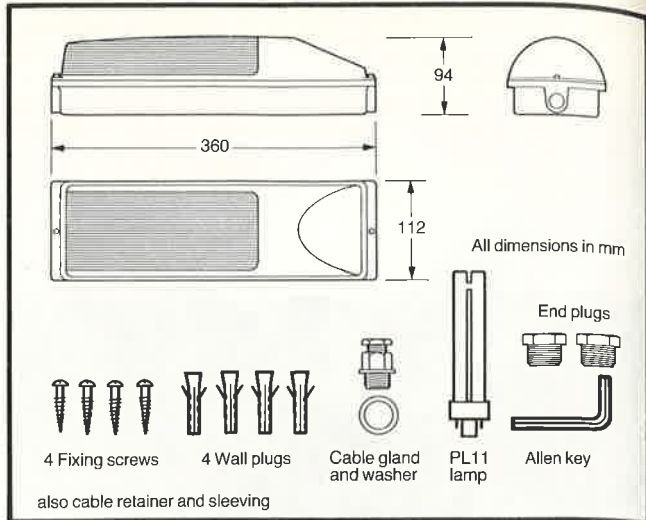
240V 50Hz

Indoor or outdoor operation, in ambient temperatures from minus 5°C to plus 30°C.

Lamp: Made in Holland

Luminaire: Made in UK

KOMBIPAK CONTENTS SHOWING DIMENSIONS IN MM



DIMENSIONS & WEIGHTS PLB 111 1.5kg PLB 211 2.0kg

LAMP DATA

Lamp type	Lamp Watts	Lumen output (100 hours)	Rated life (hours)
PL 11	11	890	5000

LUMINAIRE DATA

Type	Circuit Watts	Circuit current (A)
PLB 111	15	0.16
PLB 211	30	0.32

If PF correction is required in large installations, luminaires may be bulk-corrected at approximately 2mfd per lampway.

All data are averages, measured under standard conditions.

ORDERING DATA

Catalogue No.	Description	Packing quantity
PLB 111	PL bulkhead KombiPak, complete with PL 11 lamp and accessories.	Individually packed
PLB 211	PL bulkhead KombiPak, complete with two PL 11 lamps and accessories.	Individually packed

Spare lamps PL 11 are packed in fifties.

Please order in the form given in the following example, in multiples of the packing quantity:-
10 Philips KombiPaks PLB 211

PLW 011 PL* Wall Light



An attractive, indoor/outdoor luminaire for mounting on vertical surfaces. Supplied as a KombiPak, complete with PL*11 energy-saving lamp, prewired control gear and fixing accessories.

RANGE

PLW 011 – Wall light KombiPak, red finish.

APPLICATIONS

For use indoors and outdoors wherever an attractive, and economical wall light is required:

- Hotels
- Theatres
- Shops and offices
- Patios and porches
- Garages
- Alleys and passageways

To reorder this Data Sheet quote

PL3061

Issued 7.84

NEW

PLW 011 WALL LIGHT

FEATURES

- PL*11 lamp gives more light than an ordinary 60W light bulb for a circuit power consumption of only 15 Watts.
- Light colour and quality matches filament lamp; PL lasts five times as long as filament lamp, saving on maintenance costs.
- Red polypropylene body is both attractive and robust.
- IP 23 enclosure classification ("rainproof") permits use inside or out of doors.
- Diffuser is locked with a single screw; is easily removed for installation or relamping.
- KombiPak format simplifies ordering and stockholding, and ensures that all parts are together when needed.

MATERIALS & FINISH

Body: Polypropylene, red finish.

Diffuser: Polycarbonate, opal finish.

SPECIFICATION

- Enclosure classification IP 23
- Designed to comply with BS4533 Class I (electrical) – earth required.

To Specify State:

Wall-mounting decorative luminaire for inside or outside use, with control gear and lampholder for PL lamp. To be supplied as a kit, with all fixing accessories and lamp. Similar to Philips PLW 011.

RANGE OF OPERATION

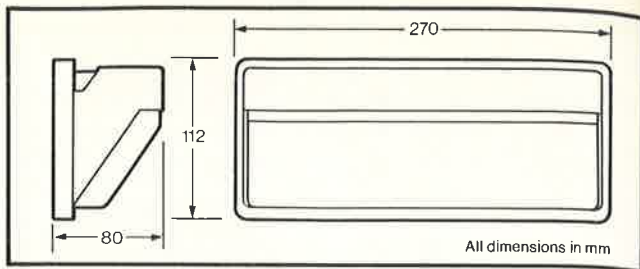
240V 50Hz.

Indoor/outdoor operation.

Classification IP 23.

For mounting on vertical non-combustible surfaces.

At temperatures below freezing, starting may be slower and light output reduced.



DIMENSIONS & WEIGHTS

Catalogue No.	Lamp Watts	Lamp lumens (2000 hours)	Circuit current (Amps)	Total circuit Watts
PLW 011	11	800	0.16	15

Weight: 27.02g.

ORDERING DATA

Catalogue No.	Description	Packing Quantity
PLW 011	Wall light KombiPak, red finish (complete with PL*11 lamp and fixing accessories)	Individually packed
Spare Lamp		
PL*11	Compact fluorescent lamp	50

Please order in the form given in the following example. Spare lamps should be ordered in multiples of the packing quantity:

25 Philips luminaire PLW 011.

Luminaire: Made in UK
Lamp: Made in Holland



SXX 36-E

Security Kombipak

SOX-E36 lantern with integral control gear, supplied as a pack complete with lamp, photo cell and all fixing accessories, for most basic security lighting needs.

APPLICATIONS

Ideal for outdoor security lighting in situations such as: -

- Public house car parks
- Perimeter fences and walls
- Factory gatehouses and approaches
- Churches
- Building entrances and exits
- Schools and youth clubs
- Transport cafes and lorry parks
- Farms and isolated buildings
- Sports and social clubs
- Building sites and plant hire depots

FEATURES

- Supplied as a packaged kit complete with lamp; absolutely no extras needed for installation.
- Low-pressure sodium lamp gives 20% more light output than a 300W GLS lamp. The total circuit dissipates only 51 Watts.
- Lamp service period can be six times that of GLS lamps, greatly reducing maintenance costs.
- Integral photo cell switches lantern on at dusk and off at dawn, effecting further savings in energy.
- Rainproof and resistant to rust and vandalism.
- Bracket supplied is suitable for mounting on flat surfaces or corners.
- Prismatic bowl gives light distribution to Group B road lighting standards.
- Vandal resistant refractor bowl hinges downwards for easy lamp changing and is simply removed for cleaning.
- Integral control gear is mounted on a steel tray which swings downwards for servicing.

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RESIDENTIAL & AMENITY

To reorder this Data Sheet quote

PL 1883/7

Issued 4/84

Replaces PL 1883/6

SXK36-E SECURITY KOMBIPAK - RESIDENTIAL & AMENITY

PHOTOMETRIC DATA

Light output ratios
 Downward light output ratio: 0.63
 Light output ratio: 0.68

MATERIALS & FINISH

Canopy: High-pressure die-cast aluminium LM6M.

Bowl: Vandal resistant material.

Bowl clips and hinges: Stainless steel.

Gear tray: Pre-coated sheet steel.

SPECIFICATION

■ Type compliance with BS 4533 Section 102-3.

■ Degree of protection IP54.

To specify state:

Security lantern for outdoor use, with integral control gear for SOX-E 36 lamp. Supplied as a complete package with lamp, mounting bracket, fixing accessories and photo cell. Substantially as Philips SXK 36-E security KombiPak.

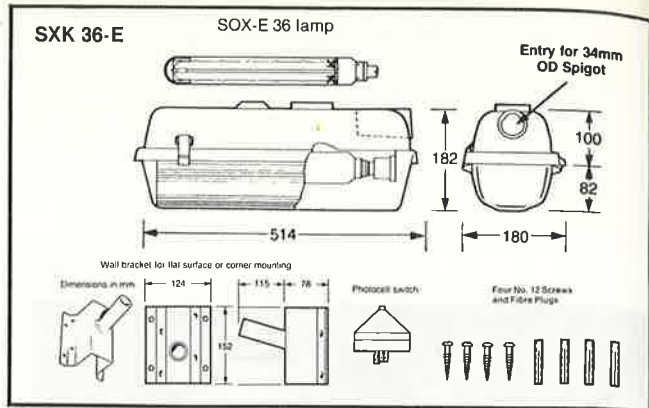
OVERALL WEIGHT 4.8 kg.

RANGE OF OPERATION

230/250V 50 Hz supplies.
 Normal outdoor operation.

Lamp: Made in Belgium
 Luminaire: Made in UK

KOMBIPAK CONTENTS SHOWING DIMENSIONS in mm

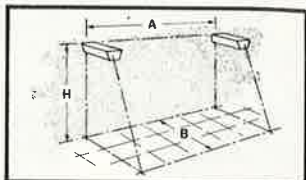


How to get the best from your Security KombiPak

This simple table shows you how to mount your KombiPak lanterns to gain the maximum spread of light and therefore the most cost-effective illumination. For straight runs, for example along a wall: -

Mounting Height H	Spacing A	Distance from wall effectively illuminated B
3-0m	12-0m	6-0m
3-5m	14-0m	7-0m
4-0m	16-0m	8-0m
4-5m	18-0m	9-0m
5-0m	20-0m	10-0m
5-5m	22-0m	11-0m
6-0m	24-0m	12-0m

Therefore, as a general rule, for any mounting height, the spacing between lanterns is approximately 4H and the depth of effective illumination from the wall at ground level is 2H. For corner siting, it is important to remember that half the spacing will be necessary on either side of the corner. For example, if a lantern is corner-mounted at 5m height, the lanterns on either side will need to be at a 10m spacing.



LAMP & CONTROL GEAR DATA

Lamp type	Lumens	Mains volts (V)	Circuit current (A)	Circuit Watts	Ballast	Capacitor	Ignitor	Lamp Cap
SOX-E 36	5700	240	0.23	51	BSX 355	L4008	SX72	BC

PHOTO CELL DATA

Description	Voltage	Switch-on Level	Switch-off Level
Conical, with 3-pin twist socket	240/250	70 lux	140 lux

ORDERING DATA

Catalogue No.	Description	Packing quantity
SXK 36-E	36W SOX-E lantern complete with photocell and fixing accessories	Individually packed

Please order in the form given in the following example: -
 20 Philips SXK 36-E Security KombiPaks



SNK 70

Security KombiPak

70W SON lantern with integral control gear, supplied as a pack complete with lamp, photocell and all fixing accessories for security lighting needs where colour discrimination is important.

APPLICATIONS

Suitable for use in commercial, public and industrial areas such as:-

- Security fences and boundaries
- Gatehouses
- Precincts
- Forecourts
- Car parks
- Loading bays
- Bus and railway stations
- Access roads
- Sports and Social Clubs

FEATURES

- Supplied as a kit complete with lamp; absolutely no extras needed for installation.
- High-pressure sodium lamp gives 25% more light than a 300W GLS lamp. The total circuit dissipates only 85 watts.
- Lamp service period can be three times that of tungsten halogen lamps greatly reducing maintenance costs.
- Integral photocell switches lantern on at dusk and off at dawn, effecting further savings in energy.
- Rainproof and resistant to rust and vandalism.
- Easily mounted on walls, on flat surfaces or corners, with bracket supplied.
- Prismatic bowl gives distribution to Group B roadlighting standards.
- Polycarbonate bowl is hinged for easy relamping and maintenance.
- Integral control gear is mounted on a steel tray which swings downwards at the spigot end for easy servicing.

6

RESIDENTIAL & AMENITY

To reorder this Data Sheet quote

PL 1892/6

Issued 6/83

Replaces PL 1892/5

SNK 70 – RESIDENTIAL & AMENITY

Features continued.

■70W SON lamp gives acceptable colour discrimination.

MATERIALS & FINISH

Canopy: High-pressure die-cast aluminium LM6M

Bowl: Polycarbonate

Bowl clips and hinges: Stainless steel

Gear tray: Precoated sheet steel

SPECIFICATION

■Type compliance with BS 4533 Section 102-3.

■Degree of Protection IP23

To specify state:

Security lantern for outdoor use with integral control gear for 70W SON lamp. Supplied as a complete package with lamp, mounting bracket, fixing accessories and photocell. Substantially as Philips SNK 70 security KombiPak.

RANGE OF OPERATION

■240V 50 Hz supplies. Normal outdoor operation.

PHOTOMETRIC DATA

(see PL 8201)

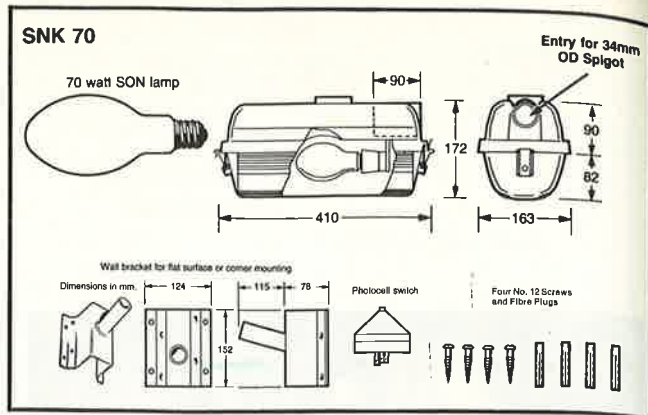
Light Output Ratios

Light Output Ratios: 0-69

Downward Light Output Ratio: 0-63

OVERALL WEIGHT 4.1 kg

KOMBIPAK CONTENTS SHOWING DIMENSIONS in mm

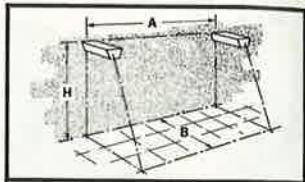


How to get the best from your Security KombiPak

This simple table shows you how to mount your KombiPak lanterns to gain the maximum spread of light and therefore the most cost-effective illumination. For straight runs, for example along a wall:-

Mounting Height H	Spacing A	Distance from wall effectively illuminated B
3-0m	12-0m	6-0m
3-5m	14-0m	7-0m
4-0m	16-0m	8-0m
4-5m	18-0m	9-0m
5-0m	20-0m	10-0m
5-5m	22-0m	11-0m
6-0m	24-0m	12-0m

Therefore, as a general rule, for any mounting height, the spacing between lanterns is approximately 4H and the depth of effective illumination from the wall at ground level is 2H. For corner siting, it is important to remember that half the spacing will be necessary on either side of the corner. For example, if a lantern is corner-mounted at 5m height, the lanterns on either side will need to be at a 10m spacing.



LAMP & CONTROL GEAR DATA

Lamp type	Lighting Design Lumens	Mains Volts (V)	Circuit Current (A)	Circuit Watts	Ballast	Capacitor	Lamp cap
70W SON	5510	240	0.4	85	BSN70	L4010	ES

PHOTOCELL DATA

Description	Voltage	Switch-on Level	Switch-off Level
Conical, with 3-pin twist socket	240/250	70 lux	140 lux

ORDERING DATA

Catalogue No.	Description	Packing Quantity
SNK 70	Luminaire complete with integral control gear, mounting accessories and 70W SON lamp	1
70W SON	Spare lamp	40



Lamp: Made in Belgium

Luminaire: Made in UK

OUTDOOR FLOODLIGHTING

	Page
HNF 001 Floodlight Projector	245
HNF 002 Floodlight Projector	249
HNF 003 Floodlight Projector	253
HNF 206 Floodlight Projector	257
HNF 013 Floodlight Projector	261
NNF 010 Floodlight Projector	263
R7788	267
QVF 420,421,422	269
Apollo Tungsten Halogen Floodlight	273
DVF 102 Par 56 Spot Floodlight	275
DHF 016 Floodlight Projector	277
DHF 017/K, DHF 017/SK Outdoor Spot	279
SNF 100	281
SNF 200	285
Floodlighting Spares	289

Please see pages II and III of General Introduction for information on how to use this Handbook.



HNF 001

Floodlight projector

A general-purpose high quality floodlight with wide or narrow beam light distribution, for use with metal halide or high-pressure sodium lamps.

Note: Metal halide lamps UK marking
MB1 = Philips International
marking HPI

RANGE

Available in narrow or wide beam forms to take two 400W metal halide lamps Type HPI/T, two 400W high-pressure sodium lamp Type SON/T or a single 1000W SON/T lamp or 1000W HPI/T lamp.

For two lamp options mixed lamp types may be used to achieve attractive solutions.

Pre-wired control gear boxes enclosed to IP54 are available to operate the 400W SON/T and 400W HPI/T lamps (see Data Sheet PL1868).

APPLICATIONS

General-purpose floodlighting, in situations such as: -

- Sports grounds
- Railway marshalling yards
- Car parks
- Buildings
- Major road constructions (high mast work)
- Shipping yards
- Skating rinks

7

FLOODLIGHTING

To reorder this Data Sheet quote **PL 1761/4**

Issued 3 84

Replaces PL 1761/3

HNF 001—FLOODLIGHTING

FEATURES

- High-grade aluminium reflector gives accurate beam control.
- Easy-to-operate stainless steel clips permit rear cover to be hinged down to facilitate lamp changing.
- Cast-on beam aiming sight and protractor scale permit quick and simple daylight adjustment.
- Reflector housing and rear cover are strong cast aluminium; low copper content ensures excellent corrosion resistance even in coastal and industrial areas.
- Ozone-resistant neoprene gaskets give dust and jetproof seal of front glass and rear cover.
- Floodlight supplied with 1 x PG11 and 1 x PG16 cable glands.

MATERIALS & FINISH

- Reflector housing and rear cover:** Cast aluminium.
- Front glass:** Toughened glass plate secured with stainless steel clips.
- Sealing gaskets:** Rubber, Ethylene propylene.
- Mounting bracket:** Stainless steel.

RANGE OF OPERATION

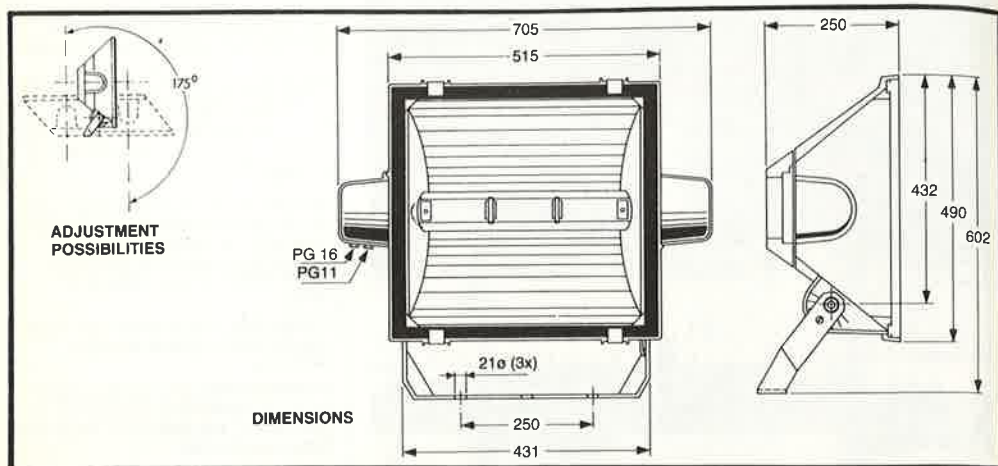
Temperature range (lamp) – 18°C to 40°C 240V 50Hz.

SPECIFICATION

- Type compliance with BS 4533 Section 102.5 Class I Floodlight Luminaire Degree of Protection IP55 'Dustproof' 'Jet-proof'.

To specify state:

Floodlight luminaire for metal halide or high-pressure sodium lamps, corrosion-resistant cast aluminium housing, degree of protection IP55, hinged rear cover for easy access to lamp, substantially as Philips HNF 001.

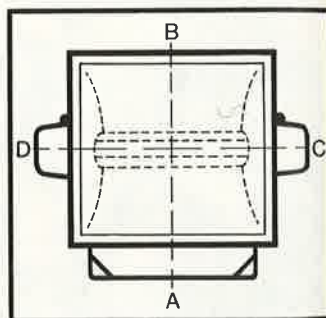


Weight of luminaire complete with lamp – 13.5 kg.

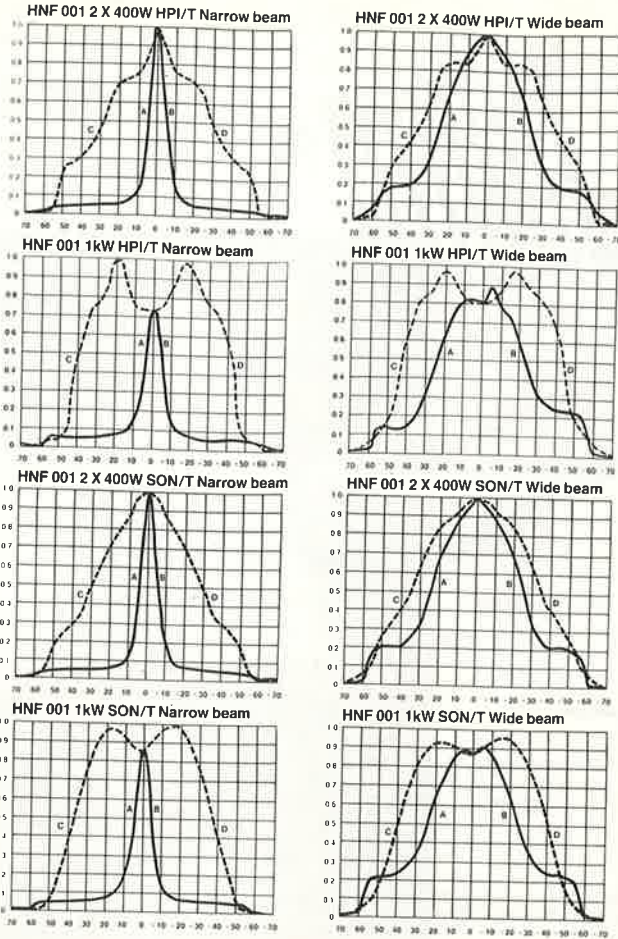
Further information on Philips lamps and control gear is contained in the following Data Sheets:—

Lamp type	Lamp Data Sheet	Control Gear Data Sheet
HPI/T	PL 1767	PL 1779
SON/T	PL 1776	PL 1778

Planes used for Distribution Diagrams



Light Distribution Diagrams



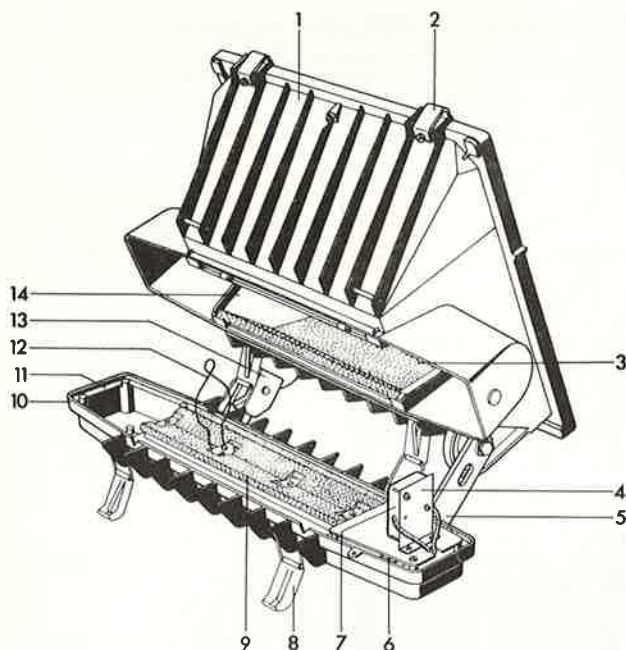
Floodlight	HNF 001/4 2 x 400W SON/T/T Wide beam	HNF 001/4 2 x 400W HPI/T Wide beam	HNF 001/2 1 x 1000W HPI/T Wide beam	HNF 001/2 1 x 1000W SON/T Wide beam	HNF 001/3 2 x 400W SON/T Narrow beam	HNF 001/3 2 x 400W HPI/T Narrow beam	HNF 001/1 1 x 1000W HPI/T Narrow beam	HNF 001/1 1 x 1000W SON/T Narrow beam
Peak intensity cd/1000 lm	619	580	518	579	2090	2062	1780	1986
Beam efficiency Total beam	71%	67%	67%	76%	71%	70%	68%	76%
Beam angles (10% peak)								
Vertical	2 x 57°	2 x 57°	2 x 57°	2 x 58°	12°/14°	12°/14°	12°/13°	15°/14°
Horizontal	2 x 56°	2 x 58°	56°/57°	2 x 53°	2 x 53°	2 x 54°	46°/47°	48°/49°
Beam angles (50% peak)								
Vertical	2 x 25°	25°/24°	2 x 23°	2 x 24°	2 x 5°	5°/6°	4°/3°	4°/5°
Horizontal	2 x 34°	2 x 37°	42°/43°	2 x 40°	2 x 30°	2 x 29°	39°/41°	4 x 37°

1.0 on scale represents peak intensity/1000 lm.

Absolute intensity (cd) = Intensity (cd/1000 lm) x Lighting Design Lumens
1000

HNF 001-FLOODLIGHTING

Exploded View



KEY TO ILLUSTRATION

1. Housing
2. Front-glass clamp (4x)
3. Reflector
4. Lampholder bracket
5. Bracket
6. Terminal block
7. Lampholder
8. Closing clip (4x)
9. Reflector rear cover
10. Rear cover
11. Gasket
12. Lamp support
13. Clamp
14. Side reflector

WINDAGE DATA

Projected (m ²) Area	0.279	0.082	0.279	0.246
Shape Factor	0.96	1.04	0.74	0.83

ACCESSORIES

Louvre for screening the lamp from direct view for limiting glare.
Construction: matt-black silicone lacquered sheet-aluminium.
Weight: 2.6 Kg.

ELECTRICAL DATA

Lamp	Ballast	Capacitor	Ignitor	Pre-wired Gearbox
400W HPI/T	BHL 400	2 x L4016	S151	H4000/2
400W SON/T	BSN 400	2 x L4020	SN50	S4000
1000W SON/T	BSN 1000	4 x L4025	SN53	—
1000W HPI/T	BHL 1000	2 x L4025	S152	—

ORDERING DATA

Catalogue Number	For lamp types	Distribution	Packing quantity
HNF 001/1	1 kW SON/T and HPI/T	Narrow	1
HNF 001/2	1 kW SON/T and HPI/T	Wide	1
HNF 001/3	400W SON/T and HPI/T	Narrow	1
HNF 001/4	400W SON/T and HPI/T	Wide	1

For spares see Floodlight Spares Data Sheet

Made in Holland

HNF 002

Floodlight projector

A range of general-purpose floodlights with wide or narrow beam light distribution, for use with metal halide lamps.

Note: Metal halide lamps UK marking
MBI = Philips International
marking HPI/T

RANGE

Available in two models for 2kW metal halide lamps, with wide or narrow beam light distribution.

APPLICATIONS

General-purpose floodlighting, in situations such as:-

- Sports grounds
- Railway marshalling yards
- Car parks
- Buildings
- Major road construction work
- Shipping yards
- Skating rinks

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FLOODLIGHTING

To reorder this Data Sheet quote

PL 1760/6

Issued 8.83

Replaces PL 1760/5

HNF 002 – FLOODLIGHTING

FEATURES

- High-grade aluminium reflector gives accurate beam control.
- Easy-to-operate stainless steel clips permit rear cover to be hinged down to facilitate lamp changing.
- Cast-on beam aiming sight and protractor scale permit quick and simple daylight adjustment.
- Reflector housing and rear cover are strong cast aluminium; low copper content ensures excellent corrosion resistance even in coastal and industrial areas.
- Ozone-resistant neoprene gaskets give dust and jet proof seal of front glass and rear cover.
- Floodlight supplied with 1 x PG11 cable gland.

MATERIALS & FINISH

Reflector housing and rear cover: Cast aluminium.

Front glass: Toughened glass plate secured with stainless steel clips.

Sealing gaskets: Rubber ethylene propylene.

Mounting bracket: Stainless steel.

RANGE OF OPERATION

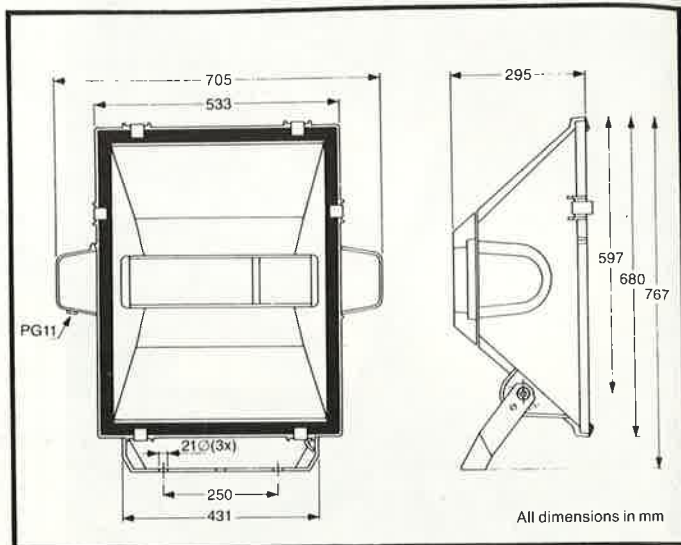
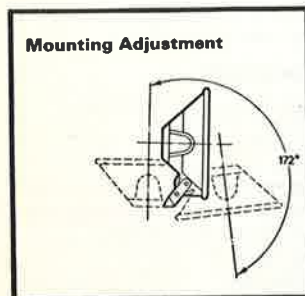
Temperature range (lamp) –18°C to 40°C. 240V 50Hz or 415V 50Hz depending on lamp.

SPECIFICATION

■ Type compliance with BS 4533 Section 102.5 Class I Floodlight Luminaire Degree of Protection IP55 'Dustproof' 'Jetproof'.

To specify state:

Floodlight luminaire for metal halide lamp, corrosion-resistant cast aluminium housing, degree of protection IP55, hinged rear cover for easy access to lamp, substantially as Philips HNF 002.



Weight of luminaire complete with lamp – 19.0 kg.

ELECTRICAL DATA

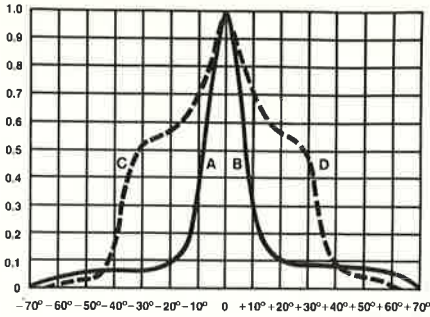
Lamp type	Mains Volts	Ballast	Ignitor	PFC Capacitor
2kW HPI/T	415	BHL 2000	SI54	4 x L4020
2kW HPI/T	240	2 x BHL 1000	SI52	4 x L4025

Further information on Philips lamps and control gear is contained in the following Data Sheets:-

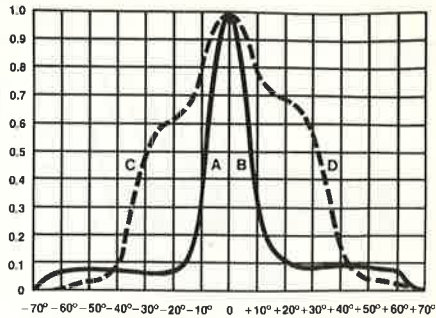
Lamp type	Lamp Data Sheet	Control Gear Data Sheet
HPI/T	PL 1767	PL 1779

Light Distribution Diagrams

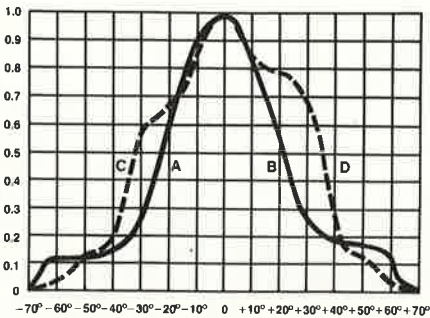
HNF 002 Narrow beam 240V



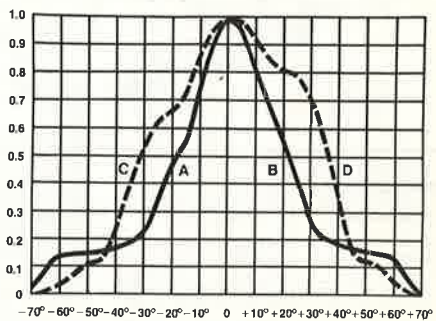
HNF 002 Narrow beam 415V



HNF 002 Wide beam 240V



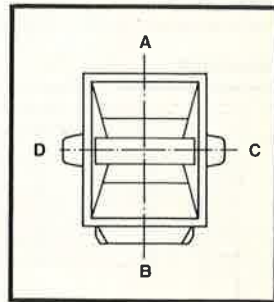
HNF 002 Wide beam 415V



7

Floodlight	HNF 002/1 Narrow Beam 240V	HNF 002/1 Narrow Beam 415V	HNF 002/2 Wide Beam 240V	HNF 002/2 Wide Beam 415V
Peak Intensity cd/1000 lm.	1375	1279	625	620
Beam Efficiency Total Beam	62%	67%	66%	64%
Beam Angle (10% peak)				
Vertical	18°/21°	17°/20°	63°/64°	65°/63°
Horizontal	42°/39°	42°/43°	52°/55°	52°/55°
Beam Angles (50% peak)				
Vertical	2 x 8°	9°/8°	22°/21°	19°/21°
Horizontal	32°/29°	30°/32°	32°/36°	31°/35°





Planes used for Distribution Diagrams

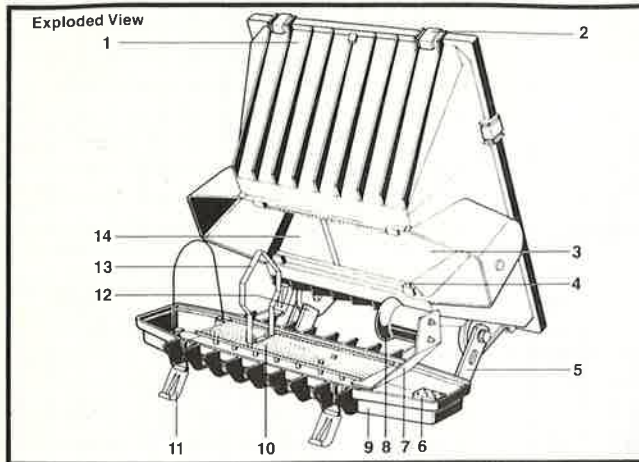


1.0 on scale represents peak intensity/1000 lm.
 Absolute intensity (cd) = Intensity (cd/1000 lm) × $\frac{\text{Lighting Design Lumens}}{1000}$

HNF 002 – FLOODLIGHTING

WINDAGE DATA

				
Projected Area (m ²)	0.345	0.123	0.345	0.303
Shape Factor	1.07	1.1	—	—



ORDERING DATA

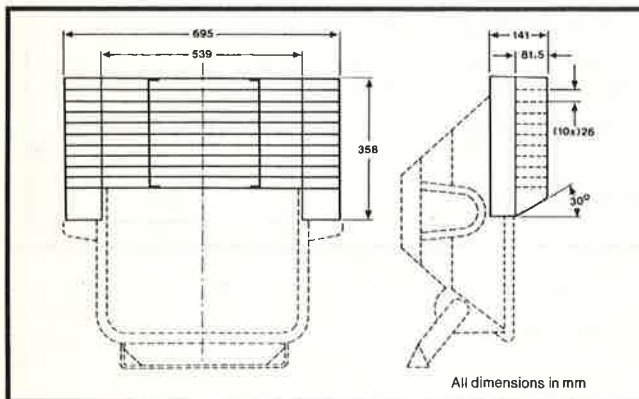
Catalogue Number	For Lamp Types	Distribution	Packing quantity
HNF 002/1	2kW HPI/T	Narrow	1
HNF 002/2	2kW HPI/T	Wide	1

N.B.—Please specify supply voltage of circuit 240V or 415V.
For spares see floodlight spares data sheet.

ACCESSORIES

Louvre for screening the lamp from direct view and for limiting glare.

DIMENSIONS



1. Housing
2. Front glass clamps (6x)
3. Front glass
4. Reflector
5. Bracket
6. Terminal block
7. Lampholder bracket
8. Lampholder
9. Rear cover
10. Reflector rear-cover
11. Clips (4x)
12. Clamp
13. Lamp support
14. Side reflector

Construction: matt-black silicone lacquered sheet-aluminium.

Weight: 3.5 kg.

Made in Holland

HNF 003

Floodlight Projector

A range of floodlights that combines both efficiency in performance with versatility in application where optical efficiency and mechanical durability are required.

RANGE

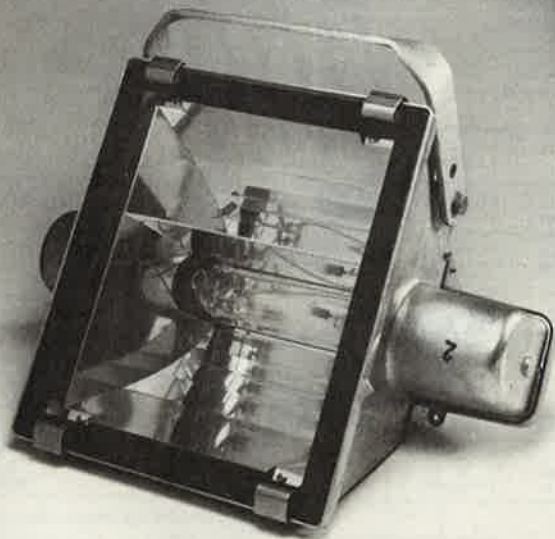
Available in both narrow and wide beam versions for 1 x 400W SON/T, 1 x 250W SON/T, 1 x 250W HPI/T or 1 x 400W HPI/T lamps.

A pre-wired control gear box enclosed to IP54 is available to operate the above lamps. See Data Sheet PL 1868.

APPLICATIONS

Applications include:

- Sports grounds
- Marshalling yards
- Car parks
- Skating rinks
- High mast road lighting
- Indoors sports halls
- Shipyards
- Floodlighting buildings
- Security lighting



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FLOODLIGHTING

To reorder this Data Sheet quote

PL 1267/6

Issued 8 84

Replaces PL 1267/5

HNF 003 – FLOODLIGHTING

FEATURES

- Careful choice of materials ensures a non-corrodible luminaire to give a long life in fairly arduous conditions.
- A silicone rubber gasket for jet-proof and dustproof sealing of front glass.
- The floodlight housing and rear cover are high pressure die-cast aluminium.
- The castings have a low copper content for excellent corrosion resistance in coastal and industrial outdoor conditions.
- Reflectors made of high grade aluminium for precise beam control.
- A cast, beam-aiming sight and protractor scale for accurate daylight adjustment.
- Supplied complete with 1 x PG11 cable gland.
- Access for lamp installation and replacement made simple by the removal of the rear cover. Particularly important when the floodlights are mounted on a gantry.
- Luminaire is dustproof and jetproof to IP55.
- A symmetric beam for optimum installed performance.

KEY TO ILLUSTRATION

1. Front glass clips (4 x)
2. Housing
3. Front glass
4. Parabolic reflector
5. Side reflector
6. Bracket
7. Gasket rear cover
8. Lampholder bracket
9. Lampholder
10. Rear cover
11. Rear reflector
12. Closing clip top (2 x)
13. Terminal block
14. Cable entry
15. Lamp support
16. Closing clip bottom (2 x)
17. Safety bracket (2 x)

RANGE OF OPERATION

Supply voltage:
240V 50Hz nominal.
Control Gear is required to run the lamp.

Earthing:
HNF 003 has Class I electrical protection. An earth is therefore required.

Ambient Temperature:
Max. 40° C.

MATERIALS & FINISH

Housing and rear cover: High pressure die-cast aluminium.

Reflectors: High grade aluminium.

Clips: Stainless steel.

Front glass: 5.5 mm thick toughened plate glass.

Gaskets: Silicone rubber.

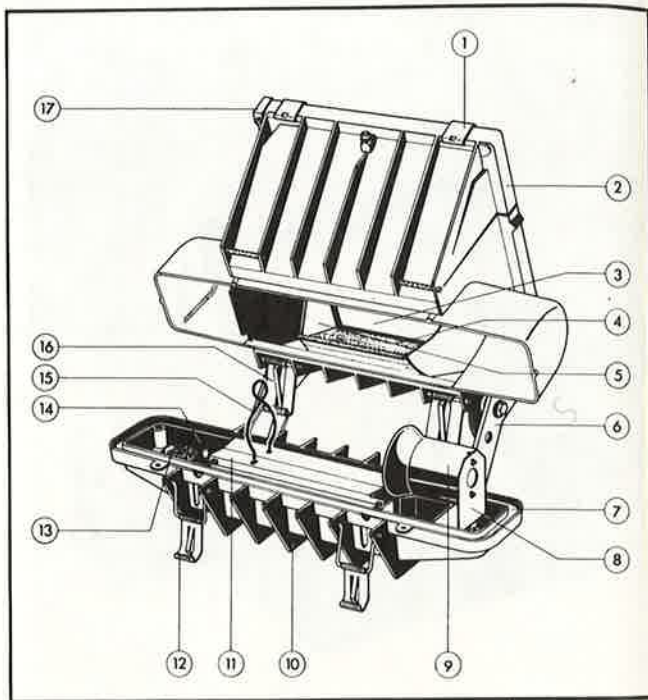
SPECIFICATION

- Type compliance with BS 4533, Section 102-5.
- International Protection category IP55.
- Class I electrical protection (this luminaire requires an earth connection).

To specify state:

A die-cast aluminium luminaire for 1 x 400W SON/T, 1 x 250W SON/T, 1 x 250W HPI/T and 1 x 400W HPI/T lamps, similar to Philips HNF 003.

The luminaire shall comply with BS 4533, Section 102-5 and shall meet protection requirements IP55 and Class I electrical.

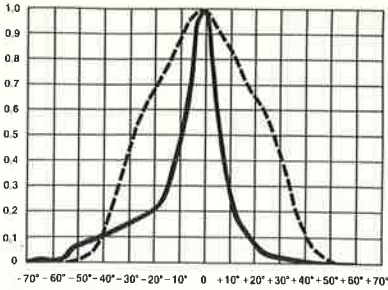


ELECTRICAL DATA

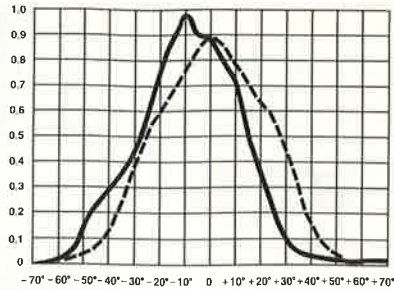
Lamp	Ballast	Capacitor	Ignitor	or	Prewired Gear Box
250W SON/T	BSN250	2 x L4016	SN50		S2500
400W SON/T	BSN400	2 x 4020	SN50		S4000
250W HPI/T	BHL250	1 x L4020	SI51		H2500/2
400W HPI/T	BHL400	1 x L4025	SI51		H4000/2

Light Distribution Diagrams

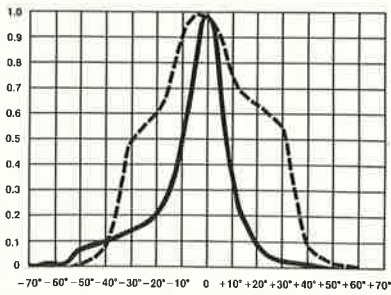
400W SON/T Narrow beam



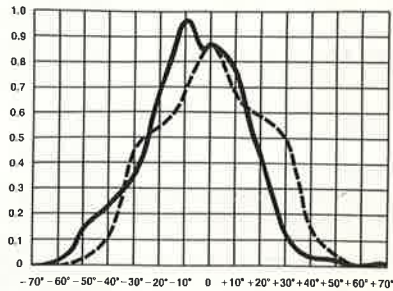
400W SON/T Wide beam



400 HPI/T Narrow beam



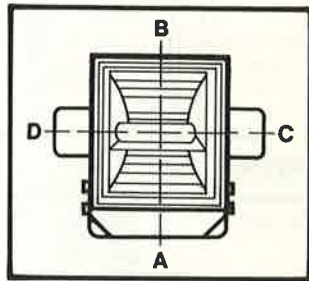
400W HPI/T Wide beam



7

Floodlight	HNF 003/2 400W SON/T Wide Beam	HNF 003/1 400W SON/T Narrow Beam	HNF 003/2 400W HPI/T Wide Beam	HNF 003/1 400W HPI/T Narrow Beam
Peak Intensity cd/1000 lm	823	1627	820	1417
Beam Efficiency total beam	66%	65%	63%	62%
Beam Angles (10% peak)				
Vertical	52°/31°	41°/18°	52°/32°	37°/20°
Horizontal	42°/44°	40°/41°	40°/43°	39°/40°
Beam Angles (50% peak)				
Vertical	27°/16°	9°/6°	24°/18°	9°/8°
Horizontal	26°/29°	2°/28°	23°/30°	29°/31°

Planes used for Distribution Diagrams

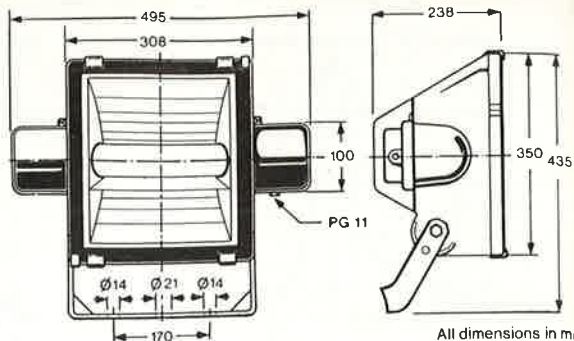
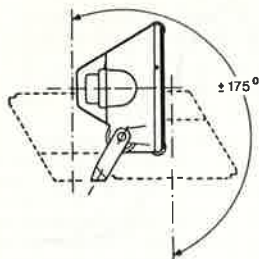


0 on scale represents peak intensity/1000 lm.

$$\text{Absolute intensity (cd)} = \text{Intensity (cd/1000 lm)} \times \frac{\text{Lighting Design Lumens}}{1000}$$

HNF 003 – FLOODLIGHTING

Mounting Adjustment



All dimensions in mm

WEIGHT

Weight of luminaire complete with lamp – 7.3kg (16.08lb.).

WINDAGE DATA

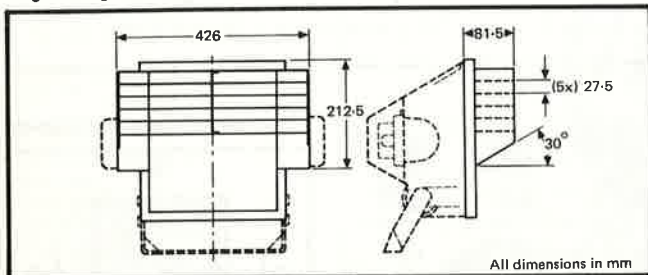
Projected Area (m ²)	0.127	0.051	0.127	0.119
Shape Factor	1.06	1.13	0.83	0.88

ACCESSORIES

Louvre for screening the lamp from direct view and for limiting glare.

Construction: Matt-black silicone lacquered sheet-aluminium.

Weight: 1.4kg.



All dimensions in mm

ORDERING DATA

Catalogue No.	For Lamp types	Distribution	Packing quantity
HNF 003/1	250W SON/T	Narrow	1
	400W SON/T		
	250W HPI/T		
	400W HPI/T		
HNF 003/2	250W SON/T	Wide	1
	400W SON/T		
	250W HPI/T		
	400W HPI/T		
HNF 003LU	Louvre		1

Further information on Philips lamps and control gear is contained in the following Data Sheets:

Lamp type	Lamp Data Sheet	Control Gear Data Sheet
HPI/T	PL 1767	PL 1779
SON/T	PL 1776	PL 1778

Made in Holland



HNF 206

Floodlight projector

A high-performance and very durable floodlight projector with a spun-aluminium reflector held in a cast ring, to which the cast aluminium rear housing is attached by means of stainless steel clips. For use with metal halide lamps rated at 2kW, mercury fluorescent lamps rated at 1kW and 2kW, and high-pressure sodium lamps rated at 1kW.

Note: Mercury fluorescent lamps
UK marking MBF = Philips
International marking HPL-N
Metal halide lamps
UK marking MBI = Philips
International marking HPI

RANGE

HNF 206 floodlight projector available in narrow beam and wide beam versions, with lampholder assemblies for the following lamps:-

Metal halide 2kW

Mercury fluorescent PowerWhite 1kW

Mercury fluorescent PowerWhite 2kW

High-pressure sodium 1kW SON/T

APPLICATIONS

General-purpose floodlighting, particularly in such arduous environments as:-

- Sports grounds
- Buildings
- Railway marshalling yards
- Large road constructions (high mast installations)
- Football and sports stadia
- Shipping yards
- Quarries

To reorder this Data Sheet quote

PL 1758/6

Issued 6/83

Replaces PL 1758/5

HNF 206 – FLOODLIGHTING

FEATURES

- Sturdy construction and excellent performance make the luminaire suitable for many outdoor applications.
- Spun parabolic reflector housing of high-purity aluminium also acts as the specular reflector.
- Available in narrow or wide beam versions, and with a wide choice of lamps, to suit most needs.
- Lamp is very simply changed, by releasing toggles holding reflector to rear housing.
- Toughened front glass is secured to the reflector by means of four stainless steel brackets.
- Silicon gasket between front glass and reflector housing renders the luminaire jet and dust proof.

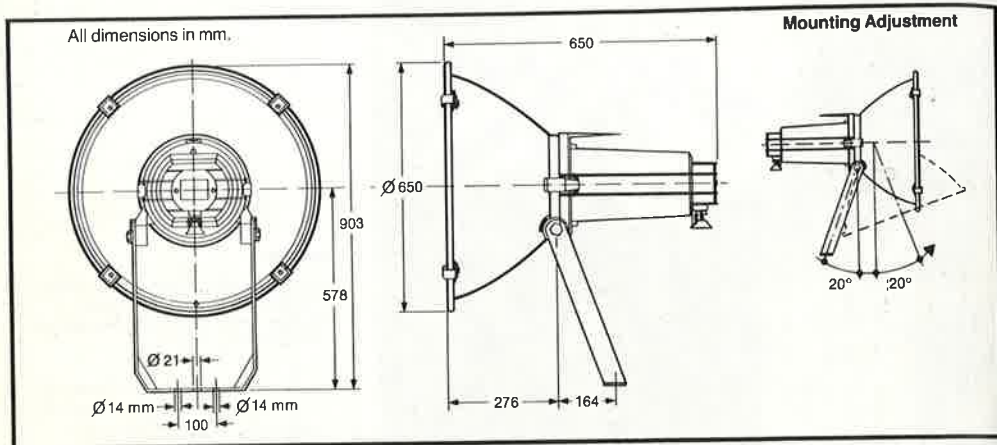
- Floodlight supplied with 1 x PG16 cable gland.
- Built-in aiming sight and protractor scale permit simple daytime adjustment.
- The reflector housing itself is supported on the mounting bracket; its setting is therefore not affected by lamp changing.
- Cast-on handle simplifies removal of rear casting.
- Castings of low copper content (0.05%) ensures high resistance to corrosion.
- Luminaire finished in grey lacquer.

SPECIFICATION

- Type compliance with BS 4533, Section 102-5.
- Degree of protection IP55.

MATERIALS & FINISH

- **Reflector housing:** Spun aluminium, black lacquer finish.
- **Rear Housing:** Die-cast from low copper content aluminium, black lacquer finish.
- **Lampholder:** GES, porcelain.
- **Rear cover:** High pressure die-cast aluminium, black lacquer finish.
- **Front glass:** Toughened glass plate, sealed with silicon gasket.
- **Reflector housing clips:** Stainless steel.
- **Mounting bracket:** Steel plate, hot-dipped galvanised.



WEIGHT

Weight of luminaire: 14.2 kg.

ELECTRICAL DATA

Lamp	Ballast	Capacitor	Ignitor	Prewired gear box
1kW SON/T	BSN1000	4 x L4025	SN53	—
1kW HPL-N	BHL1000	2 x L4025	—	—
2kW HPL-N 415V	BHL2000	3 x L4025	—	—
2kW HPI/T 240V	2xBHL1000	4 x L4025	SI52	—
2kW HPI/T 415V	BHL2000	4 x L4020	SI54	—

Further information on Philips lamps and control gear is contained in the following data sheets:

Lamp type	Lamp data sheet	Control gear data sheet
HPI/T	PL 1767	PL 1779
HPL-N	PL 1768	PL 1779
SON/T	PL 1776	PL 1778

Note: HPI/T 415V lamps for use within $\pm 20^\circ$ of horizontal only.



BRANDON SPEEDWAY, COVENTRY

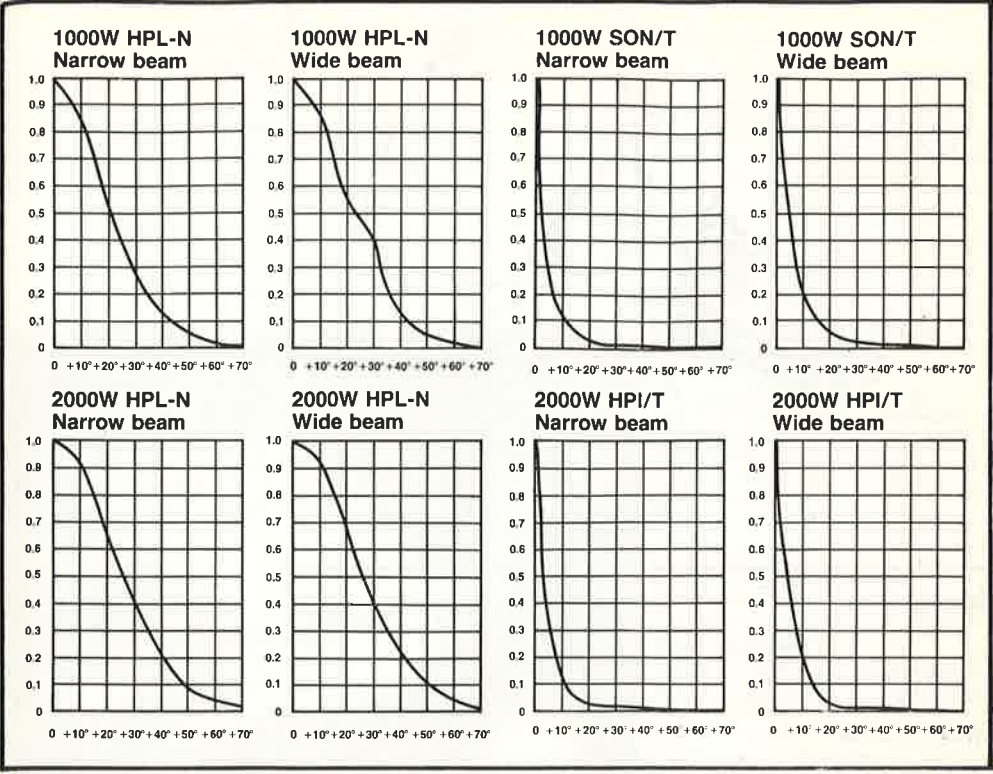
The computer-aided facilities of Philips Lighting Design and Engineering Centre produced the design for this advanced scheme of 92 HNF013 and HNF002 floodlight projectors. 2kW HPI/T lamps are used to give colour rendering suitable for TV coverage.



FRIGATE DRY DOCKS, DEVONPORT

A new Philips installation of 90 HNF003 floodlight projectors fitted with 400W SON/T lamps not only improves illuminance, particularly on the vertical plane, but has reduced energy consumption by 70 per cent. Previously, mercury fluorescent lamps in high-bay luminaires were used.

Light Distribution Diagrams

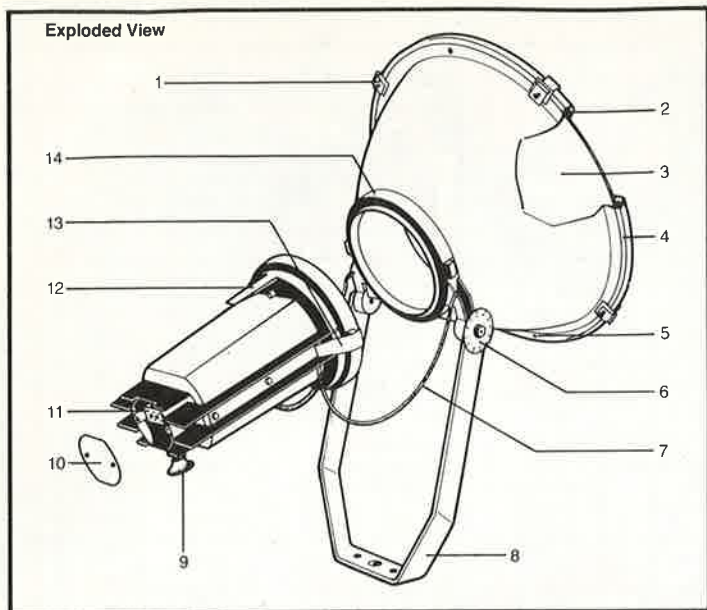


Floodlight	HNF 206/2 2000W HPI/T Wide Beam	HNF 206/1 2000W HPI/T Narrow Beam	HNF 206/4 1000W SON/T Wide Beam	HNF 206/3 1000W SON/T Narrow Beam	HNF 206/4 1000W HPL-N Wide Beam	HNF 206/3 1000W HPL-N Narrow Beam	HNF 206/4 2000W HPL-N Wide Beam	HNF 206/3 2000W HPL-N Narrow Beam
Peak Intensity cd/1000 lm	6484	9750	5276	9585	788	607	587	589
Beam Efficiency								
Total beam	62%	62%	59%	57%	60%	56%	57%	56%
Beam to 10% peak	34%	31%	32%	22%	55%	48%	51%	49%
Beam to 50% peak	14%	11%	11%	4%	29%	26%	29%	27%
Beam Angles (10% peak)								
Vertical	2 x 14°	2 x 11°	2 x 16°	2 x 11°	2 x 43°	2 x 43°	2 x 49°	2 x 48°
Horizontal	2 x 14°	2 x 11°	2 x 16°	2 x 11°	2 x 43°	2 x 43°	2 x 49°	2 x 48°
Beam Angles (50% peak)								
Vertical	2 x 6°	2 x 4°	2 x 5°	2 x 3°	2 x 24°	2 x 22°	2 x 27°	2 x 26°
Horizontal	2 x 6°	2 x 4°	2 x 5°	2 x 3°	2 x 24°	2 x 22°	2 x 27°	2 x 26°

1:0 on scale represents peak intensity/1000 lm.

Absolute intensity (cd) = Intensity (cd/1000 lm) × $\frac{\text{Lighting Design Lumens}}{1000}$

HNF 206 – FLOODLIGHTING



Key to illustration:

1. Bracket assembly (4x)
2. Gasket
3. Front glass
4. Reflector
5. Vent screw
6. Vernier scale
7. Chain (2x)
8. Mounting bracket
9. Gland
10. Cover plate
11. Terminal block
12. Rear housing with grip
13. Clip (2x)
14. Reflector ring

WINDAGE DATA

				
Projected Area (m ²)	0.346	0.212	0.346	0.282
Shape Factor	1.16	0.79	0.77	1.10

ORDERING DATA

Catalogue Number	For lamp types	Distribution
*HNF 206/5 – Lampholder Assembly	2kW HPI/T 240V 2kW HPI/T 415V	—
*HNF 206/6 – Lampholder Assembly	1kW & 2kW HPL-N 1kW SON/T	—
*HNF 206/7 Narrow reflector	—	Narrow
*HNF 206/8 Wide reflector	—	Wide
HNF 206/1	2kW HPI/T 240V 2kW HPI/T 415V	Narrow
HNF 206/2	2kW HPI/T 240V 2kW HPI/T 415V	Wide
HNF 206/3	1kW & 2kW HPL-N 1kW SON/T	Narrow
HNF 206/4	1kW & 2kW HPL-N 1kW SON/T	Wide

*Please note floodlights complete: HNF 006/1 = HNF 206/5 + HNF 006/7
 HNF 006/2 = HNF 206/5 + HNF 006/8
 HNF 006/3 = HNF 206/6 + HNF 006/7
 HNF 006/4 = HNF 206/6 + HNF 006/8

Complete luminaires and component parts individually packed.
 For spares see floodlight spares data sheet.

Please order in the form given in the following example:

- 16 Philips floodlight projectors HNF 206/1
- 16 Philips metal halide lamps 2kW HPI/T
- 32 Philips ballast units BHL1000
- 16 Philips ignitors SI52
- 64 Philips PFC capacitors L4025

Made in Holland.



HNF 013

Floodlight for 2kW HPI/T Metal Halide lamp

A cast aluminium floodlight for one 2kW HPI/T 240V or 415V metal halide lamp. The luminaire has an asymmetric distribution, and is ideal for the side-lighting of sports and training fields and lighting high buildings.

Note: Metal Halide lamps UK marking
MBI = Phillips International
marking HPI

APPLICATIONS

Suitable for the side-lighting of large areas both indoors and outdoors such as:

- Football grounds
- Rugby and hockey fields
- Running tracks and training fields
- Sports and leisure centres
- Tennis courts
- Skating rinks
- High Buildings.
- Marshalling yards
- Ship yards

FEATURES

- Specially-designed optical system with built-in louvre reduces number of luminaires required in side-lighting installations.
- High-grade anodised aluminium reflector gives accurate beam control.
- Built-in louvre provides excellent glare control.
- Asymmetric optics give good light coverage from a low mounting height.

7

FLOODLIGHTING

To reorder this Data Sheet quote

PL 3039/2

Issued 9/82

Replaces PL 1740/1

HNF 013 – FLOODLIGHTING

Features continued

- The lampholder casting is attached to one side of the reflector housing by means of three stainless steel screws. A hinged door is provided on the other side of the reflector housing, immediately opposite the lampholder, to allow easy lamp changing (see diagram). The positions of the hinged door and the lampholder casting are inter-changeable to allow floodlights to be mounted side-by-side (see diagram).
- Lampholder casting, hinged door and front glass are sealed with silicone rubber gaskets to provide a jetproof and dustproof seal.
- Cast-on beam aiming device allows daytime adjustment.
- Mounting bracket can be fixed either below or above the floodlight.
- Reflector housing, lampholder casting and side door are cast aluminium; low copper content ensures excellent corrosion resistance even in coastal and industrial areas.
- Floodlight supplied with 1 x PG16 cable gland.

MATERIALS & FINISH

Reflector housing, lampholder casting and side door: Low pressure die-cast aluminium.

Front glass: 5mm toughened glass plate secured with stainless steel clips.

Sealing gaskets: Silicone rubber.

Mounting bracket: Steel, hot-dipped galvanised finish.

SPECIFICATION

- Type compliance with BS 4533, Section 102.1.
- Class I Floodlight Luminaire.
- Degree of protection IP55 'Dust-proof', 'Jetproof'.

To specify state:

Floodlight luminaire for 2kW metal halide lamp, with asymmetric light distribution, corrosion-resistant cast aluminium housing, substantially as Philips HNF 013.

RANGE OF OPERATION

- Temperature range (lamp) —18°C to 40°C.
- 240V 50Hz (HPI/T lamp).
- 415V 50Hz (HPI/T lamp).

LIGHT DISTRIBUTION DATA

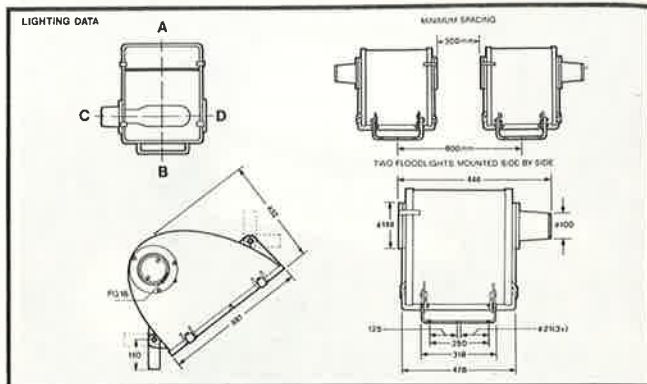
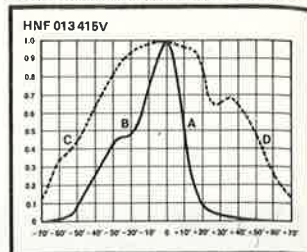
Floodlight	HNF 013
Peak Intensity cd/1000 lm	600
Beam Efficiency	
Total Beam	54%
Beam to 10% peak	50%
Beam to 50% peak	27%
Beam Angles (10% peak)	
Vertical	190°/50°
Horizontal	2 x 68°
Beam Angles (50% peak)	
Vertical	10°/19°
Horizontal	2 x 50°

Plane containing peak Intensity makes an angle of 28° above the normal to the front glass.

Further information on Philips lamps and control gear is contained in the following:

Lamp type HPI/T	PL 1767
Control gear	PL 1779

LIGHT DISTRIBUTION DIAGRAM



WEIGHT (including lamp): 23.6 kg.

WINDAGE DATA

Projected Area (m ²)	0.262	0.198	—	—
Shape Factor	1.5	1.1	—	—

ELECTRICAL DATA

Lamp	Mains Volts	Ballast	Capacitor	Ignitor
2kW HPI/T	415	BHL2000	4 x L4020	SI54
2kW HPI/T	240	2 x BHL1000	4 x L4025	SI52

ORDERING DATA

Catalogue Number	For Lamp Types	Distribution	Packing quantity
HNF 013	2kW HPI/T 240V 2kW HPI/T 415V	Asymmetric	1

Made in Holland.

For spares see floodlight spares data sheet.



NNF 010

Floodlight Projector

A general-purpose floodlight projector with a spun-aluminium reflector fixed by means of stainless steel clips to a cast aluminium rear housing. Degree of protection IP54. For use with PowerWhite mercury fluorescent lamps HPL-N up to 400W rating, high-pressure sodium lamps SON and SON/T of 250 and 400W rating, Metal halide lamps HPI/T and HPI/BUS of 400W rating.

Note: HPI/T lamps for use within $\pm 20^\circ$ of horizontal only.

HPI/BUS lamps for use within $\pm 15^\circ$ of vertical only.

Note: Metal halide lamps
 UK marking MBI = Philips
 International marking HPI
Mercury fluorescent lamps
 UK marking MBF = Philips
 International marking HPL-N

RANGE

NNF 010 floodlight projector – available in narrow beam and wide beam versions.

APPLICATIONS

General-purpose floodlighting, in situations such as:

- Sports grounds
- Buildings
- Railway marshalling yards
- Large road constructions (high mast installations)
- Docks
- Security lighting

Pre-wired gear boxes enclosed to IP54 are available for 250 and 400W lamps. (See data sheet PL 1868)

To reorder this Data Sheet quote

PL 1765/8

Issued 5/83

Replaces PL 1765/7

FLOODLIGHTING

NNF 010 FLOODLIGHTING

FEATURES

- Spun parabolic reflector housing of high purity aluminium also acts as the specular reflector.
- Focussing device enables the light distribution to be controlled very precisely.
- Available in narrow or wide beam versions for a wide range of applications.
- Lamp is very simply changed, by releasing toggles holding reflector to rear housing, without affecting focussing adjustment.
- Floodlight supplied with 1 x PG 13.5 cable gland.

■ Toughened front glass is sealed to reflector housing by means of a ethylene-propylene joint to render the luminaire dust and splashproof, IP54.

■ The reflector housing itself is supported by the mounting bracket; its setting is therefore not affected by lamp changing.

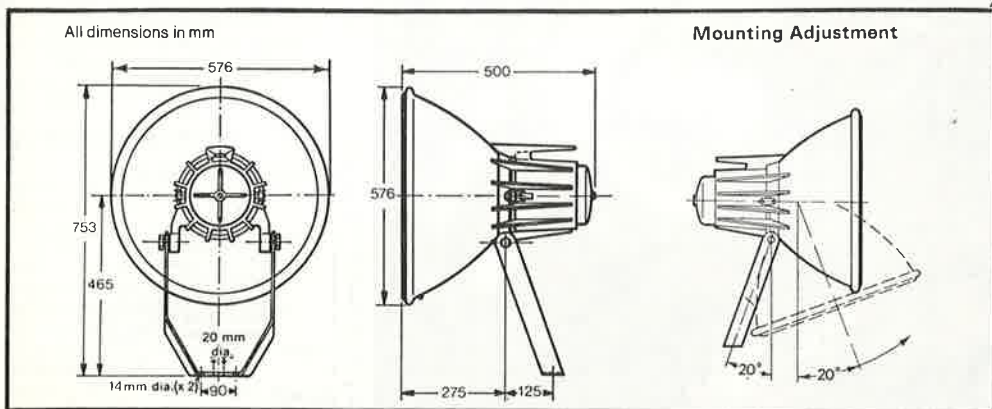
■ Aluminium rear cover, held by one captive screw, is easily removed to give access to mains connection block and focussing device. The mains entry is sealed by means of a gland.

MATERIALS & FINISH

- **Reflector housing:** Spun high purity, aluminium.
- **Rear housing:** Cast aluminium.
- **Lampholder:** GES, porcelain.
- **Rear cover:** Aluminium.
- **Front glass:** Toughened glass plate, sealed with ethylene-propylene gasket.
- **Reflector housing clips:** Stainless steel.
- **Mounting bracket:** Steel plate, hot-dipped galvanised.

SPECIFICATION

- Type compliance with BS 4533 Section 102.5 Class I floodlight luminaire.
- Degree of protection IP54.



WEIGHT

Weight of luminaire complete with lamp:-
8.5 kg. (18.72 lb.)

Further information on Philips lamps and control gear is contained in the following Data Sheets:

Lamp Type	Lamp Data Sheet	Control Gear Data Sheet
HPI/T + HPI/BUS	PL 1767	PL 1779
HPL-N	PL 1768	PL 1779
SON	PL 1776	PL 1778

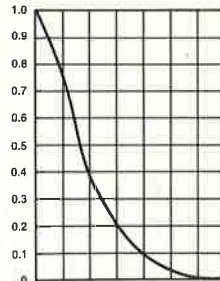
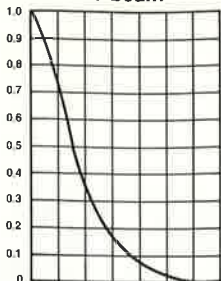
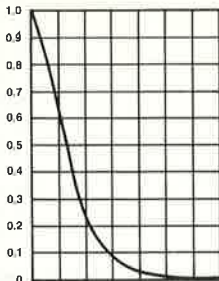
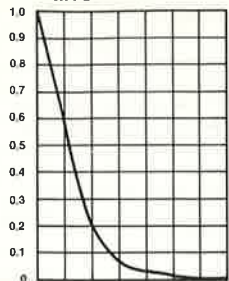
Light Distribution Diagrams

**250W SON
Narrow beam**

**250W SON
Wide beam**

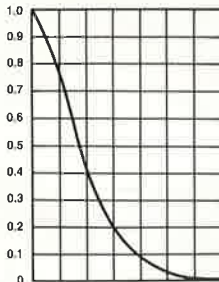
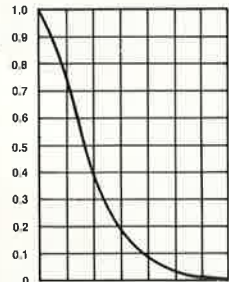
**400W SON
Narrow beam**

**400W SON
Wide beam**



**400W HPL-N
Narrow beam**

**400W HPL-N
Wide beam**

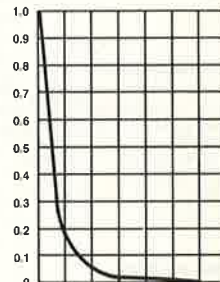
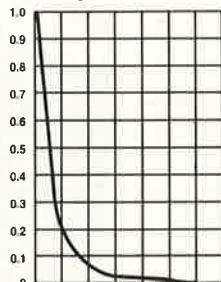
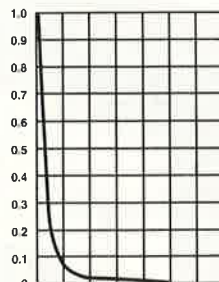
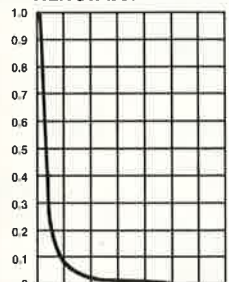


**SON/T250W
Narrow beam**

**SON/T250W
Wide beam**

**SON/T400W
Narrow beam**

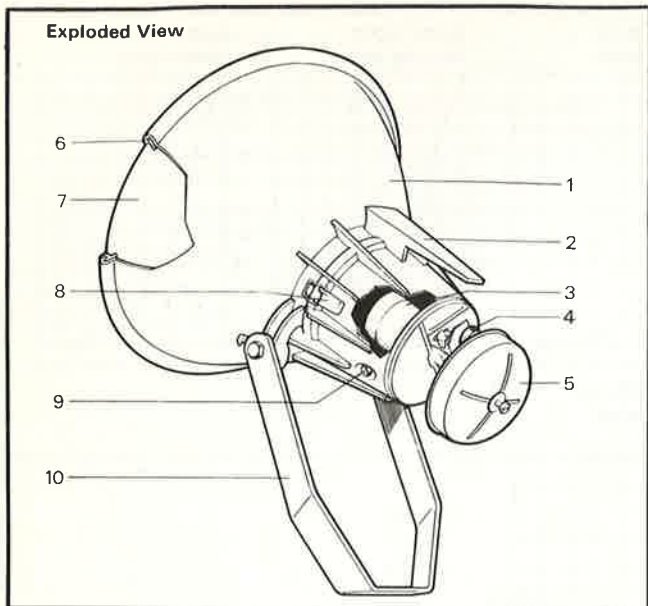
**SON/T400W
Wide beam**



Floodlight	NNF 010/1 400W HPL-N Narrow Beam	NNF 010/2 400W HPL-N Wide Beam	NNF 010/1 250W SON Narrow Beam	NNF 010/2 250W SON Wide Beam	NNF 010/1 400W SON Narrow Beam	NNF 010/2 400W SON Wide Beam	NNF 010/1 250W SON/T Narrow Beam	NNF 010/2 250W SON/T Wide Beam	NNF 010/1 400W SON/T Narrow Beam	NNF 010/2 400W SON/T Wide Beam
Peak Intensity cd/1000 lm	1141	1040	2334	2016	1455	1416	20500	7585	16571	8173
Beam Efficiency										
Total Beam	57%	56%	67%	65%	88%	76%	60%	62%	58%	69%
Beam to 10% peak	47%	46%	49%	49%	56%	62%				
Beam to 50% peak	21%	20%	21%	22%	22%	27%				
Beam Angles (10% peak)										
Vertical	2 x 37°	2 x 39°	2 x 27°	2 x 29°	2 x 37°	2 x 39°	2 x 7°	2 x 14°	2 x 8°	2 x 13°
Horizontal	2 x 37°	2 x 39°	2 x 27°	2 x 29°	2 x 37°	2 x 39°	2 x 7°	2 x 14°	2 x 8°	2 x 13°
Beam Angles (50% peak)										
Vertical	2 x 17°	2 x 17°	2 x 12°	2 x 13°	2 x 15°	2 x 17°	2 x 2°	2 x 4°	2 x 2°	2 x 4°
Horizontal	2 x 17°	2 x 17°	2 x 12°	2 x 13°	2 x 15°	2 x 17°	2 x 2°	2 x 4°	2 x 2°	2 x 4°

1 on scale represents peak intensity/1000 lm. Absolute intensity (cd) = Intensity (cd/1000 lm) x $\frac{\text{Lighting Design Lumens}}{1000}$

NNF 010 FLOODLIGHTING



KEY TO ILLUSTRATION

1. Reflector; anodised aluminium
2. Housing with grip; die-cast aluminium
3. Lampholder GES; porcelain
4. Adjusting knob; brass nickel-plated
5. Rear cover; aluminium plate
6. Gasket; ethylene-propylene
7. Front-glass; toughened glass
8. Clip (2 x); stainless steel
9. Gland; brass nickel-plated
10. Bracket; steelplate, hot dipped, galvanised

WINDAGE DATA

Projected Area (m ²)	0.260	0.147	0.260	0.209
Shape Factor	1.18	0.86	0.70	1.01

ELECTRICAL DATA

Lamp	Ballast	Capacitor	Ignitor	or Prewired gear box
250W SON & SON/T	BSN250	2 x L4016	SN50	S2500
400W HPL-N	BHL400	L4025	—	H4000
400W SON & SON/T	BSN400	2 x L4020	SN50	S4000
400W HPI/BUS	BHL400	1 x L4025	—	H4000
400W HPI/T	BHL400	1 x L4025	SI51	H4000/2

ORDERING DATA

Catalogue No.	For lamp types	Distribution	Packing quantity
*NNF 010/3 - lampholder assy	{ <ul style="list-style-type: none"> 250W SON/SON/T 400W HPL/N 400W SON/SON/T 400W HPI/BUS 400W HPI/T 	—	1
*NNF 010/4 - Reflector + glass	—	Narrow	1
*NNF 010/5 - Reflector + glass	—	Wide	1

*Please note NNF 010/1 complete = NNF 010/3 + NNF 010/4
 NNF 010/2 complete = NNF 010/3 + NNF 010/5

For spares see floodlight spare data sheet.

Made in Holland.



R7788

Area floodlights

An inexpensive, self-contained floodlight luminaire complete with all control gear secured and wired inside the body, for use with low and high pressure sodium lamps and metal halide.

RANGE

Available complete with universal mounting kit which enables the luminaire body to be mounted on feet, or secured to 2in., 3in. or 4in. diameter poles. Built-in control gear is supplied for SOX-E66 low pressure sodium, 400W high pressure sodium and 400 HPI/I lamps.

APPLICATIONS

Suitable for all external floodlighting applications for which a wide beam is appropriate, such as:-

- Buildings
- Large ground areas
- Car parks
- Work yards
- Marshalling and siding areas
- Outdoor storage areas.

FLOODLIGHTING

To reorder this Data Sheet quote

PL 1759/6

Issued 3/83

Replaces PL 1759/5

R7788 – FLOODLIGHTING

FEATURES

- The body is a welded steel fabrication, primed and painted green for high resistance to corrosion.
- Completely self-contained, with integral control gear – installation is simplified, since the luminaire only needs connection to a suitable supply.
- Luminaire is wired to 3-way terminal block above cable gland with 20mm bushed cable entry.
- Individually fused. The gear tray is retained by eight bolts and supported by four captive bolts for easy access to fuse and gear components.
- Lamp replacement is simplified by removal of the lampholder cover, which allows the lamp to be withdrawn without disturbing the front of the luminaire.

MATERIALS & FINISH

Body: Steel, welded, primed and painted green.

Trunnion arm and universal mounting kit: Wrought iron, galvanised finish.

Front glass: Toughened sheet glass sealed with special rubber strip.

SPECIFICATION

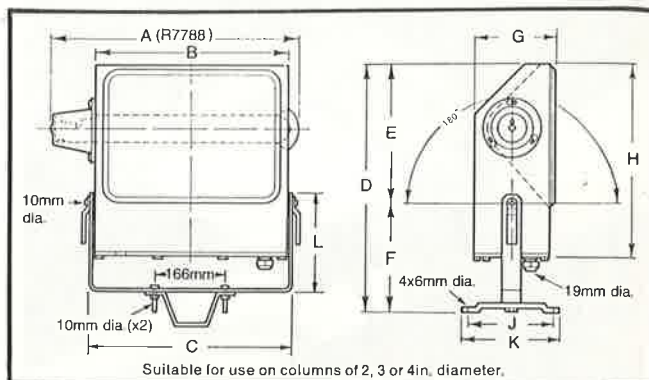
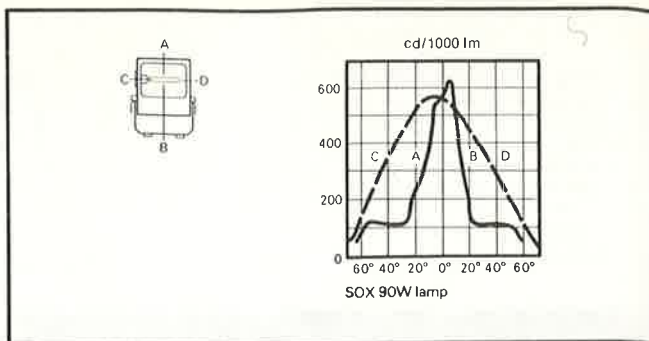
To specify state:

Philips area floodlight with integral control gear for SOX-36, SOX or 400W SON/T and 400W HPI/T.

RANGE OF OPERATION

For normal outdoor use.

Light Distribution Diagrams



ORDERING DATA

Catalogue No.	Description	Packing quantity
R7788/E	Luminaire with control gear for SOX-E66 lamp	Individually packed
R7759	Luminaire with control gear for 400W SON/T lamp	Individually packed
R7799	Luminaire with control gear for 400W HPI/T lamp	Individually packed

Please order in the form given in the following example:

10 Philips area floodlights R7788/U.

Lamps should be ordered separately.

DIMENSIONS

mm	
A — 578	G — 190
B — 453	H — 456
C — 472	J — 166
D — 604	K — 190
E — 336	L — 222
F — 268	

WEIGHTS, ELECTRICAL & TECHNICAL DATA

Body Cat. No.	Lamp type	Weight complete with lamp kg	Circuit current (Amperes)	Total circuit Watts	Lamp cap	Ignitor	Ballast	PFC capacitor
R7788/E	SOX-E low pressure sodium	16.7	0.4	83	BC	SX76	BSX90	L4010
R7759	SON/T 400W high pressure sodium	21.9	2.2	440	GES	SN50	BSN400	2 x L4020
R7799	HPI/T 400W metal halide	18.7	1.9	4.27	GES	SI51	BHL400	L4025

Luminaire: Made in UK
Lamps: Made in Belgium and UK

QVF 430, 431, 432

Floodlight Projector

The Philips range of corrosion resistant, halogen floodlights combines optical efficiency with ease of installation and light weight construction.

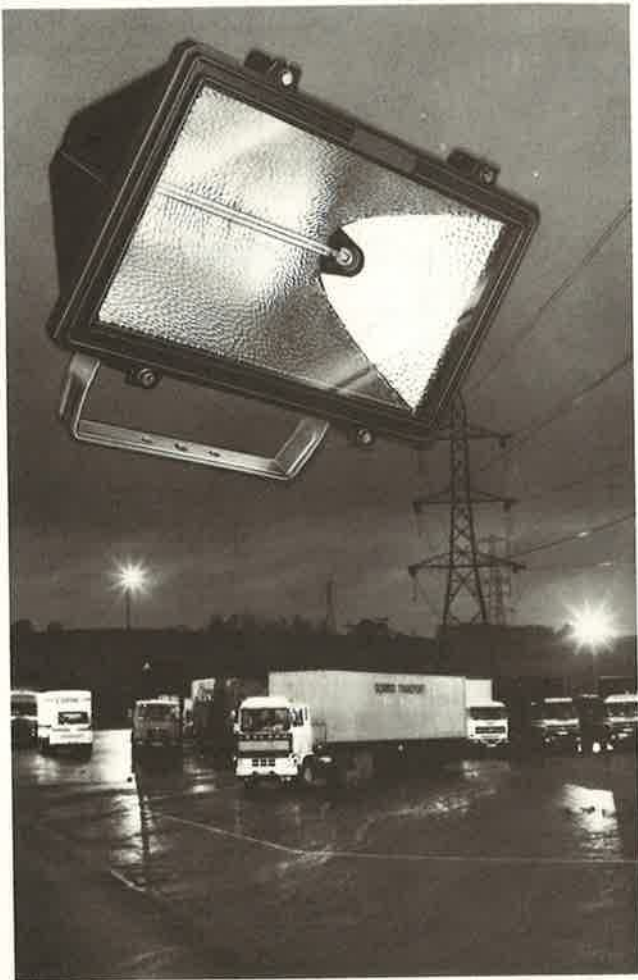
RANGE

The standard floodlight fitting is available in three sizes suitable for 300 or 500W, 750 or 1000W, 1500W tungsten halogen lamps.

APPLICATIONS

Applications include:

- Sports fields
- Sports halls
- Security lighting
- Facades
- Advertising signs
- Pedestrian crossings
- Factory perimeters
- Building sites
- Sound and light shows
- Skating rinks
- Swimming pools
- Car parks
- Golf links
- Foundations
- Statues
- Racecourses



To reorder this Data Sheet quote

PL 3032/2

Issued 12.84

Replaces PL 3032/1

QVF 430, 431, 432 – FLOODLIGHT PROJECTOR

FEATURES

- Housing of high pressure die-cast aluminium with low copper content for high corrosion resistance.
- High-grade aluminium reflector system for accurate beam control.
- Heat and impact resistant front glass.
- Simple maintenance.
- Heat resistant silicone rubber gasket.
- The light weight permits the use of inexpensive poles of simple construction.
- Ideal floodlighting for areas where heavy duty systems are not obligatory.

MATERIALS & FINISH

Floodlight body: High pressure die-cast aluminium.

Front glass: Heat resistant glass.

Front glass seal: Silicone rubber.

SPECIFICATION

- Type compliance to BS4533 Section 102 5 1981.
- IP category IP54, splashproof.
- Class I electrical protection (this luminaire requires an earth connection).

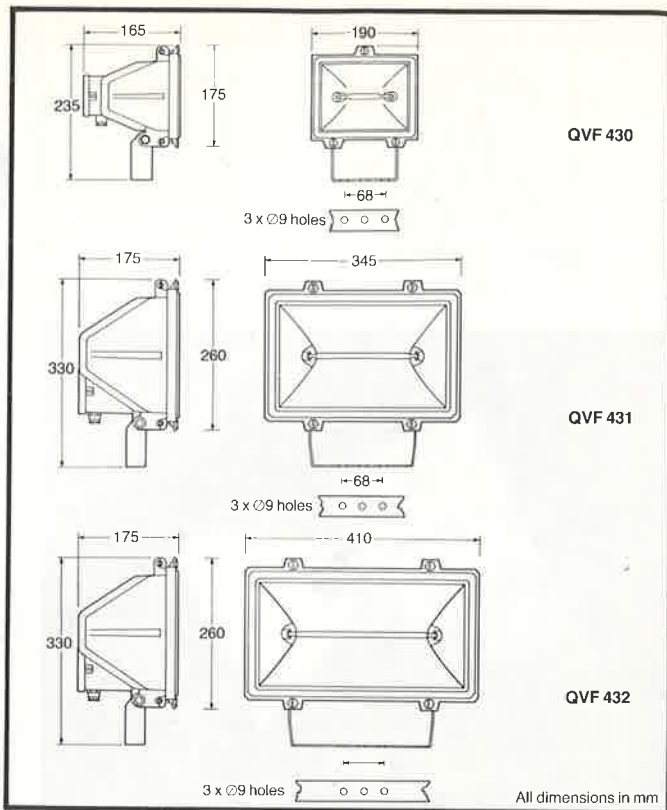
To specify state:

Tungsten halogen luminaire with light weight aluminium body giving a symmetric beam. The luminaire shall meet protection requirement IP54 and Class I electrical. Similar to Philips QVF 430, 431 or 432.

ORDERING DATA

Please order by catalogue number in the form given in the following example. Note that lamps should be ordered separately. Luminaires are individually packed.
 6 Philips floodlight projectors QVF 430
 6 Philips tungsten halogen lamps 500W 240/250V Type 7785R.

Made in Italy



All dimensions in mm

DIMENSIONS, WEIGHTS & LAMP DATA

Catalogue Number	Watts	Type	Lamp Volts	Cat. No.	Cap	Weight kg
QVF 430	300	K9	240/250	12113R	R7s-15	1.5
	500	K1	120, 240/250	7785R	R7s-15	
QVF 431	750	K3	240/250	12117R	R7s-15	3.4
	1000	K4	120, 240/250	12013R	R7s-15	
QVF 432	1500	K5	240/250	13021R	R7s-15	4.4

Details of tungsten halogen linear lamps are given on Data Sheet PL 1770.

QVF 430, 431, 432 – FLOODLIGHT PROJECTOR



QVF 432

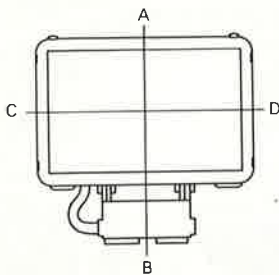


QVF 430

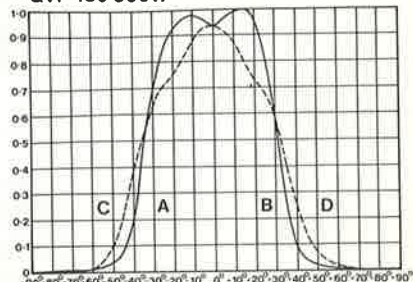


QVF 431

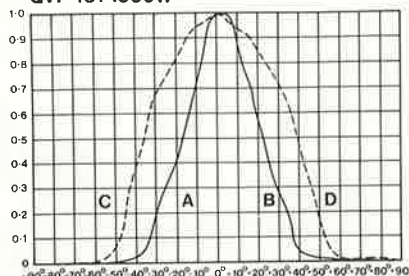
Light Distribution Diagrams



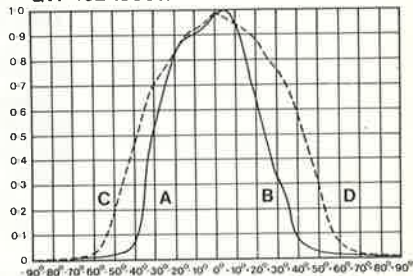
QVF 430 500W



QVF 431 1000W



QVF 432 1500W



Floodlight	QVF 430 500W	QVF 431 1000W	QVF 432 1500W
Peak Intensity (cd/1000 lm)	557	817	617
Beam Efficiency Total Beam	64%	72%	73%
Beam (10% Peak) Vertical	40°/44°	38°/33°	2 x 39°
Horizontal	50°/47°	49°/54°	2 x 57°
Beam (50% Peak) Vertical	32°/34°	22°/17°	32°/24°
Horizontal	35°/33°	35°/39°	39°/43°

1.0 on Scale represents peak intensity/1000 lm.

Absolute intensity (cd) = Intensity (cd/1000 lm x Lighting Design Lumens)
1000

QVF 430, 431, 432 – FLOODLIGHT PROJECTOR



APOLLO

Tungsten Halogen Floodlights

A high-quality open-body floodlight, designed for use with Philips 300W and 500W tungsten halogen linear lamps. Its high design standards, makes the luminaire a ready solution to many floodlighting problems in commercial or industrial environments.

RANGE

Both Apollo 500 and 300 KombiPaks are available complete with rated lamp, wall mounting bracket, plugs and screws.

The following optional accessories are available:-

- Wireguard
- Spigot cap for mounting on the end of poles
- U-bolt clamp for 48mm (1½ in. GAS) diameter pole.
- Universal mounting bracket.

APPLICATIONS

Suitable for most floodlighting applications, particularly where appearance is important, in situations such as:-

- Floodlighting gardens and statues
- Security lighting around factories, building sites and offices
- Outdoor sports complexes
- Shop fascia lighting
- Car parks
- Farm yards
- Work lighting on scaffolding
- School playgrounds

To reorder this Data Sheet quote

PL1764/2

Issued 6 81

Replaces PL1764/1

APOLLO – FLOODLIGHTING

FEATURES

■ Attractive new-styled body, die-cast from corrosion-resistant aluminium alloy. Body painted with polyester-based paint, to provide full protection against all outdoor weather conditions.

■ Optically-designed aluminium alloy reflector, chemically brightened and anodised.

■ Spring-loaded porcelain lamp-holders have heat-resisting leads welded to high-temperature terminals; the metal lampholder housings are designed to ensure adequate heat dissipation. The simple integrated lampholder design avoids excessive temperatures at the lamp pinch.

■ Large friction area between floodlight body and knuckle joint enables adjustment to remain fixed.

■ Wiring is taken through knuckle joint to low temperature mains wiring chamber.

■ Mains wiring chamber contains a terminal block with an insulation shield; a tapped boss provides an easily-accessible screw-down earth terminal.

■ Cover for mains wiring chamber sealed with a Neoprene gasket.

■ Entry is tapped for 20mm threaded conduit.

■ Designed in compliance with BS 4533, and suitable for ambients up to 25°C.

MATERIALS & FINISH

Body: Aluminium alloy (LM24) die-cast, finished black, heat resisting and weatherproof gloss paint.

Mains wiring chamber: Aluminium alloy die-casting, finished black heat-resisting and weatherproof paint.

Lampholders: Porcelain R7s-15, spring-loaded and fitted with heat-dissipating covers.

LAMP DATA

Catalogue Number	Type	Voltage	Wattage
7785R	K1 Tungsten halogen	240/250	500
12113R	K9 Tungsten halogen	240/250	300

ORDERING DATA

Catalogue Number	Description
A500	Apollo KombiPak complete with 500W lamp and mounting bracket
A300	Apollo KombiPak complete with 300W lamp and mounting bracket
A101	Wireguard
A102	Spigot cap (for 2 inch scaffold pole mounting)
A103	Universal mounting bracket
A104	U-bolt clamp for 48mm (1½ in. GAS) pole

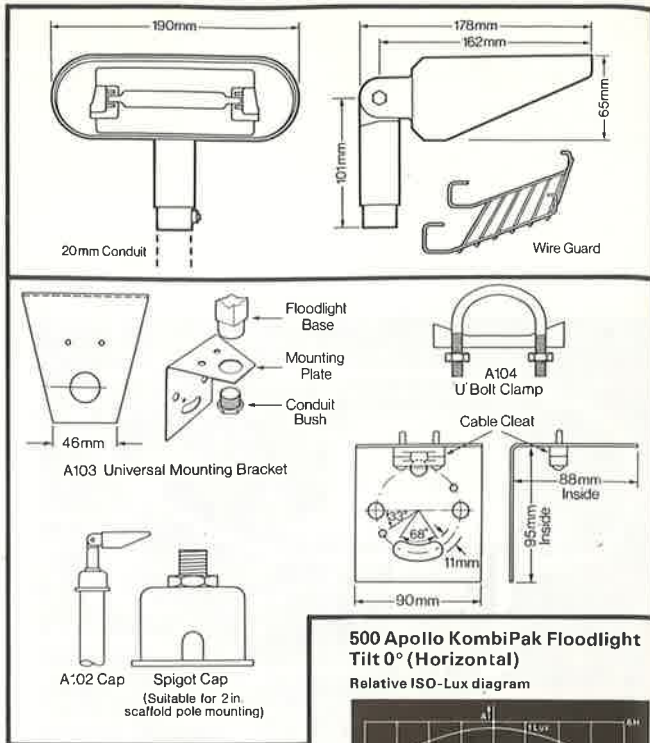
Please order in the form given in the following example:-

24 Philips Apollo floodlights A500 KombiPaks

24 Philips Apollo floodlights A300 KombiPaks

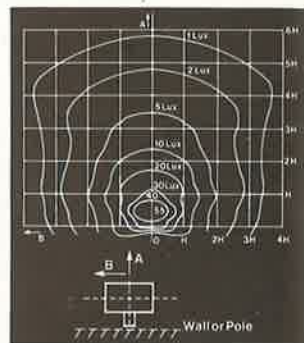
Apollo packs and accessories are individually packed.

DIMENSIONS



500 Apollo KombiPak Floodlight Tilt 0° (Horizontal)

Relative ISO-Lux diagram



INSTRUCTIONS

The Lux figures shown apply to a mounting height (H) of 5m.

Figures for other mounting heights can be obtained by multiplying the Lux figures shown by a correction factor given below.

Mounting height	Correction factor
8	0.39
7	0.51
6	0.69
5	1.00
4	1.56



DVF 102

Floodlight Projector

Corrosion resistant floodlight, particularly suitable for areas where a weatherproof fitting IP34 is required.

RANGE

For use with PAR 56 Narrow Spot, Medium flood and Wide flood lamps.

APPLICATIONS

Applications include:

- "Sound and light" spectacles
- Park lighting
- Poster hoardings
- Festive lighting
- Floodlighting of buildings
- Monuments
- Advertising signs
- Statues
- Gardens etc.

FEATURES

- High-pressure die-cast aluminium housing with cooling fins for heat-dissipation.
- High-pressure die-cast aluminium rear cover with a cable-entry gland.
- High-pressure die-cast aluminium rim, in which the toughened front-glass is fixed.
- Galvanised mild steel bracket allowing all possible mounting positions.
- Silicone gaskets to withstand high operating temperatures.
- Inner-wiring: silicone-covered and glass-fibre protected.
- GLX/16D lampholder.
- Quick release clips for ease of maintenance.
- Supplied with 1 x PG11 cable gland.

To reorder this Data Sheet quote

PL 1288/4

Issued 9.82

Replaces PL 1288/3

DVF 102 – FLOODLIGHTING

MATERIALS & FINISH

Housing: High pressure die-cast aluminium.

Rear cover: High pressure die-cast aluminium.

Front glass: High pressure die-cast rim holding a toughened front glass.

Trunnion arm: Galvanised mild steel.

Clips: Stainless steel.

Gaskets: Silicone rubber.

SPECIFICATION

■ Type compliance with BS 4533 Section 102-5 Enclosure: IP34.

■ Class I electrical protection (this luminaire requires an earth connection).

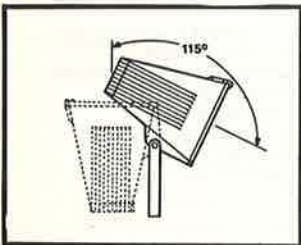
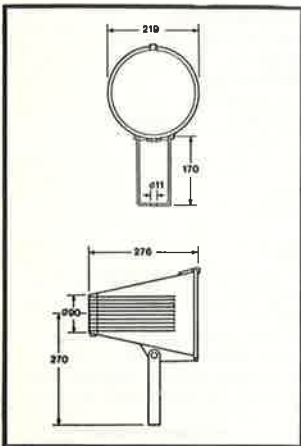
To specify state:

Floodlight of pressure die-cast aluminium for PAR 56 lamps similar to Philips DVF 102 floodlight.

Fitting: Made in Holland

RANGE OF OPERATION

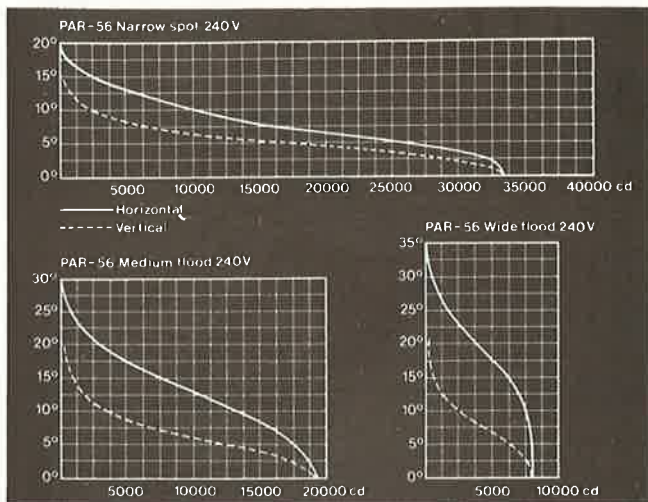
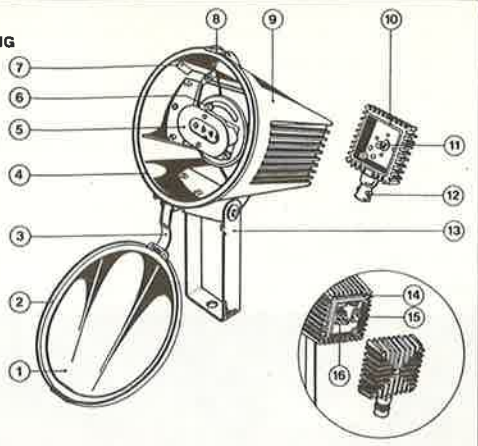
Determined by range of lamps.



ADJUSTMENT POSSIBILITIES

DETAILED DRAWING

1. Front glass
2. Front glass rim
3. Hinge clip
4. Silicone rubber gasket
5. Safety ring
6. Lampholder adjusting screw
7. Spring to keep lamp in position
8. Clip
9. Housing
10. Rear cover
11. Fixing screw
12. Gland
13. Bracket
14. Silicone rubber gasket
15. Earth screw
16. Terminal block



DIMENSIONS, WEIGHTS & ELECTRICAL DATA

Lamp Data

Type	Watts	Beam Pattern	Voltage	Cap
PAR 56	300	Narrow spot	240	GLX/16D
PAR 56	300	Medium flood	240	GLX/16D
PAR 56	300	Wide flood	240	GLX/16D

For spares see floodlight spares data sheet.

ORDERING DATA:

Catalogue Number	Weight kg.	Packing Qty.	Dimensions, mm	
			Width	Height
DVF 102	3.0	1	277	385

★Lamps should be ordered separately



DHF 016

Floodlight Projector

A corrosion resistant and weather-proof floodlight to IP34, designed for applications where variation in colour and intensity is required.

RANGE

For use with:
 1 x PARE 38 80W
 1 x Blown bulb Reflector lamp
 100/150W.
 1 x HPL-R

APPLICATIONS

- Applications include:
- "Sound and light" spectacles
 - Park lighting
 - Poster hoardings
 - Festive lighting
 - Floodlighting of buildings
 - Monuments
 - Advertising signs
 - Statues
 - Gardens etc.

FEATURES

- High-pressure die-cast aluminium housing with cooling fins for heat dissipation.
- High-pressure die-cast aluminium rear cover with cable entry gland.
- High-pressure die-cast aluminium rim, in which the toughened front glass is fixed.
- Galvanised mild steel bracket allowing all possible mounting positions.
- Silicone gaskets to withstand high operating temperatures.
- Inner wiring: Silicone covered and glass fibre protected.
- ES (E27) porcelain lampholder.
- Stainless steel clips and fixing material.
- Supplied with 1 x PG11 cable gland.

To reorder this data sheet quote

PL 1289/3

Issued 9 82

Replaces PL 1289/4

FLOODLIGHTING

DHF 016 FLOODLIGHT PROJECTOR

MATERIALS & FINISH

Housing: High pressure die-cast aluminium.

Rear cover: High pressure die-cast aluminium.

Front Glass: High pressure die-cast rim holding a toughened front glass.

Trunnion arm: Galvanised mild steel.

Clips: Stainless steel.

Gaskets: Silicone rubber.

SPECIFICATION

■ Type compliance with BS 4533

Section 102.5 Enclosure: IP34.

■ Class I electrical protection (this luminaire requires an earth connection).

To specify state:

Floodlight of High pressure die-cast aluminium for PAR-E 38 Lamps Blown Bulb and lamps similar to Philips DHF 016 floodlight.

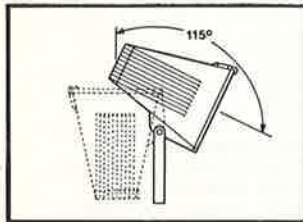
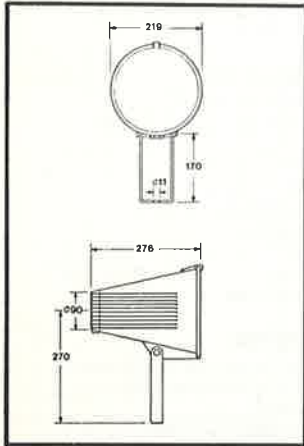
RANGE OF OPERATION

Determined by range of lamps.

Lamp and Fitting: Made in Holland.

LIGHT DISTRIBUTION

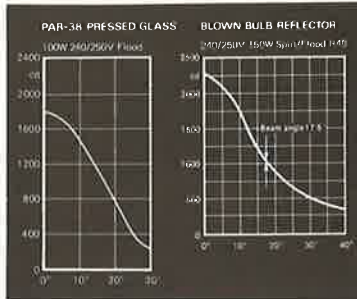
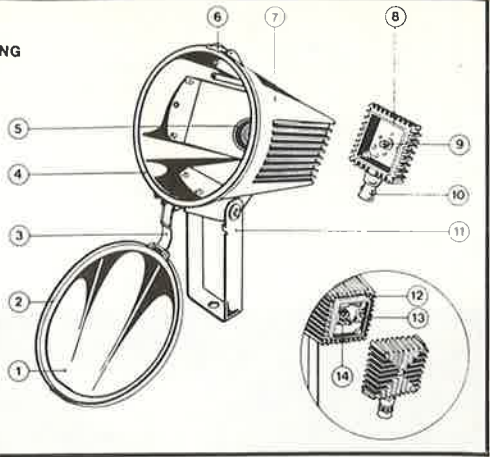
Refer to data sheet of relevant lamp for photometric information.



ADJUSTMENT POSSIBILITIES

DETAILED DRAWING

1. Front glass
2. Front glass rim
3. Hinge-clip
4. Silicone rubber gasket
5. E27 porcelain lampholder
6. Clip
7. Housing
8. Rear cover
9. Fixing screw
10. Gland
11. Bracket
12. Silicone rubber gasket
13. Earth screw
14. Terminal block



DIMENSIONS, WEIGHTS & ELECTRICAL DATA

Lamp Data

Lamp Description	Wattage	Voltage	Cap	Finish
PAR-E 38 Spot	100	240	ES	Clear
PAR-E 38 Flood	100	240	ES	Clear
PAR-E 38 Flood	100	240	ES	Blue
PAR-E 38 Flood	100	240	ES	Yellow
PAR-E 38 Flood	100	240	ES	Green
PAR-E 38 Flood	100	240	ES	Red
PAR-E 38 Spot	150	240	ES	Clear
PAR-E 38 Flood	150	240	ES	Clear
PAR-E 38 Spot	150	240	ES	Yellow
PAR-E 38 Spot	150	240	ES	Green
PAR-E 38 Spot	150	240	ES	Red
PAR-E 38 Spot	150	240	ES	Blue
R30 Blown Bulb	75	240	ES	Diffused
R30 Blown Bulb	100	240	ES	Diffused
R30 Blown Bulb	150	240	ES	Diffused
HPL-R	125	240	ES	Diffused

See Floodlight Spares Data Sheet for Spares

ORDERING DETAILS

Catalogue No.	Weight kg.	Packing Quantity	Dimensions, mm	
			Width	Height
DHF 016	3.0	1	276	385

★Lamps should be ordered separately

DHF 017/K DHF 017/SK

**Outdoor floodlight luminaire
KombiPaks for use with
80W PAR-E38 flood or spot
lamps**

DHF KombiPaks are suitable for use in any small floodlighting application where toughness, durability and versatility are important. Each luminaire is supplied as a kit, complete with PAR-E38 spot lamp and all necessary fixing accessories.

RANGE

Two KombiPaks, each supplied with lamp and accessories for hard or soft surface mounting:

DHF 017/SK—Floodlight body, aluminium stem, baseplate for hard surfaces, 80W PAR-E38 spot lamp and gasket.

DHF 017/K—Floodlight body, aluminium stem, ground spike, 80W PAR-E38 spot lamp and gasket.

APPLICATIONS

Applications include:

- Floodlighting bushes and shrubs in gardens
- Floodlighting statues
- Lighting building facades
- Driveways and patios
- Hoardings and notices
- Footpaths, pedestrian crossings and bridges



FLOODLIGHTING



To reorder this Data Sheet quote **PL 8162/2**
Replaces PL 8162/1

DHF 017/K, DHF 017/SK – FLOODLIGHTING

FEATURES

- Corrosion-proof black polycarbonate body is tough and resistant to vandals.
- Versatile fixing arrangements permit easy installation in most situations.
- Convenient KombiPak kit contains everything needed for installation, including lamp.
- Suitable for use with white or coloured PAR-38 lamps (max. 100W) or PAR-E38 (max. 80W).
- Light weight ensures easy installation.
- Beam is easily adjusted to point in any direction.
- Class II insulation eliminates the need for earthing; floodlight has the Degree of Protection IP55.
- Twin cable entries permit through-wiring.

MATERIALS & FINISH

- Body:** Black polycarbonate
- Ground spike:** Black polycarbonate
- Base plate:** Black polycarbonate
- Stem:** Aluminium
- Gasket:** Silicone rubber

SPECIFICATION

Type compliance with BS 4533 Section 102.5 Class II electrical protection (double insulated – earth not required). Degree of Protection IP55.

To specify state:

PAR-E38 lamp luminaire for outdoor floodlighting, with vandal-resistant polycarbonate body. Supplied as a KombiPak complete with lamp and accessories. Similar to Philips DHF 017.

RANGE OF OPERATION

For use on 240V 50Hz supplies.
Normal outdoor conditions.

LAMP DATA

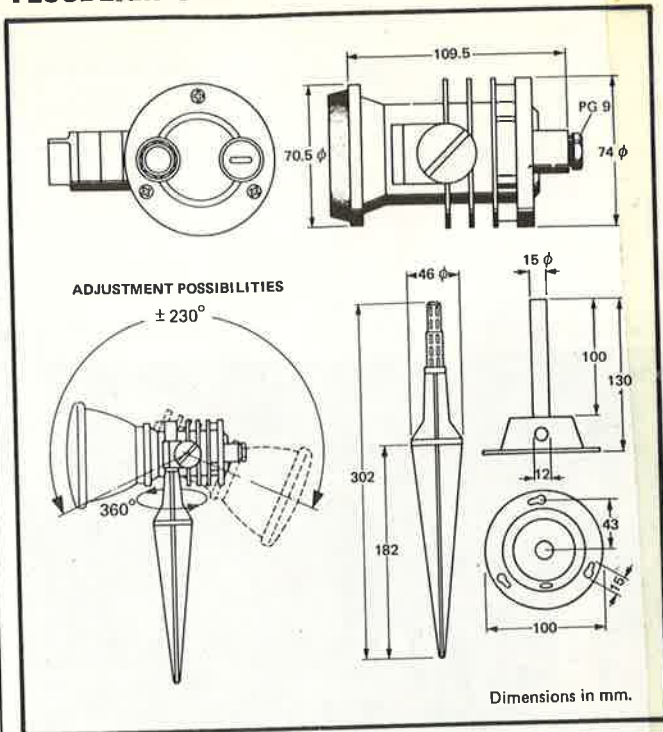
Catalogue No.	Watts	Volts	Cap	Finish	Beam angle	Beam Centre Intensity (Candelas)
PAR 38 spot	100	240	ES	Clear	16°	4000

For details of other PAR 38 lamps refer to PL1790

ORDERING DATA

Catalogue No.	Description	Packing Quantity
DHF 017/SK	Floodlight KombiPak complete with PAR 38 lamp and baseplate	1
DHF 017/K	Floodlight KombiPak complete with PAR 38 lamp and ground spike	1

For spares see floodlight spares data sheet.



DIMENSIONS & WEIGHTS

Weight:

Floodlight complete with lamp and spike or baseplate: 0.6Kg

Cable entry: PG9 (Suitable for double insulated cable of circular cross section with a diameter between 4.5mm and 7.0mm)

PAR 38 SPOT 100W

METRES	BEAM ANGLE 2x8°
1	4000
2	1000
3	440 LUX
4	250

Lamp: Made in Holland
Luminaire: Made in West Germany

9,500 Lumens



SNF 100- AREA FLOODLIGHT KOMBIPAK

Self-contained floodlight complete with pre-wired control gear for 100W SON/T lamp. The luminaire has high efficiency asymmetric reflectors, and is supplied with lamp and trunnion arm mounting.

RANGE

SNF 100 – KombiPak floodlight complete with lamp.

APPLICATIONS

Suitable for floodlighting where a low-glare economic lighting package is needed: –

Security

- Factory perimeters.
- Car parks.
- Gatehouses.
- Loading bays.

Decorative

- Facades.
- Statues and monuments.
- Infill.

Indoor

- Churches and halls.
- Gymnasias.
- Deep freezes.

Extending working hours

- Building sites.
- Outdoor work areas.
- Roadworks.

To reorder this Data Sheet quote

PL 3056

Issued 4/84

New

FLOODLIGHTING

SNF 100-AREA FLOODLIGHT KOMBIPAK

FEATURES

- Sturdy housing in injection-moulded Polycarbonate; functional black finish.
- Hingeable 5mm toughened glass front plate held by four stainless steel clips for easy-lamp replacement.
- Hot-dipped galvanised trunnion arm; black finish.
- Permanently-attached control gear box in glass-reinforced nylon; access via four stainless steel screws.
- Asymmetric light distribution.
- Class II electrical wiring (no earth needed) with PG 16 gland and stress relief clamp.
- Silicone gaskets on both optical and gear compartments provide IP55 Degree of Protection.
- Aiming protractor on bracket and aiming sight on optical section permits daylight setting.

MATERIALS AND FINISH

Body and gearbox: Housing is injection-moulded polycarbonate with the gear box in injection-moulded glass-reinforced nylon; both matt black finish.

Front cover: 5mm toughened glass.

Mounting bracket: Hot-dipped galvanised mild steel; black finish.

External screws and clips: Stainless steel.

SPECIFICATION

■ Designed to comply with BS 4533 102.5 Class II (no earth required).

■ Degree of Protection IP55.

To specify state: –

Area floodlight with asymmetric optical control and pre-wired integral gear, supplied with a 100W SON/T lamp. Similar to Philips SNF 100.

RANGE OF OPERATION

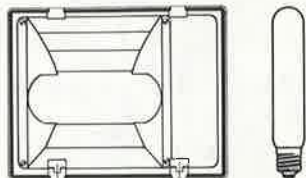
240V 50Hz supplies.

Indoor or normal outdoor operation.

KOMBIPAK CONTENTS

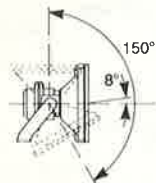
One area floodlight
SNF 100/02K

One 100W SON/T
high pressure sodium
lamp.

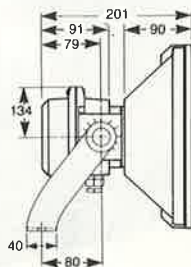
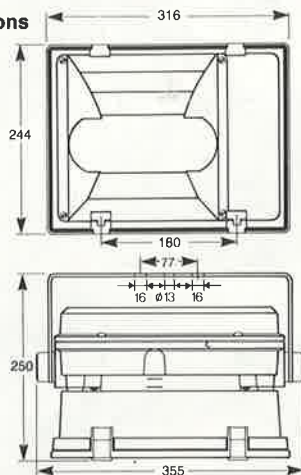


DIMENSIONS & ADJUSTMENT POSSIBILITIES

Adjustment possibilities

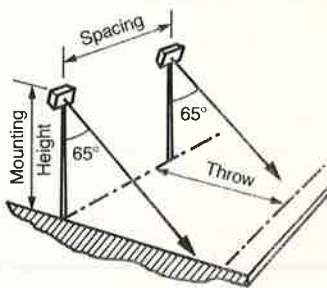
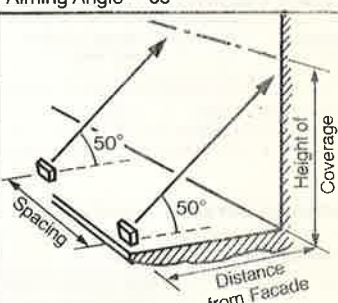
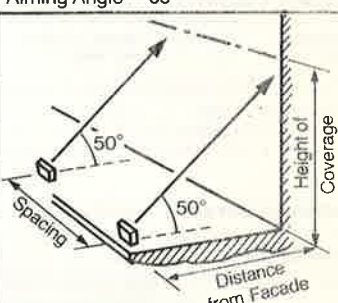


Dimensions



All dimensions in mm

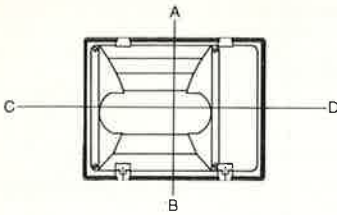
Philips First Choice Floodlights – Design Guide/Application Guide

Reasons to Choose Summary	SNF 100 (100 W SON /T)				AIMING ANGLE
	9,500 Lumens				
	Low Running Cost Weather Resistant Vandal Resistant				
Car Parks Storage Areas Security 10-30 lux* 10:1 Uniformity**	Mounting Height (Metres)	Spacing (Metres)	Throw Illuminated (Metres)	Illuminance (Lux)	 <p>Aiming Angle = 65°</p>
	5	24	22	10-20	
	6	24	24	10-20	
	7	24	26	10-15	
Building Sites Higher Risk Areas 30-80 lux* 5:1 Uniformity**	4	12	13	45-65	 <p>Aiming Angle = 50°</p>
	5***	18	14	50-70	
	5	8	14	45-65	
	6***	14	17	50-70	
Facades Decorative Floodlighting Restaurants/Pub Facades 80-120 lux* 5:1 Uniformity**	Distance from facade (Metres)	Spacing (Metres)	Height of coverage (Metres)	Illuminance (Lux)	 <p>Aiming Angle = 50°</p>
	4	9	9	85-105	
	5	8	10	80-90	
	6***	12	12	90-110	
<p>* lux CIBS Code recommendations ** Uniformity ratio of minimum to average illuminance recommended *** Floodlights mounted in pairs at each point.</p>					

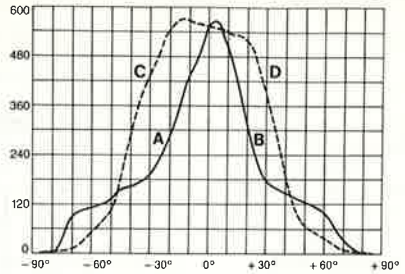
SNF100-AREA FLOODLIGHT KOMBIPAK

Light Distribution Diagram

Planes used for Distribution Diagrams



AB = Vertical
CD = Horizontal



Floodlight SNF 100/02

Peak Intensity (cd/1000 lm)	591
Beam Efficiency	
Total Beam	77%
Beam (10% Peak)	
Vertical	73°/66°
Horizontal	53°/58°
Beam (50% Peak)	
Vertical	19°/22°
Horizontal	35°/39°

Absolute intensity (cd) = Intensity (cd/1000 lm) × $\frac{\text{Lighting Design Lumens}}{1000}$

WEIGHT & ELECTRICAL DATA

Catalogue No.	Lamp type	Weight complete with lamp	Circuit current (A)	Total circuit Watts	Lamp cap
SNF 100/02K	100W SON/T	5.6kg	0.6	115	GES

ORDERING DETAILS

Catalogue No.	Description	Packing Qty
SNF 100/02K	Floodlight luminaire with control gear and 100W SON/T lamp	Individually packed

Please order in the form given in the following example: -

10 Philips area floodlights SNF 100

Lamp: Made in Belgium
Luminaire: Made In Holland



SNF 200 MNF 200

Area floodlight KombiPaks

Self-contained floodlight luminaires complete with pre-wired control gear for 150W or 250W high-pressure sodium (SON/T) lamps or 250W metal halide (HPI/T) lamp, and fixing bolts. The luminaires feature high-efficiency asymmetric optics and versatile mounting arrangements.

Note: Metal halide lamps
UK marking MBI = Philips
International marking HPI

RANGE

SNF 200/01 – KombiPak complete with floodlight, 150W SON/T lamp and fixing bolts.

SNF 200/02 – KombiPak complete with floodlight, 250W SON/T lamp and fixing bolts.

MNF 200/02 – KombiPak complete with floodlight, 250W HPI/T lamp and fixing bolts.

APPLICATIONS

Suitable for all floodlighting applications for which a well-controlled beam is appropriate, including:

- Areas and building sites
- Marshalling yards
- Building facades
- Car parks
- Industrial premises
- Floodlighting of buildings
- Statues and fountains

To reorder this Data Sheet quote

PL 3033/2

Issued 7/83

Replaces PL 3033/1

SNF 200 MNF 200

FEATURES

- Sturdy housing in high-pressure die-cast aluminium with anti-corrosive black finish.
- Light-controlling front cover is made of vandal-resistant polycarbonate which also resists yellowing from UV radiation.
- Accurate asymmetric light control by means of high-grade aluminium reflectors and refracting cover ensures high efficiency.
- Silicone rubber gasket seals front cover to housing with the Degree of Protection IP 55 (jetproof and dustproof).
- Reversible cover permits pole, wall or ceiling mounting.
- Choice of lamp types (SON/T for economy; HPI/T for excellent colour rendering) makes the luminaire suitable for most applications.
- Integral control gear, prewired to three-way terminal block, permits simple connection to standard mains supplies.
- Cable entry through sealing gland with built-in cable stress release.
- Simple lamp changing by removing front cover does not disturb light throw adjustment.
- Floodlight supplied with 1 x PG 13-5 cable gland.

- Supplied complete with lamp, and fixing bolts.
- Simple step by step design guide included with each kombiPak.
- Optional pole clamp see floodlight spares data sheet.

MATERIALS & FINISH

- Body:** High-pressure die-cast aluminium, black finish.
- Front cover:** High-pressure die-cast aluminium, black finish, with UV-resistant etched polycarbonate controller.
- Mounting bracket:** Mild steel, hot-dip galvanised and painted black.

SPECIFICATION

- Designed to comply with BS 4533 102.5 Class I electrical (earth required).
- Degree of Protection IP 55.

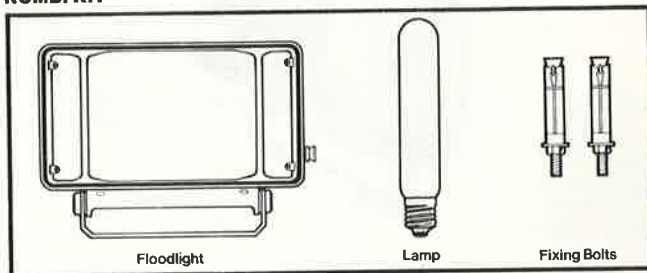
To specify state:

Area floodlight with precise optical control and prewired integral control gear for HPI/T or SON/T lamp, supplied complete with lamp and fixing accessories. Similar to Philips SNF 200.

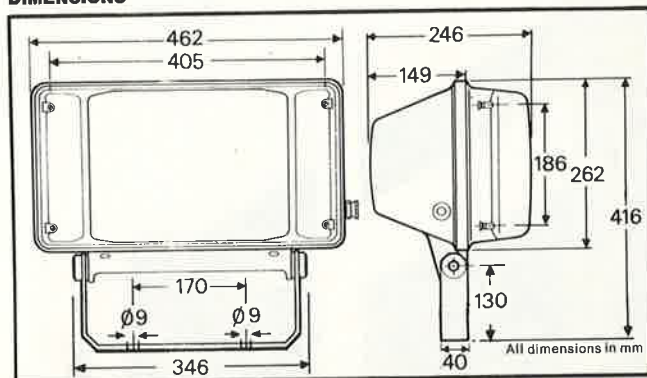
RANGE OF OPERATION

240V 50Hz supplies.
Indoor or normal outdoor applications.

KOMBI KIT



DIMENSIONS



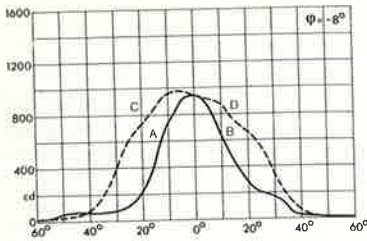
Philips First Choice Floodlights – Design Guide/Application Guide

LUMEN PACKAGE	SNF 200/01 MNF 200/02				SNF 200/02			
	16K Lumen				25K Lumen			
Reasons to Choose Summary	Low Running Cost Weather Resistant Vandal Resistant				Low Running Cost Weather Resistant Vandal Resistant			
1. Car Parks Storage Areas 10-30 lux * 10:1 Uniformity **	Mouning Height	Spacing	Width Illuminated	Illuminance	Mouning Height	Spacing	Width Illuminated	Illuminance
	5	12	12	29				
	6	14	14	20				
	7	17	17	15	7	17	17	23
	8	19	19	11	8	19	19	18
					9	21	21	14
2. Building Sites Higher Risk Areas 30-80 lux * 5:1 Uniformity **	4	8	8	58				
	5	10	10	37	5	10	10	58
					6	12	12	40
3. Facades Decorative Floodlighting Restaurants/Pub Facades 80-120 lux * 5:1 Uniformity **	4	6	6	111				
	5	8	7	71	5	8	7	111
					6	10	8	77
lux *- CIBS Code recommendations Uniformity **- Ratio of minimum to average illuminance recommended	AIMING ANGLE				AIMING ANGLE			
	1. 65°				1. 65°			
	2. 65°				2. 65°			
3. 50°				3. 50°				

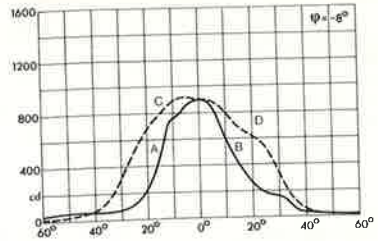
SNF 200 MNF 200

LIGHT DISTRIBUTION DIAGRAMS

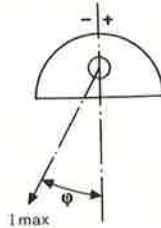
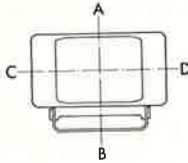
SNF 200/01 - 1 x 150W SON/T



SNF 200/02 - 1 x 250W SON/T



Planes used for Distribution Diagrams



AB = Vertical
CD = Horizontal on -6° vertical plane for SON/T

Floodlight	SNF 200/01 150W SON/T	SNF 200/02 250W SON/T
Peak Intensity cd/1000 lm	939	889
Beam Angles (50% Peak)		
Vertical	15°/13°	15°/13°
Horizontal	2 x 27.5°	2 x 27.5°

WEIGHTS & ELECTRICAL DATA

Catalogue No.	Lamp type	Weight complete with lamp (kg)	Circuit current (A)	Total circuit Watts	Lamp cap
SNF 200/01	150W SON/T	7.5	0.90	174	GES
SNF 200/02	250W SON/T	8.4	1.30	280	GES
MNF 200/02	250W HPI/T	7.6	1.30	268	GES

ORDERING DATA

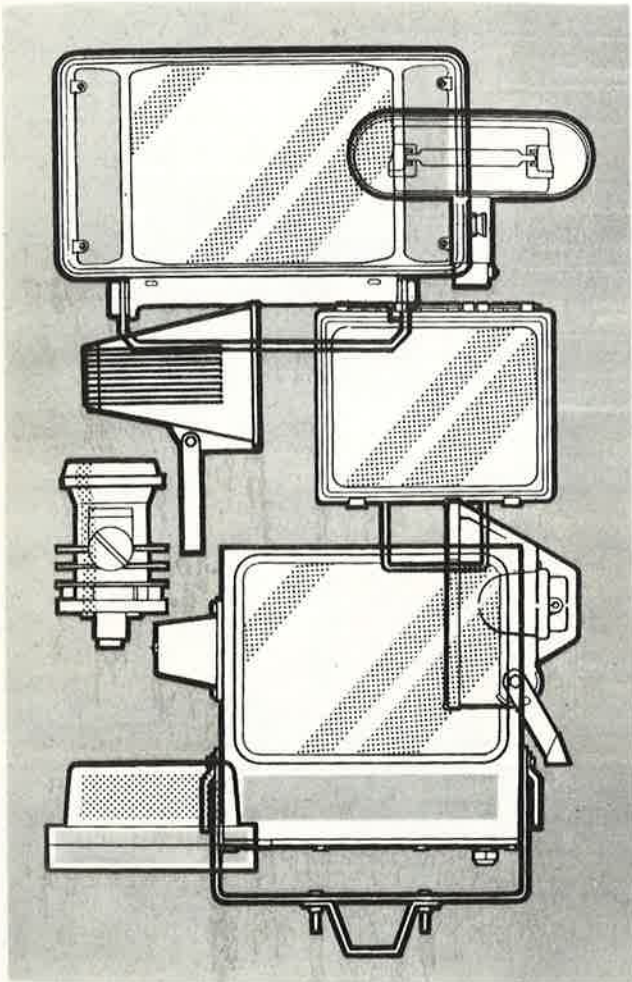
Catalogue No.	Description	Packing quantity
SNF 200/01	Luminaire with control gear and 150W SON/T lamp	Individually packed
SNF 200/02	Luminaire with control gear and 250W SON/T lamp	Individually packed
MNF 200/02	Luminaire with control gear and 250W HPI/T lamp	Individually packed

Please order in the form given in the following example:-
10 Philips Area floodlights SNF 200/02

SPARES AND OPTIONS

Catalogue No.	Description	Packing quantity
SNFPC	Pole clamp for 60 & 76mm spigots	1
BSNF150	Ballast for SNF 200/01	1
BSN250	Ballast for SNF 200/02	1
SNFFG	Front cover for SNF & MNF200	1

Lamp: Made in Belgium
Luminaire: Made in Great Britain



DISCHARGE LUMINAIRES

Floodlighting Spare Parts

A range of spares and accessories for Philips Floodlights.

RANGE

Front Glasses
Gaskets
Front Glass Clips
Lampholders
Lamp Supports
Pole Clamps
Wall Brackets

APPLICATIONS

For use as replacement or spares for Philips floodlighting range.

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FLOODLIGHTING

To reorder this Data Sheet quote

PL 3063

Issued 10,84

NEW

FLOODLIGHTING SPARES

Floodlight HNF 001

Description	Catalogue No.
Front glass: for round cornered for square cornered	HNF 001 OT FG HNF 001 FG
Sealing gasket: for round cornered* for square cornered	HNF 001 OT SG HNF 001 SG
Front glass clips: for round cornered for square cornered	GC 001/R GC 001/S
Lampholder: for all wattages	HNF LHR
Lamp support: for 1000W lamp for 400W lamp	HNF LS10 HNF LS04

* Supplied in two parts each 2 metres and with fitting tool.

Floodlight HNF 002

Front glass: for round cornered for square cornered	HNF 002 OT FG HNF 002 FG
Sealing gasket: for round cornered for square cornered	HNF 001 SG HNF 002 SG
Front glass clips: for round cornered for square cornered	GC 002/R GC 002/S
Lampholder: for all wattages	HNF LHR
Lamp support: for 2000W lamp	HNF LS20

Floodlight HNF 003

Front glass: for round cornered for square cornered	HNF 003 OT FG HNF 003 FG
Sealing gasket: for round cornered for square cornered	HNF 003 OT SG HNF 003 SG
Front glass clips: for round cornered for square cornered	GC 002/R GC 002/S
Lampholder: for all wattages	HNF LHR
Lamp support: for 400W lamp	HNF LS04
Pole clamp: suitable for 60 x 76mm poles	SNF PC

* Supplied in two parts each 2 metres and with fitting tool.

Floodlight HNF 006

Description	Catalogue No.
Front glass:	HNF 006 FG
Sealing gasket: <i>supplied in two parts each 2 metres and with fitting tool.</i>	HNF OT SG
Front glass clip: <i>supplied as screw, bracket and plate</i>	GC 006
Lampholder:	HNF LHR

Floodlight HNF 012

Front glass:	HNF 012 FG
Front glass clip:	GC 012
Lampholder: for 2000W	HNF LHR

Floodlight HNF 013

Front glass:	HNF 013 FG
Sealing gasket:	HNF 013 SG
Front glass clip:	GC 013
Lampholder: for 2000W	HNF LHR

Floodlight NNF 010

Front glass:	NNF 010 FG
Sealing gasket: <i>supplied in two parts each 2 metres and with fitting tool.</i>	HNF OT SG
Lampholder: for all wattages	HNF LHR

Floodlight QVF 410

Front glass: <i>includes sealing gasket</i>	QVF 40 FG
Lampholder: <i>supplied as a pair</i>	QVF 40 LHR

Floodlight QVF 411

Front glass: <i>includes sealing gasket</i>	QVF 411 FG
Lampholder: <i>supplied as a pair</i>	QVF 410 LHR



ROMFORD BREWERY

Three Philips SNF200 floodlights with 150W SON/T lamps evenly spaced down each gangway provide a uniform 500 lux at floor level in the work areas, without wasting light over the tops of vehicles. A total of 24 luminaires are used.



SALISBURY CATHEDRAL

The different colours of metal halide and warm and cool fluorescent lamps, each individually controlled and dimmable, permit an infinite variety of lighting effects. Six lighting 'scenes' are preset. A portable plug-in control console is used to give theatrical effects in Services and other functions.

FLOODLIGHTING SPARES

Floodlight QVF 412

Description	Catalogue No.
Front glass: <i>includes sealing gasket</i>	QVF 412 FG
Lampholder: <i>supplied as a pair</i>	QVF 410 LHR

Floodlight QVF 420

Front glass:	QVF 420 FG
Lampholder:	QVF 420 LHR

Floodlight QVF 421

Front glass:	QVF 421 FG
Lampholder:	QVF 421 LHR

Floodlight QVF 422

Front glass:	QVF 422 FG
Lampholder:	QVF 422 LHR

Floodlight R77 Series/TV Flood

Front glass: <i>supplied with gasket</i>	TVF GLASS
Lampholder: for all wattages	MA30 LHR

Floodlight SNF 200/MNF 200

Front assembly: polycarbonate moulded total front <i>painted as original</i>	SNF FG
Lampholder: for all wattages	HNF LHR
Spare ballast: for SNF 200 02K for SNF 200 01K for MNF 200 02K	BSNF 250 BSNF 150 MSNF 250
Pole clamp: <i>suitable for 60 and 76mm poles</i>	SNF PC

Floodlight SNF 100

Front glass:	SNF FG
Front glass clip: <i>supplied as a set of 4</i>	SNF FGC
Lampholder:	HNF LHR
Pole clamp: <i>suitable for 60 and 76mm poles</i>	SNF PC

Floodlight DHF 017

Description	Catalogue No.
Sealing ring:	DHF SR
Sealing glass assembly: <i>suitable for 4.5mm to 7.00mm double insulated circular section cable</i>	PG9 KIT
Lampholder:	DHF LHR

Floodlight DVF 102/DHF 016

Front glass: <i>supplied with rim</i>	DVF 102 FG
Front glass clip: <i>one only</i>	DVF GC
Lampholder: for DVF 102 for DHF 016	DVF 102 LHR DHF LHR

Floodlight Apollo

Wireguard: to inhibit vandalism	A101
Spigot cap: for 2 inch scaffold poles	A102
Universal bracket: for fixed or adjustable wall mounting	A103
Pole clamp: 'U' bolt clamp for 48mm (1½ inch GAS) pole	A104
Lampholder:	A500 LHR

Floodlight W4321 & W4326

Front glass diffuser:	W4330
Wire guard:	W4331

7

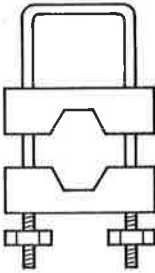
FLOODLIGHTING SPARES

Wall Brackets and Pole Clamps

Floodlight	Application	Catalogue No.
SNF200 01K, SNF200-02K, MNF200 02K; SNF100 02K; HNF003	mounted on 60 & 76mm poles	SNFPC
A300 and A500	mounted on 48mm (1 1/2 inch GAS) poles	A104

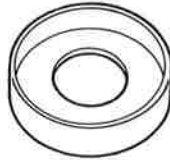
DIAGRAMS

SNF PC

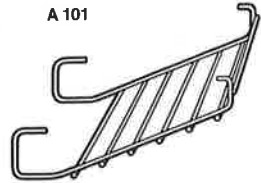


Suitable for 60 & 76mm poles

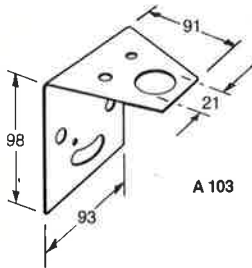
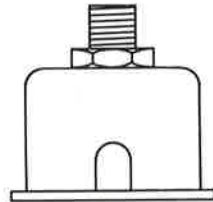
DHF SR



A 101

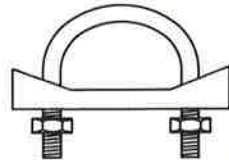


A 102



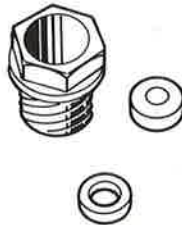
A 103

A 104



Suitable for 48mm (1 1/2 inch GAS) poles

PG9 KIT



All dimensions in mm

INCANDESCENT LAMPS

	Page
GLS Lamps	295
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Light Point	317

Please see pages II and III of General
Introduction for information on how to use
this Handbook.



GLS

General lighting service Incandescent lamps

RANGE

This Data Sheet covers pear-shaped lamps in clear, pearl, coiled-coil, single-coil and low-voltage versions, K-Mushroom, Superlux, Fireglow and Nightlight lamps.

APPLICATIONS

- Clear bulbs: Used to create sparkle in glass fittings, etc.
- Pearl bulbs: Lightly diffused to reduce filament glare and to soften shadows.
- Argenta bulbs: White internal coating to give a high degree of diffusion and reduced glare.

FEATURES

- **Quality:** Stringent quality control procedures and meticulous attention to cleanliness result in a high degree of uniformity to specification.
- **Safety:** Test and inspection procedures are geared to the safety of lamps in service. All GLS lamps of 25 Watts or greater, rated for supply voltages of 100V or more, are internally fused.
- **New Packaging:** 60mm & 68mm pear shaped lamps and 60mm mushroom shaped lamps have a new high quality sleeve specifically denoting the lamp within in a new pictorial style.

8

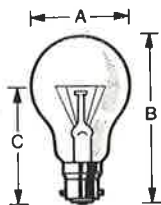
LAMPS INCANDESCENT

To reorder this data sheet quote **PL 1789/5**

Issued 8.83

Replaces PL 1789/4

GLS – LAMPS INCANDESCENT

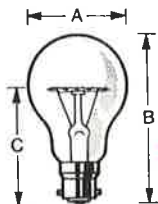


GLS Coiled Coil

GLS Coiled-coil

Rating	Dimensions (mm)		C
	A	B	
25W-100W	60	103	70
150W	68	125	90

GLS Coiled-coil – high efficiency
For general use, with more light output than single-coil and long life equivalents.

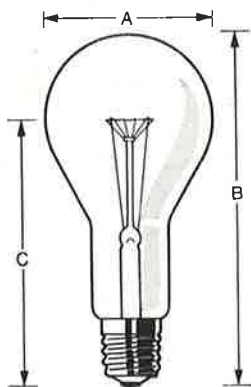


GLS Single Coil

GLS Single-coil

Rating	Dimensions (mm)		C
	A	B	
15W-100W	60	103	70
150W, 200W	80	160	120
300W, 500W	110	233	178
1000W	130	290	225

GLS Single-coil – normal efficiency
A range of high and low wattage and low voltage types, for use where the benefits of coiled-coil filaments are not applicable.



GLS Single Coil

K-Mushroom

Rating	Dimensions (mm)	
	A	B
40W-100W	60	100
150W	75	120

K-Mushroom – Modern, attractive, compact shape with internal white 'Argenta' finish for maximum diffuslon. Gives a softer light and looks neater and more modern when not in use. Coiled-coil filaments. Smaller box sizes.

Superlux

Rating	Dimensions (mm)	
	A	B
60W-100W	60	100
150W	75	120

Superlux – Directional mushroom lamp giving a diffused wide (2 x 35%) downward beam while retaining some upward light. A useful working light and possible economical alternative to wide beam reflector lamps.

Fireglow

Rating	Dimensions (mm)	
	A	B
60W	60	103

Fireglow – A durable red lacquer creates a warm, glowing flame effect for use in fuel effect fires.

Night light

Rating	Dimensions (mm)	
	A	B
8W	60	103

Night light – Gives a sense of security to children and elderly people when used in bedrooms, nurseries, stairways and hospitals. Has a low power consumption for economy.

Dimensions are nominal and for BC caps. For ES caps add 1.5mm to dimension B.

GLS – LAMPS INCANDESCENT

Wattage	Voltage	Cap	Finish	Packing quantity
25W	240V	BC	Pearl	25
40W	240V	BC	Pearl, clear	25
40W	240V	ES	Pearl	25
40W	250V	BC	Pearl	25
60W	240V	BC	Pearl, clear	25
60W	240V	ES	Pearl	25
60W	250V	BC	Pearl	25
75W	240V	BC	Pearl	25
100W	240V	BC	Pearl, clear	25
100W	240V	ES	Pearl	25
100W	250V	BC	Pearl	25
150W	240V	BC/ES	Pearl	25

Wattage	Voltage	Cap	Finish	Packing quantity
15W	240V	BC	Pearl	25
200W	240V	BC	Pearl, clear	25
200W	240V	ES	Clear	25
300W	240V, 250V	GES	Clear	10
500W	240V, 250V	GES	Clear	10
1000W	240V, 250V	GES	Clear	10

110V lamps

25W	110V	BC	Pearl	25
40W	110V	BC	Pearl	25
60W	110V	BC/ES	Pearl	25
100W	110V	BC/ES	Pearl	25
300W	110V	GES	Clear	10
500W	110V	GES	Clear	10

25V and 50V lamps for emergency lighting

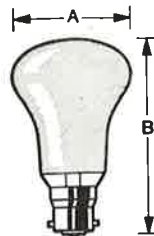
25W	25V, 50V	BC/ES	Pearl	25
40W	25V, 50V	BC/ES	Pearl	25
60W	25V, 50V	BC/ES	Pearl	25
100W	25V, 50V	BC	Pearl	25
100W	25V	ES	Pearl	25

Wattage	Voltage	Cap	Finish	Packing quantity
40W	240V	BC	Argenta	25
60W	240V	BC	Argenta	25
100W	240V	BC	Argenta	25
150W	240V	BC	Argenta	25

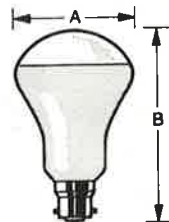
Wattage	Voltage	Cap	Finish	Packing quantity
60W	240V	BC	Argenta	25
100W	240V	BC	Argenta	25
150W	240V	BC	Argenta	25

Wattage	Voltage	Cap	Finish	Packing quantity
60W	240/250V	BC, 3-pin BC	Amber	10 x 10

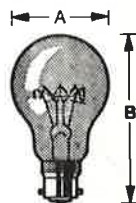
Wattage	Voltage	Cap	Finish	Packing quantity
8W	240/250V	BC	Pearl	10 x 10



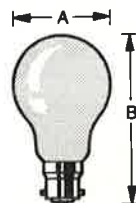
K. Mushroom



Superlux



Fireglow



L. Night Light

GLS - LAMPS INCANDESCENT

PERFORMANCE DATA

For General Lighting Service tungsten filament lamps.

Lumen output

Initial rated lumens to BS 161

High efficiency. Pear-shaped 240V

Watts	Lumens
25	225
40	420
60	710
75	940
100	1360
150	2180

Normal efficiency. Pear-shaped

240V		110V	
Watts	Lumens	Watts	Lumens
15	115	25	225
200	2900	40	445
300	4650	60	770
500	8300	100	1420
1000	1840	150	2360
		200	3300
		300	5200
		500	9400
		1000	20200

Lighting design notes

Lighting design lumens are usually taken at about 94% of initial rated lumens.

End of life lumens are typically 90% of initial rated lumens.

Effect of supply voltage on performance

The life expectancy and light output of tungsten filament lamps are highly dependent on supply voltage, as shown in fig. 1 and fig. 2.

These curves may be used as a guide to average performance, but factors such as frequency of switching, vibration and temperature exert a greater influence on expected results as voltage deviates further from normal.

GLS lamps may be operated in any position, but life expectancy may be reduced in positions other than cap-up.

SPECIFICATION

GLS lamps are designed to conform with BS 161 (IEC 64) and related British and European Standards where applicable. Also with BS 5971 Safety and Interchangeability of Tungsten Filament Lamps for domestic and similar General Lighting purposes.

Figure 1

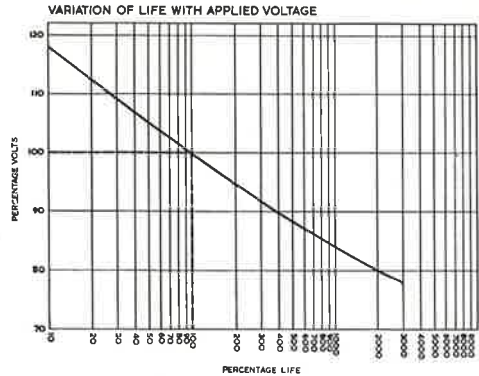
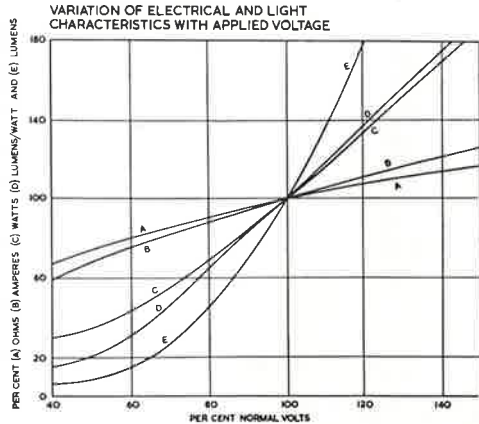


Figure 2



Made in Great Britain.



DECORATIVE incandescent lamps

A range of tungsten filament lamps for use on normal mains supplies, for effect or decorative lighting.

RANGE

This Data Sheet covers internally-coloured pear-shaped GLS lamps, plain and twisted candle lamps, round bulb and tubular types.

For Coloured pygmy lamps see data sheet PL 1787, Special Service Lamps.

APPLICATIONS

- Clear bulbs: Used to create sparkle in glass fittings, chandeliers, etc.
- Pearl bulbs: Lightly diffused to reduce glare and filament images, and to soften shadows.
- Argenta bulbs: White internal coating to give a high degree of diffusion and reduced glare, having an attractive appearance when switched off.
- Argenta rose: Pink tone for restful warmth.

FEATURES

- Quality: Stringent quality control procedures and meticulous attention to cleanliness result in a high degree of uniformity to specification.
- Safety: Test and inspection procedures are geared to the safety of lamps in service.

8

LAMPS INCANDESCENT

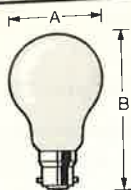
To reorder this Data Sheet quote

PL 1788/4

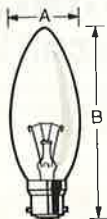
Issued 6/83

Replaces PL 1788/3

DECORATIVE — LAMPS INCANDESCENT



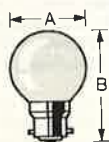
Coloured GLS-
Argenta Rose



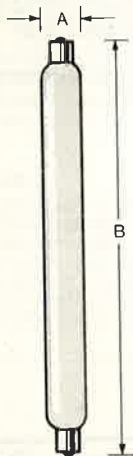
Plain Candle



Twisted Candle



Argenta Lustre



Striplite

Coloured GLS

Rating	Dimensions (mm)	
	A	B
15W-60W	60	103

Coloured GLS - Lamps for mood lighting and parties available in six standard colours: Red, Blue, Green, Yellow, Amber, and Pink. 15W and 25W ratings can be used outdoors with weatherproof lampholders.

Argenta Rose

60W, 100W	60	103
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Argenta Rose - Gives a soft pink light for an intimate atmosphere.

Plain Candle

Rating	Dimensions (mm)			
	A	B	B (BC)	B (SES)
25W, 40W, 60W*	35	89	95.5	97
60W	45	125	127	—

Plain Candle - Attractive, slim olive shape in clear and White Argenta. Clear candles are frequently used in glass chandeliers to create sparkle. All types have coiled-coil filaments for improved light output.

*Clear version only

Twisted Candle

Rating	Dimensions (mm)		
	A	B	B (BC)
25W	35	97	100
40W, 60W	47	125	127

Twisted Candle - Decorative, slim twisted shape in clear finish; an alternative to the plain candle lamp.

Argenta Lustre

Rating	Dimensions (mm)			
	A	B	B (BC)	B (ES)
25W, 40W	45	68.5	73.5	70

Argenta Lustre - A small, round bulb with an internal white Argenta coating, frequently used where the bulb itself forms part of the design of the fitting.

Striplite

Rating	Dimensions (mm)	
	A	B
30W, 60W	25	221 or 284

Striplite - Double cap, clear or opal, in two lengths. Useful for concealed lighting or for low glare (opal), over mirrors, bedheads, aquaria, etc.

Colorenta

Rating	Dimensions (mm)	
	A	B
60W	38	303

Colorenta - Single cap, inside white, giving a uniform soft, diffuse light over the whole lamp.

Philinea 1

Rating	Dimensions (mm)	
	A	B
35W	26	300 (12")
60W	26	500 (20")
75W	26	610 (24")

Philinea 1 - Architectural Straight lamp with concealed peg or new flat (S14s) caps in several lengths, with similar surface brightness. Opal White finish.

Philinea 2

Rating	Dimensions (mm)	
	A	B
35W	26	300 (12")
60W	26	500 (20")

Philinea 2 - Architectural Straight lamp with single central concealed flat cap. Opal finish.

Dimensions are nominal

DECORATIVE — LAMPS INCANDESCENT

Wattage	Voltage	Cap	Finish	Packing quantity
Coloured GLS				
15W	240/250V	BC	Externally coloured	10 x 10
25W	240/250V	BC	Externally coloured	10 x 10
40W*	240/250V	BC	Externally coloured	10 x 10
60W*	240/250V	BC	Externally coloured	10 x 10
100W*	240/250V	BC	Externally coloured	10 x 10

Argenta rose				
60W	240/250V	BC	Argenta	25
100W	240/250V	BC	Argenta	25

*Not suitable for outdoor use unless protected against rain.

Wattage	Voltage	Cap	Finish	Packing quantity
25W	240/250V	BC	Clear, Argenta	50 (5 x 10)
		SBC	Clear, Argenta	50 (5 x 10)
		SES	Argenta	50 (5 x 10)
40W	240/250V	BC	Clear, Argenta	50 (5 x 10)
		SBC	Clear, Argenta	50 (5 x 10)
		SES	Argenta	50 (5 x 10)
60W (47mm dia.)	240/250V	BC	Clear, Argenta	50 (5 x 10)
		SBC	Clear, Argenta	50 (5 x 10)
60W (35mm dia.)	240/250V	BC	Clear	50 (5 x 10)
		SBC	Clear	50 (5 x 10)

Wattage	Voltage	Cap	Finish	Packing quantity
25W	240/250V	BC, SBC	Clear	50 (5 x 10)
40W	240/250V	BC, SBC	Clear	50 (5 x 10)
60W	240/250V	BC, SBC	Clear	50 (5 x 10)

Wattage	Voltage	Cap	Finish	Packing quantity
25W	240/250V	BC, SBC, ES, SES	Argenta	50 (5 x 10)
40W	240/250V	BC, SBC, ES, SES	Argenta	50 (5 x 10)

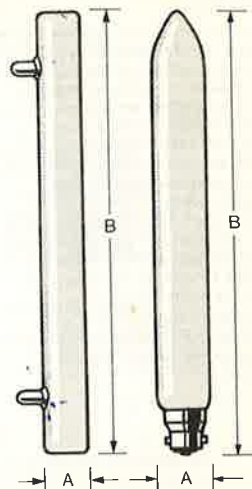
Wattage	Voltage	Cap	Finish	Packing quantity
30W	240/250V	S15s	Clear, opal	25
60W	240/250V	S15s	Clear, opal	25

Wattage	Voltage	Cap	Finish	Packing quantity
60W	240/250V	BC	Argenta	25

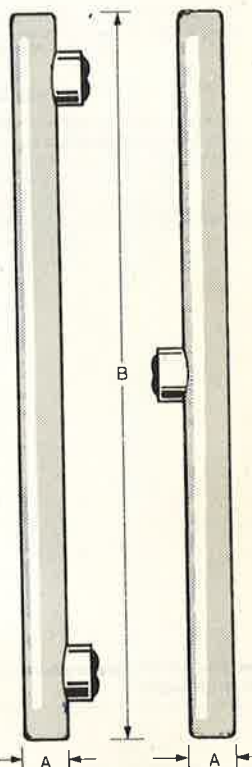
Wattage	Voltage	Cap	Finish	Packing quantity
35W	240/250V	Peg	Opal	25
60W	240/250V	Peg	Opal	25
75W	240/250V	Peg	Opal	25

35W	240V	S14s	Opal	25
60W	240V	S14s	Opal	25

Wattage	Voltage	Cap	Finish	Packing quantity
35W	240V	Central Peg S14d	Opal	25
60W	240/250V	Central Peg S14d	Opal	25



Philinea 1 Colorenta (Peg)



Philinea 1 (S14s)

Philinea 2

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DECORATIVE — LAMPS INCANDESCENT

Effect of supply voltage on performance

In common with all tungsten filament lamps, the life expectancy and light output of decorative lamps are highly dependent on supply voltage. To reduce the effect on expected life of higher supply voltages, decorative lamps are rated nominally for 245V supplies, unless otherwise stated.

The data shown may be used as a guide to average performance, but factors such as frequency of switching, vibration and temperature exert a greater influence on expected results as voltage deviates further from the nominal.

GLS lamps may be operated in any position, but life expectancy may be reduced in positions other than cap-up.

PERFORMANCE DATA for Tungsten Filament Decorative Lamps

Figure 1

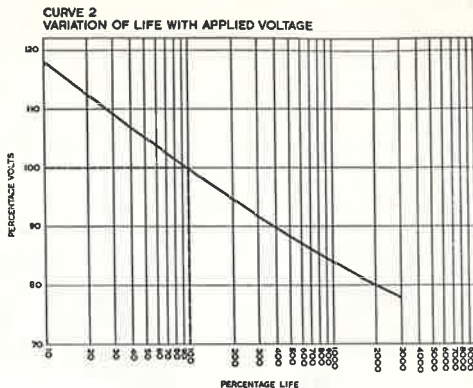
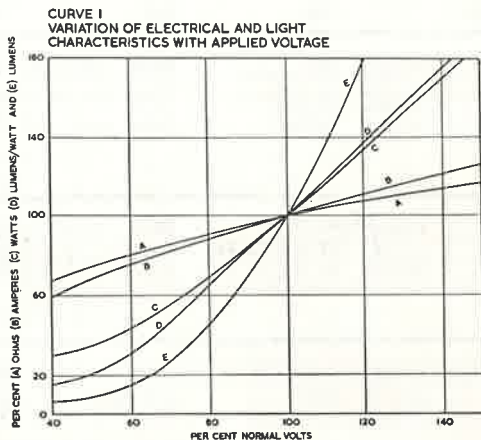


Figure 2



Lamps: Made in UK unless otherwise stated on packaging.



SPECIAL SERVICE

Incandescent lamps

A range of tungsten filament lamps manufactured for specific applications, or for special conditions of service.

RANGE

This Data Sheet covers lamps for rough service conditions; sign and coloured sign, pilot and indicator lamps, traffic signal; appliance; baker's oven and tungsten ballast lamps.

Details of traffic signal and infra-red heat lamps are given on Data Sheets PL 1898 & PL 1805.

FEATURES

- **Quality:** Stringent quality control procedures and meticulous attention to cleanliness result in a high degree of uniformity to specification.
- **Safety:** Test and inspection procedures are geared to the safety of lamps in service.

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INCANDESCENT LAMPS


To reorder this Data Sheet quote

PL 1787/2

Issued 8/83

Replaces PL 1787/1

SPECIAL SERVICE TYPES – INCANDESCENT LAMPS



Rough Service

Rough Service


Rating	Dimensions (mm)		
	A	B	B
40W, 60W	60	103	104.5
100W	68	125	—

Rough Service—Reinforced internal construction gives increased resistance to filament breakage due to jolts and vibration. Suitable for use in hand inspection lamps, for industrial machine lighting and similar applications.


Sign

Rating	Dimensions (mm)				
	A	B	B	B	B
15W	28	57	63	60.5	64.5

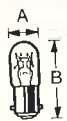
Sign—A range of pygmy sign lamps with many applications.




Sign



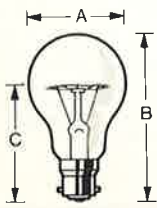
Internally Coloured Sign



Pilot



Switchboard Indicator



Traffic Signal

Internally Coloured Sign

Rating	Dimensions (mm)		
	A	B	(BC)
15W	28	57	—

Internally Coloured Sign—Red, blue, white, green, yellow, pink and amber. The lamps may be used externally in suitable holders.

Pilot

Rating	Dimensions (mm)			
	A	B	B	B
6/10W	20 (max)	40	46	44

Pilot—Small indicator lamps for many applications.

Switchboard Indicator

Rating	Dimensions (mm)	
	A	B
10W	28	57

Switchboard Indicator—Special-purpose lamp, for telephone switchboard indication.

Traffic Signal

Rating	Dimensions (mm)		
	A	B	C
65W	60	104.5	62

Appliance

Rating	Dimensions (mm)		
	A	B	B
25W tubular	28.5	61 (max)	—
25W round	45	—	71
40W pear	45	—	90.5

Appliance—Special-purpose lamps, for use in cookers, and other appliances.

Baker's Oven

Rating	Dimensions (mm)	
	A	B
60W	60	103

Baker's Oven—Special design to withstand temperatures up to 450°F (232°C).

Dimensions are nominal

STOP PRESS: Additional Appliances and Oven Lamps are being introduced into our range. Please enquire for details.

SPECIAL SERVICE TYPES – INCANDESCENT LAMPS

Wattage	Voltage	Cap	Finish	Packing quantity
40W	240/250V	BC, ES	Pearl	25
60W	240/250V	BC, ES	Pearl	25
100W	200/250V	BC, ES	Pearl	25
40W	110/120V	BC	Pearl	25
60W	110/120V	BC	Pearl	25
100W	110/120V	BC	Pearl	25

Wattage	Voltage	Cap	Finish	Packing quantity
15W	25V	BC	Clear	100
15W	50V	BC	Clear	100
15W	110V	BC, SBC, ES, SES	Clear	100
15W	120/130V	BC	Clear	100
15W	200/250V	BC, SBC, ES, SES	Clear	100

Wattage	Voltage	Cap	Finish	Packing quantity
15W	200/250V	BC	Internally coloured	100

Wattage	Voltage	Cap	Finish	Packing quantity
6W	100/130V	SBC, SES, E12	Clear	100
10W	200/250V	SBC, SES, E12	Clear	100

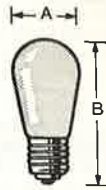
Wattage	Voltage	Cap	Finish	Packing quantity
10W	200/260V	BC	Clear	100

Wattage	Voltage	Cap	Finish	Packing quantity
65W	240V	ES	Clear	25

Wattage	Voltage	Cap	Finish	Packing quantity
25W tubular	230/250V	BC	Clear	100
25W round	230/250V	ES	Pearl	50
40W pear	230/250V	ES	Pearl	100

Wattage	Voltage	Cap	Finish	Packing quantity
60W	240V	BC	Clear	25

Appliance



Pear



Round



Tubular



Bakers Oven

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SPECIAL SERVICE TYPES – INCANDESCENT LAMPS

Effect of supply voltage on performance

In common with all tungsten filament lamps, the life expectancy and light output of special service lamps are highly dependent on supply voltage. The data shown may be used as a guide to average performance, but factors such as frequency of switching, vibration and temperature exert a greater influence on expected results as voltage deviates further from the nominal.

GLS lamps may be operated in any position, but life expectancy may be reduced in positions other than cap-up.

PERFORMANCE DATA for tungsten filament special service lamps

Figure 1

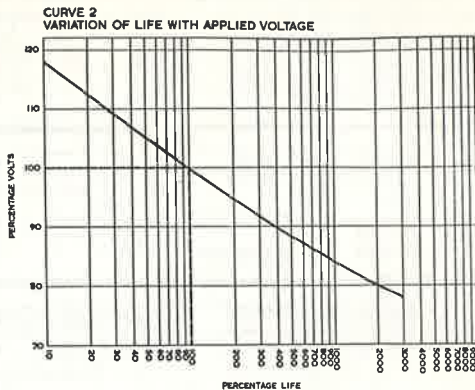
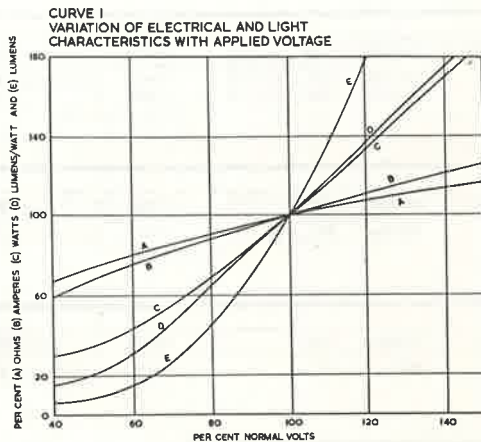
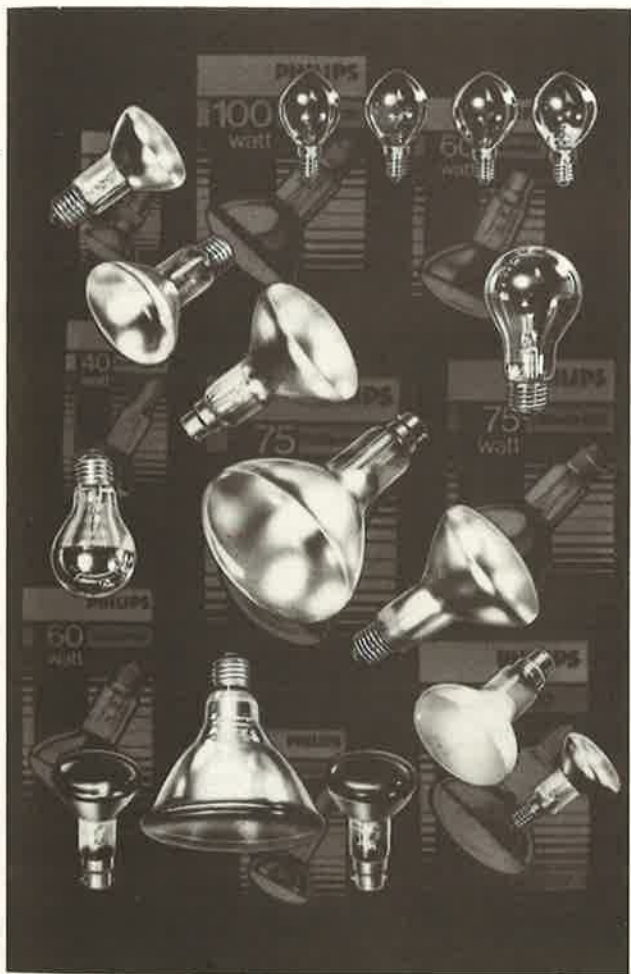


Figure 2



Lamps: Made in UK unless otherwise stated on packaging.



DISPLAY REFLECTOR LAMPS

Incandescent lamps

A comprehensive range of lamps for display and effect lighting in commerce, industry and the home, including pressed glass types also suitable for exterior lighting.

RANGE

This Data Sheet covers internally silvered reflector lamps rated from 30W to 300W in various beam widths and colours and crown silvered lamps from 30W to 100W.

Details of tungsten-halogen display lamps are given on Data Sheet PL 1898.

FEATURES

- **Quality:** Stringent quality control procedures and close attention to filament positioning result in a high degree of uniformity to specification.
- **Safety:** Test and inspection procedures are geared to the safety of lamps in service. All GLS lamps of 25 Watts or greater, rated for supply voltages of 100V or more, are internally fused.

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LAMPS INCANDESCENT

To reorder this Data Sheet quote

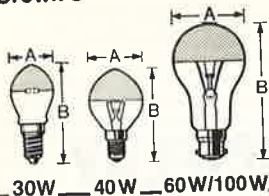
PL 1790/6

Issued 8 83

Replaces PL 1790/5

DISPLAY REFLECTOR LAMPS

Crown Silvered



30W — 40W — 60W/100W

Rating	Max. Dimensions (mm)			
	A	B (BC)	B (ES)	B (SES)
30W	36	—	—	73.5
40W	45	—	—	77.5
60W	60	103.5	105.0	—
100W	68	123.0	124.5	—

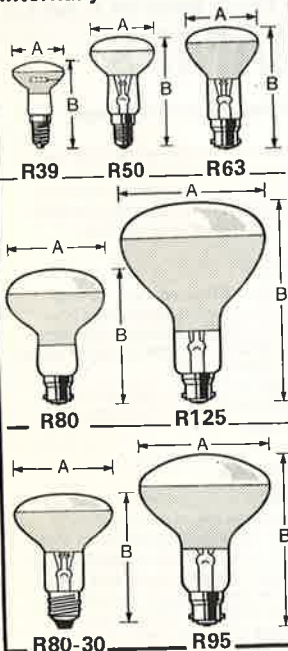
Crown Silvered - bowl reflector

Principal use is in conjunction with external reflector to give a sharply

defined narrow beam of high intensity for accent display work.

The 30W lamp is an addition to the 40W and has the same distinctive 'pointed' reflectorised crown which gives a brighter and more homogenous beam from parabolic dishes by directing more light onto the dish. Cap temperature rise is also reduced. The 30W has the same light centre length and can therefore be substituted in the same luminaires.

Internally Silvered



Rating	Max. Dimensions (mm)			
	A	B (BC)	B (ES)	B (SES)
R39 (30W)	40	—	—	66.5
R50 (40W)	64	101	102.5	—
R63 (40, 60W)	80	113	114.5	—
R80 (Ro80)	80	—	112.0	—
(60, 75, 100W)	80	—	112.0	—
R80-30	95	140	141.5	—
R95 (75, 100W)	125	182	183.5	—
R125 (150W)	125	182	183.5	—

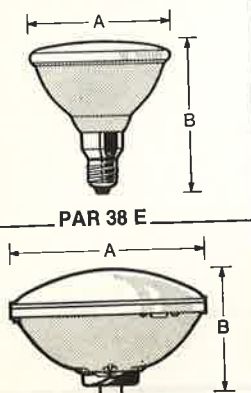
Internally Silvered-blown bulb reflector

A comprehensive range from narrow spot to wide flood in various voltages to suit lighting applications such as displays, exhibitions, task, reading and indoor spotlighting. Especially effective in Philips display fittings.

Also available is the R80 'Disco lamp' in sparkling transparent colours.

New introduction:- R39, 30W reflector for miniaturised luminaires in many applications.

Pressed Glass



PAR 38 E

PAR 56

(Not to scale)

Rating	Max. Dimensions (mm)	
	A	B
PAR 38-E (60, 80, 120)	122.5	136
PAR 56 (300W)	179	127

Pressed Glass

Precision-made, efficient lamps of robust construction to give high beam intensity with 2000 hours nominal average life.

PAR38-E

Full range includes Colour and Cool Spot versions. 120W coloured lamps have stained glass for permanence of colour. All PAR 38 lamps except Cool Spot and 120W coloured lamps may be used for outdoor applications in suitable fittings.

PAR56

Available in three beam widths with an elliptical pattern. Frequently used in high-mounted long-throw applications and in purpose-built fittings where it is located by means of the front rim. Protect from water splashes.

DISPLAY REFLECTOR LAMPS

Description	Wattage	Voltage	Cap	Finish	Beam angle†	Beam centre Intensity Candelas	Packing quantity
Bowl reflector	30W	240/250V	SES	Clear	—	—	20
Bowl reflector	40W	240/250V	SES	Clear	—	—	20
Bowl reflector	60W	240/250V	BC, ES	Clear	—	—	25
Bowl reflector	100W	240/250V	BC, ES, 3-pin BC	Clear	—	—	25

Description	Wattage	Voltage	Cap	Finish	Beam angle†	Beam centre Intensity Candelas	Packing quantity
R39	30W	240V	SES	Diffused	42°	180cd	25
R50 30°	40W	240V	SES	Diffused	30°	425cd	25
R63 30°	60W	240/250V	BC, ES	Diffused	30°	800cd	25
R80 (Ro80) Philux 80°	60W	240/250V	BC, ES	Diffused	80°	270cd	25
R80 (Ro80) Philux 80°	75W	240/250V	BC, ES	Diffused	80°	360cd	25
R80 (Ro80) Philux 80°	100W	240/250V	BC, ES	Diffused	80°	530cd	25
R80 (Ro80) 'Disco lamp'	40W	240V	ES	Transparent colours*	—	—	12
R80-30 30°	75W	240/250V	ES	Diffused	30°	1000cd	25
R80-30 30°	100W	240/250V	ES	Diffused	30°	1500cd	25
R95 30°	75W	240/250V	BC, ES	Diffused	30°	1050cd	10
R95 30°	100W	240/250V	BC, ES	Diffused	30°	2300cd	10
R125 35°	150W	240/250V	BC, ES	Diffused	35°	2000cd	10
R63 coloured	40W	240/250V	BC, ES	Red, blue, green, yellow	—	—	12
R95 coloured	100W	240/250V	BC, ES	Red, blue, green, yellow, amber	—	—	10

*Available in blue/yellow/green/red/amber/purple

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Description	Wattage	Voltage	Cap	Finish	Beam angle†	Beam centre Intensity Candelas	Packing quantity
PAR38-E spot	60W	240V	ES	Clear	12°	3400	15
PAR38-E flood	60W	240V	ES	Clear	30°	1200	15
PAR38-E spot	80W	240V	ES	Clear	12°	5400	15
PAR38-E flood	80W	240V	ES	Clear	30°	1800	15
PAR38-Enarrow spot	120W	24V	ES	Clear	10°	23000	15
	120W	110V	ES	Clear	12°	10450	15
PAR38-E spot	120W	240V	ES	Clear	12°	9300	15
PAR38-E flood	120W	110V	ES	Clear	30°	3400	15
	120W	240V	ES	Clear	30°	3100	15
PAR38-E cool spot*	120W	240V	ES	Clear	12°	9300	15
PAR38-E coloured flood	80W	240V	ES	Red, blue, yellow, green	30°	—	15
PAR38-E coloured spot	120W	240V	ES	Red, blue, yellow, green	16°	—	15
PAR56 narrow spot	300W	240V	GLX16d	Clear	15° x 9°	40000	6
PAR56 medium flood	300W	240V	GLX16d	Clear	25° x 11°	22000	6
PAR56 wide flood	300W	240V	GLX16d	Clear	40° x 16°	9000	6

*Dichroic reflector focuses visible light while permitting heat content to pass through. Heat content of beam is reduced by up to 75%. This lamp may only be used in special heat-resisting fittings.

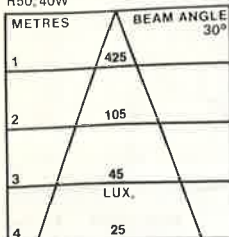
†Beam angle between 50% Intensity values. Diagrams overleaf.

DISPLAY REFLECTOR LAMPS

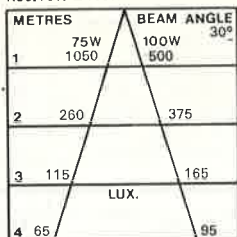
Internally Silvered

Pressed Glass

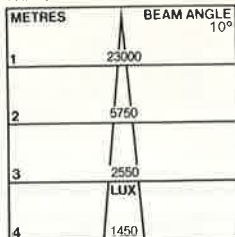
R50, 40W



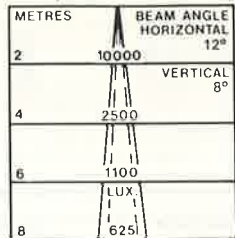
R95, 75W & 100W



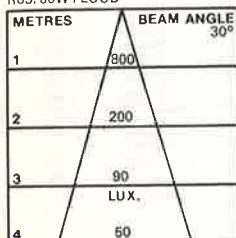
PAR 38-E 120W 24V SPOT



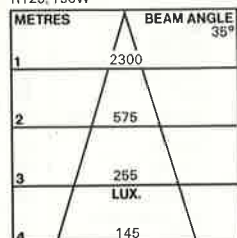
PAR 56, 300W NARROW SPOT



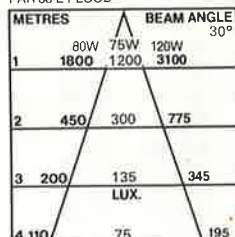
R63, 60W FLOOD



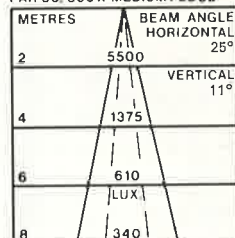
R125, 150W



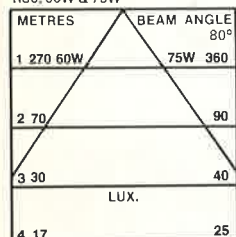
PAR 38-E FLOOD



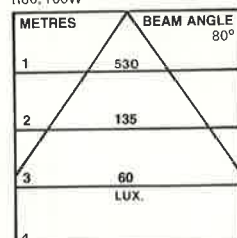
PAR 56, 300W MEDIUM FLOOD



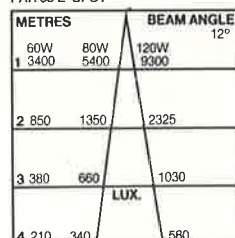
R80, 60W & 75W



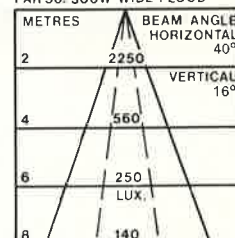
R80, 100W



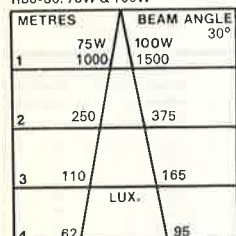
PAR 38-E SPOT



PAR 56, 300W WIDE FLOOD



R80-30, 75W & 100W



Using the Guide

The beam cones are drawn at the angles where the light intensity is 50% of the centre intensity. PAR 56 lamps give an elliptical beam.

The 'Lux' is a measure of the illuminance on a surface (lumens per sq. metre), and the values given are at beam centre for the distances shown.

Lux is calculated by dividing intensity (candelas) by the distance squared (m²), for surfaces at 90° to the beam. Candela values are shown in the table. The I.E.S. Interior Lighting Code recommends:

Shop display 500 Lux
 Desk Lighting 500 Lux
 Casual Reading 150 Lux

Made in UK unless otherwise stated on packaging



PAR38-E LAMPS

Display reflector lamps

A new range of pressed-glass lamps of high luminous intensity; in reduced ratings to save energy but producing the same useful light as conventional PAR38 lamps.

RANGE

Clear finish

240V 60W, 80W and 120W spot and flood (replacing 75W, 100W and 150W PAR38 respectively).

110V 120W spot and flood.

24V 120W spot.

240V 120W cool spot.

Colours (red, green, yellow, blue)

240V 80W flood.

240V 120W spot.

APPLICATIONS

Energy-saving direct replacements for PAR38 lamps, or for use in new installations: -

Indoors

- Shop and window display lighting.
- Hotels and restaurants.
- Theatres and museums.
- Commercial display work.
- Domestic lighting.

Outdoors

- Floodlighting.
- Advertising signs.
- Statues and garden displays.
- Sports podia and activities.

TOP: Spot
BOTTOM: Flood

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LAMPS INCANDESCENT

To reorder this Data Sheet quote

PL 3055

Issued 2.84

New

PAR38-E - LAMPS INCANDESCENT

FEATURES

Flood

■ Improved reflector reduces the light outside the beam, giving performance within the beam matching the conventional PAR38 with 20% lower energy consumption.

■ Prismatic front glass provides a homogenous floodlight beam.

Spot

■ Improved reflector reduces beam angle from 16° (PAR38) to 12°, and gives increased beam intensity for 20% lower energy consumption.

General

■ Hard glass envelope gives mechanical strength and protection from thermal shock.

■ Physically identical to PAR38; can be used as direct replacement in existing equipment.

DIMENSIONS



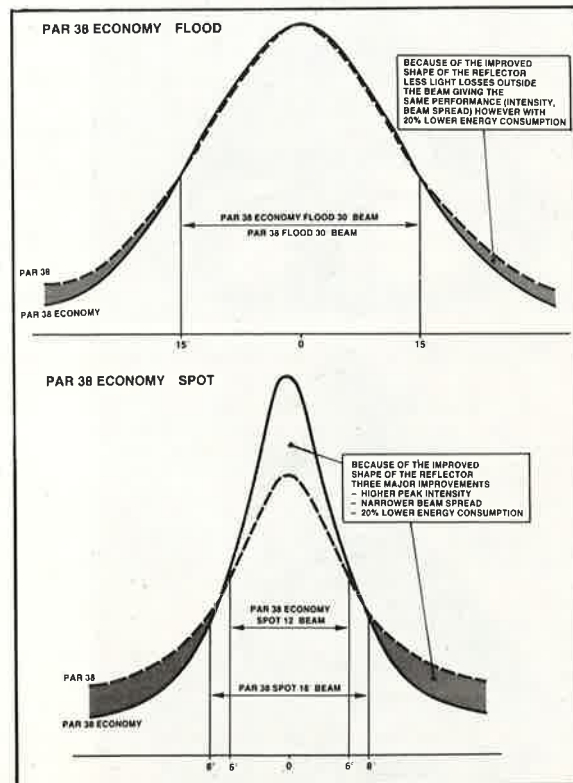
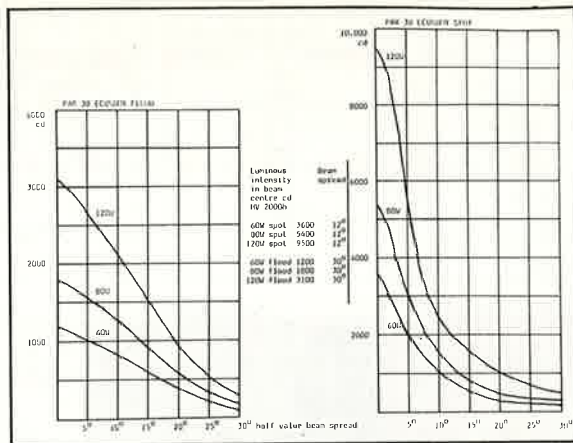
ORDERING DETAILS

Please order lamps quoting spot or flood, voltage and wattage, and finish in multiples of the packing quantity. Lamps are boxed in quantities of 15, e.g. 60 PAR-E lamps, 240V 80W clear finish flood.

Note that all lamps have E27 (ES) caps.

Type	Wattage	Voltage	Finish
Spot	60	240	Clear
Flood	60	240	Clear
Spot	80	240	Clear
Flood	80	240	Clear
Flood	80	240	Blue
Flood	80	240	Yellow
Flood	80	240	Green
Flood	80	240	Red
Spot	120	240	Clear
Spot	120	110	Clear
Spot	120	240	Clear
Cool Spot	120	240	Clear
Flood	120	110	Clear
Flood	120	240	Clear
Spot	120	240	Red
Spot	120	240	Green
Spot	120	240	Yellow
Spot	120	240	Blue

PROVISIONAL DATA PAR 38 ECONOMY LAMPS





DISPLAY LAMPS

Tungsten Halogen Single Ended

A range of low voltage lamps for spotlighting

RANGE

- 6V 15W "Halogen Spot" (three beam widths) used in the Lightpoint (PL3035)
- 6V 35W "Halogen Spots" (two beam widths)
- 12V 20W "Halogen Spot"
- 12V 50W "Halogen Spots" (two beam widths)
- M/28—12V 100W
- M/32—12V 50W

APPLICATIONS

Indoors: Halogen Spots in various beam widths for display applications and accent lighting.

M/28, M/32, in conjunction with purpose-built fittings for:

- Shops and show windows
- Bars
- Discotheques
- Museums and exhibitions
- Precision task lighting

FEATURES

- Excellent colour rendering
- Constant light output throughout long life.
- Precision manufacture for correct beam control.
- "Halogen Spots" have strong bayonet fixing, protective front glass and bright aluminium integral reflectors for lasting bright performance in fittings.
- M/32 and M/28 have platinum plated pins for reliable contact through life, and good resistance to repeated switching.

8

LAMPS INCANDESCENT

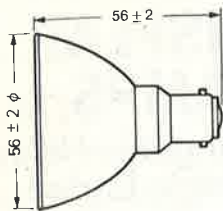
To reorder this Data Sheet quote

PL 1898/6

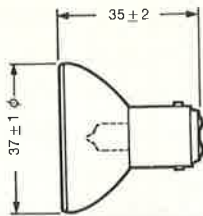
Issued 6/83

Replaces PL 1898/5

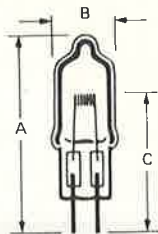
TUNGSTEN HALOGEN LAMPS



15W Halogen Spot 4° & 14°
35W Halogen Spot 6° & 14°
50W Halogen Spot 10° & 25°



15W Halogen Spot 6°
20W Halogen Spot



M/28, M/32

All dimensions in mm.

BEAM ANGLE DATA

Halogen Spots 12 Volt 50 Watt

METRES	BEAM ANGLE	
1	10000	10° 25° 1750
2500		440
1110		190
625		100

LUX

Halogen Spots 6 Volt 15 Watt

METRES	BEAM ANGLE	
1	10000	4 6 5000
2	2500	1250
3	1100	550
4	625	312

LUX

Halogen Spot 6 Volt 15 Watt

METRES	BEAM ANGLE	
1		1200 14
2		300
3		135
4		75

LUX

Halogen Spot 12 Volt 20 Watt

METRES	BEAM ANGLE	
1		5000 5
2		1250
3		555
4		310

LUX

The beam cones are drawn at the angles where the light intensity is 50% of the centre intensity. For details of other single-ended halogen lamps see Data Sheet PL 1810.

Life expectancy:

In common with other incandescent lamps, life expectancy is greatly influenced by applied voltage. The characteristic curves given on PL 1789/1 General Lighting Service lamps may be used as a guide.

ORDERING AND GENERAL DATA

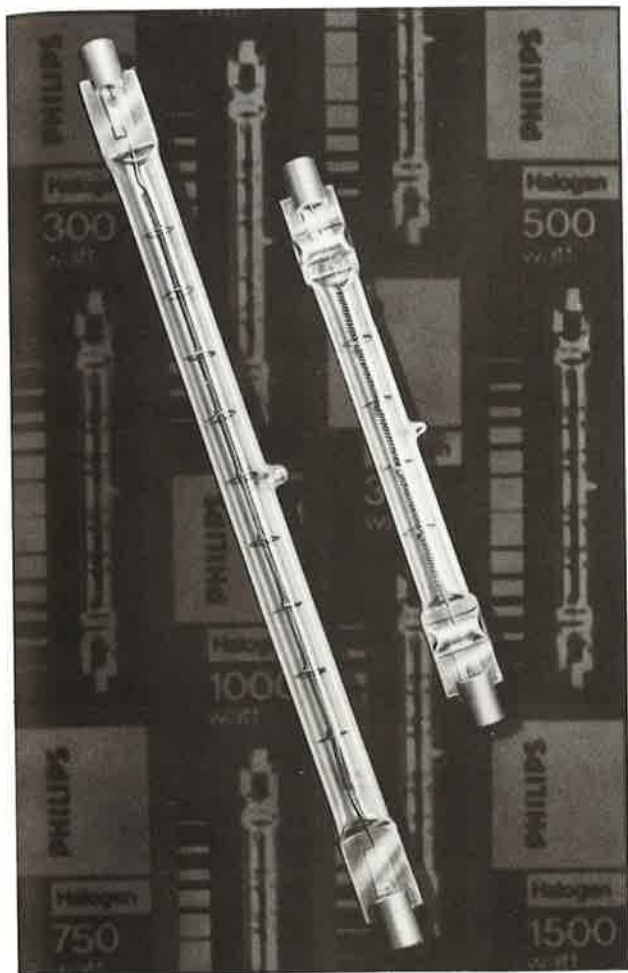
Type	Cat. No.	Watts	Volt	Base	Bulb dia max A	Overall length max B	Light Centre length C	Average life (hrs)	Centre beam intensity (cd)	Burning Position	Packing quantity
M/28	7724	100	12	GY6.35	13.5	45	30±0.25	2000	2250*	Any	100
M/32	13512	50	12	GY6.35	12	44	30±0.25	3000†	850*	Any	100
615 Halosp 4°	6425	15	6	B15d		58		2000	12000	Any	10
615 Halosp 6°	6424	15	6	B15d		37		2000	5000	Any	10
615 Halosp 14°	6426	15	6	B15d		58		2000	1400	Any	10
635 Halosp 6°	6429	35	6	B15d		58		2000	15500	Any	10
635 Halosp 14°	6430	35	6	B15d		58		2000	4000	Any	10
1220 Halosp 6°	6433	20	12	B15d		37		2000	7000	Any	10
1220 Halosp 18°	6434	20	12	B15d		37		2000	1400	Any	10
1220 Halosp 32°	6435	20	12	B15d		37		2000	350	Any	10
1250 Halosp 10°	6438	50	12	B15d		58		2000	11000	Any	10
1250 Halosp 25°	6439	50	12	B15d		58		2000	1900	Any	10

*Light output lumens

† Life at switching cycle 30s Lit - 30s Unlit.

Please order lamps in multiples of packing quantity.

Made in Belgium



FLOODLIGHTING LAMPS

Tungsten Halogen

A range of longer life lamps for horizontal burning ($\pm 4^\circ$), suitable for use in small, lightweight luminaires for a wide variety of floodlighting applications.

RANGE

Linear lamps for operation from 240/250V supplies:-

- K/11 - 200W
- K/9 - 300W
- K/1 - 500W*
- K/3 - 750W
- K/4 - 1000W*
- K/5 - 1500W
- K/6 - 2000W

*Also available for operation from 120V supplies.

APPLICATIONS

Outdoor applications

- Building sites
- Sports grounds
- Parks
- Large gardens
- Agriculture
- Car parks
- Airport aprons

Indoor applications

- Exhibitions
- Shop windows
- Churches
- Effect lighting

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LAMPS INCANDESCENT

To reorder this Data Sheet quote

PL 1770/6

Issued 6/83

Replaces PL 1770/5

FLOODLIGHTING – TUNGSTEN HALOGEN LAMPS

FEATURES

- Double pinch fuses lamp for extra safety. (Types K/1, K/9 and K/11).
- Excellent colour rendering of tungsten halogen lamps preserves the natural colours of the environment in which the lamps are used.
- Luminous flux output is maintained throughout the life of the lamps due to the halogen regenerative cycle.
- Up to 20% more efficient than a GLS lamp of corresponding rating.
- Compact, easily controllable light source, suitable for use in small, lightweight luminaires.
- Easy to install and maintain.
- Instantaneous light after switch on.

TUNGSTEN HALOGEN LAMP CHARACTERISTICS

The theoretical extended life calculated from the curves below is not always realised in practice as many other causes influence this factor considerably, e.g. Vibration, Handling, Cleaning, Frequency of Switching, etc.

These curves are based on averages of many lamps and can only be used as an approximate guide to performance.

ORDERING DATA

Watts	Volts	Box Quantity	
		Inner	Outer
200	240	12	72
300	240	12	72
500	120	12	72
500	240	12	72
750	240	12	72
1000	240	12	72
1000	120	12	72
1500	240	12	72
2000	240	12	72

Please state voltage when ordering.

ELECTRICAL DATA & DIMENSIONS,

Type	Catalogue Number	Rating (Watts)	Nominal Luminous Flux	Correlated Colour Temperature (K)	Lamp Volts	Burning Position (see diagram)	Cap	Dimensions (mm)		
								A	B	Diameter
K/11	12094R	200	3,200	3,000	240/250	Horizontal	R7s-15	114.2 ± 1.6	117.6 max	11
K/9	12113R	300	5,100	3,000	240/250	Horizontal	R7s-15	114.2 ± 1.6	117.6 max	11
K/1	7785R	500	10,000	3,000	120	Horizontal	R7s-15	114.2 ± 1.6	117.6 max	11
K/1	7785R	500	8,500	3,000	240/250	Horizontal	R7s-15	114.2 ± 1.6	117.6 max	11
K/3	12117R	750	15,500	3,000	240/250	Horizontal	R7s-15	185.7 ± 1.6	189.1 max	11
K/4	12013R	1000	22,000	3,000	120	Horizontal	R7s-15	185.7 ± 1.6	189.1 max	11
K/4	12013R	1000	22,000	3,000	240/250	Horizontal	R7s-15	185.7 ± 1.6	189.1 max	11
K/5	13021R	1500	33,000	3,000	240/250	Horizontal	R7s-15	250.7 ± 1.6	254.1 max	11
K/6	12110R	2000	44,000	3,000	240/250	Horizontal	Fa4	334.4 ± 2.1	322.0 max	11

Please order in the form given in the following example, in multiples of the packing quantity:—

72 Philips tungsten halogen lamps 240V 500W Type K/1

"Double Pinch" Fusing for Safety

At both ends of the 200 watt, 300 watt and 500 watt lamps are fusible link chambers. These are highly reliable and protect against excessive current surge at the moment of lamp failure, in installations having high current rated external fuses.

Unlike conventional fuses, this Philips development does not introduce a potential weakness which could shorten life expectancy. The filament length of these lamps is not reduced.

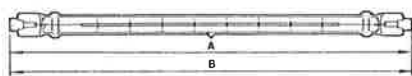
200 Watt K/11

Interchangeable with the existing 300W and 500W lamps, this lamp widens the field of application of popular, low cost floodlight fittings, giving a reduced energy cost alternative where a lower illumination level is acceptable.

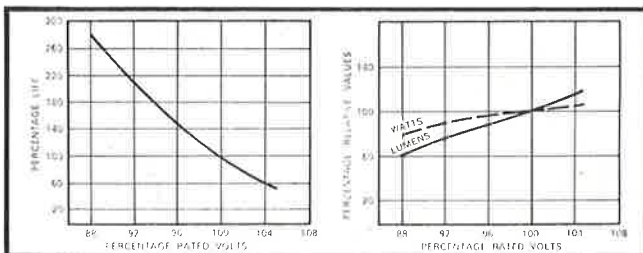
BURNING POSITION



Horizontal ±4°



Dimension B (above) relates to the clearance required between lampholders for insertion of lamp. Dimension A relates to electrical contact centres.



Made in Belgium



LIGHT POINT

Pencil-beam Spotlight with integral mains transformer for extra-low-voltage tungsten halogen lamps.

Elegant spotlight with ES cap and integral transformer, supplied complete with replaceable tungsten halogen reflector lamp. The spotlight can be used to replace a mains voltage lamp in many commercial display fittings to provide the extremely narrow beam, crisp white light and low energy consumption associated with extra-low-voltage tungsten halogen lamps without the inconvenience of a separate transformer or a new spot fitting.

RANGE

Light Point complete with 6V 15W tungsten halogen lamp with 6° beam angle. (HS 37)

Light Point complete with 6V 15W tungsten halogen lamp with 4° beam angle (HS 56).

APPLICATIONS

For use wherever a high-intensity, precise beam of light is required, in situations such as:

- Task lighting of work in precision industry
- Accent lighting in shop windows
- Lighting of pictures and exhibits in galleries and museums
- Restoration work
- Jewellers' and diamond merchants' premises

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INCANDESCENT LAMPS

To reorder this Data Sheet quote

PL 3035/1

Issued 4/82

Replaces PL 3035

LIGHT POINT HALOGEN SPOTLIGHT – INCANDESCENT LAMPS

FEATURES

Light Point

- Integral transformer and standard lamp cap bring the benefits of tungsten halogen lamps to most display lighting installations.
- Elegant matt black housing with blue styling ring blends well with commercial display fittings. Light Point fits many fittings without modification.
- High-intensity pencil beam (10,000cd in 4° version) picks out detail even against high ambient light.
- Combines low energy consumption with low heat generation; total dissipation is only 18W.
- Packed in distinctive carton which includes simple stand for retail display.

Lamp

- Tungsten halogen cycle combines long service (2,000hrs), crisp white light, excellent colour rendering and good lumen maintenance.
- Integral reflector and pre-set focus which never needs adjustment.
- Integral safety glass prevents finger contact of hot quartz lamp; protects inner from dirt contamination.
- Standard SBC cap; lamp can be quickly changed.

MATERIALS & FINISH

- Body:** Polycarbonate moulding, matt black with blue styling ring.
- Screening ring:** Polycarbonate moulding, matt black finish.

WEIGHTS

Weight (both types): 525g.

SPECIFICATION

Type compliance with BS 4533 2.2 Class II (double-insulated – earth not required).

To specify state:

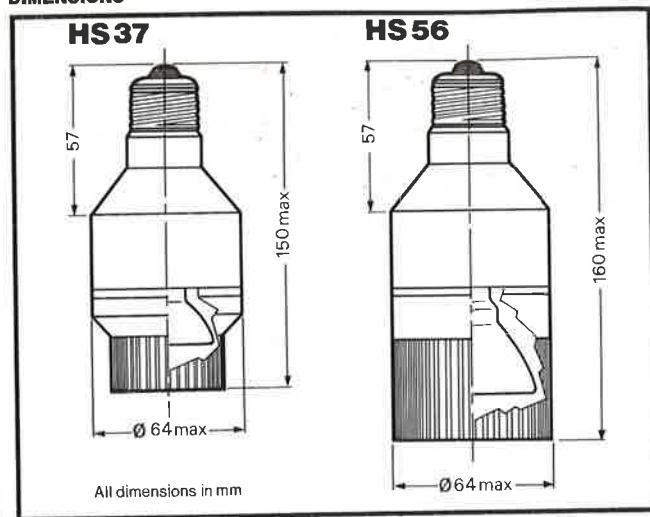
Spotlight with ES cap and integral transformer, for replaceable 6V 15W prefocussed tungsten halogen lamp with beam angle 4° (6°). Similar to Philips Light Point.

RANGE OF OPERATION

- 240V 50Hz supplies.
- Continuous operation.
- Normal dry indoor use.
- Suitable for 6V lamps up to and including 15W.
- Not suitable for use with dimmers.

Fitting: Made in Belgium.

DIMENSIONS



Beam Angle Data

4°	
METRES	BEAM ANGLE
1	10,000
2	2,500
3	1,100
4	625
10,000 cd.	

6°	
METRES	BEAM ANGLE
1	5,000
2	1,250
3	550
4	312
5,000 cd.	

ELECTRICAL DATA

Light Point			Replacement Lamp				
Catalogue No.	Watts	Cap	Watts	Volts	Lamp Cap	Beam angle	Mid-beam Intensity (candelas)
6° Light Point (HS 37)	18	ES	15	6	SBC	6°	5,000
4° Light Point (HS 56)	18	ES	15	6	SBC	4°	10,000
			†15	6	SBC	14°	1,200

ORDERING DATA

Please order in the form given in the following example. Spotlights are individually packed complete with lamp in outers of four.
8 Philips 4° Light Points.

NEW MINIATURISED FLUORESCENT LAMPS

SL Lamp 9W, 13W, 18W, 25W
PL Lamp

Page

321

325

**Please see pages II and III of General
Introduction for information on how to use
this Handbook.**

SL* LAMP

Energy-saving replacement for the filament lamp

Compact fluorescent lamp with integral control gear and BC or ES cap; directly replaces conventional filament lamps with considerable energy savings and greatly extended service.

RANGE

- SL9 (replaces 40W GLS)
- SL13 (replaces 60W GLS)
- SL18 (replaces 75W GLS)
- SL25 (replaces 100W GLS)

Opal or prismatic finish, with Bayonet Cap (B22) or Edison Screw cap (E27)

SL18 Replaces:

- 75W GLS lamp; light output (prismatic) is comparable.
- 60W GLS lamp: light output (prismatic and opal) is greater.

APPLICATIONS

Replaces GLS lamps where the benefits of energy saving and long service are of importance:

- Hotel foyers, bedrooms and corridors
- Commercial buildings
- Luminaires of difficult access on landings, high ceilings, etc.
- Amenity lighting fittings
- Public buildings, schools, etc.
- Domestic applications

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FLUORESCENT LAMPS

To reorder this Data Sheet quote

PL 3001/8

Issued 7/83

Replaces PL 3001/7

SL * LAMP

FEATURES

The SL lamp successfully combines three major technical developments of the Philips research laboratories:-

The miniaturisation of the fluorescent lamp

The conventional fluorescent lamp has been folded and miniaturised, to produce a package small enough to fit into an envelope of a size comparable to that of a conventional filament lamp.

The integration of lamp and control gear

The fluorescent ballast and starter have been miniaturised, and fit into the base of the lamp.

New phosphor technology

The SL lamp uses phosphors developed for the Philips Colour 80 Series of fluorescent lamps. These phosphors have narrow bands of light output at specific wavelengths. The wavelengths have been carefully chosen for a high colour rendering index, and the concentration of energy in the narrow bands gives a higher light output than conventional 'high-efficiency' phosphors.

- Uses approximately one quarter of the power of a comparable GLS lamp.
- Rated average life of 5000 hours is five times the rated filament lamp life; lamp changing costs are greatly reduced, particularly where luminaires are of difficult access.
- Integral control gear and standard lamp caps provide direct replacement, without modification, in suitable luminaires.
- Lamp starts and restarts within 2 seconds.
- Philips special phosphor combines high efficacy with good colour rendering.

RANGE OF OPERATION

240V 50Hz supplies.

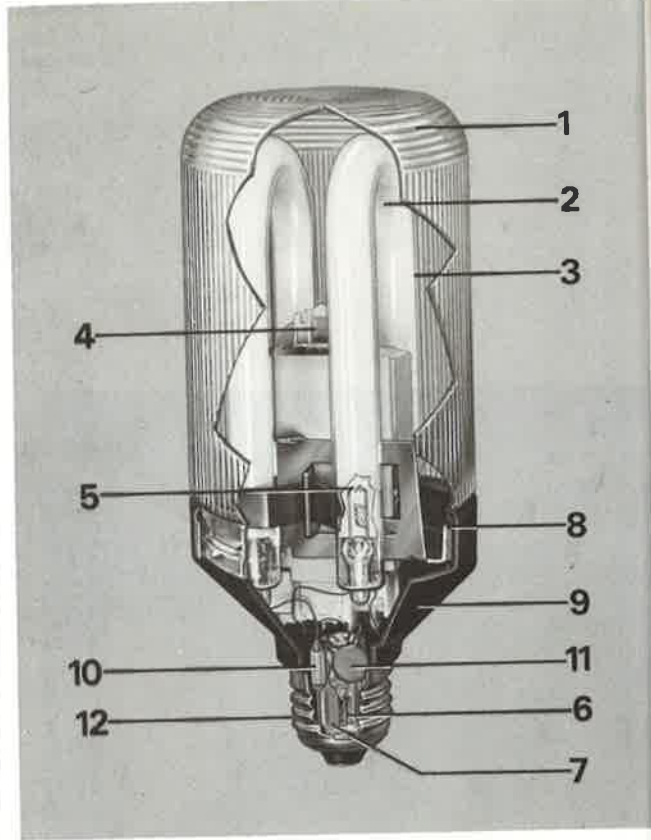
Normal indoor conditions (see note).

Not suitable for dimming.

Not suitable for AC or high frequency supplies; e.g. in emergency lighting.

Operating position:- Any (adequately supported).

Temperature of air inside luminaire surrounding bulb must not exceed 75°C. Small luminaires and luminaires for lamps with internal reflectors may not be suitable. Thermal blankets must be spaced away from luminaires.



KEY TO ILLUSTRATION

- | | |
|----------------------------------|-----------------------|
| 1. Outer bulb (prismatic) | 7. Starter |
| 2. Discharge tube | 8. Mounting plate |
| 3. Phosphor | 9. Housing |
| 4. Ballast | 10. Thermal cut-out |
| 5. Electrode | 11. Starter capacitor |
| 6. Bi-metallic strip in starter. | 12. Lamp cap |

Note:

Operation and starting may not be reliable below 0°C.

In cap-down operation, light output falls as ambient temperature is reduced.

Lamps operated outdoors, at users' discretion, must be enclosed.



MOTHER HUBBARD RESTAURANT, OLDHAM

Philips SL compact fluorescent lamps not only reduce electricity costs of filament lighting by 75 per cent; they also give light matching filament in colour and quality. This is particularly important in restaurants. The SL is used in all Broom House Group restaurants, including Mother Hubbard.



BENETTON, LONDON

Philips PL compact fluorescent not only permits the design of new slim-line luminaires; it is attractive unenclosed, as this unusual installation of PL11s shows.

Luminaires for SL lamps

The SL lamp can be used as a direct replacement for GLS lamps in most luminaires and will provide savings in energy costs without modification. However, since the lamp has larger dimensions and is heavier than a filament lamp of equivalent light output, the following checks should be made on the luminaires before installing the lamp:

1. Check that adequate space is available inside the luminaires to accommodate the lamp.
2. Check that the luminaires and wiring are able to support a lamp of the weight given below. Old or frayed wiring must be replaced.
3. Replace the lampholder if it is unsuitable or in poor condition. Lampholders for BC lamps should be all-metal (earthed), or of ceramic or of insulating material with a metal insert.

Note: Edison Screw lampholders provide better lamp location and support, and should therefore be used in new or refurbishing schemes. End support may be needed for the lamp if it is mounted in BC holders either horizontally or vertically cap down.



DIMENSIONS, WEIGHTS & ELECTRICAL DATA

		SL9	SL13	SL18	SL25
Nom. overall length (ES)	mm	148	158	168	178
Nom. overall diameter	mm	72	72	72	72
Weight (approx)	g	430	460	560	710
Nom. power (incl. ballast)	W	9	13	18	25
Nom. current	mA	110	115	180	250
Start/restart time (approx)	s	2	2	2	2

LUMINOUS DATA

Average lumens at 100hr (prismatic*)	425	600	900	1200
Depreciation: % per 1000 hrs (all ratings)	6			
Chromaticity co-ordinates (all ratings)	x = 0.462 y = 0.412			
Correlated colour temperature (approx - all ratings)	2700K			
Colour rendering index (Ra8 - all ratings)	80			
Time to 90% output (approx)	1 min.			

* The lumen output with opal finish is approximately 85% of prismatic.

SERVICE PERIOD

Average lamp, with normal switching, lasts electrically at least 5000 hours. Preferably, lamps should be group-replaced at a predetermined percentage (e.g. 70%) of 100hr light output.

STANDARDS

No current relevant Standards exist.

The lamp complies with CISPR radio interference limits for domestic appliances.

All information refers to average lamps, measured under standard conditions, at 240V.

GLS (filament) LUMENS

The lumen output of GLS lamps of roughly equivalent light output is tabled below for comparison. At 1000 hours the output is approx. 90% of Initial.

SL lamp	GLS equivalent	Lumens (Initial.)
SL9	40W	420
SL13	60W	710
SL18	75W	940
SL25	100W	1360



SL * LAMP

SL INSTALLATION ECONOMICS

Over 5000 hours, the total cost of each SL 18 point is:

$$S + A + (18 \times 5U) \text{ pence}$$

Where S = purchase cost of SL 18 in pence (e.g. 600p)

A = labour cost of lamp changing (e.g. 50p)

U = cost of Unit (kWh) of electricity (e.g. 5.5p)

Users should insert values appropriate to their own conditions. With the values shown, the total cost per 5000 hours is 1145p (£11.45)

For comparison, the total cost over 5000 hours of five GLS 75W lamps of 1000 hours rated life is:

$$5G + 5A + (75 \times 5U) \text{ pence}$$

Where G = purchase cost of GLS 75W (e.g. 30p)

A = labour cost of lamp changing (e.g. 50p)

U = cost of Unit (kWh) of electricity (e.g. 5.5p)

Users should insert values appropriate to their own conditions. With the values shown, the total cost per 5000 hours is 2462p (£24.62)

In this example, the SL 18 which provides about the same amount of light as a 75W GLS lamp, has a total cost (initial plus running) of less than one half. This is also true even if the labour cost is nil.

TARIFFS

Where the tariff is wholly on a Unit (kWh) basis, SL lamps offer a saving of about 4 to 1 in electricity cost for a given light output. Some tariffs include a VA component but even so the Unit (kWh) component preponderates. The saving in electricity cost changes by only a small amount, from about 4 to 1 to about 3.8 to 1.

POWER & VA

For equal light output, SL lamps take about one-quarter the power of GLS lamps and about one-half the current and VA. In rare instances, SL lamps may constitute the majority of the load at the Consumer Terminals of a building, and it may be wished to improve the Power Factor.

($PF = \frac{W}{VA}$), Suitable values of capacitance for group correction are 15-20 mfd per 10 lamps.

Note that the power taken cannot be measured by a current meter.

FREE-SPACE DRAWINGS

For designers of new luminaires, drawings are available showing the required Free-Space within the luminaires.

ORDERING DATA

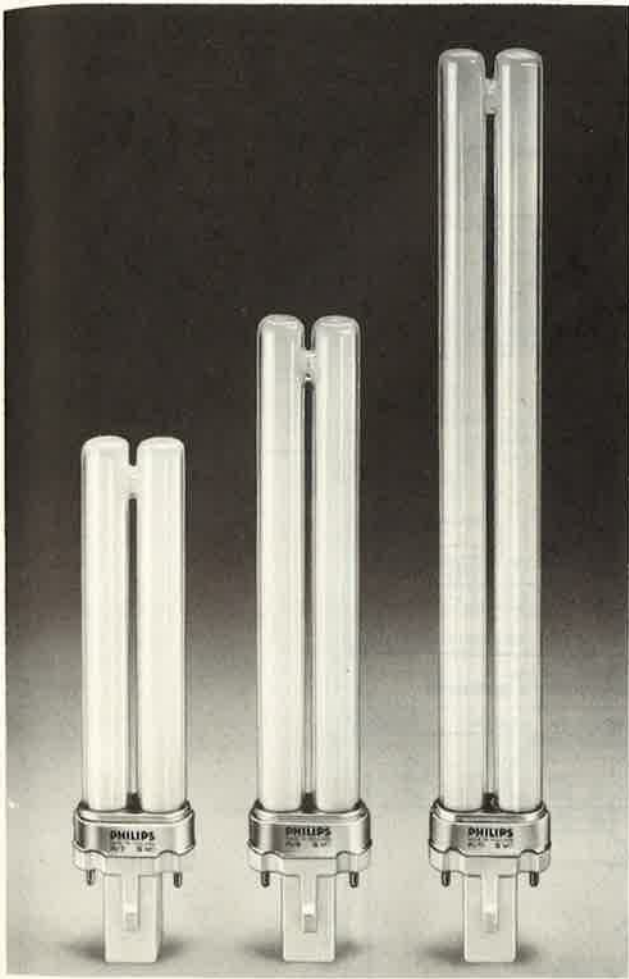
Catalogue No.	Description	Packing
SL 18 BC-O	18W lamp, Bayonet Cap, opal envelope	Lamps in fully-descriptive individual cartons are packed in boxes of six.
SL 18 ES-O	18W lamp, Edison Screw, opal envelope	
SL 18 BC-P	18W lamp, Bayonet Cap, prismatic envelope	
SL 18 ES-P	18W lamp, Edison Screw, prismatic envelope	

For other ratings replace 18 by appropriate rating 9, 13 or 25

Please order lamps in the form given in the following example, in multiples of the box quantity:

60 Philips SL lamps SL 18W ES-P.

Made in Holland



PL* LAMP

Single-ended miniature fluorescent lamps

A range of single-ended miniature fluorescent lamps with integral starters, for use with separate ballast. The range offers to designers of luminaires and equipment containing lighting a new light source with exciting design possibilities. The integral starter and single cap simplify modifications to existing luminaires; the compact dimensions open up the possibility of new slim luminaires, including decorative types.

RANGE

- PL5 – 5 lamp Watts
- PL7 – 7 lamp Watts
- PL9 – 9 lamp Watts
- PL11 – 11 lamp Watts

APPLICATIONS

For use in new luminaires, and modified existing luminaires, in applications such as:

- Bulkhead luminaires
- Wall-mounting luminaires
- Table lamps

And for building into other forms of equipment, such as:

- Luminous displays
- Cocktail cabinets and similar furniture
- Built-in lighting in office furniture



FLUORESCENT LAMPS

To reorder this Data Sheet quote **PL 3017/2**
Issued 9.82 **PL 3017/1**

PL ✕ FLUORESCENT LAMPS

FEATURES

- Single-ended construction reduces cost of lampholders and associated wiring.
- Integral starter in lamp cap cuts component and wiring costs and saves space; starter is automatically replaced with lamp to increase reliability of luminaire.
- Double limb reduces overall length, and gives lighting width of two miniature lamps.
- Phosphor uses components from Colour 80 Series to combine high efficacy with good colour rendering.
- New compact light source using a fraction of the power of a filament lamp of comparable output; needing fewer components than conventional miniature fluorescent lamps.
- Overage, lasts at least five times as long as conventional filament lamp.

Operating position – any.

LUMINOUS DATA

Catalogue No.	Lumen output	
	100hrs	2000hrs
PL5	300	260
PL7	410	370
PL9	570	510
PL11	890	800

Depreciation: Approx. 4% per 1000 hrs.

Chromaticity co-ordinates: $x=0.460$
 $y=0.414$

Correlated Colour Temperature: 2700K

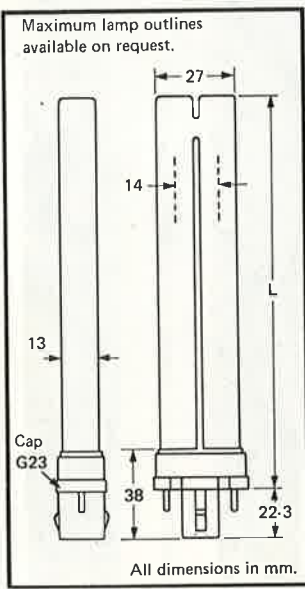
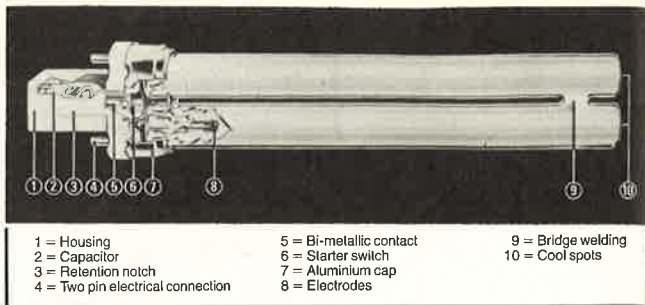
Colour Rendering Index: (Ra8) 81

Averages, measured under standard conditions.

ELECTRICAL DATA

Catalogue No.	Lamp Volts (V)	Lamp Current (A)	Lamp power (W)
PL5	35	0.19	4.9
PL7	45	0.18	6.9
PL9	60	0.17	8.7
PL11	90	0.16	11.4

Averages, measured under standard conditions.



DIMENSIONS & WEIGHTS

Catalogue No.	L (mm)	Weight (g)
PL5	90	41
PL7	112	43
PL9	144	45
PL11	213	47

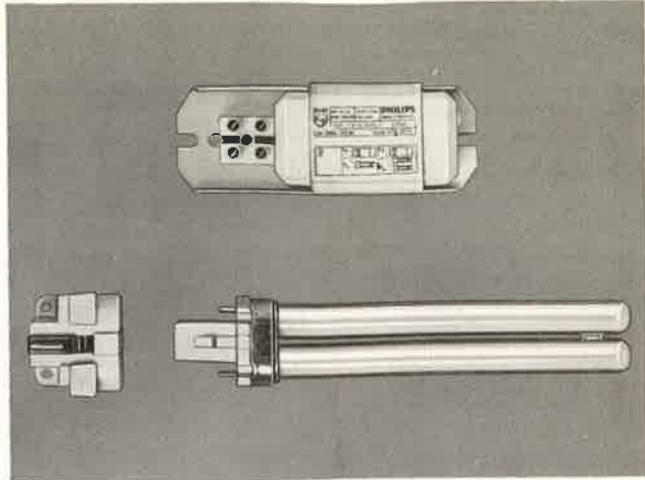
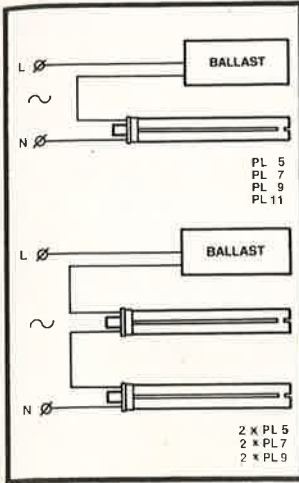
Ballasts and circuits

Circuit: Switchstart only, with integral starter. PL5, PL7 and PL9 Lamps may be operated two in series.

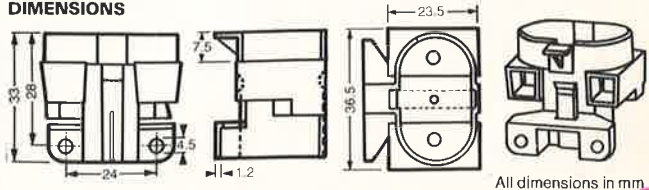
Not suitable for use on dimmers or on DC or on high-frequency supplies (capacitor incorporated in parallel with starter).

CIRCUIT DIAGRAMS

Note: Starter is incorporated in lamp. PF capacitors not usually required, but may be added at rate of approx 20 mfd per 10 circuits.



DIMENSIONS



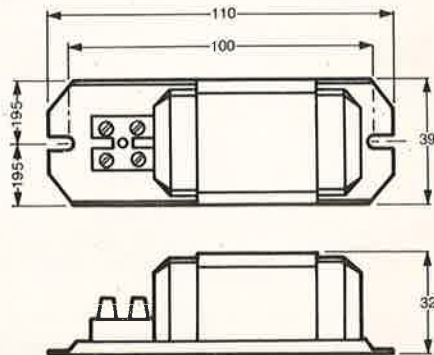
This lampholder is made of Pocan 4235, a self-extinguishing thermoplastic polyester material re-inforced with glass-fibre.

Electrical connection by means of insert contacts (no screws). For mounting on a plane parallel to the lamp.

9

DIMENSIONS

Ballast BPL 10L 24 Weight 400g Losses 4W 240V 50112



PL ✖ FLUORESCENT LAMPS

Temperature limits

Light output and electrical characteristics vary with ambient temperature. Maximum temperature on metal band 135°C. Outdoor luminaires should be enclosed, with cap down.

ORDERING DATA

Please order lamps in the form given in the following example, in multiples of the packing quantity. Lamps are supplied in boxes of 50.
100 Philips PL9 fluorescent lamps.

Made in Holland.

FLUORESCENT LAMPS

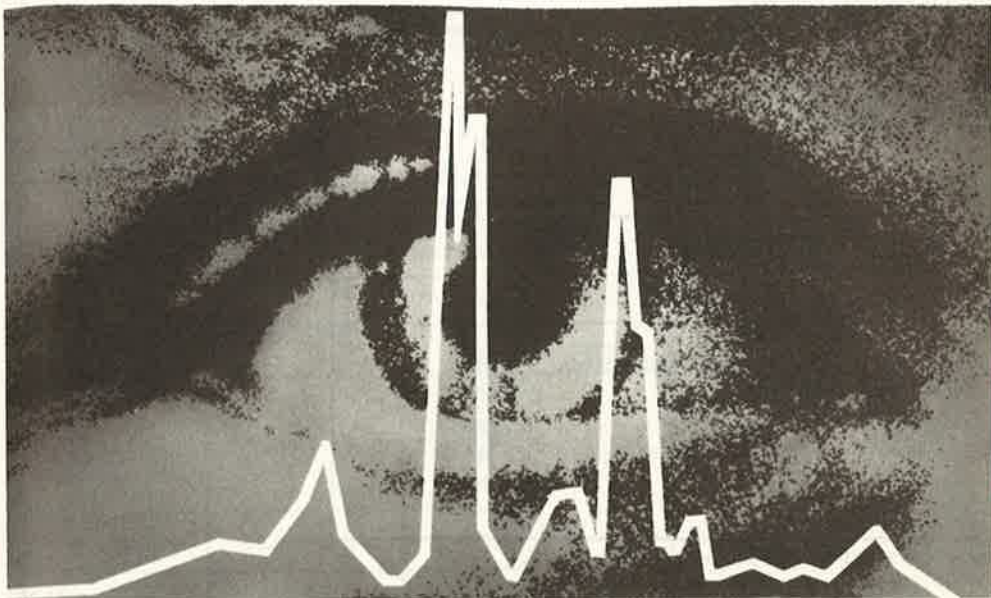
• Page

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Please see pages II and III of General Introduction for information on how to use this Handbook.

GUIDE TO FLUORESCENT LAMPS

Types and Colours



10

Recent developments and trends in fluorescent lighting.

Correct choice of lamp type.

Correct choice of lamp colour.

Spectral power distributions and colour data.

Dimensions, weights and electrical data.

Guide to lamp prefixes and ordering.

Replacement with other makes.

RANGE

This Data Sheet covers lamps from 450mm (18 in.) to 2400mm (8ft.) with diameters T12 (38mm/1½ in.) and T8 (26mm/1 in.)

Standard ordering descriptions and lumen values of these lamps are given in Data Sheet PL 3043.

See back page for Data Sheet references of other lamps.

FLUORESCENT LAMPS

To reorder this Data Sheet quote

PL 3044/2

Issued 10.84

Replaces PL 3044/1

FLUORESCENT LAMPS – TYPES

INTRODUCTION

Two important recent developments have had a major effect on the selection of fluorescent lamps.

The developments are:

■ The krypton-filled lamp, made in T8 (26mm diameter) format in lengths below 2400mm. Krypton-filled lamps are for use in switchstart circuits only, on the ballast for the corresponding argon-filled lamp. Krypton-filled lamps give about the same amount of light as the older lamps, but with a reduction of circuit power (and hence running costs) of about 8 per cent.

Also, the smaller diameter permits the use of smaller, more elegant luminaires, and less light is absorbed from adjacent lamps in multi-lamp luminaires.

■ Triphosphor lamp colours, which combine good colour rendering with efficacies higher than the best halophosphate lamps. Triphosphor colours therefore simplify lamp choice by eliminating the compromise between efficacy and colour rendering which is an intrinsic characteristic of halophosphate lamps.

These developments have produced the following trends in fluorescent lighting:-

- From T12 argon-filled lamps to T8 krypton-filled lamps.
- From halophosphate coatings to triphosphor coatings.
- From 2400mm (8ft.) and 1800mm (6ft.) to 1500mm (5ft.) as the principal length.
- From starterless (XS) circuits to switchstart (SS) circuits with low-loss control gear.
- From glow-switch starters to electronic starters.

CHOICE OF LAMP TYPE

Krypton-filled power-saving lamps are First Choice types. They should be used in all new installations in high LOR luminaires, and in existing installations wherever possible.

Argon-filled lamps are retained for starterless circuits, including emergency and dimming circuits, and for low-temperature applications.

Consideration should be given to not replacing lamps in starterless luminaires over 15 years old. It is usually more economical to replace the luminaires with modern types using krypton-filled lamps.

Choice by type

Length	First Choice Krypton-filled T8	Second Choice Argon-filled T12
2400mm (8ft)	100W (Krypton filled T12 format)	125W
1800mm (6ft)	70W	75/85W
1500mm (5ft)	58W	65/80W
1200mm (4ft)	36W	40W
600mm (2ft)	18W	20W

Note: TLD 30W and TLD 15W are Argon filled T8, for switchstart only.

Obsolescent types

Luminaires using obsolescent lamps should be replaced with modern, energy-effective types.

80W bayonet cap 85W 2400mm
Earth strip (MCFA) 40W 600mm
Reflector (MCFRE)

LIF Rationalization Plan

The tables on this and the facing page are based on the Rationalization Plan of the Lighting Industry Federation, developed at the request of the E.W.F. and of the E.C.A.

When ordering fluorescent lamps, give preference to **First Choice** types and to **First Choice** colours.

FLUORESCENT LAMPS – COLOURS

INTRODUCTION

The principal characteristics of fluorescent lamps of different colours are:

Colour rendering index (CRI) – an index of the lamp's ability to render colour. It ranges from 50 (representing the rendering of the original Warm White colour) to 100 (the colour rendering obtained from a complete spectrum light source such as daylight or an incandescent lamp). Ra8 refers to the rendering of eight sample surfaces.

CHOICE OF LAMP COLOUR

Halophosphate lamps are available in basic colours, with high efficacies and relatively poor colour rendering, and in De Luxe colour, with good colour rendering and relatively low efficacy. Triphosphor lamps combine good colour rendering with efficacies even higher than

Correlated colour temperature (CCT) – the colour appearance of a 'white' lamp derived from the colour temperature of a complete spectrum light source nearest in colour appearance to the lamp. The temperature is measured in Kelvin; 3000K is warm and 4000K is cool. The colour temperature is not related in any way to the running temperature of the lamp, nor is it any guide to its colour rendering.

for basic halophosphate lamps. With these lamps, CRI and efficacy can therefore be taken for granted, and a choice made on colour appearance alone. Triphosphor lamps are normally First Choice for all installations. They are available in krypton-filled format, and in

Efficacy – light output for power input, measured in lumens per Watt.

Further information is contained in the Technical Section of the Philips Comprehensive Handbook.

argon-filled format for installations where krypton-filled lamps cannot be used.

White 35, a halophosphate lamp of intermediate colour appearance (3500K), is retained as an initial lamp in batten packs and KombiPaks.

Choice by colour

COLOUR APPEARANCE (Nom. Colour Temperature)	FIRST CHOICE – new installations, group replacement.	SECOND CHOICE – matching in spot replacement	
	TRIPHOSPHORS	HALOPHOSPHATES	
		Basic	DeLuxe
COOL (4000K SECTOR) Work Areas	COLOUR 84	COOL WHITE 33	NATURAL 25
	(3500K) (USE WHITE 35)	WHITE 35	
WARM (3000K SECTOR) Social Areas	COLOUR 83	WARM WHITE 29	SOFTONE 32
SPECIALIST PHOSPHORS: Northlight 55 for colour matching. Trucolor 38 for DHSS and art galleries.			

FLUORESCENT LAMPS – TRIPHOSPHORS

Colour 80 Series fluorescent lamps

Colour 80 Series fluorescent lamps have rare-earth phosphor coatings similar to colour TV phosphors, with narrow bands of light output centred at wavelengths of about 450nm (blue), 540nm (green) and 610nm (red). These phosphors have been carefully blended for a high colour rendering index; at the same time, the concentration of energy in the narrow bands gives a light output higher than that associated with conventional high-efficacy lamps.

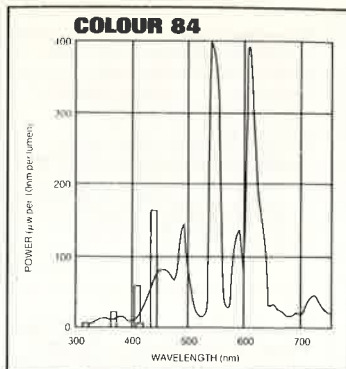
Colour 80 Series lamps therefore eliminate the compromise between light quality and quantity which is a disadvantage of conventional halophosphate colours. Lamp selection is also simplified; since all Colour 80 Series lamps have both good colour rendering and high efficacy, the specifier is able to make a choice based on colour appearance alone.

- Better colour rendering than basic halophosphate lamps.
- Higher light output than de Luxe halophosphate lamps. This enables the number of luminaires to be reduced – typically by up to 30 per cent – with corresponding savings in running and maintenance costs.

Further advantages of Colour 80 Series

Colour 80 Series T8 lamps have further gains over ordinary lamps in addition to the higher light output:-

- Colour 80 Factor – light output falls off less in enclosed luminaires than with halophosphate phosphors.
- T8 Factor – the smaller diameter of the T8 krypton-filled lamps means that less light is absorbed in multi-lamp luminaires.
- Lumen depreciation is less steep than with halophosphates (see Technical Section of Comprehensive Handbook). Average light output is higher over a given service period. Alternatively for depreciation to a given level, Colour 80 Series lamps can be kept in service longer.

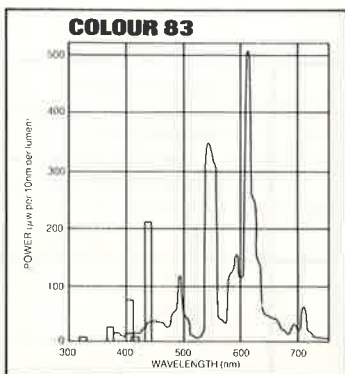


Colour 84

Cool appearance, high efficacy, good rendering. The modern lamp for work areas – offices, shops, factories.

LAMP DATA

Correlated colour temperature: 4,000K
Colour rendering index (Ra B): 85
Chromaticity co-ordinates: x = 0.380
y = 0.377



Colour 83

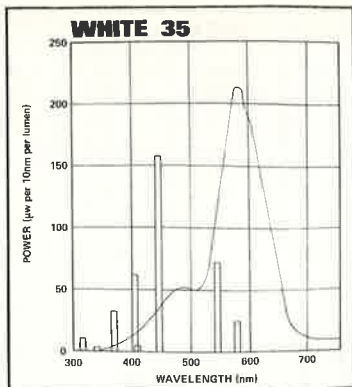
Warm appearance, high efficacy, good rendering. For social areas – restaurants, hotels, the home.

LAMP DATA

Correlated colour temperature: 3,000K
Colour rendering index (Ra B): 85
Chromaticity co-ordinates: x = 0.441
y = 0.404

FLUORESCENT LAMPS – HALOPHOSPHATES

Halophosphate phosphors – Basic
Halophosphate lamps with relatively high efficacy, and relatively low colour rendering. Not available in T8 krypton-filled format, except for White 35.

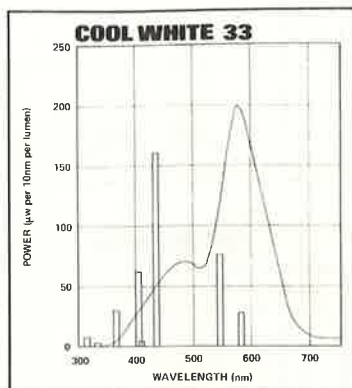


White 35

A lamp of intermediate appearance (3500K) principally for use in Packs as an initial lamp.

LAMP DATA

Correlated colour temperature: 3,500K
Colour rendering index (Ra B): 58
Chromaticity co-ordinates: x = 0.412
y = 0.392

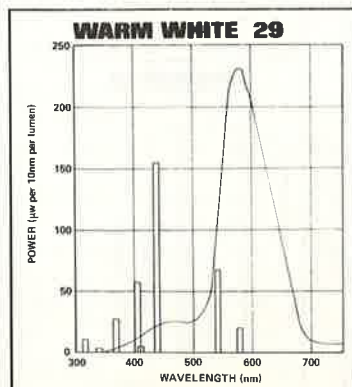


Cool White 33

Cool colour appearance. An early lamp colour previously called Daylight 33. Now mainly used in road lighting; in other applications replace with Colour 84, which has high output and improved rendering.

LAMP DATA

Correlated colour temp. approx: 4,000K
Colour rendering index (Ra B): 62
Chromaticity co-ordinates: x = 0.379
y = 0.384



Warm White 29

Warm colour appearance. An early lamp colour now accepted only for circular lamps; otherwise replace with Colour 83, which has higher output and good rendering.

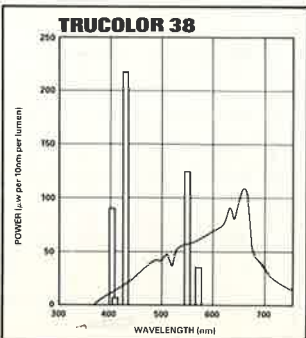
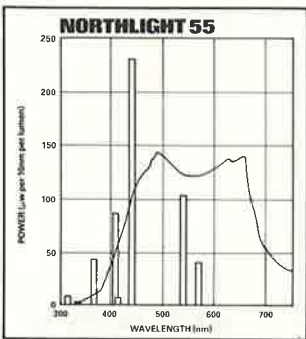
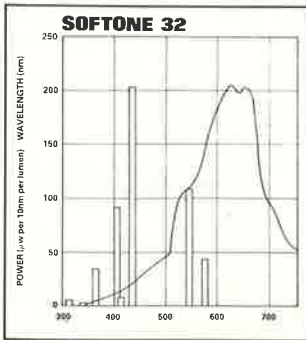
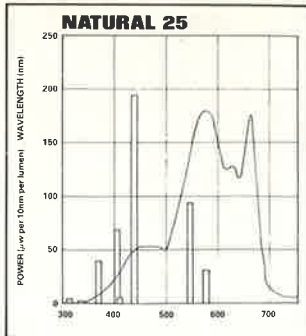
LAMP DATA

Correlated colour temp. approx: 2,800K
Colour rendering index (Ra B): 51
Chromaticity co-ordinates: x = 0.446
y = 0.406

10

FLUORESCENT LAMPS – HALOPHOSPHATES

Halophosphate phosphors – De Luxe
Halophosphate lamps with relatively high colour rendering, and relatively low efficacy. Not available in T8 krypton-filled format.



Natural 25
De Luxe colour rendering and cool colour appearance. An early lamp colour, previously used in offices, shops and department stores; now being replaced by Colour 84, which has higher efficacy.

LAMP DATA

Correlated colour temp. approx: 4,000K
Colour rendering index (Ra 8): 77
Chromaticity co-ordinates: x = 0.377
y = 0.374

Softone 32
De Luxe colour rendering and warm colour appearance. An early lamp colour, previously used in restaurants, hotels and other social areas; now being replaced by Colour 83, which has higher efficacy.

LAMP DATA

Correlated colour temp. approx: 2,900K
Colour rendering index (Ra 8): 85
Chromaticity co-ordinates: x = 0.444
y = 0.404

Specialist halophosphate lamps
Halophosphate lamps for special purposes where the ability to render colours faithfully is the prime consideration. Not available in T8 krypton-filled format.

Northlight 55
A cold colour (6500K) with a high colour rendering index (95 on the Ra8 scale) used for critical colour matching or appraisal. Previously called Colour Matching 55. It is important that a high level of illumination (see BS 950 Part 1) is maintained over the whole area where matching is taking place. Northlight 55 complies with the visible spectrum requirements of BS950 Part 1, but does not include the optional UV component.

LAMP DATA

Correlated colour temp. approx: 6,500K
Colour rendering index (Ra 8): 95
Chromaticity co-ordinates: x = 0.316
y = 0.334

Trucolor 38
A cool colour (4000K) for installations where it is essential that colours are rendered with high fidelity (CRI 92 on the Ra8 scale); for example in art galleries and in fitting booths in clothing shops. Also, Trucolor 38 is approved to DHSS Sheets DE 21 – 23 for use in clinical areas.

LAMP DATA

Correlated colour temp. approx: 4,000K
Colour rendering index (Ra 8): 92
Chromaticity co-ordinates: x = 0.381
y = 0.377

Colour 47 (Graphica) is a 5000K lamp incorporated by manufacturers of viewing cabinets complying with BS950 Part 2. The lamp is not a stock type.

LAMP DIMENSIONS, WEIGHTS & ELECTRICAL DATA

Nominal Rating	Under BS conditions			Maximum dimensions		Approx. Weight (g)	
	Lamp power (W)	Lamp volts (V)	Lamp current (I)	Face-to-face length (L) (mm)	Diameter (D) (mm)		
T12 (38mm/1½ in. dia.) krypton-filled MCF 100W 2400mm (8ft)	99	125	0.96	2374.9	40.5	610	
T8 (26mm 1 in. dia.) krypton-filled	TLD 70W 1800mm (6ft)	69	128	0.70	1763.8	28.0	310
	TLD 58W 1500mm (5ft)	58	110	0.67	1500.0	28.0	229
	TLD 36W 1200 mm (4ft)	36	102	0.44	1199.4	28.0	186
	TLD 18W 600mm (2ft)	18	59	0.36	589.8	28.0	97
T12 (38mm 1½ in. dia.) argon-filled	MCFE 125W 2400mm (8ft)	123	149	0.94	2374.9	40.5	610
	MCFE 75/85W 1800mm (6ft)	73*	131	0.64	1763.8	40.5	451
	MCFE 65/80W 1500mm (5ft)	64*	110	0.67	1500.0	40.5	360
	MCFE 40W 1200mm (4ft)	39.5	103	0.43	1199.4	40.5	292
	MCFE 20W 600mm (2ft)	19.3	57	0.37	589.8	40.5	156

Note:

All above lamps have bi-pin caps G13.

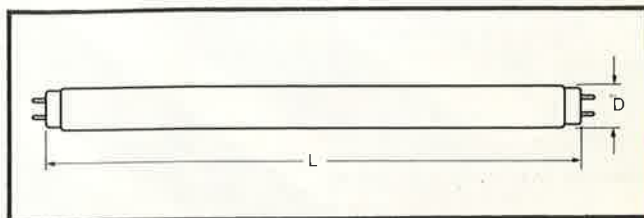
* 1800mm lamp on 75W ballast; 1500mm lamp on 65W ballast.

The dimensions and electrical data for circular and miniature fluorescent lamps are given in Data Sheets PL 1794 and PL 1763.

ELECTRICAL SERVICE PERIOD

From a large group of fluorescent lamps operated under standard conditions, up to two per hundred may fail during the first 1000 hours. The failure rate is then negligible (less than 1 per cent per thousand hours) until there has been appreciable loss of emitter (approaching 10,000 hours). Thereafter the failure rate accelerates.

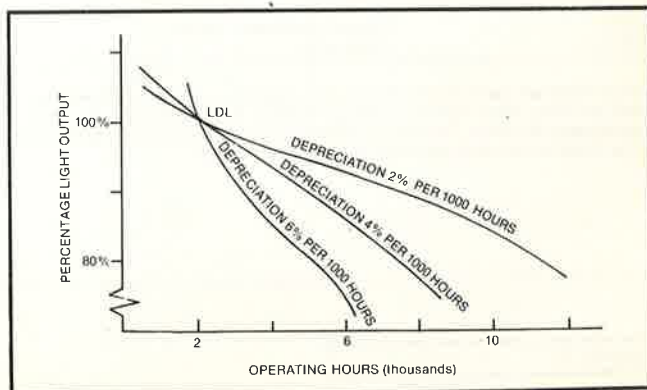
Lamps should be group-replaced after the economic service period. Early fall-outs should be changed straight away. For further information, see the Technical Section of the Comprehensive Handbook.



ECONOMIC SERVICE PERIOD

Under standard conditions, the light output of fluorescent lamps declines linearly after the 2000 hour point. The rate varies with rating and phosphor, but is typically 4 per cent per thousand hours for Halophosphates and 3 per cent per thousand hours for Triphosphors.

Lamps should be group-replaced after the economic service period – usually taken as the time when light has declined 20 per cent below the 2000 hour level. For further information, see the Technical Section of the Comprehensive Handbook.

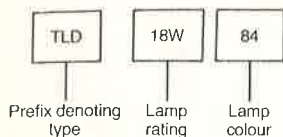


FLUORESCENT LAMPS

Guide to lamp prefixes and ordering

The standard description of a Philips fluorescent lamp consists of a prefix, lamp rating, and lamp colour number, as in the following example:-

TLD18W/84



It is not necessary to quote the lamp length.

This guide explains the meaning of the prefixes.

MCF

Low-pressure mercury lamp with fluorescent internal coat. For switchstart circuit only.

MCFE

Low-pressure mercury lamp with fluorescent internal coat, silicone external coat and 10V electrodes (except the 85W 2400mm lamp, which has 3V electrodes). For switchstart and starterless circuits. MCFEK refers to 40W 600mm.

MCFA

Low-pressure mercury lamp with fluorescent internal coat and external metal strip (to be connected to Earth). For switchstart and 10V starterless circuits.

TL

As for MCF. Also means 'fluorescent lamp in general'.

TLD

As for TL but 26mm diameter. The principal lamps are krypton-filled (70W, 58W, 36W, 18W). For switchstart circuits only.

TLD...T

As for MCFE but 26mm diameter. Note that 26mm diameter silicone-coated lamps can also be described as MCFE.

TLA

As for MCFA.

TLM

As for TL but with external (but connected) strip. For switchstart or 3V starterless circuits.

TLE/TLEK

Circular low-pressure mercury lamp with fluorescent internal coat. The 'K' suffix signifies high loading. For switchstart circuits only.

The suffix **RS** implies rapid start (3V starterless circuits and switchstart).

REPLACING OTHER MAKES

Other make	PHILIPS
White	White 35
Warm White	Colour 83 or Warm White 29
Daylight	Colour 84 or Cool White 33
Natural	} Colour 84 or Natural 25
De Luxe Natural	
Plus White	
De Luxe Warm White	} Colour 83 or Softone 32
Warmtone	
Kolor-rite	} Tricolor 38
Colour Matching	
Northlight	} Northlight 55
Pluslux	Krypton-filled Halophosphate
Polylux	

Lamps of different makes should not normally be mixed in an installation. When Philips lamps are being used to replace an existing installation, the guide indicates a lamp that is approximately equivalent. The correct approach is not to seek a match, but to decide which of the Philips lamps is the best one for the particular application.

Associated Products

Starters – see Data Sheet PL 1792
Electronic starters – see Data Sheet PL 1839
Ballasts – see Data Sheet PL 1864
Capacitors – see Data Sheet PL 1859
Accessories (lampholders, etc.) – see Data Sheet PL 1863

Note:- Special-purpose fluorescent lamps not for general lighting, such as lamps with UV output, are listed in the Lamps for Special Purposes section of the Philips Comprehensive Handbook.

Other fluorescent lamps

Miniature lamps T5 diameter (16mm/5/8 in.) – see Data Sheet PL 1763.
Circular lamps – see Data Sheet PL 1794.
SL single-ended lamps with integral ballast – see Data Sheet PL 3001.
PL single-ended lamps – see Data Sheet PL 3017
HF Lamp – see Data Sheet PL3072
Made in Holland and U.K.

FLUORESCENT LAMPS

Main Range (T8 and T12)



A data sheet reference to other lamp types is given on the back page.

Further information on fluorescent lamps is given in Data Sheet PL 3044 (Guide to Fluorescent Lamps – Types and Colours).

10

FLUORESCENT LAMPS

To reorder this Data Sheet quote

PL 3043/2

Issued 3.80

Replaces PL 3043/1

FLUORESCENT LAMPS

			TRIPHOSPHOR COLOURS		HALOPHOSPHATE COLOURS
			First-choice colours – for initial installations and for replacement		Initial lamp in packs.
			Colour 84	Colour 83	White 35
2400mm (8ft)	100W 125W	T12 K	MCF 100W/84	MCF 100W/83	MCF 100W/35 MCFE 125W/35
		T12 A	MCFE 125W/84	MCFE 125W/83	
1800mm (6ft)	70W* 75/85W	T8 K	TLD 70W/84	TLD 70W/83	TLD 70W/35 MCFE 75/85W/35
		T12 A	MCFE 75/85W/84	MCFE 75/85W/83	
1500mm (5ft)	58W* 65W	T8 K	TLD 58W/84	TLD 58W/83	TLD 58W/35 MCFE 65/80W/35
		T12 A	MCFE 65/80W/84	MCFE 65/80W/83	
1200mm (4ft)	36W 40W	T8 K	TLD 36W/84	TLD 36W/83	TLD 36W/35 MCFE 40W/35
		T12 A	MCFE 40W/84	MCFE 40W/83	
600mm (2ft)	18W 20W	T8 K	TLD 18W/84	TLD 18W/83	TLD 18W/35 MCFE 20W/35
		T12 A	MCFE 20W/84	MCFE 20W/83	
900mm (3ft) 450mm (18in)	30W* 15W*	T8	TLD 30W/84	TLD 30W/83	TLD 30W/35 TLD 15W/35
		T8			

K = Krypton-filled A = Argon-filled T8 = 26mm (1 in.) Dia. T12 = 38mm (1½ in.) Dia.

An entry denotes a normal stock type. Each entry is the standard ordering description of the lamp.

* 58W lamps must not be operated in 80W circuits.

70W lamps must not be operated in 85W circuits.

125W lamps must not be operated in 85W circuits.

TLD 30W and TLD 15W are switchstart only.

- Krypton-filled** – power saving lamps; first choice for new installations and for most existing switchstart circuits.
- Argon-filled (MCFE)** – retained for replacement into starterless circuits (including dimming and emergency) and for low temperatures. Old luminaires should be replaced with modern ones.
- Colour 84** – Cool appearance for work areas, especially shops, offices and factories.
- Colour 83** – Warm appearance for social areas, e.g. hotels, restaurants and the home.
- White 35** – an initial lamp, intermediate appearance, in batteren packs and KombiPacks.

Krypton-filled power-saving lamps (mainly T8) operate on the same switchstart ballasts as the corresponding argon-filled lamps, and save about 8 per cent of circuit power.

Triphosphor colours (Colour 80 Series) combine high efficacy and good colour rendering – first choice for almost all installations. Colour 80 Series are available in both krypton-filled and argon-filled lamps.

Halophosphate colours are mainly for spot replacement in existing installations. Where possible, choose a krypton-filled lamp and a triphosphor colour.

HALOPHOSPHATE COLOURS

Second-Choice colours – mainly for spot replacement in existing installations

Basic colours		De luxe colours	
Cool White 33 (Daylight 33)	Warm White 29	Natural 25	Softone 32
—	—	—	—
MCFE 125W/33	MCFE 125W/29	MCFE 125W/25	MCFE 125W/32
—	—	—	—
MCFE 75/85W/33	MCFE 75/85W/29	MCFE 75/85W/25	MCFE 75/85W/32
—	—	—	—
MCFE 65/80W/33	MCFE 65/80W/29	MCFE 65/80W/25	MCFE 65/80W/32
—	—	—	—
MCFE 40W/33	MCFE 40W/29	MCFE 40W/25	MCFE 40W/32
—	—	—	—
MCFE 20W/33	MCFE 20W/29	MCFE 20W/25	MCFE 20W/32
—	—	—	—
TLD 30W/35	TLD 30W/29	TLD 30W/25	TLD 30W/32
TLD 15W/33	TLD 15W/29	TLD 15W/25	—

- Cool White 33** – replace with Colour 84 and obtain improved colour rendering.
- Warm White 29** – replace with Colour 83 and obtain improved colour rendering.
- Natural 25** – replace with Colour 84 and obtain higher output.
- Softone 32** – replace with Colour 83 and obtain higher output.

SPECIALIST COLOURS (De Luxe halophosphates)

				Trucolor 38	Northlight 55 (Colour Matching 55)
				For hospitals (meets DHSS requirements) and for art galleries	For critical colour matching: Complies with BS 950 Part 1 (visible component).
2400mm (8ft)	125W	T12	A	—	MCFE 125W/55
1800mm (6ft)	75/85W	T12	A	MCFE 75/85W/38	MCFE 75/85W/55
1500mm 5ft	65/80W	T12	A	MCFE 65/80W/33	MCFE 65/80W/55
1200mm (4ft)	40W	T12	A	MCFE 40W/38	MCFE 40W/55
600mm (2ft)	20W	T12	A	MCFE 20W/38	MCFE 20W/55

FLUORESCENT LAMPS

LUMEN VALUES (January 1985)

The following table lists rounded values of average light output measured under standard conditions at 2000 hours.

For information on the use of lumen values in the design of fluorescent lighting installations, see the Technical Section of the Comprehensive Handbook.

For lumen depreciation and mortality see Data Sheet PL 3044 (Guide to Fluorescent Lamps).

Note:- This table is not a guide to availability.

Rating & Length	First choice colours		Second choice colours			Specialist colours
	Colour 84 & Colour 83	White 35	Warm White 29 & Cool White 33	Softone 32	Natural 25	Trucolor 38 & Northlight 55
KRYPTON-FILLED LAMPS						
100W 2400mm (8ft)	8900	7800	—	—	—	—
70W 1800mm (6ft)	6300	5600	—	—	—	—
58W 1500mm (5ft)	5100	4500	—	—	—	—
36W 1200mm (4ft)	3200	2800	—	—	—	—
18W 600mm (2ft)	1300	1100	—	—	—	—
ARGON-FILLED LAMPS						
125W 2400mm (8ft)	9400	8800	Lumens	5000	7000	5500
75 85W 1800mm (6ft)	5900	5600	as	3100	4000	3500
65 80W 1500mm (5ft)	4900	4600	for	2800	3500	3000
40W 1200mm (4ft)	3000	2700	White	1800	2200	1900
20W 600mm (2ft)	1200	1000	35	700	900	800
30W 900mm	2400	2200	—	1400	1800	—
15W	—	800	—	—	700	—

Notes:

- 75/85W lamps: Lumens measured at 75W (output is approximately 10% higher at 85W).
- 65/80W lamps: Lumens measured at 65W (output is approximately 10% higher at 80W).
- Cool White 33 was previously called Daylight 33, and Northlight 55 was previously called Colour Matching 55.

Obsolescent lamp types – for replacement only

ARGON FILLED 38mm DIA

Rating	Colour 84	White 35	Natural 25	Softone 32	Warm White 29	Cool White 33	North Light 55
85W 2400mm (8ft)	MCFE 85W/84	MCFE 85W/35	MCFE 85W/25	MCFE 85W/32	MCFE 85W/29	MCFE 85W/33	—
40W 600mm (2R)	MCFEK 40W/84	MCFEK 40W/35	MCFEK 40W/25	—	MCFEK 40W/29	MCFEK 40W/33	MCFEK 40W/55

MCEFA earth strip lamps, with internal reflectors and Colour 34 are no longer made but may be available from stockists.

80W BC lamps are available in White 35 only but their luminaires are old and should be replaced.

Other lamps

A number of special lamps are manufactured for incorporation into equipment but are not necessarily stock items: e.g. TLX lamps (single contact cap) for use in ex 'e' luminaires.

Packing Quantity

Lamps in this data sheet are packed 25 per box, except 2400mm lamps 20 per box.

Data on other fluorescent lamps is given in the following data sheets:-

Miniature fluorescent lamps – Data Sheet PL 1763

Circular fluorescent lamps – Data Sheet PL 1794

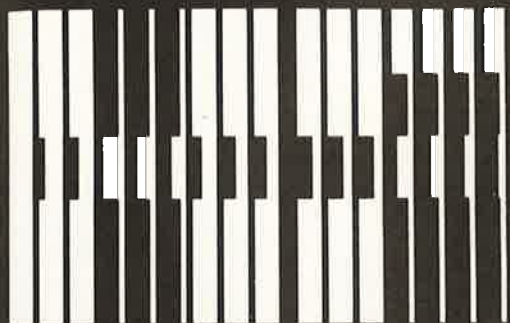
SL single-ended lamps (directly replace filament lamps) – Data Sheet PL 3001

PL single-ended lamps – Data Sheet PL 3017.

HF fluorescent lamp – Data Sheet PL 3073

Made in Holland and U.K.

PHILIPS



HIGH-FREQUENCY

electronic lighting

HIGH-FREQUENCY FLUORESCENT LAMPS

A range of T8 (26mm/1 in. diameter) energy-saving fluorescent lamps with argon filling, for use with Philips high-frequency control gear.

Philips TLD HF fluorescent lamps are for use with Philips HF control gear, and can reduce energy consumption by up to 30 per cent, compared with conventional lamp/luminaire combinations, as well as providing other lighting benefits. TLD HF lamps are available in triphosphor colours Colour 84 (cool) and Colour 83 (warm), combining high efficacy with colour rendering in the Deluxe class.

RANGE

- TLD 16W/84 – 600mm; Colour 84.
- TLD 16W/83 – 600mm; Colour 83.
- TLD 32W/84 – 1200mm; Colour 84.
- TLD 32W/83 – 1200mm; Colour 83.
- TLD 50W/84 – 1500mm; Colour 84.
- TLD 50W/83 – 1500mm; Colour 83.

APPLICATIONS

For use in luminaires fitted with Philips HF high-frequency control gear.

FEATURES

- High frequency operation raises lamp efficacy, producing energy savings up to 30 per cent for the same lighting effect, compared with conventional luminaires.
- Mains flicker and mains hum are eliminated, and hence stroboscopic effects.
- Fast, reliable starting, even under cold conditions.
- Preheat start maintains lamp life.
- Deluxe colour rendering.
- Low depreciation rate.

10

FLUORESCENT LAMPS

To reorder this Data Sheet quote

PL 3072

Issued 9.84

NEW

HIGH-FREQUENCY FLUORESCENT LAMPS

MATERIALS AND FINISH

Tubing: 26mm diameter glass,

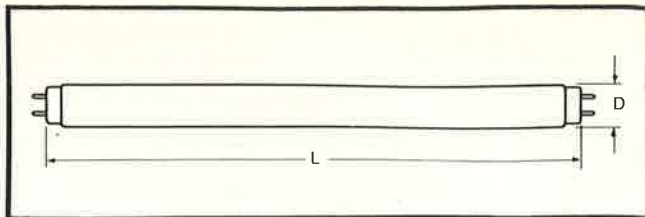
Filling: Argon,

Phosphors: Colour 80 Series triphosphor coating.

SPECIFICATION

■ Type compliance with BS 1853 where applicable.

To specify state: T8 argon-filled fluorescent lamps for use with Philips High-Frequency control gear. With triphosphor coating. Substantially as Philips TLD HF lamps.



LAMP DATA

	Colour 84	Colour 83
Correlated colour temperature	4,000K	3,000K
Colour rendering index (Ra8)	85	85
Chromaticity co-ordinates: x	0.380	0.441
y	0.377	0.404

DIMENSIONS, WEIGHTS & ELECTRICAL DATA

Catalogue No.	Lamp power (W)	Lamp volts (V)	Lamp current (A)	Maximum dimensions		Approx weight (g)	Lighting design lumens
				L (mm)	D		
TLD 16W/83HF 16	63	0.25	589.8	28	97	1300	
TLD 16W/84HF 16	63	0.25	589.8	28	97	1300	
TLD 32W/83HF 32	128	0.25	1199.4	28	186	3200	
TLD 32W/84HF 32	128	0.25	1199.4	28	186	3200	
TLD 50W/83HF 50	142	0.35	1500.0	28	229	5100	
TLD 50W/84HF 50	142	0.35	1500.0	28	229	5100	

Notes: - All lamps are TLD type (i.e. 26mm nominal diameter), with standard bi-pin caps.

Lighting Design Lumens are measured at 2,000 hours, the basis for lighting design calculations. Electrical data and lumens are averages, measured under standard conditions.

ORDERING DATA

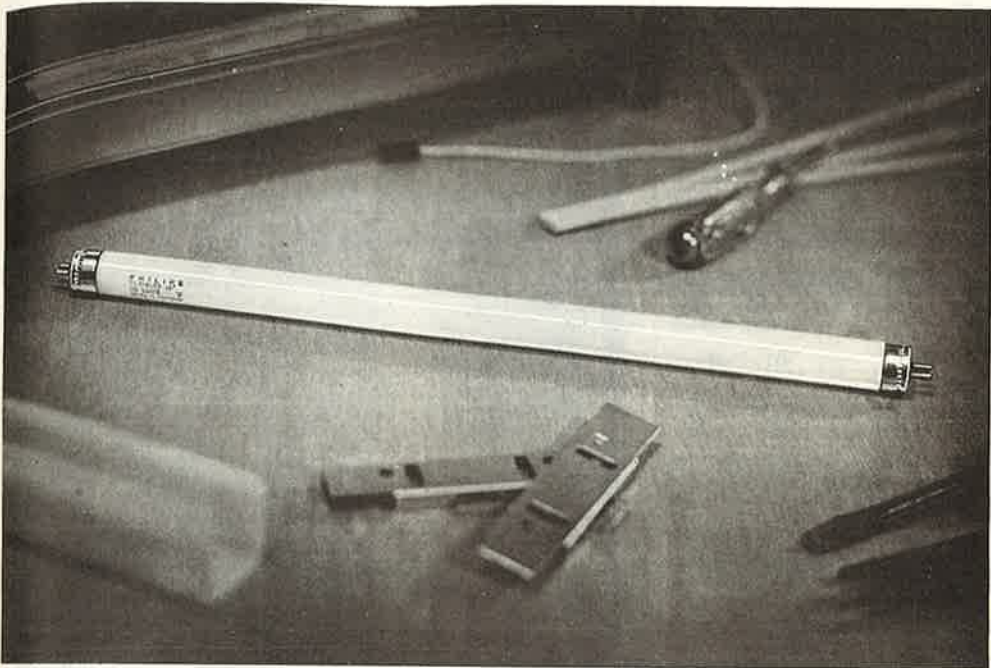
Catalogue No.	Nominal length	Packing quantity
TLD 16W/84HF	600mm	25
TLD 16W/83HF	600mm	25
TLD 32W/84HF	1200mm	25
TLD 32W/83HF	1200mm	25
TLD 50W 84HF	1500mm	25
TLD 50W 83HF	1500mm	25

Please order lamps in the form given in the following example, in multiples of the packing quantity: 100 Philips High-Frequency lamps TLD 50W/84HF.

Note: - HF lamps are not for use in luminaires which are not fitted with Philips HF control gear.

Made in Holland.

MINIATURE FLUORESCENT LAMPS



10

A range of 16mm diameter (T5) lamps that combine the fluorescent lamp advantages of high light output and long service period with slim shape.

RANGE

Available in the following ratings:-

White 35

TL 13W 525mm (21in.)

TL 8W 300mm (12in.)

TL 6W 225mm (9in.)

Warm White 29 & Cool White (Daylight) 33

TL 13W 525mm (21in.)

TL 8W 300mm (12in.)

TL 6W 225mm (9in.)

TL 4W 150mm (6in.)

APPLICATIONS

Miniature fluorescent lamps are used in fluorescent striplights and in bulkhead luminaires for lighting stairways and common parts of buildings, and in lightboxes for photography and display. They also have applications in exhibition and display lighting, in picture lighting and in street furniture and signs.

LAMPS FLUORESCENT

To reorder this Data Sheet quote

PL 1763/4

Issued 7/83

Replaces 1763/3

MINIATURE FLUORESCENT LAMPS

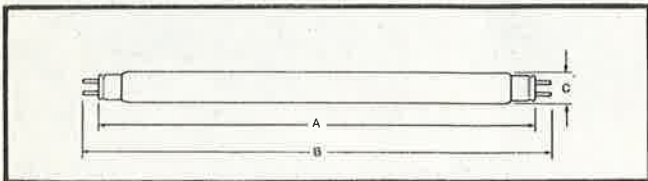
FEATURES

- Cool running, and long service high efficacy relative to tungsten filament lamps.

LAMP DATA

LDL represents Lighting Design Lumens, the lumen value at 2000 hours.

Lamp type	LDL White 35	LDL Warm White 29	LDL Cool White 33
TL13W	800	800	800
TL8W	400	400	400
TL6W	250	250	250
TL4W	—	150	150



DIMENSIONS, WEIGHTS & ELECTRICAL DATA

Lamp type	Lamp volts	Lamp current	Lamp weight	Dimensions			Cap (mini bi-pin)	
				A max. (mm)	B max. (mm)	C max. (mm)		
TL13W	525mm (21in.)	98	0.17	49	517	531	16	G5/15
TL8W	300mm (12in.)	58	0.17	31	288	302	16	G5/15
TL6W	225mm (9in.)	45	0.16	24	212	226	16	G5/15
TL4W	150mm (6in.)	30	0.15	17	136	150	16	G5/15

All data are averages, and refer to operation under standard conditions.

Note: For switchstart operation. Certain emergency luminaires and transistorised ballasts may not operate these lamps correctly.

ORDERING DATA

Catalogue No.	Nominal length	Colours	Packing quantity
TL13W/**	525mm(21in)	35, 29, 33,	25
TL8W/**	300mm(12in)	35, 29, 33,	25
TL6W/**	225mm(9in)	35, 29, 33,	25
TL4W/**	150mm(6in)	29, 33,	25

**Insert colour number for the lamp colour required eg. TL13 W/35.

Please order lamps in the form given in the following example, in multiples of the packing quantity:
100 Philips TL 13W/35 fluorescent lamps.

Note:

Please also refer to Data Sheet PL 3017 for range of PL * Miniature Compact fluorescent lamps.

LAMP COLOURS

White 35: A high efficacy phosphor, now the preferred colour for the majority of these applications.

Warm White 29: Warm colour appearance, now tending to be replaced by White 35.

Cool White 33: Cool colour appearance, now tending to be replaced by White 35.

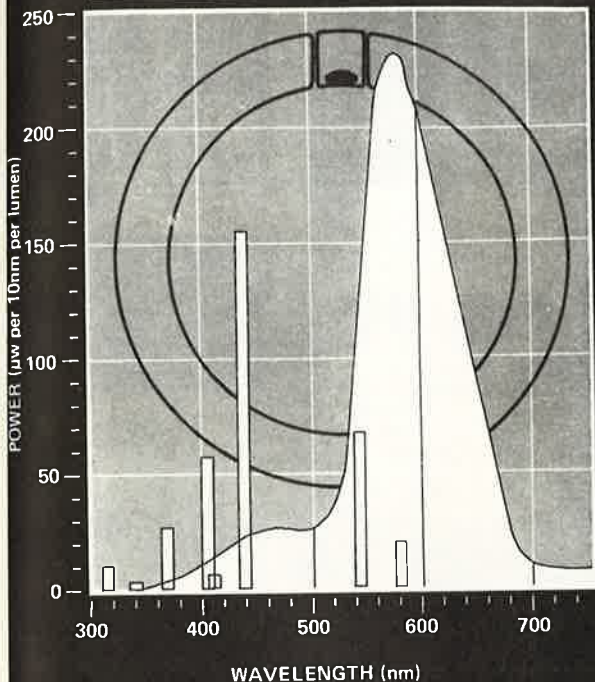
Made in Holland

PHILIPS



SPECTRAL POWER DISTRIBUTION

**WARM WHITE 29
CIRCULAR FLUORESCENT**



CHROMATICITY COORDINATES

x = 0.446
y = 0.406

COLOUR RENDERING INDEX

(Ra 8) = 51

CORRELATED COLOUR TEMPERATURE

2855K

CIRCULAR FLUORESCENT LAMPS

A range of circular fluorescent lamps for use in signs and equipment, and for incorporation in compact decorative luminaires.

Philips circular fluorescent lamps combine the advantages of conventional linear fluorescent lamps – long service and high efficacy – with a compact format that can be used to advantage in equipment and decorative luminaires. The lamp colour is Warm White 29, which combines high light output with a warm colour appearance.

RANGE

- 60W and 40W ratings – nominal o.d. 410mm (16in.).
- 32W rating – nominal o.d. 305mm (12in.).
- 22W rating – nominal o.d. 210mm (8½in.).

APPLICATIONS

For use in suitable luminaires, for commercial and social areas such as:

- Bars
- Hotels and reception areas
- Private offices
- Domestic

Also for use in signs, and in equipment such as vending machines.



LAMPS FLUORESCENT

To reorder this Data Sheet quote .

PL 1794/2

Issued 9.82

PL 1794/1

CIRCULAR FLUORESCENT LAMPS

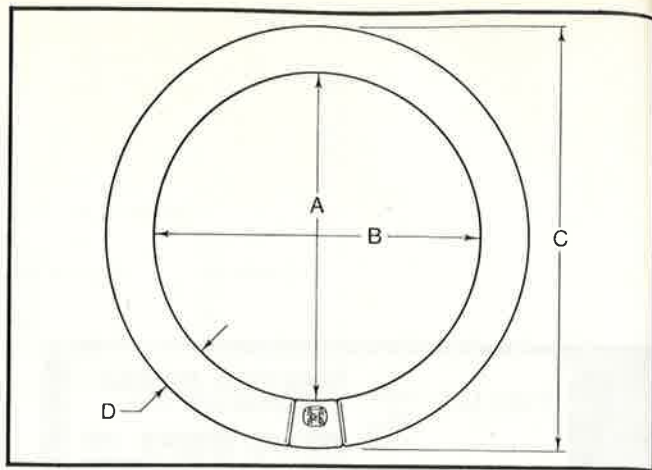
FEATURES

- Makes possible decorative fluorescent luminaires for use in locations where linear fluorescent lighting would not be suitable.
- TLE and TLEK lamps operate from conventional switchstart control gear.

ORDERING DATA

Please order lamps in accordance with the following example, in multiples of the packing quantity:—

24 Philips circular fluorescent lamps
TLEK 60W/29.



Made in Holland.

LAMP DATA

Ordering reference	Nom. o.d. (mm/in.)	A (min/max) (mm)	B (min/max) (mm)	C (min/max) (mm)	D (min/max) (mm)	LDL	B.S. Lamp Volts	B.S. Lamp Current	Weight (g)	Packing quantity
TLEK 60W/29	410/16	341-3/347-7	338/9-346-9	400/412-8	29-4/34-1	3400	92	0-75	333	6
TLE 40W/29	410/16	341-3/347-7	338-9/346-9	400/412-8	29-4/34-1	2480	110	0-42	333	6
TLE 32W/29	305/12	239-7/246-1	237-3/245-3	298-5/311-2	29-4/34-1	1670	82	0-45	250	6
TLE 22W/29	210/8½	150-7/155-6	151-1/160-4	203-2/215-9	26-2/30-9	840	62	0-4	183	6

Notes:—LDL represents Lighting Design Lumens, the lumen value after 2000 hours (average, under standard conditions).

All lamps are fitted with G10q four-pin caps.

STARTERS

For Fluorescent Lamps

A range of starters for fluorescent lamps, for use as original equipment in new luminaires or as replacement spares. The starters are of the glow switch type; a capacitor is included.

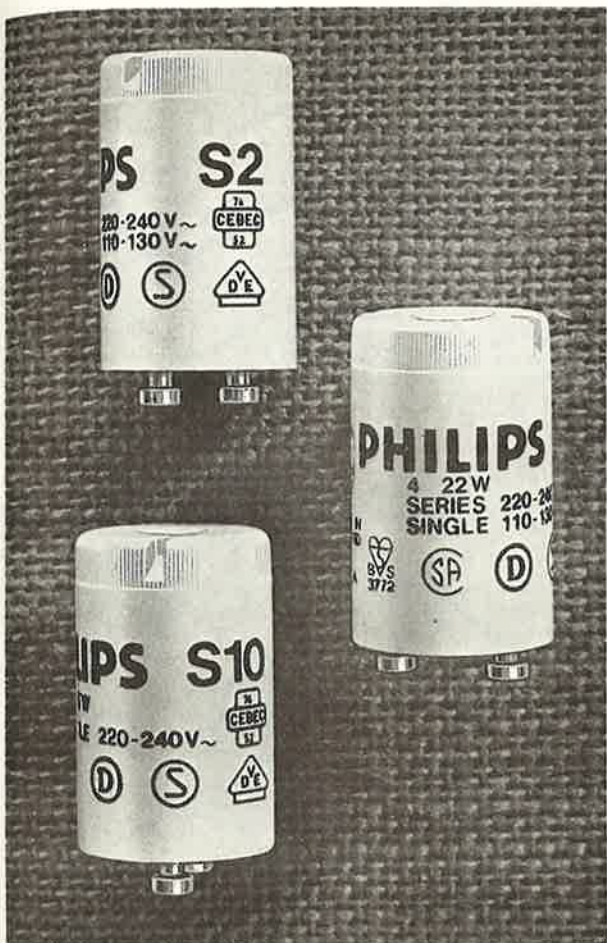
RANGE

S2 } For principal
S10 } lamp types
S16 }

S12 } Special starters
S18 }

FEATURES

- Philips starters outlast several fluorescent lamp changes.
- Polycarbonate cases. (Except S18)



NOTE: for Electronic starters, see Data Sheet PL 1785.

To reorder this data sheet quote

PL 1792/6

Issued 7/83

Replaces PL 1792/5

FLUORESCENT LAMP

STARTERS

MATERIALS & FINISH

Canister:

Polycarbonate, off-white, (Except S18)

SPECIFICATION

- Type compliance with BS 3772.
- In addition, Philips hold a Kitemark license for the manufacture of S10 and S2 starters to BS 3772.

To specify state:

Fluorescent lamp starter, with polycarbonate canister, similar to Philips S10 and S2.

RANGE OF OPERATION

For use in conventional fluorescent lamp luminaires, and similar equipment.

ORDERING DATA

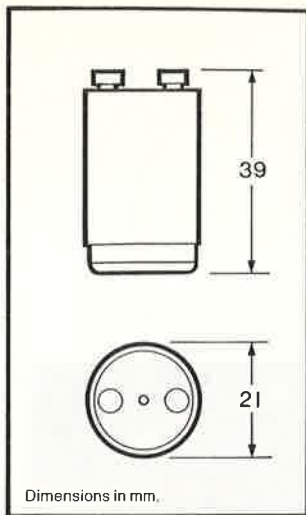
Please order in the form given in the following example, in multiples of the packing quantity:

1000 Philips starters S10.

LAMP APPLICATIONS

Ordering reference	For use with	Packing quantity
S10	65/80W, 58W, 40W 1200mm (4ft), 36W, 30W, 13W and single short lamp. Also Circular 60W, 40W, 32W	10
S2	40W 600mm (2ft), 20W, 18W, 15W, 8W, 6W 4W twin lamps (or single lamp*). Also Circular 22W	10
S16	100W, 75/85W, 70W	10
S18	125W, (also 100W, 75/85W, 70W).	50
S12	140W 1500mm (5ft), 120W 1500mm (5ft) 85/100W 1800mm operated at 100W	25

* For a single short lamp S10 is preferable to S2. S2, S10, S16 also in 1000 way packs.



Weight: 30g.

LIST OF EQUIVALENTS

Philips Type	Replaces	
S2(K3002)	155/100	155/200
S10(K3001)	155/400	155/500
S16	155/501	—
S18(K3125)	155/501	155/800
S12(K3012)	—	—

Made in Holland/Great Britain.

FLUORESCENT BALLASTS

A range of ballasts for use with the Philips range of fluorescent lamps.

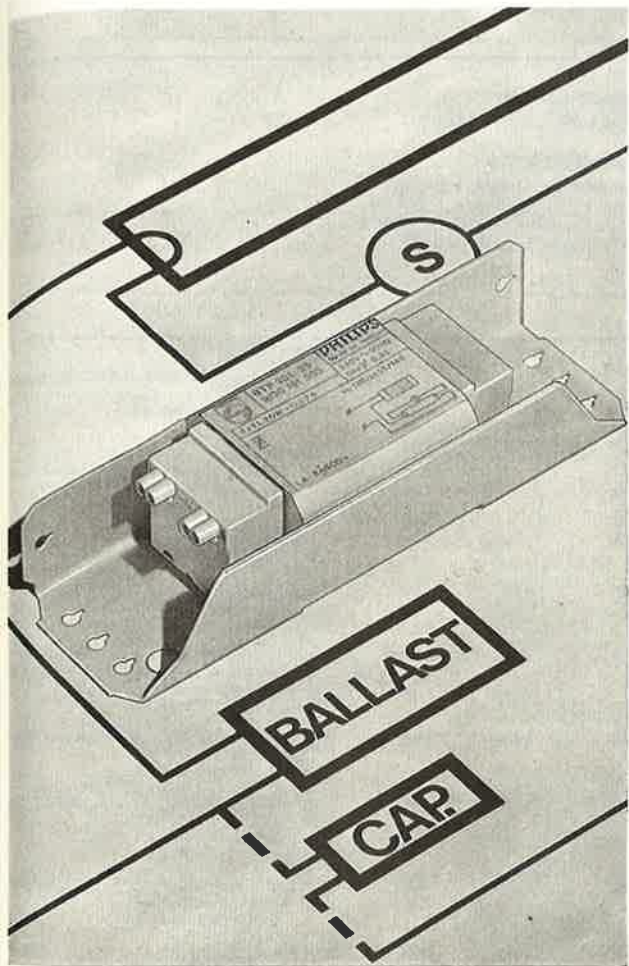
RANGE

Ballasts for switchstart circuits
- a range of LPF chokes for lamps from 4/6/8W to 125W.

APPLICATIONS

- Stockholding as spares for ballasts in luminaires.
- Incorporation in fluorescent luminaires, and in equipment using fluorescent lamps.

Note:- For starters see Data Sheet PL 1792
For capacitors see Data Sheet PL 1859
For circuit data see Data Sheet PL 1839
For HF ballasts see Data Sheet PL 3073
For PL ballasts see Data Sheet PL 3017



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LAMPS FLUORESCENT

To reorder this Data Sheet quote

PL 1864/6

Issued 7/83

Replaces PL 1864/5

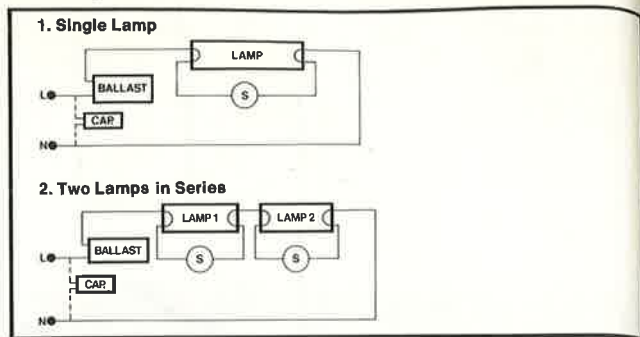
FLUORESCENT BALLASTS

RANGE OF OPERATION

For nominal supplies of 240V 50Hz
Normal indoor conditions.

CIRCUIT DIAGRAMS

Switch Start



SPECIFICATION

Type compliance with BS2818

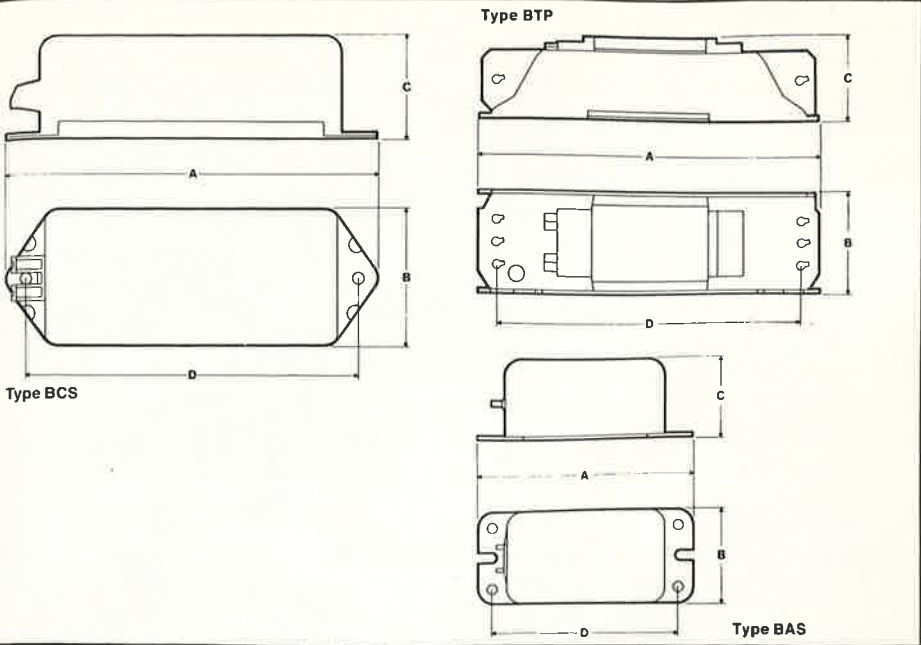
ORDERING DATA

Please order ballasts in the form
given in the following example, in
multiples of the packing quantity:—
50 Philips ballasts BTP 40 L25

BAS & BCS Ballasts: Made in UK

BTP Ballasts: Made in Holland

DIMENSIONS



DIMENSIONS & WEIGHTS

Catalogue No.	For lamp types	Overall Length A (mm)	Overall Width B (mm)	Overall Depth C (mm)	Fixing centres D (mm)	Weight (g)	Packing Quantity
Ballasts for switchstart circuits – 240V							
BCS 100/1	1 x 100W 2400mm (8ft) See note	232	42	35	220	1600	5
BCS 75/L	1 x 75/85W 1800mm (6ft) 1 x 70W 1800mm (6ft)	180	44	37	165	1350	5
BTP 65 L25	1 x 65/80W 1500mm (5ft) 1 x 58W 1500mm (5ft) 1 x 60W circ. 410mm (16in.)	195	45.5	38	180	1150	5
BTP 40 L25	1 x 40W 1200mm (4ft) 1 x 36W 1200mm (4ft) 2 x 18W or 20W 600mm (2ft) 1 x 40W circ. 410mm (16in.)	155	45.5	36.5	140	690	5
BTP 30 L25	1 x 30W 900mm (3ft) 2 x 15W 450mm (18in.) 1 x 32W circ. 305mm (12in.)	155	45.5	36.5	140	690	5
BTP 20 L25	1 x 20W 600mm (2ft) 1 x 18W 600mm (2ft) 1 x 15W 450mm (18in.) 1 x 22W circ. 210mm (8.25in.)	155	45.5	36.5	140	680	5
BAS 13	1 x 13W 525mm (21in.) 2 x 8W 300mm (12in.) 2 x 6W 225mm (9in.)	99	41	36	85 x 29	460	5
BAS 8	1 x 4W, 6W, 8W 150mm (6in.) 2 x 4W 150mm (6in.)	99	41	36	85 x 29	460	5

Note: 125W lamps must not be used in the 100W lagging PF circuit. Ballast BCS125 is for 125W loading PF circuit.

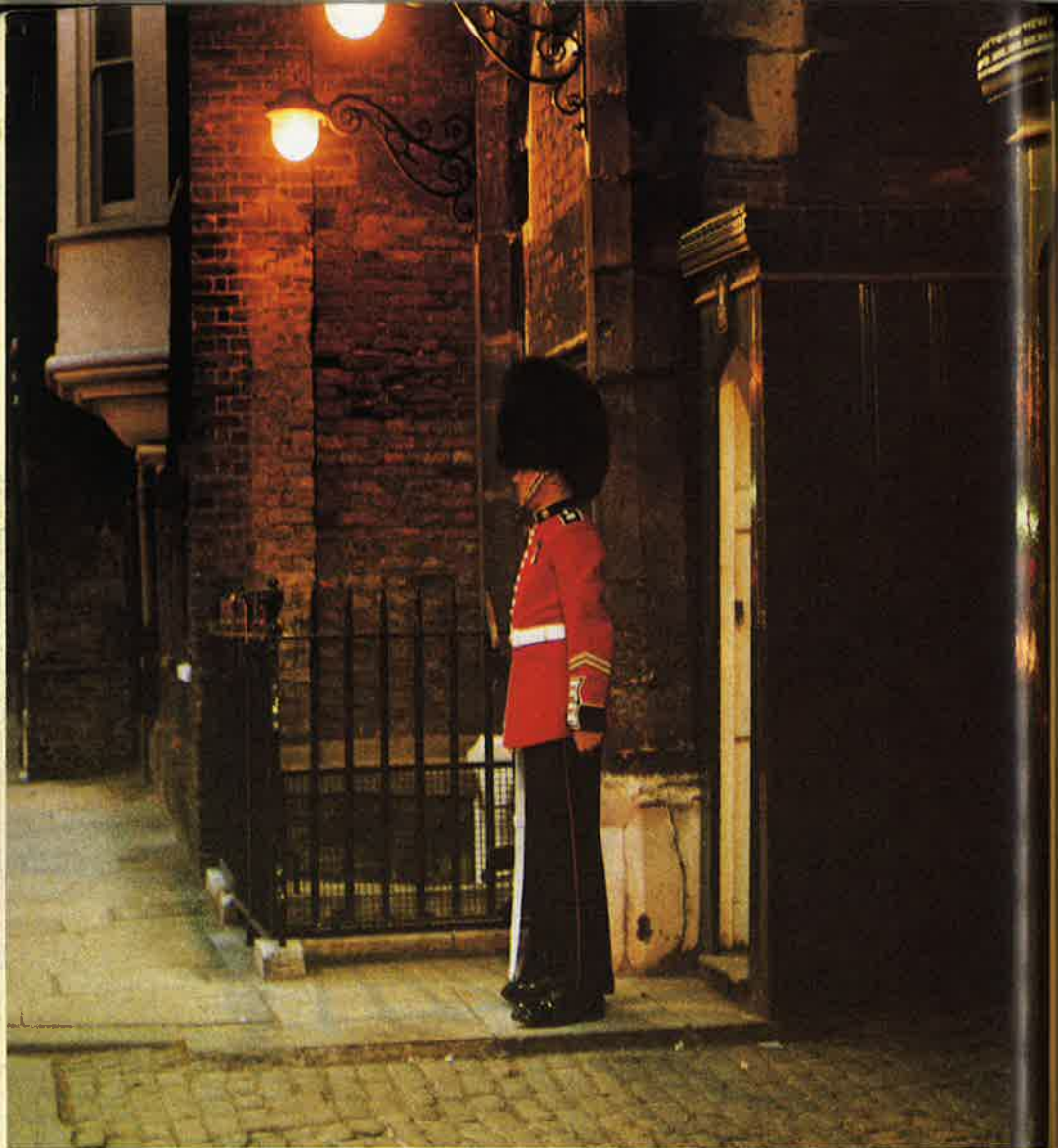
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FLUORESCENT BALLASTS



WARWICK UNIVERSITY

As well as replacing more than 300 GLS lamps with SL in the Rootes Hall and reception area, the University has installed PL lamps in outdoor globe luminaires – again replacing GLS.

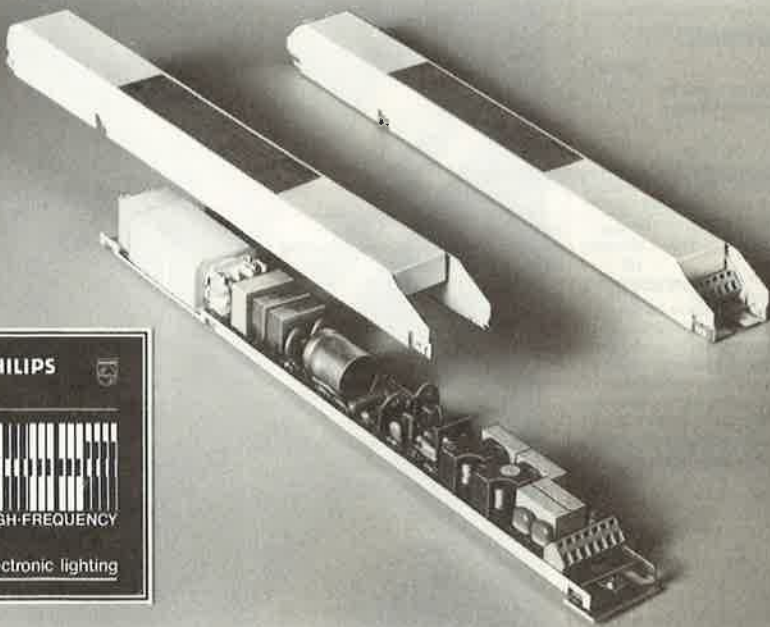


ST. JAMES'S PALACE, WESTMINSTER

Energy-saving SL lamps are serving the Queen Mother in this energy-saving conversion outside St. James's Palace. The SL is also extensively used inside and outside the Houses of Parliament.

HIGH-FREQUENCY FLUORESCENT BALLASTS

A range of High-Frequency ballasts for use with Philips TLD HF fluorescent lamps.



10

FLUORESCENT LAMPS

RANGE

BHF 416 – for use with four 16W 600mm TLD HF lamps.

BHF 132 – for use with one 32W 1200mm TLD HF lamp.

BHF 150 – for use with one 50W 1500mm TLD HF lamp.

BHF 232 – for use with two 32W 1200mm TLD HF lamps.

BHF 250 – for use with two 50W 1500mm TLD HF lamps.

APPLICATIONS

For use with Philips TLD HF fluorescent lamps.

FEATURES

- High-frequency operation of lamp (28kHz) raises efficacy, and ballast losses are reduced. With Philips TLD HF Colour 80 Series lamps, energy consumption can be reduced by up to 30 per cent for the same lighting effect, compared with conventional fluorescent luminaires.

- Mains flicker and mains hum are eliminated, and hence stroboscopic effects.

- Preheat start maintains lamp life.

- Fast, reliable starting, even in cold conditions.

- Automatic cut-out switches off ballast at end of lamp life, obviating flickering. Circuit resets automatically when new lamp is fitted.

- Power factor is near unity without capacitor correction.

- Solid-state electronics for reliable operation.

RANGE OF OPERATION

240V 50Hz supplies.

Protected within luminaire.

Note: Can also be operated on DC.

To reorder this Data Sheet quote

PL 3073

Issued: 9/84

NEW

HIGH-FREQUENCY FLUORESCENT BALLASTS

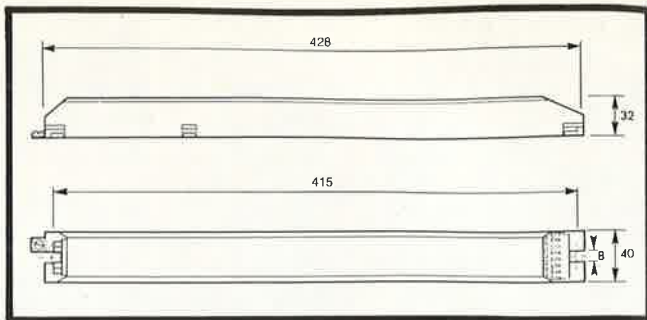
SPECIFICATION

■ Radio interference: Philips HF ballasts have exceptional RI suppression, so that luminaires incorporating them will comply with the appropriate requirements.

To specify state:- High-frequency ballasts for use with Philips TLD HF lamps. Substantially as Philips BHF ballasts.

BALLAST LIMITS

Under normal test conditions of luminaire, ballast temperature at test points must not exceed 65°C (abnormal operation 75°C). Observe manufacturers instructions on Electric Strength test, use on ELCBs, and separation between lamps and ballast.



MATERIALS AND FINISH

Case:- Aluminium.

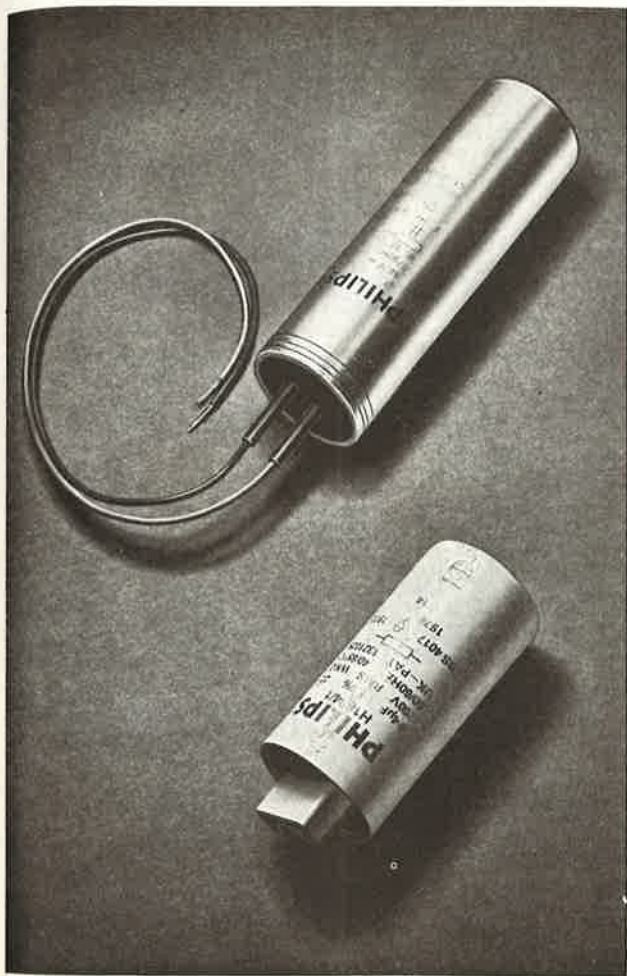
Terminations:- Grab terminals for 1,5mm² L,N terminations take two conductors each.

DIMENSIONS, WEIGHTS AND ELECTRICAL DATA

Catalogue No.	For lamp types	Circuit current (A)	Total circuit Watts	Power factor	Weight (kg)	Packing qty
BHF 416	4 x 16W TLD HF	0.31	72	0.96	0.9	1
BHF 132	1 x 32W TLD HF	0.15	36	0.96	0.9	1
BHF 150	1 x 50W TLD HF	0.24	56	0.96	0.9	1
BHF 232	2 x 32W TLD HF	0.31	72	0.96	1.1	1
BHF 250	2 x 50W TLD HF	0.48	111	0.96	1.1	1

ORDERING DATA

Please order ballasts in the form given in the following example, in multiples of the packing quantity:-
50 Philips high-frequency ballasts BHF 250.



FLUORESCENT LAMP CAPACITORS

A range of power factor capacitors and series capacitors for use in conjunction with the Philips range of fluorescent lamp ballasts.

RANGE

H1684/1
H1672
H1655/1
H1635/1

Note: Philips Catalogue Nos. for capacitors for fluorescent lamp control gear start with the prefix H16. The next two digits give the capacitance in mfd (e.g. H1684/1 = 8.4 mfd).

APPLICATIONS

For use as original equipment, or as replacement spares, in fluorescent luminaires of the appropriate rating. Details of starters and ballasts for use in conjunction with these capacitors are given in Data Sheets PL 1792 and PL 1864 respectively. Circuit diagrams are printed on some ballasts, and are also contained in PL 1864.

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LAMPS FLUORESCENT

To reorder this Data Sheet quote

PL 1859/4

Issued 7/83

Replaces PL 1859/3

FLUORESCENT LAMP CAPACITORS

FEATURES

- 250V capacitors have insulated canisters which require no earthing and are easily fixed (440V capacitors have aluminium canisters which require earthing).
- Windings of metallised polypropylene; no PCB's present.
- Rated for ambient temperatures up to 85°C.

MATERIALS & FINISH

Can: Tubular PPO for 250V rating, Aluminium for 440V rating.

Construction: Metallised polypropylene winding; fitted with discharge resistor.

Note: No liquid filling.

Terminations: 250V capacitors have grab terminals for 0.5–1.0mm² solid cable; insulation to be stripped back 11mm ± 1mm. 440V capacitors have 300mm flying leads.

SPECIFICATION

Type compliance with BS 4017; licensed to bear Kitemark.

To specify state:

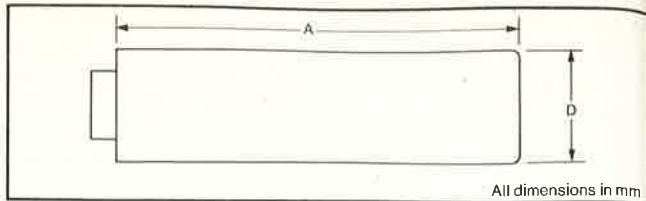
Capacitor in 38mm max. dia. canister with dry metallised polypropylene winding; substantially as Philips H16** range.

RANGE OF OPERATION

Voltage as specified in Table, 50 or 60 Hz.

Temperature: Minus 40°C to plus 85°C

DIMENSIONS, WEIGHTS & ELECTRICAL DATA



Catalogue No.	Length A (mm)	Capacitance (mfd)	Tolerance (%)	Working Volts (rms)	Weight (g)	Packing quantity
PF Capacitors						
H1635/1	51	3.5	10	250	70	10
Series Capacitors						
H1672	130	7.2	5	440	250	10
H1684/1	77	8.4	5	250	100	10
H1655/1	77	5.5	5	250	90	10

250V capacitors have a diameter of 38mm. } D
440V capacitors have a diameter of 35mm. }

TYPICAL SWITCH START Circuit Applications

Lamp type	Suitable capacitor
1 × 18W 600mm	H1655/1
2 × 18W 600mm series	H1635/1
1 × 36W 1200mm	H1635/1
1 × 58W 1500mm	H1655/1
1 × 70W 1800mm	H1684/1
1 × 100W 2400mm lag	H1684/1

All shunt-connected

Power Factor capacitors (10% tolerance; 250V) are shunt-connected across the mains supply to raise the lagging power factor of an inductive load, and to reduce the current in the supply cables. Series capacitors (5% tolerance) are part of the fluorescent lamp circuit e.g. switch start loading. A 5% capacitor may be used in place of a 10% capacitor of the same nominal value, but not vice versa.

Note: H1672 for 125W leading circuit.

ORDERING DATA

Please order in the form given in the following example, in multiples of the packing quantity:—

50 Philips capacitors H1672

Made in UK.

FLUORESCENT LAMP ACCESSORIES

A range of bi-pin and mini bi-pin lampholders, starter holders, bi-pin to BC adaptors and spring clips for use with the Philips range of lamps and control gear.

RANGE

Lampholders

- K7221 – Fixed bi-pin lampholder.
- K7221E – Fixed bi-pin lampholder with earth contact.
- K7202 – Fixed bi-pin lampholder.
- K7265E – Bi-pin lampholder with earth contact.
- K7229/1 – Lampholder for 16mm miniature bi-pin lamps.

Starter holder

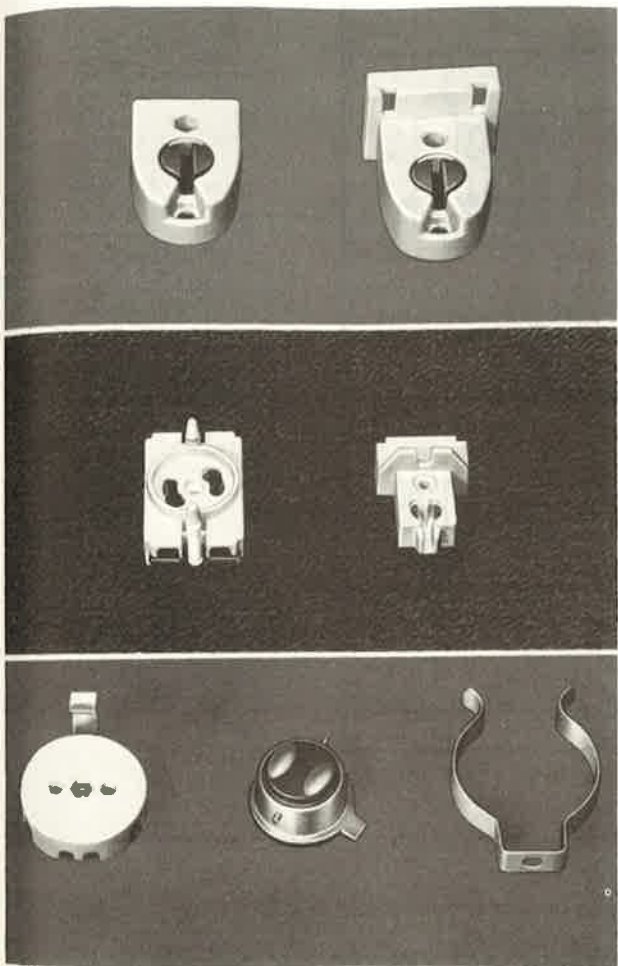
- K7373 – Starter holder with push-wire terminals.

Sundries

- K7250 – Adaptor, bi-pin to BC.
- K7235 – Spring clip for 38mm lamps and PFC capacitors.
- K7257 – Springclip for 25mm lamps.

APPLICATIONS

For use as original equipment, or as replacement spares, in fluorescent luminaires. Details of control gear for use in luminaires is given in the following Data Sheets:-
Ballasts – PL 1864/1.
Starters – PL 1792/1.
PFC capacitors – PL 1859/1.



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LAMPS FLUORESCENT

To reorder this Data Sheet quote

PL 1863/3

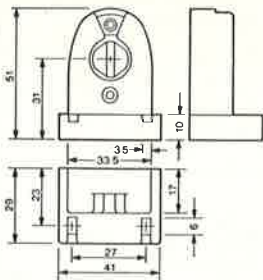
Issued 9.82

Replaces PL 1863/2

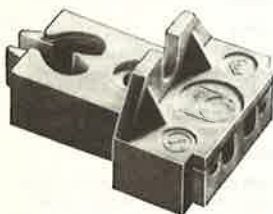
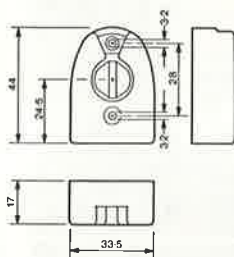
FLUORESCENT LAMP ACCESSORIES



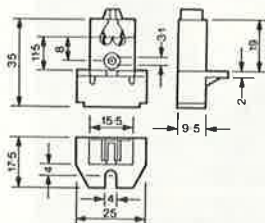
K7221 Fixed Bi-Pin Lampholder.
K7221E Fixed Bi-Pin Lampholder
with earth contact. Screw fixing.
Material: Philite White. Electrical
Connections: K7221 Push-wire
terminals. K7221E Push-wire terminals.



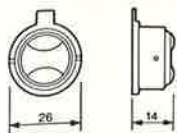
K7202 Fixed Bi-Pin Lampholder.
Screw Fixing to Back Plate. Material:
Philite White. Electrical connections:
Push-wire terminals.



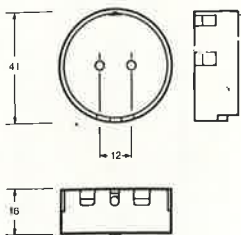
K7229/1 Fixed Bi-Pin Lampholder for
16mm miniature lamps. Screw fixing.
Material: White Polypropylene.
Electrical connections: Push-wire
terminals.



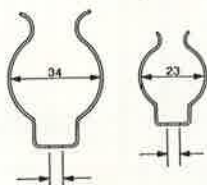
FLUORESCENT LAMP ACCESSORIES



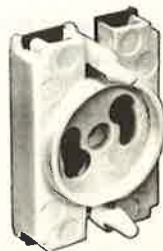
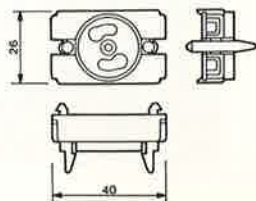
K7250 Adaptor Bi-Pin to BC.
Push-on fit. Material: Brass.



K7265E Bi-Pin Push-on fully shrouded
lampholder with earth contact.
Material: Urea. Electrical connections:
Push-wire terminals. Earth contact:
Screw terminals.



K7235 Spring clip for 38mm lamps
and PFC capacitors. Material: Spring
steel, cadmium plated.
K7257 Spring clip for 25mm lamps.
Material: Spring steel, cadmium
plated.

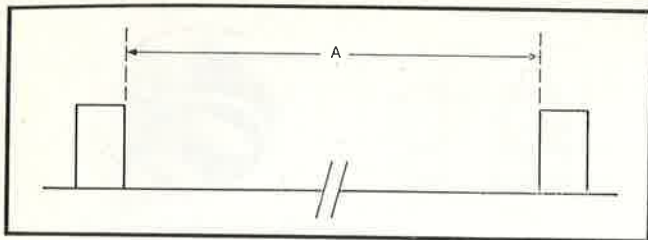


K7373 Starter Holder clip-in fixing.
Material: Polycarbonate, Electrical
connections: Push-wire terminals.

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FLUORESCENT LAMP ACCESSORIES

LAMP HOLDER SPACING DISTANCES



Lamp Nom. Length	Face-to-Face spacing (A) mm
2400mm (8ft)	2376
1800mm (6ft)	1765
1500mm (5ft)	1501
1200mm (4ft)	1200
900mm (3ft)	896
600mm (2ft)	591
450mm (18in)	461
525mm (21in)	517
300mm (12in)	288
225mm (9in)	212
150mm (6in)	136

(A) Values apply also to corresponding krypton-filled lamps.

ORDERING DATA

Catalogue No.	Description	Packing quantity
K7221	Fixed bi-pin lampholder	100
K7221E	Fixed bi-pin lampholder with earth contact	100
K7202	Fixed bi-pin lampholder	100
K7265E	Bi-pin lampholder with earth contact	100
K7229/1	Lampholder for 16mm lamps	100
K7373	Starter holder, push-wire terminals	100
K7250	Adaptor, bi-pin to BC	100
K7235	38mm spring clip	100
K7257	25mm spring clip	100

Please order in the form given in the following example, in multiples of the packing quantity:-

200 Philips lampholders K7221
 Note: K7221E Obsolescent

Made in UK, except K7221, K7221E, K7202, and K7229/1 which are made in Holland.

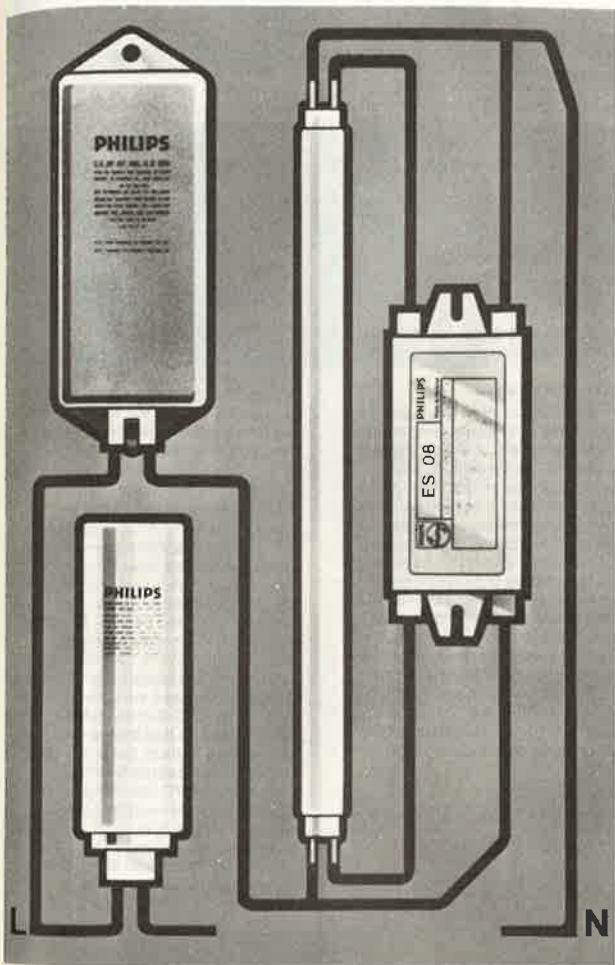
FLUORESCENT LAMP CIRCUITS & OPERATING DATA

Basic circuits and a table of typical circuit components with circuit characteristics. Three forms of "start" are described:

- Switchstart
- Starterless
- Electronic Start,

Operating notes for luminaires and control gear are included.

For HF ballasts see Data Sheet PL 3073.



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LAMPS FLUORESCENT

To reorder this Data Sheet quote

PL 1839/5

Issued 8/83

Replaces PL 1839/4

FLUORESCENT LAMP CIRCUITS

FLUORESCENT LAMP CIRCUITS

Switchstart

Starting is accomplished by a glow-switch starter, which is a small discharge tube with bi-metallic electrodes connected in parallel with the fluorescent lamp, in such a manner that the lamp electrode heating current passes through the switch. When the circuit is energised with a cold lamp, a discharge is established within the glow switch, warming the bi-metallic electrodes which move into contact and establish a circuit through the lamp electrodes.

Since the discharge in the starter ceases when its electrodes come into contact, they cool down and spring apart after about a second, subjecting the lamp to mains voltage plus the inductive transient voltage due to the ballast. The arc in the lamp is established, reducing the voltage across the starter to a value below that at which a discharge can take place and rendering it cold and inoperative.

Should the lamp fail to start, the discharge will be re-established in the starter and the starting cycle will be repeated. It is this ability of the glow switch starter to 'try again' that causes the repeated blinking of a switchstart circuit with a failed lamp. Once the lamp has started, the ballast acts as a current-limiting device.

The circuit is efficient and reliable, provided that starters are changed at occasional relampings. It is suitable both for Krypton-filled and Argon-filled lamps.

Electronic Start

This Philips innovation replaces either the glow switch starter or starterless circuits with a solid-state component that has no moving parts and lasts as long as the luminaire. Circuit power is the same as for the switchstart circuit.

Electronic Start therefore combines the advantages of both switchstart (lower power) and starterless (maintenance free) circuits, without the limitations of either of them. An added feature is automatic cut-out of the starter after about 5 seconds of non-starting of a failed lamp.

OPERATING NOTES

Storage

Unless otherwise stated, Philips fluorescent luminaires are for use in dry interiors. Luminaires must be stored only in dry environments; if packaging is exposed to damp, it must be changed.

Mains supply

Standard fluorescent luminaires incorporate ballasts designed for a supply voltage of 240V 50Hz, subject to statutory tolerances. The supply voltage should be checked by measurement (at the load terminals), at times of high and low demand.

Ambient temperature

Luminaires and control gear give their rated service in ambient temperatures not exceeding 25°C, with occasional increases to not above 35°C. At higher temperatures (for example, in shop windows or on heated ceilings), service will be reduced and operation impaired. To improve heat dissipation, luminaires should be fixed to conducting rather than insulating surfaces, or should be suspended slightly below a ceiling rather than mounted directly on it. Electrical and Photometric values refer to operation in a 25°C ambient at 240V, and are averages. At low temperatures, light output and service are normally reduced; with most circuits, starting may not be reliable below 5°C.

Fuses and circuit breakers

Circuit breakers or HRC fuses rather than re-wireable fuses should be employed. The choice of current rating is a compromise between close protection against fault currents and spurious failure due to switching transients. An approximate guide to rating is 2-3 times steady current, with a minimum of 2A for an HRC fuse and 5A for a circuit breaker.

Operating noise

All fluorescent luminaires emit an operating noise which may be noticeable in situations where the ambient noise level is low, or if the luminaires are attached to resonant structures. Trials should be made before installing the less expensive luminaires in acoustically sensitive situations; a heavy-duty grade of luminaire is usually more suitable for these environments. Normally, the shorter the luminaire, the lower the operating noise.

Radio interference

Fluorescent luminaires should not be installed in close proximity to radio sets or similar equipment. Some radio interference is inevitable, but diminishes with distance. AM sets without an external aerial are inherently susceptible to adjacent discharge lamp circuits; adding an external aerial usually gives better results than adding suppressors to the luminaire or to the set. FM sets are less susceptible to interference from electrical equipment.

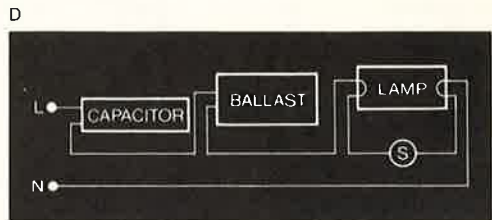
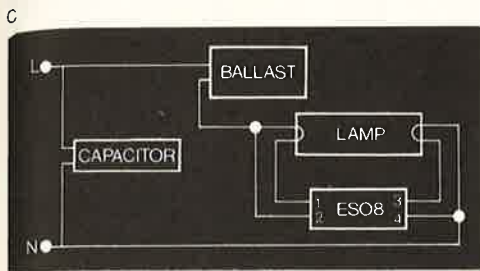
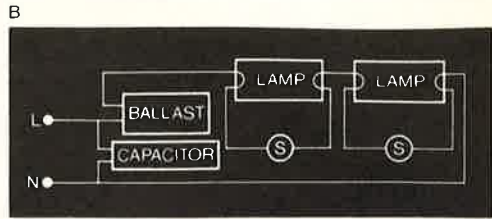
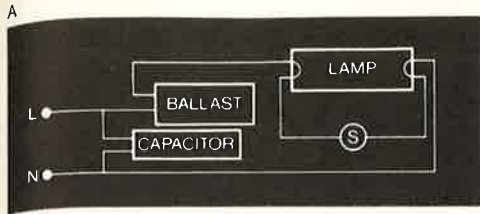
Cables and switches

The current rating of cables for fluorescent luminaires should be determined in accordance with IEE Regulations. In a three-phase four-wire system, a full-size neutral should be employed since harmonic currents are additive in the neutral. All cables entering a luminaire, especially if passing alongside a ballast, must be suitable for the temperatures involved. Ballasts may have surface temperatures up to 95°C. Supply cables should be arranged so that they do not pass alongside a ballast, but if this is not possible then cables with high-temperature PVC insulation should be used, or heat-resistant sleeving should be fitted over each individual supply cable. Switches should be generously rated, and should be suitable for inductive loads.

FLUORESCENT LAMP CIRCUITS

CIRCUIT DIAGRAMS

Standard circuits (A, B, C) for fluorescent lamps. Some luminaires may have variations on these circuits. D is a leading P.F. circuit, with 440V capacitor, mainly used with 125W 2400mm lamps.



FLUORESCENT LAMP CIRCUITS

ELECTRICAL DATA

Lamp rating and length	Circuit letter	Ballast Cat. No.	PF Capacitor μ F	Starter Cat. No.	Circuit Watts (W)	Circuit current (A) approx.
Switchstart - single lamp						
100W 2400mm	A	BCS100/1	8.4	S16	115	0.60
70W 1800mm	A	BCS 75L	5.5	S16	86	0.36
58W 1500mm	A	BTP 65 L25	5.5	S10	70	0.35
36W 1200mm	A	BTP 40 L25	3.5	S10	46	0.25
30W 900mm	A	BTP 30 L25	3.5	S10	40	0.20
18W 600mm	A	BTP 20 L25	5.5	S10 or S2	29	0.15
15W 450mm	A	BTP 20 L25	5.5	S10 or S2	25	0.13
13W 525mm	A	BAS 13	2.0	S10	18	0.10
8W 300mm	A	BAS 8	2.0	S10 or S2	13	0.10
6W 225mm	A	BAS 8	2.0	S10 or S2	11	0.10
4W 150mm	A	BAS 8	2.0	S10 or S2	10	0.10
Switchstart - two lamps in series						
2 x 18W 600mm	B	BTP 40 L25	3.5	2 x S2	46	0.25
2 x 15W 450mm	B	BTP 30 L25	3.5	2 x S2	40	0.20
2 x 8W 300mm	B	BAS 13	2.0	2 x S2	21	0.10
2 x 6W 225mm	B	BAS 13	2.0	2 x S2	17	0.10
2 x 4W 150mm	B	BAS 8	2.0	2 x S2	13	0.10
Electronic Start						
100W 2400mm	C	BCS 100/1	8.4	ESO8	115	0.60

Harmonic Content (3 Phase 4 Wires) less than 3 x 25% all circuits.

Circuit Power Factor, with capacitors quoted, is above 0.85 lagging.

For parallel P.F. connection either 10% or 5% tolerance capacitors may be used, 250V rating.

Values of circuit watts relate to the ballasts quoted.

DISCHARGE LAMPS

	Page
Low Pressure Sodium (SOX)	369
SOX-E	373
High Pressure Sodium SON, SON/T, and SON-R	377
High Pressure Sodium Lamps	381
Powerwhite HPL-N	385
HPI Lamps	389
ML-MLR	393
Ballasts for Low Pressure (SOX) Lamps	397
Ballasts for High Pressure Sodium (SON) Lamps	401
Ballasts, Ignitors and Capacitors for Mercury Fluorescent Lamps	405

**Please see pages II and III of General
Introduction for information on how to use
this Handbook.**

1830

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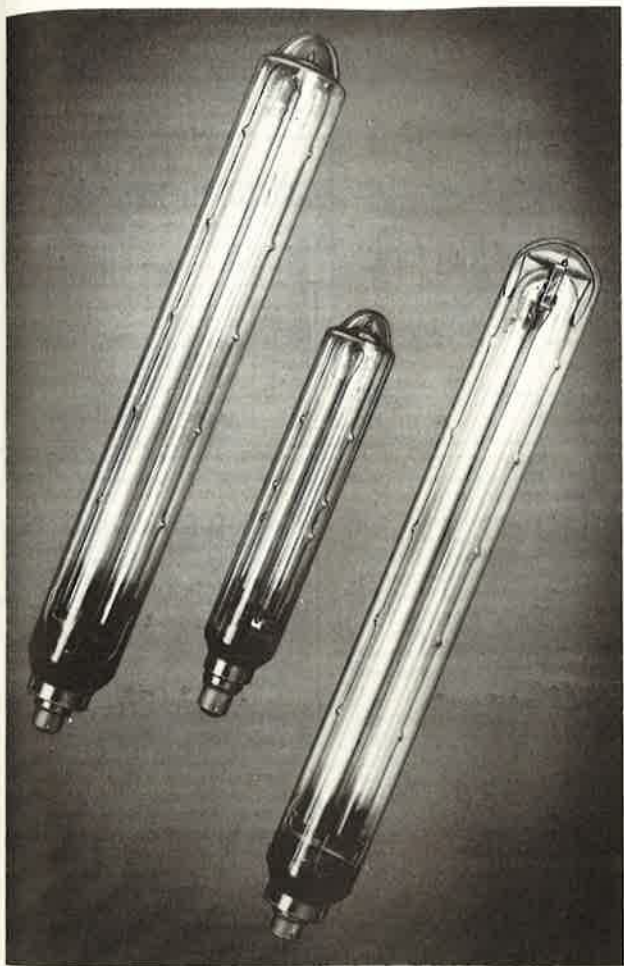
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SOX

Low pressure sodium discharge lamps

Low pressure sodium lamps achieving up to 183 Lumens/Watt. They give a characteristic yellow light, and are therefore suitable for use in applications where efficacy and long life are of prime importance, rather than colour rendering.

RANGE

18W	90W
35W	135W
55W	180W

APPLICATIONS

Suitable for any application where efficacy and long life are essential, in situations such as:

- Road lighting
- Trunk road and motorway lighting
- Security lighting
- Car parks
- Floodlighting
- Some factory warehouse applications

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DISCHARGE LAMPS

To reorder this Data Sheet quote

PL 1757/7

Issued 7/83

Replaces PL 1757/6

SOX – DISCHARGE LAMPS

FEATURES

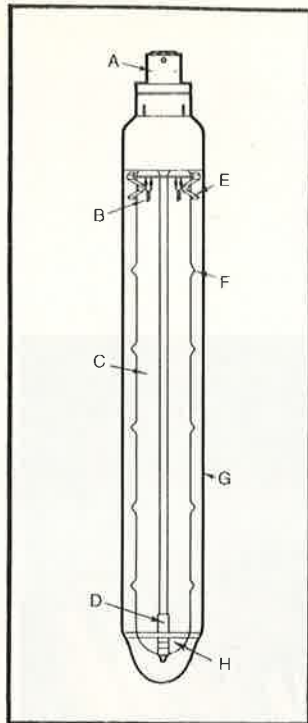
- Extremely high efficacy – up to 183 Lumens/Watt – conserves energy in many applications.
- Indium oxide layer on internal surface of outer glass envelope reflects infra-red radiation; keeps the discharge tube at temperatures for high efficiencies.
- Dimples formed in discharge tube form cool spots to retain sodium; prevent mirroring and consequent loss of efficiency.
- Single BC cap for strength and simplicity.
- Triple-coil cathodes and non-staining discharge tube ensure long life and low depreciation during use.
- All SOX lamps can be operated up to 20° above or below the horizontal, and the three smaller sizes can be operated in any 'cap up' position.
- Lamps are manufactured to BS 3767 and IEC 192.
- 35W to 135W versions are available in SOX BOX – special packing designed to make relamping quicker and easier.

RANGE OF OPERATION

Lamps operate reliably from -18°C.

MATERIALS & FINISH

Envelope: Clear tubular glass containing discharge tube with BC cap



KEY TO ILLUSTRATION

- A Alkyde BC cap coloured beige
- B Triple coil cathode
- C U bend non-staining glass discharge tube
- D Discharge tube support assembly to improve insulation
- E Discharge tube supports
- F Sodium retaining dimples
- G Outer glass envelope with internal heat reflecting layer
- H Bend heat insulation cap

LIFE EXPECTANCY AND LUMEN DEPRECIATION

Lamp life is a very complex subject. In order to give some guidance for light technical and economic calculations, we show the typical curves of life survival, lumen depreciation and economic service based on tests carried out by our Quality Department Light (QDL).

1. Life Survival Curve – The average life expectancy of a large batch of lamps under controlled laboratory test conditions with a switching cycle of 5½ hours on ½ hour off. (Based on I.E.C. regulations).
2. Lumen Depreciation Curve – The average fall-off in lumen output of a batch of lamps measured over a specific period of time. The initial light output is measured after 100 hours operation and subsequently at regular intervals with the lamps operated at nominal wattage by controlling the input supply to the lamp.
3. Economic Service Curve – The additive percentage value of the Life Survival Curve and the Lumen Depreciation Curve after a period of time e.g., assuming at 8000 hours a life survival figure is given as 90% (10% failures) and a corresponding lumen depreciation figure is 90% (10% lumen fall in light output) the resultant economic service figure is determined as

80%. This figure of 80% means that the original installation is now running at 20% below its design efficiency. Applied to an indoor industrial scheme designed to give 400 lux initial lighting level, this means that after 8000 hours the lighting level will have fallen to 320 lux (this does not include depreciation due to accumulation of dust or non maintenance schedules).

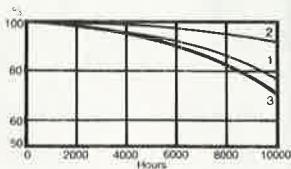
The Average Rated Life – The average rated life obtained from large representative groups of lamps under controlled conditions, at five or more burning hours per switch. It is based on the survival of at least 50% of the lamps and allows for individual lamps or groups of lamps to vary from the average.

However, life obtained in service can vary due to a number of parameters such as:-

- Switching cycle
- Mains voltage (plus tolerances)
- Burning position (horizontal or vertical)
- Mechanical influence (vibration, shocks)
- Ambient temperature (free burning, enclosed)
- Luminaire and gear specifications.

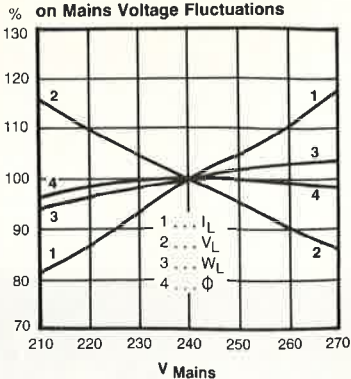
The information above is intended to give practical guidance to the user or

specifier in determining the replacement lamp cycle best suited to his needs, based on the particular conditions of the installation in question. With all installations, group replacement of lamps will generally reduce total cost by reducing the labour costs content in changing individual lamps when these fail.

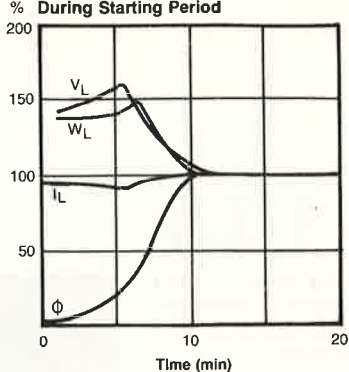


LAMP PERFORMANCE DATA

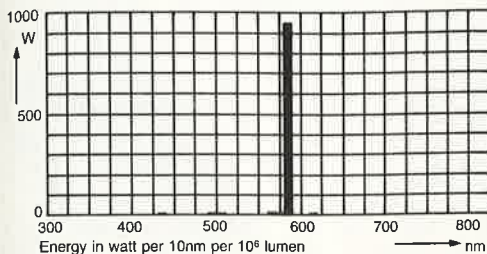
Lamp Performance on Mains Voltage Fluctuations



Lamp Performance During Starting Period



ABSOLUTE SPECTRAL ENERGY DISTRIBUTION



ELECTRICAL DATA & DIMENSIONS

Catalogue Number	Rating (Watts)	Average Lumen Output (100 hrs)	Average Lumen Output (2000 hrs)	Correlated Colour Temperature (K)	Lamp Volts	Lamp Current (A)	Min. Voltage Supply (V)	Run-up Time (min)	Burning Position	CAP	Overall Length (mm)	Diameter (mm)
SOX 18	18	1800	1750	2000	57	0.35	200	7	1	BC	216	54
SOX 35	35	4500	4300	2000	70	0.60	200	7	1	BC	310	54
SOX 55	55	7400	7150	2000	109	0.60	200	7	1	BC	425	54
SOX 90	90	13000	12250	1800	112	0.94	200	9	2	BC	528	68
SOX 135	135	22500	21200	1800	164	0.95	200	10	2	BC	775	68
SOX 180	180	33000	31500	1750	240	0.91	200	12	2	BC	1120	68

All lamps must be operated with appropriate control gear.
For control gear information refer to Data Sheet No. PL 1777.

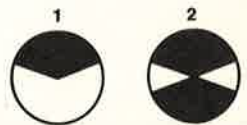
ORDERING DATA

Description	Packing quantity
18W SOX	20
35W SOX	9
55W SOX	9
90W SOX	9
135W SOX	9
180W SOX	9
35W SOX BOX	12
55W SOX BOX	12
90W SOX BOX	12
135W SOX BOX	12

Please order in multiples of the packing quantity.

18W and 180W made in Belgium, all other wattages made in U.K.

BURNING POSITIONS



Cap up and horizontal $\pm 20^\circ$ Horizontal $\pm 20^\circ$

Unshaded area shows recommended burning positions.

SOX - DISCHARGE LAMPS





SOX-E

Low Pressure Sodium Discharge Lamps

Low Pressure Sodium lamps are the most efficient form of lighting known. With their improved thermal insulation SOX-E lamps can achieve up to 200 lumens/Watt. They give a characteristic yellow light, and are therefore suitable for use in applications where efficacy and long life are of prime importance, rather than colour rendering.

RANGE

SOX-E18
SOX-E26
SOX-E36
SOX-E66
SOX-E91
SOX-E131

APPLICATIONS

Suitable for any application where efficacy and long life are essential, in situations such as:-

- Road Lighting
- Trunk road and motorway lighting
- Security lighting, Interior & Exterior
- Car Parks
- Floodlighting
- Some factory warehouse applications

DISCHARGE LAMPS

To reorder this Data Sheet quote

PL 3049/1

Issued 9.83

Replaces PL 3049

SOX-E

FEATURES

- Extremely high efficacy – up to 200 lumens/Watt – conserves energy in many applications.
- Indium oxide layer on internal surface of outer glass envelope reflects infra-red radiation; keeps the discharge tube at the optimum temperature for maximum efficacy.
- Improved bend insulation to help stabilise temperature.
- Dimples formed in discharge tube form cool spots to retain sodium; preventing mirroring and consequent loss of efficacy.
- Fully interchangeable mechanically and electrically by their equivalent SOX rating.
- Single BC cap ensures correct alignment within optical systems.

■ Triple-coil cathodes and non-staining discharge tube ensure long life and low depreciation during use.

■ All SOX-E lamps can be operated at up to 20° above or below the horizontal, and the three smaller sizes can be operated in any "cap up" position.

■ A black cap differentiates SOX-E from SOX lamps

RANGE OF OPERATION

Lamps operate reliably from – 18°C

MATERIALS & FINISH

Envelope: Clear tubular glass containing discharge tube with BC cap.

LAMP COMPATIBILITY

SOX-E 26W replaces 35W SOX
 SOX-E 36W replaces 55W SOX
 SOX-E 66W replaces 90W SOX
 SOX-E 91W replaces 135W SOX
 SOX-E 131W replaces 180W SOX

ELECTRICAL COMPATIBILITY

SOX-E lamps are designed to operate on all existing SOX type circuits. However, as they run with a lower lamp current, optimum efficacy will only be achieved on control gear specially designed for SOX-E lamps. When run on other circuits a lower efficacy will be achieved, however this will still be greater than the equivalent SOX lamp on the same circuit. A summary is given below based on Philips circuits. SOX-E lamps operated on Philips circuits will comply with electricity board power factor correction requirements.

SOX-E												
	Autoleak			Hybrid – Constant Watts			Hybrid-Choke Ignitor			Optimum Hybrid Constant Watts		
Commercial Watts	True Lamp Watts	Total Circuit Watts	Light Output 100 Hr	True Lamp Watts	Total Circuit Watts	Light Output 100 Hr	True Lamp Watts	Total Circuit Watts	Light Output 100 Hr	True Lamp Watts	Total Circuit Watts	Light Output 100 Hr
18	–	–	–	–	–	–	–	–	–	18	25	1800
26	31	56	4060	–	–	–	30	41	3800	25	32	3500
36	41	62	6400	–	–	–	39	51	5700	35	43	5700
66	70	99	10800	68	95	10500	70	83	10100	65	79	10700
91	97	137	16800	96	129	16300	–	–	–	90	106	17500
131	142	176	26500	–	–	–	–	–	–	130	151	26000

DIMENSIONS

Catalogue Number	Nominal Rating (Watts)	Correlated Colour Temperature (K)	Min Voltage Supply (V)	Run-Up Time (min)	Burning Position	CAP	Overall Diameter	Length
							(mm)	
SOX-E 18	18	2000	200	7	1	BC	216	54
SOX-E 26	25	2000	200	7	1	BC	310	54
SOX-E 36	35	2000	200	7	1	BC	425	54
SOX-E 66	65	1800	200	9	2	BC	528	68
SOX-E 91	90	1800	200	10	2	BC	775	68
SOX-E131	130	1750	200	12	2	BC	1120	68

ORDERING DATA

Description	Packing quantity
SOX-E 18	20
SOX-E 26	9
SOX-E 36	9
SOX-E 66	9
SOX-E 91	9
SOX-E 131	9

Please order in multiples of the packing quantity

BURNING POSITIONS

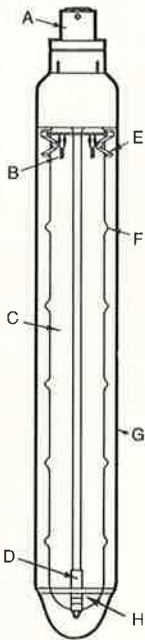
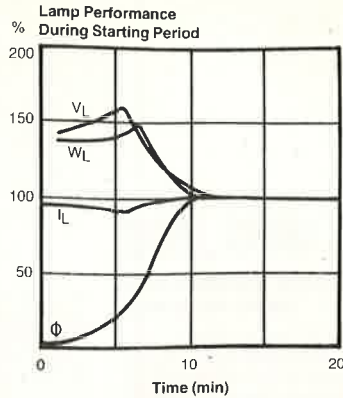
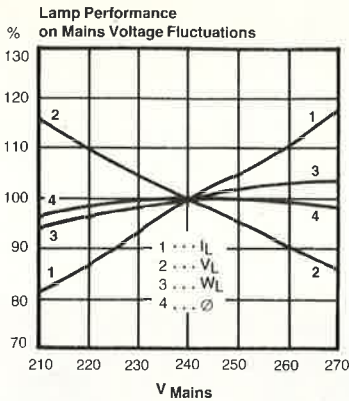


Cap up and horizontal ± 20°

Unshaded area shows recommended burning positions.

All lamps must be operated with appropriate control gear. For control gear information refer to Data Sheet No. PL 1777

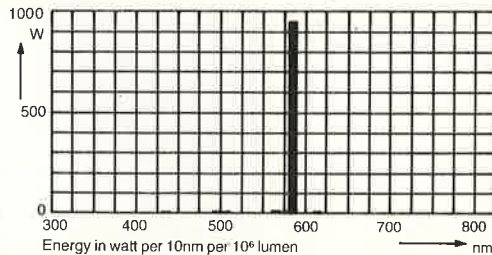
LAMP PERFORMANCE DATA

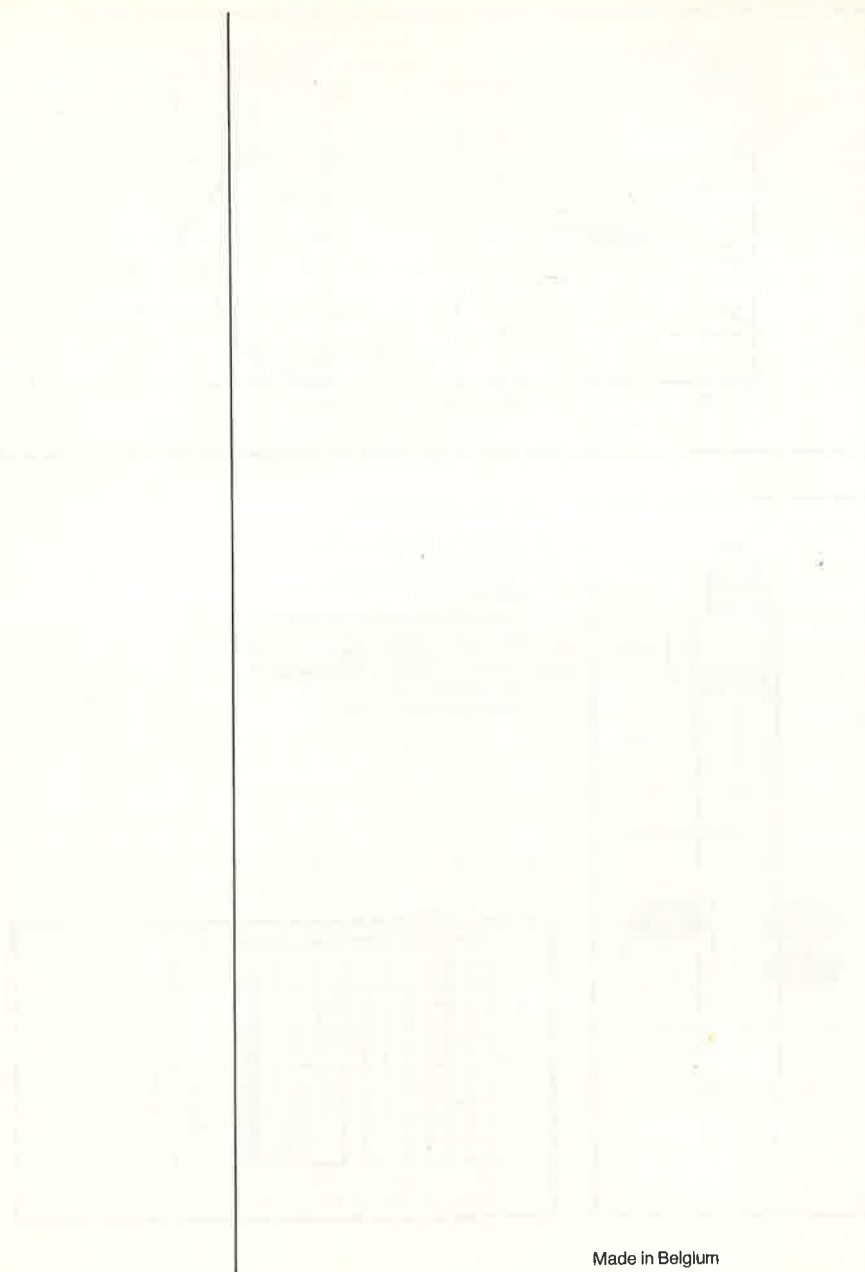


KEY TO ILLUSTRATION

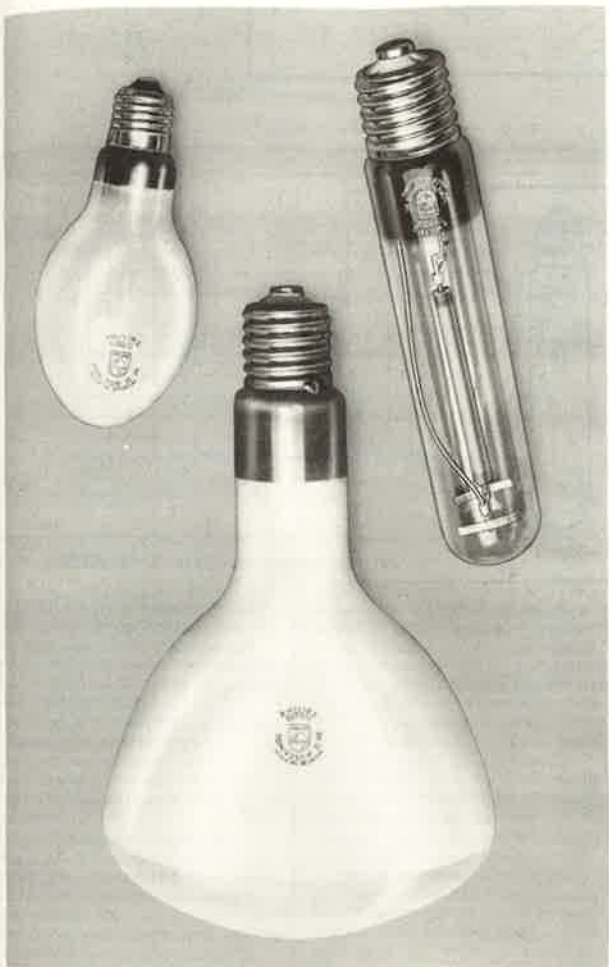
- A Alkyde BC cap coloured black
- B Triple coil cathode
- C U bend non-staining glass discharge tube
- D Discharge tube support assembly
- E Discharge tube supports
- F Sodium retaining dimples
- G Outer glass envelope with internal heat reflecting layer
- H Bend heat insulating cap

ABSOLUTE SPECTRAL ENERGY DISTRIBUTION





Made in Belgium



SON, SON/T

High pressure sodium discharge lamps

High-pressure sodium lamps combine extremely high initial efficacies (up to 112 Lumens/Watt) with good colour rendering, and are therefore suitable for many applications where a warm white light and long lamp life are important factors. The discharge tube is made of sintered aluminium oxide, containing a mixture of mercury and sodium at high pressure. The effect of high pressure is to broaden the sodium spectrum, so that the lamp gives an output throughout the entire visible spectrum.

RANGE

SON (Ovoid outer envelope, with white internal diffusive coating):

Available in ratings of 50W, 70W (also available with clear envelope), 100W, 150W, 250W, 400W and 1000W.

SON/T (Tubular outer envelope of clear glass):

Available in ratings of 100W, 150W, 250W, 400W and 1000W.

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DISCHARGE LAMPS

To reorder this Data Sheet quote

PL 1776/7

Issued 9/82

Replaces PL 1776/6

SON, SON/T – DISCHARGE LAMPS

APPLICATIONS

Suitable for any application where high efficacy, reliability and long life coupled with good colour rendering is required, in situations such as:

- Security lighting
- Floodlighting
- Docks and goods yards
- Transport termini
- Churches
- Swimming pools
- Exhibition halls
- Outdoor markets and civic centres
- Floodlighting where precise optical control is essential (SON/T)

FEATURES

- Short run-up time – 80% of full light output is achieved after only 3½ minutes.
- Solid-state ignitor on lamps of 100W rating and above ensures reliable and quick starting – even when hot – at temperatures down to –40°C.
- Reliability, stable operation and long life permits lamps to be used in situations where 'lamp outage' could create a hazard.
- Excellent lumen maintenance.
- Isothermal hard glass outer envelope guards against breakage due to thermal shock.
- Golden white light, with colour rendering capable of reproducing blue surfaces clearly, and enhancing red or yellow surfaces. Complexions and Skin tones are flattered by the light.
- Universal burning position for all lamps in the range.
- Lamps are manufactured to IEC 662.

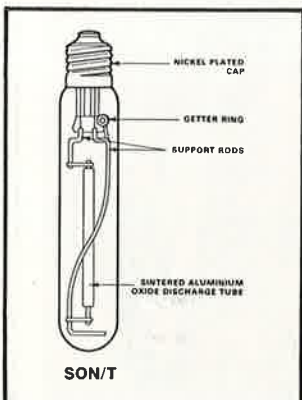
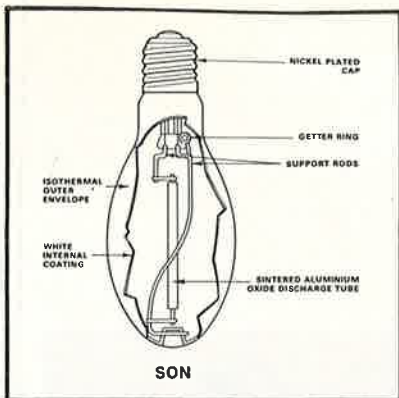
Marking

Lamp with an internal starter are marked with the international symbol.



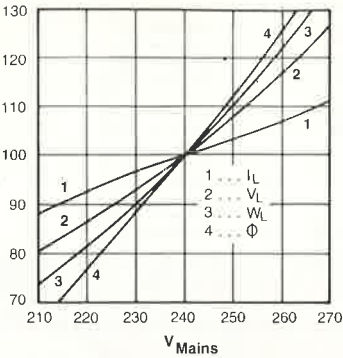
RANGE OF OPERATION

Lamps start reliably down to –40°C.

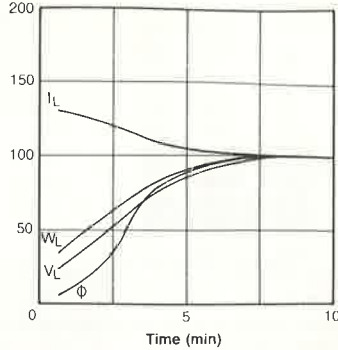


LAMP PERFORMANCE DATA

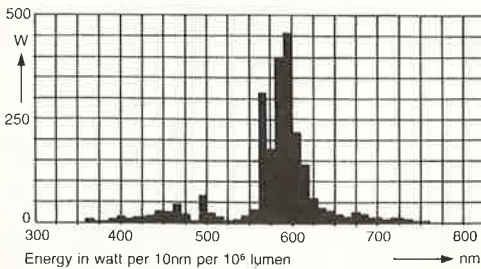
Lamp Performance on Mains Voltage Fluctuations



Lamp Performance During Starting Period



ABSOLUTE SPECTRAL ENERGY DISTRIBUTION



LIFE EXPECTANCY AND LUMEN DEPRECIATION

Lamp life is a very complex subject. In order to give some guidance for light technical and economic calculations, we show the typical curves of life survival, lumen depreciation and economic service based on tests carried out by our Quality Department Light (QDL).

1. Life Survival Curve – The average life expectancy of a large batch of lamps under controlled laboratory test conditions with a switching cycle of 5/2 hours on 1/2 hour off. (Based on I.E.C. regulations).
2. Lumen Depreciation Curve – The average fall-off in lumen output of a batch of lamps measured over a specific period of time. The initial light output is measured after 100 hours operation and subsequently at regular intervals with the lamps operated at nominal wattage by controlling the input supply to the lamp.
3. Economic Service Curve – The additive percentage value of the Life Survival Curve and the Lumen Depreciation Curve after a period of time e.g., assuming at 8000 hours a life survival figure is given as 90% (10% failures) and a corresponding

lumen depreciation figure is 90% (10% lumen fall in light output) the resultant economic service figure is determined as 80%. This figure of 80% means that the original installation is now running at 20% below its design efficiency. Applied to an indoor industrial scheme designed to give 400 lux initial lighting level, this means that after 8000 hours the lighting level will have fallen to 320 lux (this does not include depreciation due to accumulation of dust or non maintenance schedules).

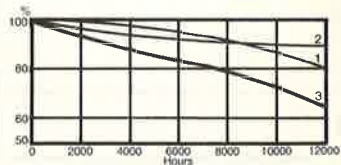
The Average Rated Life – The average rated life obtained from large representative groups of lamps under controlled conditions, at five or more burning hours per switch. It is based on the survival of at least 50% of the lamps and allows for individual lamps or groups of lamps to vary from the average.

However, life obtained in service can vary due to a number of parameters such as:-

- Switching cycle
- Mains voltage (plus tolerances)
- Burning position (horizontal or vertical)
- Mechanical influence (vibration, shocks)

- Ambient temperature (free burning, enclosed)
- Luminaire and gear specifications.

The information above is intended to give practical guidance to the user or specifier in determining the replacement lamp cycle best suited to his needs, based on the particular conditions of the installation in question. With all installations, group replacement of lamps will generally reduce total cost by reducing the labour costs content in changing individual lamps when these fail.



SON, SON/T – DISCHARGE LAMPS

ELECTRICAL DATA & DIMENSIONS

Catalogue Data	Rating (Watts)	Lighting Design Lumens	Correlated Colour Temperature (K)	Lamp Volts	Lamp Current (A)	Min Supply Voltage (V)	Run-up Time (min)	Burning Position	CAP	Overall Length (mm)	Diameter (mm)
50W SON	50	3100	1900	85	0.76	200	5	Universal	ES	156	72
70W SON	70	5510	1900	90	1.0	200	5	Universal	ES	156	72
70W SON/C	70	5700	1900	90	1.0	200	5	Universal	ES	156	72
100W SON	100	9000	1900	100	1.2	200	5	Universal	GES	186	76
100W SON/T	100	9500	1900	100	1.2	200	5	Universal	GES	211	47
150W SON	150	13500	1900	100	1.8	200	5	Universal	GES	227	92
150W SON/T	150	14000	1900	100	1.8	200	5	Universal	GES	211	47
150W SON/ST	150	15500	1900	100	1.8	200	5	Universal	GES	211	47
250W SON	250	24000	2000	100	3.0	200	5	Universal	GES	227	92
250W SON/T	250	25000	2000	100	3.0	200	5	Universal	GES	257	47
400W SON	400	45000	2100	105	4.45	210	5	Universal	GES	292	122
400W SON/T	400	46500	2100	100	4.6	210	5	Universal	GES	283	47
1000W SON	1000	110000	2100	110	10.3	210	10	Universal	GES	400	170
1000W SON/T	1000	123000	2100	100	10.6	210	10	Universal	GES	390	67

All lamps must be operated with appropriate control gear.

For control gear information refer to Data Sheet No. PL 1778.

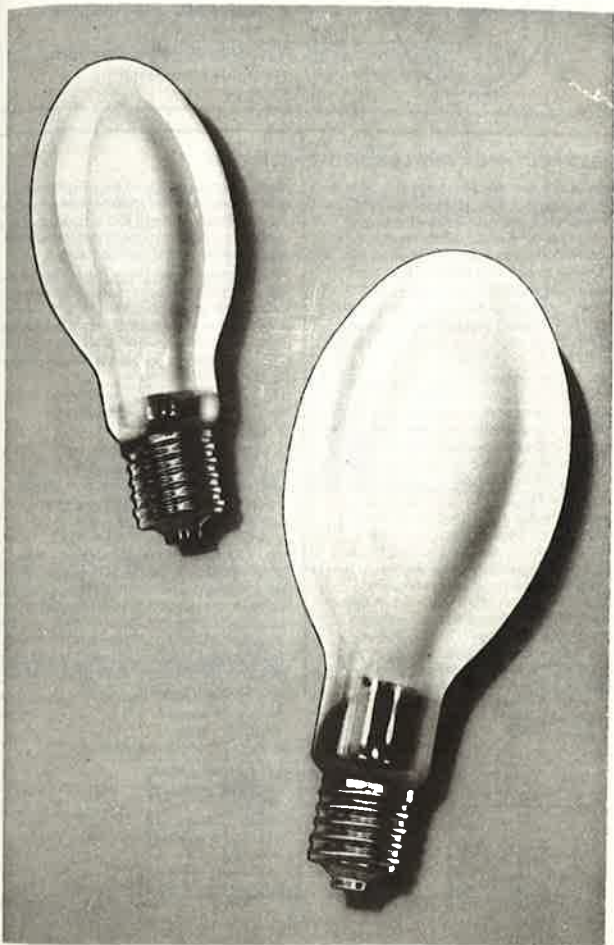
NOTE: SON lamps are temperature sensitive and care must be taken when selecting luminaires for SON lamps. If in doubt consult Philips Lighting.

ORDERING DATA

Catalogue Number	Description	Packing Quantity
50W SON	Elliptical lamp with white internal coating and internal ignitor	40
70W SON	Elliptical lamp with white internal coating and internal ignitor	40
70W SON/C	Elliptical lamp with clear envelope and internal ignitor	40
100W SON	Elliptical lamp with white internal coating	12
100W SON/T	Tubular lamp with clear envelope	12
150W SON	Elliptical lamp with white internal coating	12
150W SON/T/ST	Tubular lamp with clear envelope	12
250W SON	Elliptical lamp with white internal coating	12
400W SON	Elliptical lamp with white internal coating	6
400W SON/T	Tubular lamp with clear envelope	12
1000W SON	Elliptical lamp with white internal coating	6
1000W SON/T	Tubular lamp with clear envelope	4

Please order in multiples of the packing quantity.

Made in Belgium.



HIGH PRESSURE SODIUM LAMP

Plug-in SON-H

The SON-H range of high-pressure sodium lamps simply plug into existing 250W and 400W mercury circuits. The lamps use the existing mercury control gear, and the self-starting system featured in the design does not require the addition of an ignitor to the circuit.

Note: Mercury fluorescent lamps
UK marking MBF = Philips
International marking HPL-N

RANGE

Available in 210W and 350W ratings, for use with 250W and 400W mercury control gear.

APPLICATIONS

Suitable for replacing a 250W or 400W mercury lamp in any situation, including the following:-

Outdoors

- Trunk roads & streets
- Shopping precincts
- Residential areas
- Floodlighting
- Airport lighting
- Illumination of industrial areas.

Indoors

- Factories
- Transport termini
- Swimming pools
- Sports halls
- Public buildings
- Storage areas

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DISCHARGE LAMPS

To reorder this Data Sheet quote

PL 1748/4

Issued 9/82

Replaces PL 1748/3

HIGH PRESSURE SODIUM LAMP — DISCHARGE LAMPS

FEATURES

- The initial efficacy of 97 lm/W is 65% higher than a standard mercury lamp. An existing lighting point can therefore be upgraded to give 54% more light with a substantial reduction in power consumption.
- No need to change mercury control gear so capital expenditure is kept to a minimum.
- The isothermal outer envelope is internally coated for compatibility with most optical systems.
- Reliable ignition at 190V, even at low temperatures (-30°C).
- Re-ignition in only 3 minutes.

RANGE OF OPERATION

190–250V 50Hz.
-30°C to 50°C, depending on other circuit limiting factors.

MATERIALS & FINISH

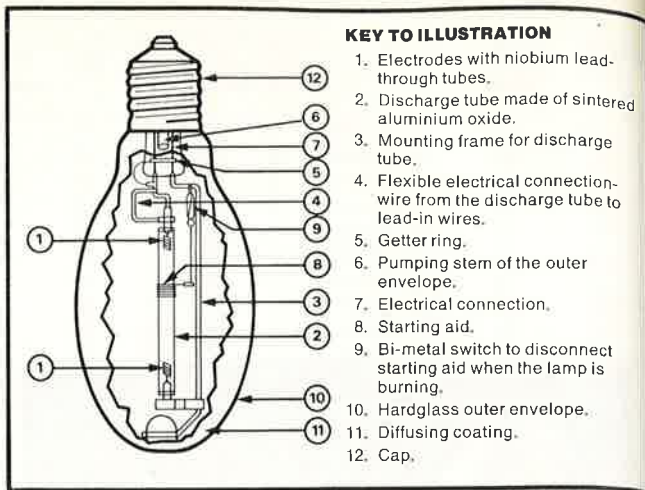
Hard glass envelope, internally coated; GES cap.

SPECIFICATION

- High pressure sodium lamp rated at 210W or 350W.
- Auxiliary electrode starting device.
- Similar in overall size to 250W and 400W mercury HPL-N lamps, and capable of operating on standard mercury HPL-N control gear of comparable wattage.

To specify state:

High-pressure sodium lamp with hard glass envelope internally coated, GES cap, similar in size to 250W (400W) mercury lamp and capable of operation from standard mercury control gear, substantially as Philips 210W SON-H (350W SON-H).



KEY TO ILLUSTRATION

1. Electrodes with niobium lead-through tubes.
2. Discharge tube made of sintered aluminium oxide.
3. Mounting frame for discharge tube.
4. Flexible electrical connection-wire from the discharge tube to lead-in wires.
5. Getter ring.
6. Pumping stem of the outer envelope.
7. Electrical connection.
8. Starting aid.
9. Bi-metal switch to disconnect starting aid when the lamp is burning.
10. Hardglass outer envelope.
11. Diffusing coating.
12. Cap.

LIFE EXPECTANCY AND LUMEN DEPRECIATION

Lamp life is a very complex subject. In order to give some guidance for light technical and economic calculations, we show the typical curves of life survival, lumen depreciation and economic service based on tests carried out by our Quality Department Light (ODL).

1. Life Survival Curve – The average life expectancy of a large batch of lamps under controlled laboratory test conditions with a switching cycle of 5½ hours on ½ hour off. (Based on I.E.C. regulations).
2. Lumen Depreciation Curve – The average fall-off in lumen output of a batch of lamps measured over a specific period of time. The initial light output is measured after 100 hours operation and subsequently at regular intervals with the lamps operated at nominal wattage by controlling the input supply to the lamp.
3. Economic Service Curve – The additive percentage value of the Life Survival Curve and the Lumen Depreciation Curve after a period of time e.g., assuming at 8000 hours a life survival figure is given as 90% (10% failures) and a corresponding lumen depreciation figure is 90% (10% lumen fall in light output) the resultant economic service figure is determined as 80%. This figure of 80% means that the original installation is now running at 20% below its design efficiency. Applied to an indoor industrial scheme

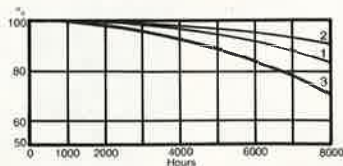
designed to give 400 lux initial lighting level, this means that after 8000 hours the lighting level will have fallen to 320 lux (this does not include depreciation due to accumulation of dust or non maintenance schedules).

The Average Rated Life – The average rated life obtained from large representative groups of lamps under controlled conditions, at five or more burning hours per switch. It is based on the survival of at least 50% of the lamps and allows for individual lamps or groups of lamps to vary from the average.

However, life obtained in service can vary due to a number of parameters such as:-

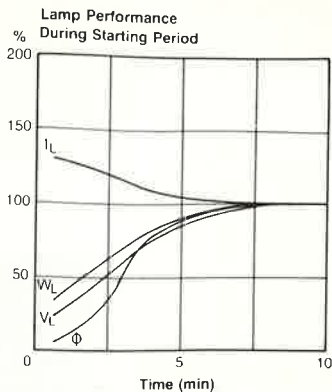
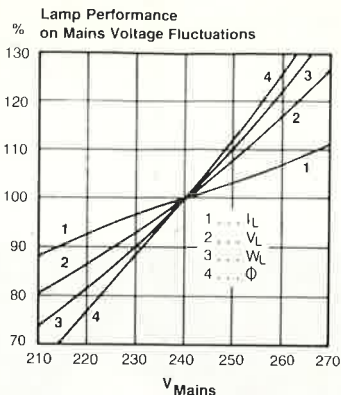
- Switching cycle
- Mains voltage (plus tolerances)
- Burning position (horizontal or vertical)
- Mechanical influence (vibration, shocks)
- Ambient temperature (free burning, enclosed)
- Luminaire and gear specifications.

The information above is intended to give practical guidance to the user or specifier in determining the replacement lamp cycle best suited to his needs, based on the particular conditions of the installation in question. With all installations, group replacement of lamps will generally reduce total cost by reducing the labour costs content in changing individual lamps when these fail.

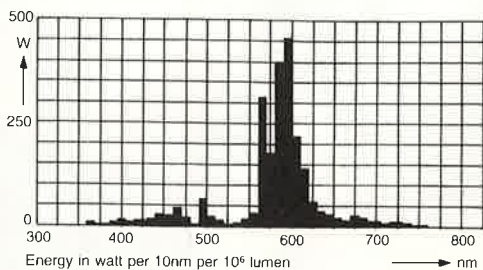


HIGH PRESSURE SODIUM LAMP — DISCHARGE LAMPS

LAMP PERFORMANCE DATA



ABSOLUTE SPECTRAL ENERGY DISTRIBUTION



11

ELECTRICAL DATA & DIMENSIONS

Catalogue Number	Rating (Watts)	Average Lumen Output (100 hrs)	Average Lumen Output (2000 hrs)	Correlated Colour Temperature	Lamp Volts	Lamp Current (A)	Min Supply Volts	Run-up Time (mins)	Burning Position	Cap	Overall Length (mm)	Diameter (mm)
210W SON-H	210	18000	17250	2000	104	2.5	198	5	Universal	GES	227	92
350W SON-H	350	34500	32600	2100	117	3.6	198	5	Universal	GES	292	122

These lamps must be operated with appropriate control gear.
For information on Control gear refer to Data Sheet PL 1779.

ORDERING DATA

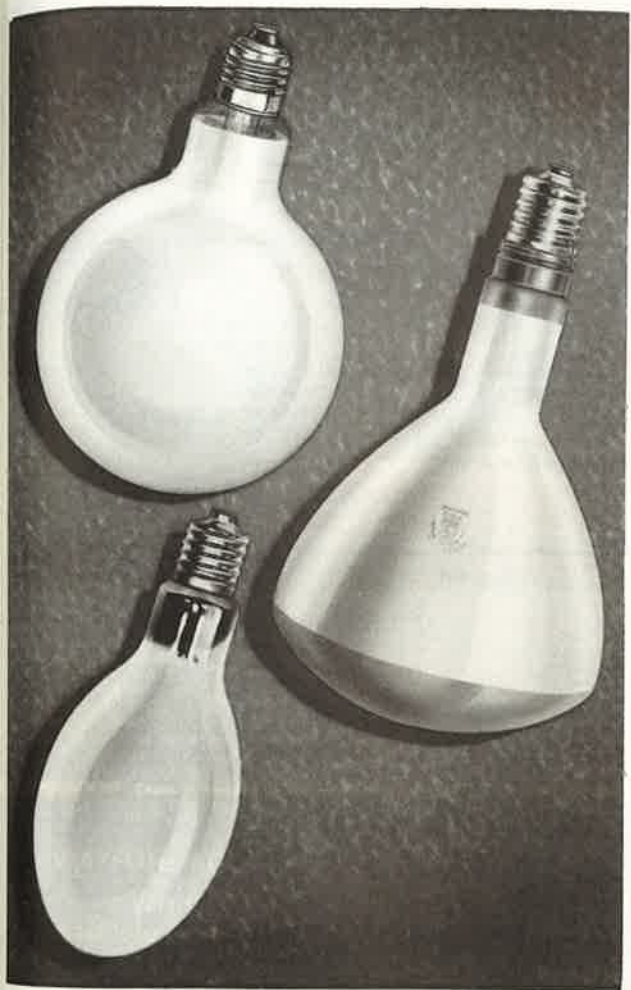
Catalogue Number	Packing Quantity
210W SON-H	12
350W SON-H	6

Please order in multiples of the packing quantity.

Made in Belgium.

HIGH PRESSURE SODIUM LAMP — DISCHARGE LAMPS





HPL

Mercury fluorescent lamps

HPL-N lamps are ovoid shaped and have coated inside surfaces of Europium doped yttrium vanadate phosphor which is activated by UV from the discharge tube adding red to the mercury arc visible emissions.

HPL-R lamps have a spotlight shape with an additional reflecting layer of titanium dioxide between the phosphor and the glass to direct light downwards.

HPL-Comfort lamps have ovoid shapes and a special phosphor to give light of improved colour rendering being on the black body locus and improved efficacy.

HPL-B Comfort has a special shape combining attractive appearance with HPL-Comfort quality light.

Note: Mercury fluorescent lamps
UK marking MBF/U = Philips
International marking HPL-N

APPLICATIONS:

Where efficacy long life and colour rendering are important.

- Public Lighting
- Floodlighting
- Factorles
- Railways
- Decorative (Comfort)
- Hotels (Comfort)
- Commerce (Comfort)
- Plant Irridation (Reflective)

To reorder this Data Sheet quote **PL 1768/8**

Issued 8/83

Replaces PL 1768/7

11

DISCHARGE LAMPS

HPL-DISCHARGE LAMPS

RANGE

HPL-N	50W ES 80W ES or 3 pin BC 125W ES, GES or 3 Pin BC 250W, 400W, 700W 1000W, 240V or 415V 2000W 415V	GES
HPL-R	250W, 400W, 700W 1000W	GES
HPL-Comfort	50W, 80W, 125W 250W, 400W	ES GES
HPL-B Comfort	50W, 80W	ES

FEATURES

- Short run-up time – 80% of full light output is achieved after only 3½ minutes.
- Reliable starting, even at temperatures down to –30°C (–18°C for 415V 1000W lamp).
- Isothermal hard glass outer envelope on sizes from 125W HPL-N and 250W HPL-Comfort and HPL-R upwards permits use in exposed positions (if weatherproof connections are used).
- Reasonable colour rendering, (colour point on black body locus for Comfort) coupled with high efficacy (around 60 lumens/Watt) permits economical use in many industrial and floodlighting applications.
- Good colour rendering of Comfort lamps permits use in offices and other commercial environments, and is also suitable for departmental store lighting.
- Larger versions have GES caps which screw on to preformed outer envelopes, eliminating the danger of the cap becoming loose.
- Reflector versions give preferential light distribution downwards, and is immune from degradation in use due to dust settling on the upper surfaces. Some upwards light is permitted, to avoid a tunnel effect.
- HPL-B Comfort lamp's spherical shape adds attractive appearance for decorative street lighting and indoor luminaire.
- Lamps are manufactured to BS 3677 and IEC 188.

RANGE OF OPERATION

Reliable starting at –30°C (1000W 415V –18°C)

MATERIALS & FINISH

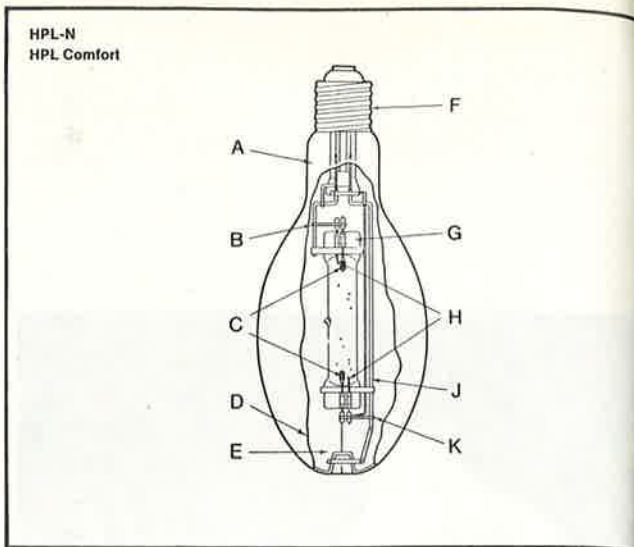
Hard glass lamp envelope: for ratings of 250W and above.

HPL-N lamps: internally coated with Europium-activated yttrium vanadate phosphor.

HPL-Comfort lamps: internally coated with Comfort phosphor.

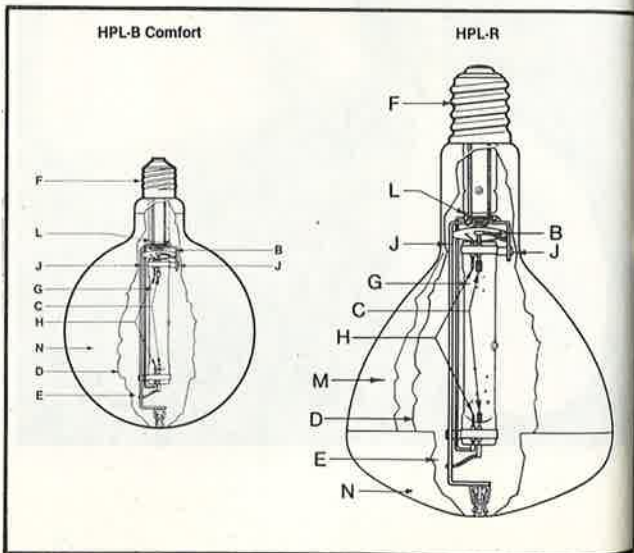
HPL-R lamps: with internal reflecting titanium dioxide layer.

Screw caps: nickel plated.



KEY TO ILLUSTRATIONS

- | | |
|--|---|
| A Isothermal hard glass outer envelope 125W–400W | H Twin auxiliary electrodes 400W ratings upwards (cap end only in lower wattages) |
| B Lead-in wire | J Support |
| C Main electrodes | K Lead-in wire |
| D Internal phosphor coating | L Twin auxiliary electrode resistors |
| E Inert gas filling | M Outer reflecting layer |
| F Nickel-plated cap | N Hard glass outer envelope satin frosted |
| G Quartz discharge tube | |





WATFORD FOOTBALL CLUB HALT

The new Halt, built to avoid the need for fans to pass through the town, has an energy-saving, low-maintenance installation of 14 SGS 201 roadlighting lanterns, each fitted with a 70W SON lamp.

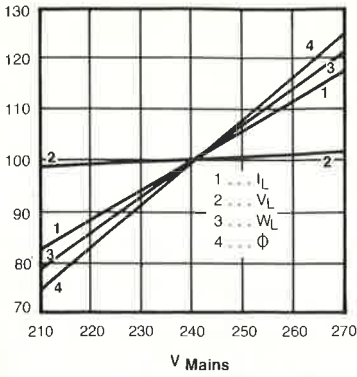


MILTON KEYNES TOWN CENTRE

The whole central area of the town is illuminated with post-top lanterns fitted with Philips HPL Comfort lamps, combining energy saving and low maintenance with a white light of good colour rendering.

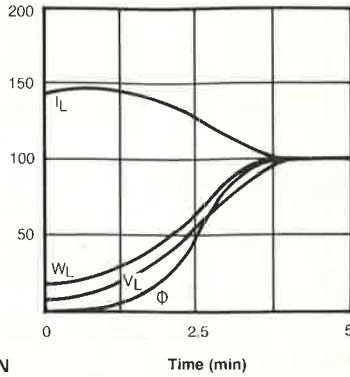
LAMP PERFORMANCE DATA

Lamp Performance on Mains Voltage Fluctuations



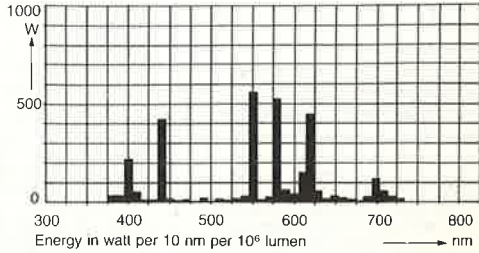
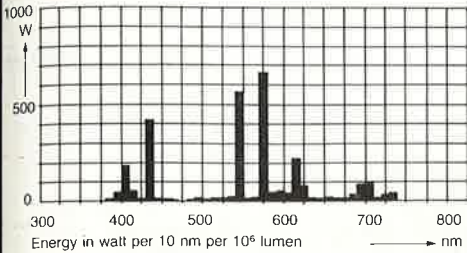
HPL-N

Lamp Performance During Starting Period



Time (min)

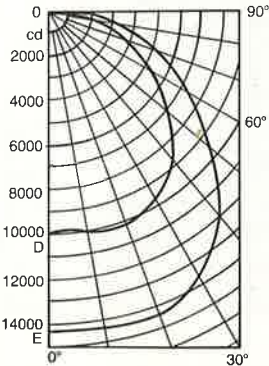
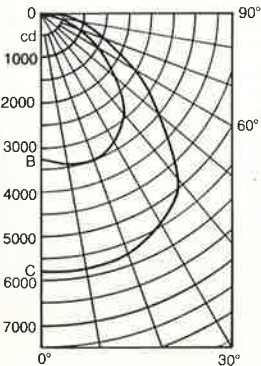
ABSOLUTE SPECTRAL ENERGY DISTRIBUTION



HPL-N and HPL-R

HPL Comfort

POLAR LIGHT DISTRIBUTION DIAGRAMS



A = HPL-R 125 W
B = HPL-R 250 W
C = HPL-R 400 W

D = HPL-R 700 W
E = HPL-R 1000 W

11

HPL - DISCHARGE LAMPS

ELECTRICAL DATA & DIMENSIONS

Catalogue Number	Rating (Watts)	Average Lumen Output (100 hrs)	Average Lumen Output (2000 hrs)	Correlated Colour Temperature (K)	Lamp Volts (V)	Lamp Current (A)	Min. Supply (V)	Run-up Time (mins)	Burning Position Voltage	CAP	Overall Length (mm)	Diameter (mm)
HOL-N												
50W HPL-N	50	1800	1700	4300	95	0.61	198	4			129	56
80W HPL-N	80	3700	3550	4050	115	0.80	198	4	Universal	ES	156	72
125W HPL-N	125	6300	5800	3850	125	1.15	198	4	Universal	ES/3 pin BC	177	77
250W HPL-N	250	13000	12000	3700	135	2.13	198	4	Universal	GES	227	92
400W HPL-N	400	22000	20400	3800	140	3.25	198	4	Universal	GES	292	122
700W HPL-N	700	40000	38100	3900	140	5.40	198	4	Universal	GES	329	142
1000W HPL-N	1000	58000	50500	3750	145	7.50	198	4	Universal	GES	400	168
1000W HPL-N*	1000	58000	50500	3750	265*	4.00	-	4	Universal	GES	400	168
2000W HPL-N*	2000	125000	110000	3750	270*	8.00	-	4	Universal	GES	445	185
HPL Comfort												
50W HPL Comfort	50	2000	1890	3300	95	0.61	198	4	Universal	ES	129	56
80W HPL Comfort	80	3850	3690	3300	115	0.80	198	4	Universal	ES	156	72
125W HPL Comfort	125	6500	6200	3300	125	1.15	198	4	Universal	ES	177	76
250W HPL Comfort	250	14000	13250	3300	135	2.13	198	4	Universal	GES	227	92
400W HPL Comfort	400	24000	22800	3300	140	3.23	198	4	Universal	GES	290	122
HPL-R												
250W HPL-R	250	12000	10800	4200	135	2.13	198	4	Universal	GES	260	168
400W HPL-R	400	20000	18000	4100	140	3.25	198	4	Universal	GES	300	184
700W HPL-R	700	40000	38000	4100	140	5.40	198	4	Universal	GES	328	204
1000W HPL-R	1000	56000	49800	4000	145	7.50	198	4	Universal	GES	380	224
HPL-B Comfort												
50W HPL-B Comfort	50	2000	1900	3300	95	0.61	198	12		ES	187	129
80W HPL-B Comfort	80	3850	3700	3300	115	0.80	198	12		ES	187	129

*For Cross Phase Supply.

All lamps must be operated with appropriate control gear. For control gear information refer to Data Sheet No. PL 1779.

ORDERING DATA

LIFE EXPECTANCY AND LUMEN DEPRECIATION

Lamp life is a very complex subject. In order to give some guidance for light technical and economic calculations, we show the typical curves of life survival, lumen depreciation and economic service based on tests carried out by our Quality Department Light (QDL).

1. Life Survival Curve - The average life expectancy of a large batch of lamps under controlled laboratory test conditions with a switching cycle of 5½ hours on ½ hour off. (Based on I.E.C. regulations).
2. Lumen Depreciation Curve - The average fall-off in lumen output of a batch of lamps measured over a specific period of time. The initial light output is measured after 100 hours operation and subsequently at regular intervals with the lamps operated at nominal wattage by controlling the input supply to the lamp.
3. Economic Service Curve - The additive percentage value of the Life Survival Curve and the Lumen Depreciation Curve after a period of time e.g., assuming at 8000 hours a life survival figure is given as 90% (10% failures) and a corresponding lumen depreciation figure is 90% (10% lumen fall in light output) the resultant economic service figure is determined as 80%. This figure of 80% means that the original installation is now running at 20% below its design efficiency. Applied to an indoor industrial scheme

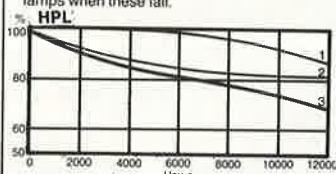
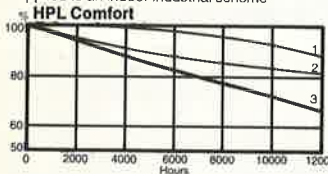
designed to give 400 lux initial lighting level, this means that after 8000 hours the lighting level will have fallen to 320 lux (this does not include depreciation due to accumulation of dust or non maintenance schedules).

The Average Rated Life - The average rated life obtained from large representative groups of lamps under controlled conditions, at five or more burning hours per switch. It is based on the survival of at least 50% of the lamps and allows for individual lamps or groups of lamps to vary from the average.

However, life obtained in service can vary due to a number of parameters such as:-

- Switching cycle
- Mains voltage (plus tolerances)
- Burning position (horizontal or vertical)
- Mechanical influence (vibration, shocks)
- Ambient temperature (free burning, enclosed)
- Luminaire and gear specifications.

The information above is intended to give practical guidance to the user or specifier in determining the replacement lamp cycle best suited to his needs, based on the particular conditions of the installation in question. With all installations, group replacement of lamps will generally reduce total cost by reducing the labour costs content in changing individual lamps when these fail.

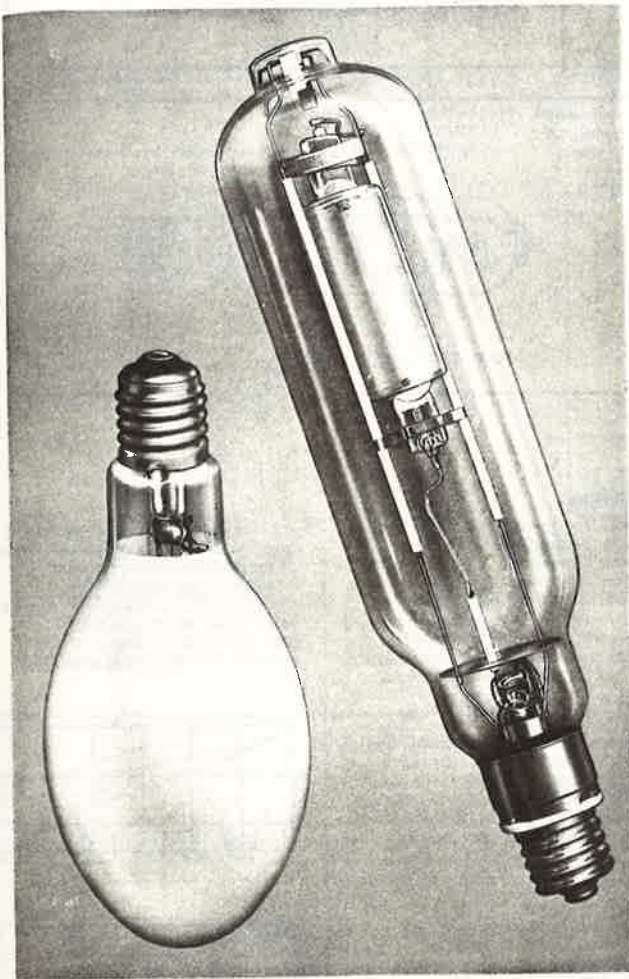


ORDERING DATA

HPL-N	Packing qty.
50W HPL-N	60
80W HPL-N ES	40
80W HPL-N 3 pin BC	40
125W HPL-N ES	24
125W HPL-N GES	24
125W HPL-N 3 pin BC	24
250W HPL-N	12
400W HPL-N	6
700W HPL-N	6
1000W HPL-N 240V	6
1000W HPL-N 415V	6
2000W HPL-N	4
HPL Comfort	
80W HPL Comfort	40
125W HPL Comfort	24
250W HPL Comfort	12
400W HPL Comfort	6
HPL-R	
250W HPL-R	5
400W HPL-R	5
700W HPL-R	4
1000W HPL-R	4
HPL-B Comfort	
50W HPL-B Comfort	12
80W HPL-B Comfort	12

Please order in multiples of the packing quantity.

Made in Belgium.



HPI LAMPS

Metal Halide discharge lamps

Metal halide lamps contain selected metal halides in the quartz discharge tube. These have the effect of subduing the mercury spectrum and giving a considerable increase in the required colour bands. They also increase efficacy over conventional mercury lamps since the energy levels of the added metals are lower than those of mercury.

The result is a crisp white light with good colour rendering, and an initial efficacy that can be as high as 90 Lumens/Watt.

Note: Metal halide lamps
UK marking MBI = Philips
International marking HPI

RANGE

HPI/T clear tubular metal halide lamps available in 250W, 400W, 1kW, 2kW, 415V and 2kW 240V versions. Also 400W HPI/BUS isothermal lamp with internal diffusing coating.

APPLICATIONS

Suitable for any application where high efficacy and long life combined with good colour rendering are important, in situations such as:

- High bay installations in industrial buildings
- Bridge lighting
- Lighting in city centres
- Sports stadia
- High-mast lighting
- Lighting football stadia for colour television transmission
- Area floodlighting
- Lighting training grounds

To reorder this Data Sheet quote

PL 1767/6

Issued 7/83

Replaces PL 1767/5

HPI — DISCHARGE LAMPS

FEATURES

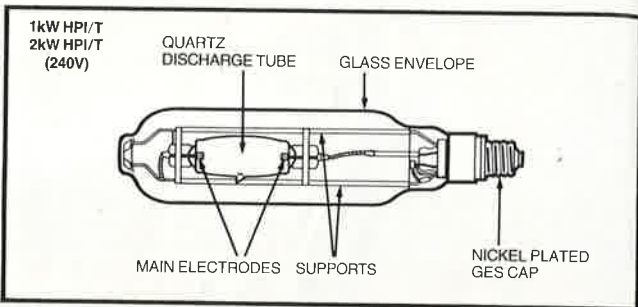
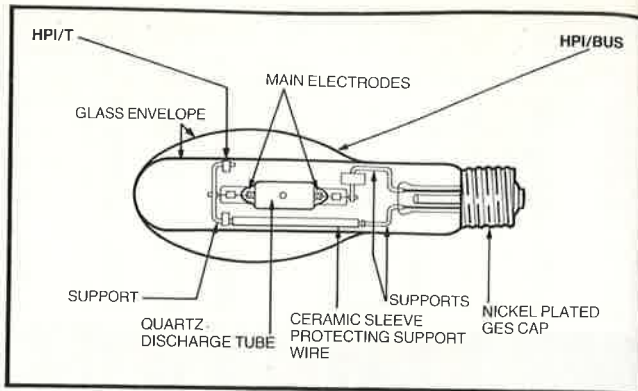
- Short run-up time—80% of full light output is achieved after 3 to 5 minutes.
- Thyristor ignitor device starts the lamp reliably at temperatures down to -18°C , on mains supplies in excess of 200V.
- HPI/BUS lamp requires no external ignitor.
- Good colour rendering suitable for colour TV transmission.
- GES cap is screwed on to a preformed thread on the glass bulb, eliminating the danger of loose caps due to cement failure.

RANGE OF OPERATION

Lamps operate reliably on mains supplies in excess of 200V down to -18°C .

MATERIALS & FINISH

Hard glass envelope.
Internally coated finish for BUS lamp.
Clear finish for tubular lamps.
Nickel plated GES caps.



LIFE EXPECTANCY AND LUMEN DEPRECIATION

Lamp life is a very complex subject. In order to give some guidance for light technical and economic calculations, we show the typical curves of life survival, lumen depreciation and economic service based on tests carried out by our Quality Department Light (QDL).

1. Life Survival Curve — The average life expectancy of a large batch of lamps under controlled laboratory test conditions with a switching cycle of 5½ hours on ½ hour off. (Based on I.E.C. regulations).
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80%. This figure of 80% means that the original installation is now running at 20% below its design efficiency. Applied to an indoor industrial scheme designed to give 400 lux initial lighting level, this means that after 8000 hours the lighting level will have fallen to 320 lux (this does not include depreciation due to accumulation of dust or non maintenance schedules).

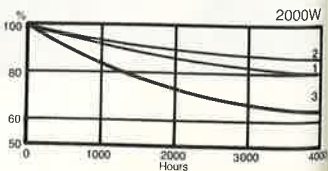
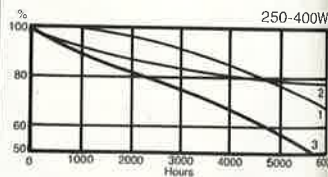
The Average Rated Life — The average rated life obtained from large representative groups of lamps under controlled conditions, at five or more burning hours per switch. It is based on the survival of at least 50% of the lamps and allows for individual lamps or groups of lamps to vary from the average.

However, life obtained in service can vary due to a number of parameters such as:-

- Switching cycle
- Mains voltage (plus tolerances)
- Burning position (horizontal or vertical)
- Mechanical influence (vibration, shocks)
- Ambient temperature (free burning, enclosed)
- Luminaire and gear specifications.

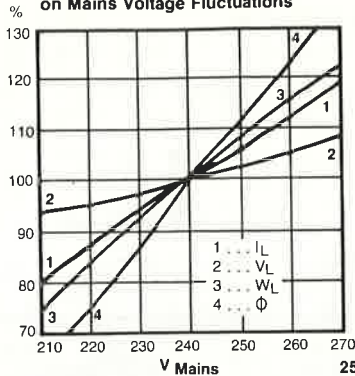
The information above is intended to give practical guidance to the user or

specifier in determining the replacement lamp cycle best suited to his needs, based on the particular conditions of the installation in question. With all installations, group replacement of lamps will generally reduce total cost by reducing the labour costs content in changing individual lamps when these fail.

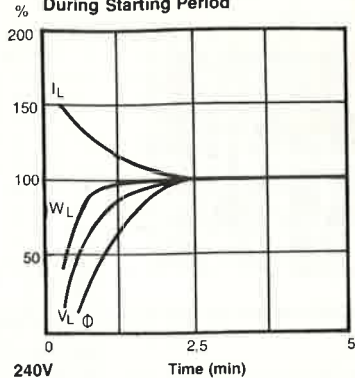


LAMP PERFORMANCE DATA

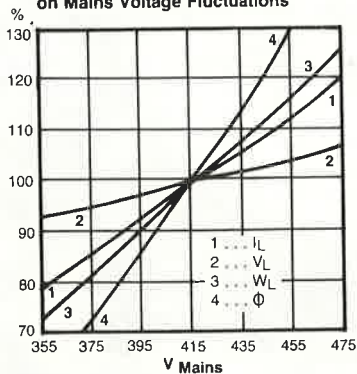
Lamp Performance on Mains Voltage Fluctuations



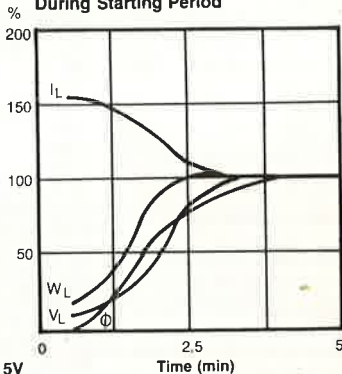
Lamp Performance During Starting Period



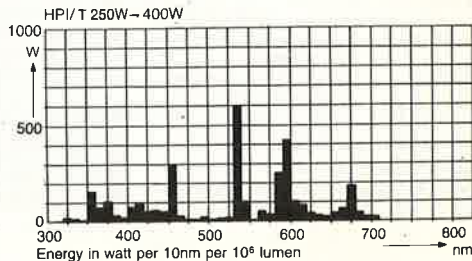
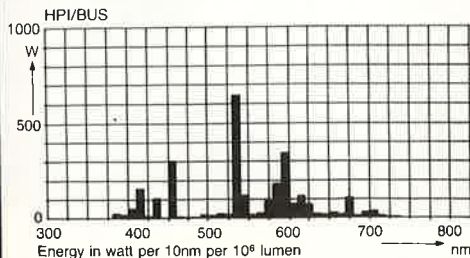
Lamp Performance on Mains Voltage Fluctuations



Lamp Performance During Starting Period



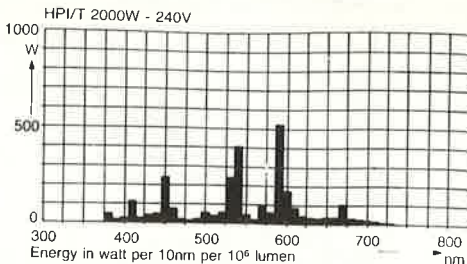
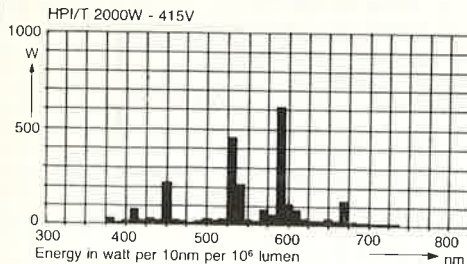
ABSOLUTE SPECTRAL ENERGY DISTRIBUTION



HPI — DISCHARGE LAMPS

LAMP PERFORMANCE DATA (continued)

ABSOLUTE SPECTRAL ENERGY DISTRIBUTION



ELECTRICAL DATA & DIMENSIONS

Catalogue Number	Rating (Watts)	Average Lumen Output (100 hrs)	Average Lumen Output (2000 hrs)	Correlated Colour Temperature (K)	Lamp Volts	Lamp Current (A)	Min. Supply Voltage (V)	Run-up Time (mins)	Burning Position	CAP	Overall Length (mm)	Diameter (mm)
250W HPI/T	250	17000	13600	4000	125	2.1	200	4	2	GES	257	47
400W HPI/T	400	31500	29200	4000	125	3.4	200	4	2	GES	283	47
400W HPI/BUS	400	31500	28300	4000	125	3.4	200	4	1	GES	292	122
1000W HPI/T	1000	81000	70000	4000	130	8.25	800	4	2	GES	382	67
2000W HPI/T (240V)	2000	183000	166320	4000	135	16.5	200	5	3	GES	430	103
*2000W HPI/T (415V)	2000	189000	166530	4000	240	8.6	340	5	2	GES	430	103

NOTES: All lamps must be operated with appropriate control gear.
For information on control gear refer to Data Sheet No. PL 1779.

fBUS = Base Up Self-starting, Isothermal lamp with internal ignitor.

*For cross phase supplies only. This lamp and the single phase 2Kw HPI/T lamp may be distinguished by the following marks etched on the outer envelope:

G/92/2 Single phase lamp (2 signifies 220/240V supply);

G/92/3 Cross phase lamp (3 signifies 380/415V supply).

BURNING POSITIONS



Vertical
Base up
± 15°



Horizontal
± 20°



Universal
(except vertical)
± 15°

Unshaded area shows recommended burning positions

ORDERING DATA

Catalogue Number	Description	Packing Quantity
250W HPI/T	Tubular horizontal burning lamp with clear envelope	12
400W HPI/T	Tubular horizontal burning lamp with clear envelope	12
400W HPI/BUS	Selfstarting isothermal vertical burning lamp with diffusing coating	6
1000W HPI/T	Tubular horizontal burning lamp for use on single phase supplies.	4
2kW HPI/T (415V)	Tubular horizontal burning lamp for use on cross phase supplies	4
2kW HPI/T (240V)	Tubular near-universal burning lamp for use on single phase supplies	4

Please order in multiples of the packing quantity.

Made in Belgium.

MERCURY BLENDED POWER BLEND ML & MLR

Mercury blended discharge lamps

PowerBlend mercury blended lamps are ballasted by means of a tungsten filament within the outer envelope. They therefore need no control gear, give light output immediately after switch-on, and provide a light source combining the warm colour of tungsten GLS lamps with the high efficacy of mercury lamps. An objective life up to 6000 hours makes the lamps particularly suitable as a direct replacement for GLS lamps in remote or inaccessible luminaires, where maintenance is difficult or costly.

ML lamps have europium-activated yttrium vanadate phosphor coatings on the inner surface of the envelope to give good colour rendering, with up to 17% red content. A hard glass outer envelope is fitted to the 500W rating. The 160W MLR reflector lamp has an internal reflector to ensure that soiling cannot reduce its efficacy and the shape of the lamp avoids accumulation of dirt on the light window.

Note: Mercury blended lamps
Phillips International marking ML
= UK marking MBTF.
Phillips International marking MLR
= UK marking MBTF/R.

RANGE

100W ML ES Cap
100W ML BC Cap
160W ML ES Cap
160W ML BC Cap
250W ML
500W ML
160W MLR

To reorder this Data Sheet quote

PL 1772/5

Issued 9/82

Replaces PL 1772/4

11
DISCHARGE LAMPS

MLR – DISCHARGE LAMPS

APPLICATIONS

Suitable for use in commercial, industrial and public lighting applications, particularly where initial installation costs must be kept low. In addition, the MLR reflector lamp is suitable for use in display and plant lighting.

FEATURES

- No control gear required – the lamps simply plug into existing lighting points so that installation costs are low.
- Good colour rendering, making the lamps suitable for use as direct replacements for GLS lamps in most situations.
- Long service life – up to 6000 hours – greatly reduces maintenance costs, particularly where access is difficult.
- Instant light output after switch-on, and re-ignition after only 3–4 minutes.
- Greater efficacy than GLS lamp either increases light output or enables lamp rating to be reduced, so conserving energy.
- Internal reflecting surface of MLR lamp ensures efficacy and reduces cleaning maintenance even in dirty environments.

RANGE OF OPERATION

Lamps operate reliably from -16°C .

MATERIALS & FINISH

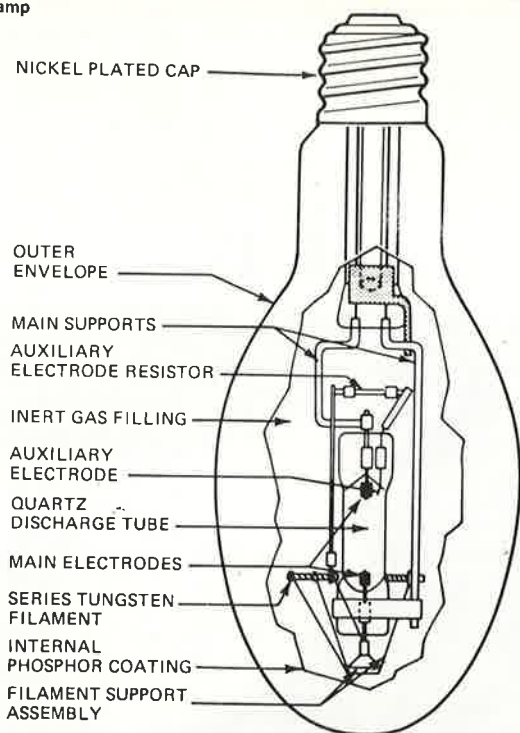
Envelopes: Hard glass for 500W rating.

ML lamps: Internal phosphor coating.

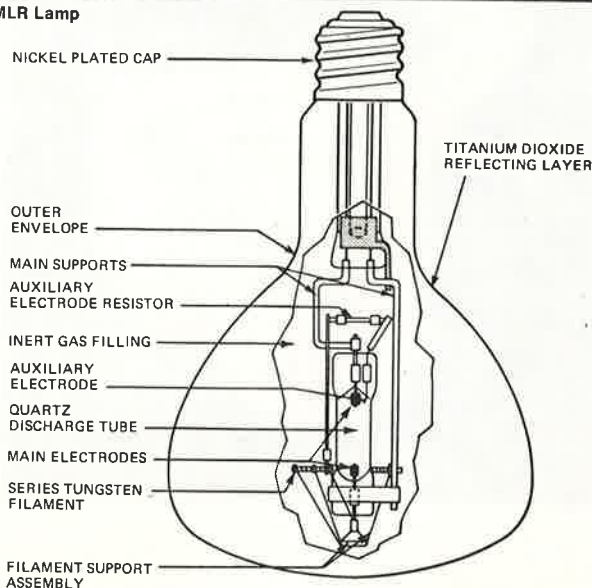
MLR lamps: Titanium dioxide reflecting layer.

Screw caps: Nickel plated.

ML Lamp



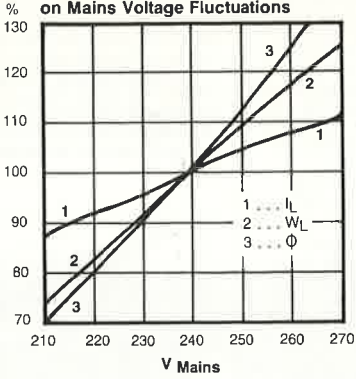
MLR Lamp



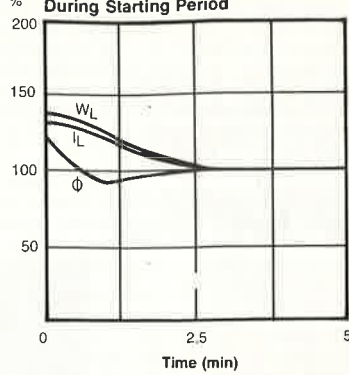
ML & MLR – DISCHARGE LAMPS

LAMP PERFORMANCE DATA

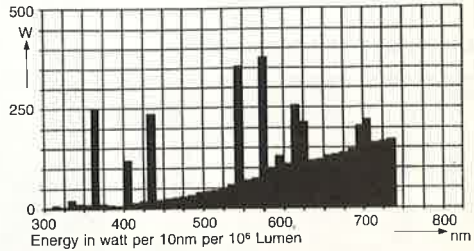
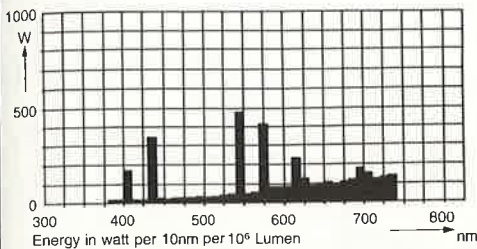
Lamp Performance on Mains Voltage Fluctuations



Lamp Performance During Starting Period



ABSOLUTE SPECTRAL ENERGY DISTRIBUTION

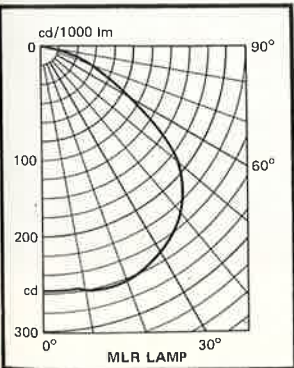


ML

MLR

11

POLAR LIGHT DISTRIBUTION DIAGRAM



MLR – DISCHARGE LAMPS

LIFE EXPECTANCY AND LUMEN DEPRECIATION

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3. Economic Service Curve – The additive percentage value of the Life Survival Curve and the Lumen Depreciation Curve after a period of time e.g., assuming at 8000 hours a life survival figure is given as 90% (10% failures) and a corresponding lumen depreciation figure is 90% (10%

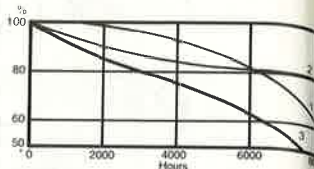
lumen fall in light output) the resultant economic service figure is determined as 80%. This figure of 80% means that the original installation is now running at 20% below its design efficiency. Applied to an indoor industrial scheme designed to give 400 lux initial lighting level, this means that after 8000 hours the lighting level will have fallen to 320 lux (this does not include depreciation due to accumulation of dust or non maintenance schedules).

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However, life obtained in service can vary due to a number of parameters such as:-

- Switching cycle
- Mains voltage (plus tolerances)
- Burning position (horizontal or vertical)
- Mechanical influence (vibration, shocks)
- Ambient temperature (free burning, enclosed)

– Luminaire and gear specifications. The information above is intended to give practical guidance to the user or specifier in determining the replacement lamp cycle best suited to his needs, based on the particular conditions of the installation in question. With all installations, group replacement of lamps will generally reduce total cost by reducing the labour costs content in changing individual lamps when these fail.



ELECTRICAL DATA & DIMENSIONS

Catalogue Number	Rating (Watts)	Average Lumen Output (100 hrs)	Average Lumen Output (2000 hrs)	Correlated Colour Temperature (k)	Lamp Volts (as mains)	Lamp Current (A)	Min Supply Voltage (V)	Run-up Time (min)	Burning Position	Cap	Overall Length (mm)	Diameter (mm)
100W ML	100	1100	1000	3400	240	0.45	216	5	1	BC or ES	156	72
160W ML	160	3150	3000	3600	220	0.69	216	5	1	BC or ES	177	77
160W ML	160	3150	3000	3600	220	0.75	198	5	1	BC or ES	177	77
250W ML	250	5700	5700	3500	240	1.10	216	5	2	GES	227	92
500W ML	500	14000	14000	3700	240	2.20	216	5	2	GES	292	122
160W MLR	160	2750	2750	3600	240	0.69	216	5	3	ES	190	127

NOTES: Lighting Design Lumens refers to the light output after 2000 hours operation, the value used for lighting design purposes.

All lamps have a power factor greater than 0.95.

No control gear is required for use with these lamps.

220V rating is suitable for mains supplies of 220–230V;

240V rating is suitable for mains supplies of 240–250V.

Specify voltage when ordering.

ORDERING DATA

Catalogue Number	Packing Quantity
100W BC ML lamp	40
100W ES ML lamp	40
160W BC ML lamp	40
160W ES ML lamp	40
250W ML lamp	12
500W ML lamp	6
160W MLR lamp	12

Please order in multiples of the packing quantity.

BURNING POSITIONS



Vertical Base up or down ± 30°



Vertical Base up or down ± 45°



Vertical Base up ± 30°

Unshaded area shows recommended burning positions

Made in Belgium.

BALLASTS, IGNITORS & CAPACITORS

for low pressure sodium lamps

A range of current-limiting ballasts, self-healing dry film capacitors for power factor correction and electronic ignitors for low pressure sodium lamps.

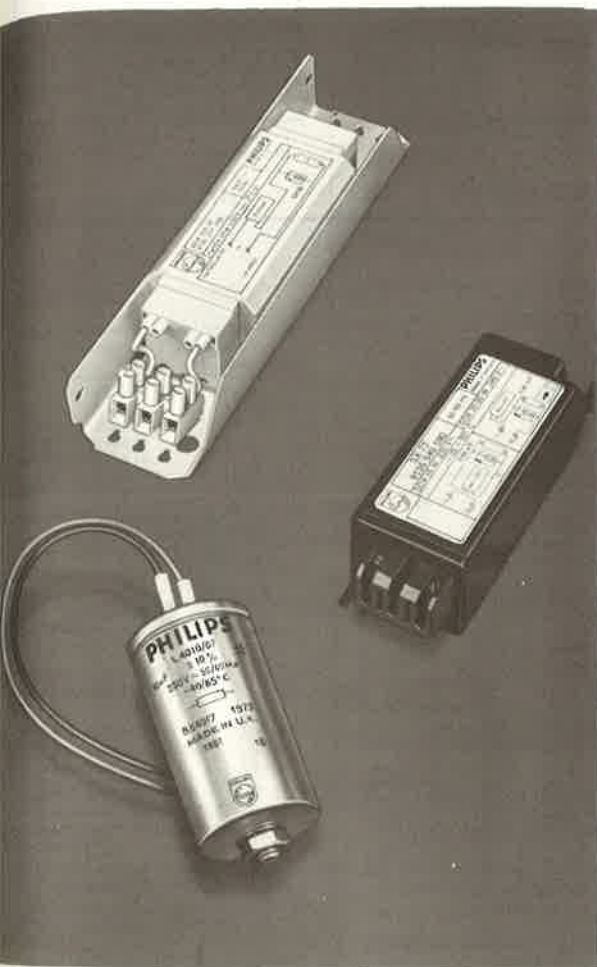
IMPORTANT NOTE: All low-pressure sodium lamps **MUST** be operated with a current-limiting device in the lamp circuit. Power factor correction capacitors should be used in accordance with the circuit diagram and data in this leaflet to ensure that the power factor presented to the supply is in accordance with the requirements of the Electricity Authority and to reduce currents in the circuit supply cables.

Other circuit capacitors are essential for the correct operation of lamps.

RANGE

A full range of control gear components is available for use with the following Philips low-pressure sodium lamps:-

- SOX-E18
- SOX-E26 35W SOX
- SOX-E36 55W SOX
- SOX-E66 90W SOX
- SOX-E91 135W SOX
- SOX-E131 180W SOX



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DISCHARGE LAMPS

To reorder this Data Sheet quote

PL 1777/7

Issued 7/82

Replaces PL 1777/6

BALLASTS, IGNITORS & CAPACITORS - LOW PRESSURE SODIUM

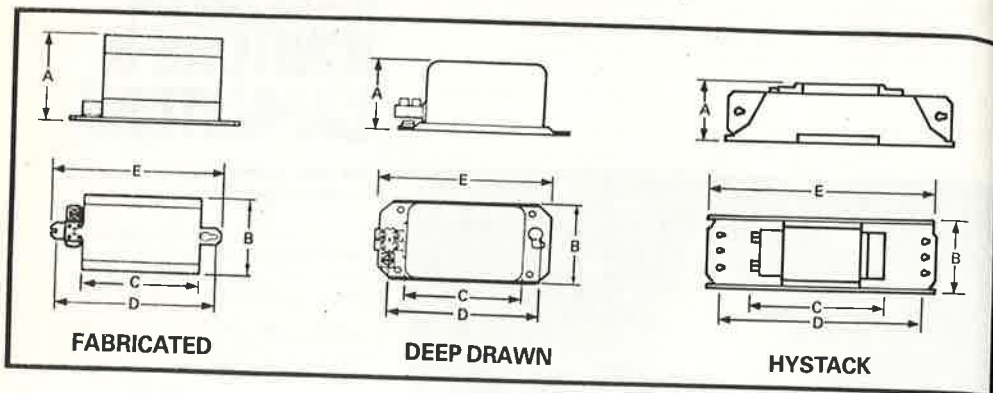
DISCHARGE BALLASTS (BSX)

Features

- All ballasts are suitable for mounting in columns with the terminal block downwards.
- All hystack ballasts have terminal block connectors for easy fixing.

- Non-track terminal blocks, and a separate earth terminal which is easily accessible and mounted so as to ensure good electrical connection between cable and base-plate.
- Screen-printed labels include circuit diagrams which cannot peel off in damp or humid conditions.

- Low wattage losses ensure economical operation and conservation of energy.



ELECTRICAL DATA

Low-pressure sodium lamp ballasts for use on 50Hz mains supplies, to operate SOX lamps. Manufactured in accordance with BS 4782.

Cat. No.	For lamp type	Circuit Diag. No.	Mains current start (A)	Mains current run (A)	Total circuit Watts	Tw	Δt	Voltage range	Can*	Total third harmonic %	Essential capacitor	Ignitor
BSX18	SOX-E18	1	0.15	0.14	25	130	70	240	H	13.7	L4005	—
BSX355	35W & 55W SOX	2	0.2/0.3	0.22/0.3	48-68	130	70	240	H	14	‡L4008	—
BSX355	SOX-E26/36	2	0.17/0.22	0.17/0.22	41/51	130	70	240	H	14	‡L4008	SX72
BSX90	90W SOX	2	0.3	0.5	104	120	60	240	D	18	‡L4010	SX76
BSX90	SOX-E66	2*	0.24	0.24	83	120	60	240	D	18	‡L4010	SX76
BSX135	135W SOX	3	0.6	0.67	159	120	60	240	D	8.2	L5007	SX74
BSX135	SOX-E91	3	0.49	0.49	129	120	60	240	D	8.2	L5007	SX74
L4135	135W & 180W SOX	4	0.6/0.7	0.9/1.0	175/220	120	75	220/240	F	41/79	L5020	—
L4135	SOX-E91/131	4	0.47/0.56	0.47/0.56	137/176	120	75	220/240	F	41/79	L5020	—

*Can types: D - Deep drawn, F - Fabricated, H - Hystack
 ‡PFC capacitor

Total Third Harmonic values relate to measurements in the neutral of a balanced four wire, three phase supply. These values are divided by three to obtain values in single phase supplies.

DIMENSIONS & WEIGHTS

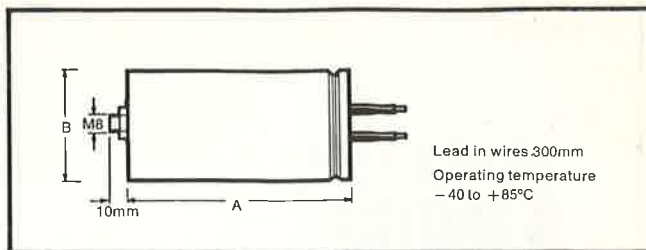
Catalogue No.	For lamp type	Weight kg	Dimensions				
			A mm	B mm	C mm	D mm	E mm
BSX18		0.58	36	45	97	—	—
BSX355		1.0	38	45	118	180	195
BSX90		1.6	63	68	88	102	118
BSX135		2.9	67	80	120	134	149
L4135		6.8	108	106	147	177	189

BALLASTS, IGNITORS & CAPACITORS – LOW PRESSURE SODIUM

CAPACITORS

Features

- Wound from metallised poly-propylene film which has 'self-healing' characteristics after electrical breakdown.
- 'Dry' construction eliminates the possibility of leakage.
- Internal resistor eliminates the danger of shock from a capacitor charged by the inductive kick-back of the ballast.
- Pin terminations with push-on leads 300mm long. (8, 10 and 20 mfd) Terminal blocks on other value capacitors.
- Extruded aluminium canister of circular cross-section with an MB earthing and fixing stud.
- Operating temperature range -40°C to $+85^{\circ}\text{C}$.



Lead in wires 300mm
Operating temperature
 -40 to $+85^{\circ}\text{C}$

DIMENSIONS, WEIGHTS & ELECTRICAL DATA

Catalogue No.	Max. Working Voltage RMS	Capacitance μF	Diameter mm (B)	Length mm (A)	Approx. Weight kg.
L4005	250	$5 \pm 10\%$	38	59	0.03
L4008	250	$8 \pm 10\%$	38	75	0.10
L4010	250	$10 \pm 10\%$	38	96	0.08
L5007	400	$6.8 \pm 4\%$	45	74	0.10
L5020	300	$20 \pm 10\%$	45	95	0.12

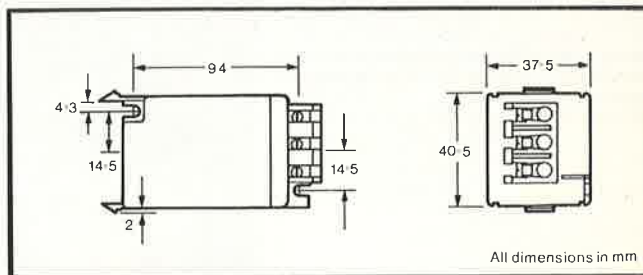
Operating Temperature: -40°C to $+85^{\circ}\text{C}$. Lead in Wire Length 300mm (12in.)

IGNITORS

Features

- Reliable solid-state circuit provides high-voltage pulses to achieve virtually instantaneous ignition of lamp.
- Low energy content of pulses present an electrical hazard to safety no greater than that of any mains voltage installation.
- Ignitor is switched out of circuit after ignition; has zero watts loss during lamp operation.
- Re-ignition of a hot lamp after mains interruption usually occurs in less than one minute.
- Ignitor detects a lamp fault condition and automatically switches off, thus eliminating radio interference problems.
- Corrosion proof polyamide casings with two slots the length of each side, two flexible lugs and two screw holes offering a choice of methods of attachment.
- Operates reliably at temperatures up to 80°C .

DIMENSIONS



Wiring

Certain cables in the ignition circuit should be rated at 450/750V (600/1000V) AC (see circuit diagram), and must be capable of withstanding any temperature encountered and should be protected against mechanical damage.

ELECTRICAL DATA & WEIGHTS

Cat. No.	Mains V.	Min. Supply V.	Weight kg
SX 72	200/250	200	0.10
SX 74	200/250	200	0.10
SX 76	200/250	200	0.10

The following recommendations are for guidance only; the cable manufacturers' published data should be consulted for fuller cable specifications with regard to temperature.

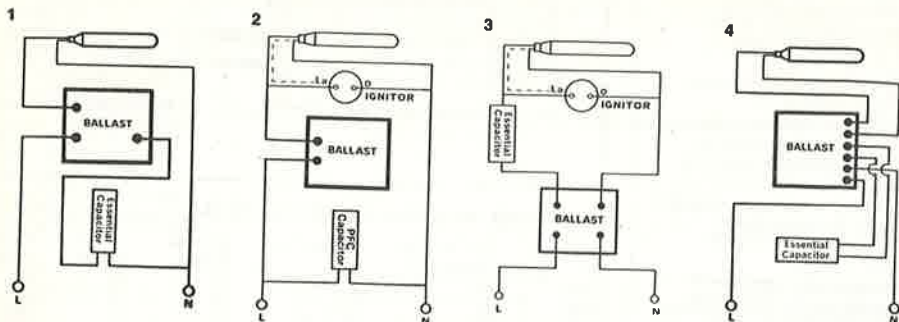
Conductor temperatures up to 70°C :
PVC-insulated cable.

Conductor temperatures up to 90°C :
HT PVC-insulated cable.

Conductor temperatures up to 200°C :
Silicone rubber insulated cable with glass fibre sheath for mechanical protection.

BALLASTS, IGNITORS & CAPACITORS – LOW PRESSURE SODIUM

Circuit diagrams



Wiring diagram codes:

- | | |
|--------------------------------------|---|
| 1. 18W SOX | 3. 135W SOX with ignitor |
| 2. 35W, 55W and 90W SOX with ignitor | 4. 135W and 180W SOX autoleak transformer |

ORDERING DATA

Catalogue Number	Description	Packing Quantity
†BSX18	Ballast for 18W SOX-E	36
†BSX355	Ballast for 35W & 55W SOX, SOX-E26 & 36	24
BSX90	Ballast for 90W SOX & SOX-E66	12
BSX135	Ballast for 135W SOX & SOX-E91	4
L4135	Ballast for 135W & 180W SOX, SOX-E91 & 131	4
L4005	Capacitor	160
L4008	PF Capacitor	50
L5007	Capacitor	50
L4010	PF Capacitor	35
L5020	Capacitor	50
†SX 72	Ignitor for 35W & 55W SOX, SOX-E26 & 36	35
†SX 74	Ignitor for 135W SOX & SOX-E91	20
†SX 76	Ignitor for 90W SOX & SOX-E66	20

Please order control gear components in the form given in the following example.
Control gear ordered with luminaires can be supplied in the exact quantity required:—
36 Philips ballasts L4135
35 Philips PF capacitors L5020

Made in UK
†Made in Holland
‡Made in West Germany

BALLASTS, IGNITORS & CAPACITORS

for high-pressure sodium (SON) lamps

A range of current-limiting ballasts, self-healing dry film capacitors for power factor correction and electronic ignitors for providing the high-voltage pulses needed to start SON lamps.

IMPORTANT NOTE: All high-pressure sodium SON and SON/T lamps **MUST** be operated with a current-limiting device in the lamp circuit. Power factor correction capacitors should be used in accordance with the circuit diagrams and data in this leaflet to ensure that the power factor presented to the supply is in accordance with the requirements of the Electricity Authority, and to reduce currents in the circuit supply cables.

RANGE

A full range of control gear components is available for use with the following Philips high-pressure sodium lamps:-
50W SON
70W SON
100W SON & SON/T
150W SON, SON/T! & SON/ST
250W SON & SON/T
400W SON & SON/T
1kW SON & SON/T



To reorder this Data Sheet quote

PL 1778/8

Issued 7/82

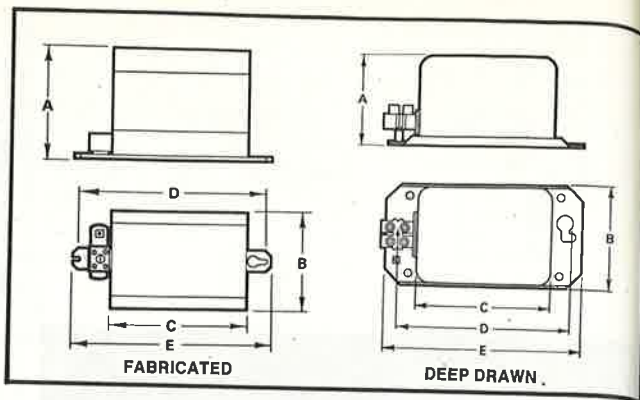
Replaces PL 1778/7

BALLASTS, IGNITORS & CAPACITORS - SON

DISCHARGE BALLASTS (BSN)

Features

- Ballasts for high-pressure sodium lamps are housed in deep-drawn or fabricated cans, filled with polyester to withstand the arduous conditions of service.
- Non-track terminal blocks, and a separate earth terminal which is easily accessible and mounted so as to ensure good electrical connection between cable and baseplate.
- Screen-printed labels include circuit diagrams which cannot peel off in damp or humid conditions.
- Simply fixed with a keyhole at one end and a slot at the other, necessitating only two pre-mounted screws.
- Polyester filling permits small, quiet ballasts, and secures the gap and coils to ensure correct operation of lamps throughout the long life of the ballasts. Polyester does not soften even under fault conditions.
- Low wattage losses ensure economical operation and conservation of energy.



■ All ballasts are suitable for mounting in columns with the terminal block downwards.

DIMENSIONS, WEIGHTS & ELECTRICAL DATA

High-pressure sodium lamp ballasts for use on 50Hz mains supplies, to operate SON, SON/T & SON/R lamps.

Catalogue No.	For lamp type	Circuit Diagram No.	Mains Current Start (A)	Mains Current Run (A)	Total circuit Watts	Weight kg	Tw	Δt	Voltage range	Dimensions					Can*	Total third harmonic %**	PFC capacitor	
										A mm	B mm	C mm	D mm	E mm				
BSN 50	50W SON	1	0.55	0.38	61	1.6	120	70	240									
BSN 70	70W SON	1	0.70	0.42	85	1.8	120	65	240	63	68	88	102	118	D	25	L4008	
BSN 100	100W SON, SON/T	2	0.80	0.60	115	2.0	120	75	240	63	68	88	102	118	D	30	L4010	
BSN 150	150W SON, SON/T, SON-ST	2	1.20	0.90	174	4.0	—	—	240	67	80	120	134	149	D	27	L4010 L4016	
BSN 250	250W SON, SON/T	2	1.80	1.30	280	6.2	—	—	220/240	67	80	120	134	149	D	73	2 x L4016	
BSN 400	400W SON, SON/T	2	3.00	2.20	440	6.35	—	—	220/240	108	106	130	177	189	F	59	2 x L4020	
BSN 1000	1kW SON, SON/T	2	6.90	5.00	1100	20.0	—	—	240	169	140	215	240	255	F	69	4 x L4025	

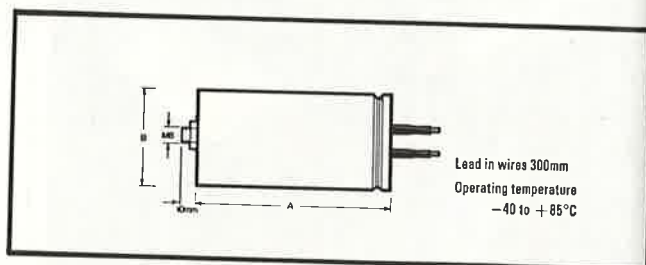
*Can types: D - Deep drawn, F - Fabricated.

**Total third harmonic values relate to measurements in the neutral of a four wire balanced three phase circuit. Divide values above by three for value in single phase circuit.

CAPACITORS for power factor correction

Features

- Wound from metallised polypropylene film which has 'self-healing' characteristics after electrical breakdown.
- 'Dry' construction eliminates the possibility of leakage.
- Internal resistor eliminates the danger of shock from a capacitor charged by the inductive kick-back of the ballast.
- Pin terminations with push-on leads 300mm (12in.) long.
- Extruded aluminium canister of circular cross-section with an M8 earthing and fixing stud.
- Operating temperature range -40°C to +85°C.



DIMENSIONS, WEIGHTS & ELECTRICAL DATA

Catalogue No.	Max. Working Voltage RMS	Capacitance μF	Diameter mm (B)	Length mm (A)	Approx. Weight kg.
L4008	250	8 \pm 10%	38	75	0.10
L4010	250	10 \pm 10%	38	96	0.08
L4016	250	16 \pm 10%	45	70	0.10
L4020	250	20 \pm 10%	45	95	0.12
L4025	250	25 \pm 10%	45	95	0.14

Operating temperature: -40°C to +85°C. Lead in Wire Length 300mm (12in.).

BALLASTS, IGNITORS & CAPACITORS - SON

IGNITORS

for SON, SON/T & SON/R
high-pressure sodium lamps

Features

- Reliable solid-state circuit provides high-voltage pulses to achieve virtually instantaneous ignition of lamp.
- Low energy content of pulses present an electrical hazard to safety no greater than that of any mains voltage installation.
- Ignitor is switched out of circuit after ignition; has zero watts loss during lamp operation.
- Re-ignition of a hot lamp after mains interruption usually occurs in less than one minute, even in high ambient temperatures such as occur in multi-lamp luminaires. This is an important feature where lamp outage can present a hazard to safety.
- Corrosion proof polyamide casing with two slots the length of each side, two flexible lugs and two screw-holes offering a choice of methods of attachment.
- Operates reliably at temperatures up to 80°C.

Wiring

Certain cables in the ignition circuit should be rated at 450/750V (800/1000V) AC (see circuit diagram), and must be capable of withstanding the ignition pulses in humid conditions. All cables should be capable of withstanding any temperature encountered, and should be protected against mechanical damage.

The following recommendations are for guidance only; the cable manufacturers' published data should be consulted for fuller cable specifications with regard to temperature.

Conductor temperatures up to 70°C:
PVC-insulated cable.

Conductor temperatures up to 90°C:
HT PVC-insulated cable.

Conductor temperatures up to 200°C:
Silicone rubber insulated cable with glass fibre sheath for mechanical protection.

Mineral-insulated cables are not recommended for use in these parts of the ignition circuit.

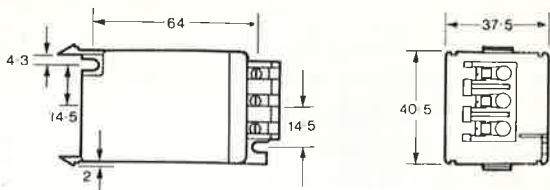
Cable length limitations

In circuits using ignitors, the maximum cable length between lamp and control gear is limited by the capacitance of the cable. This is obtained by adding together two values obtained in test:

The capacitance of the 'high' conductor (i.e. the conductor connecting the ballast to the lamp centre contact) and all other conductors bonded together.

DIMENSIONS

SN50/SN53/SN55



All dimensions in mm

WEIGHTS & ELECTRICAL DATA

Catalogue No.	For Lamp	Voltage range	Min. Supply Voltage	Circuit Diagram	Weight kg.
SN50	150W SON, SON/T & SON/ST 250W/400W SON & SON/T	200/250	200	2	0.10
SN53	1000W SON & SON/T	200/250	200	2	0.10
SN100	100W SON & SON/T	200/250	200	2	0.10

The capacitance between the 'high' conductor and earth (usually the protective housing of the cable).

The maximum capacitances acceptable to the ignitors in this Data Sheet are as follows:-

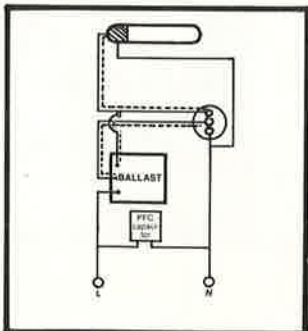
SN50: 6,000pF

SN53: 3,500pF

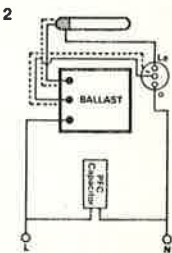
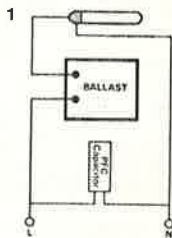
Tables giving maximum permissible cable lengths using typical cables in common applications are contained in Customer Information Sheet No. 80.

An alternative to ignitors SN50, SN53 and SN55, for applications where the cable capacitance limitations cannot be met are the MZM series of ignitors. These ignitors are intended to be located adjacent to the lamp.

For further information on these ignitors please contact Lighting Division.



Circuit Diagrams



1. 50W and 70W SON

2. 150W to 1kW SON and SON/T

3. 100W SON and SON/T

----- High Voltage Cables

BALLASTS, IGNITORS & CAPACITORS—SON

ORDERING DATA

Catalogue No.	Description	Packing Quantity
BSN50	Ballast for 50W SON	12
BSN70	Ballast for 70W SON	12
BSN100	Ballast for 100W SON, SON/T	12
BSN150	Ballast for 150W SON, SON/T, SON/ST	4
BSN250	Ballast for 250W SON, SON/T	4
BSN400	Ballast for 400W SON, SON/T	4
†BSN1000	Ballast for 1kW SON	4
L4008	PF Capacitor	50
L4010	PF Capacitor	50
L4016	PF Capacitor	40
L4020	PF Capacitor	35
L4025	PF Capacitor	36
†SN60	Ignitor for 150W, 250W, 400W SON, SON/T, SON/R	48
†SN63	Ignitor for 1kW SON, SON/T	48
SN100	Ignitor for 100W SON, SON/T	48

Please order control gear components in the form given in the following example, in multiples of the packing quantity. Control gear ordered with luminaires can be supplied in the exact quantity required:—

48 Philips ballasts BSN70
50 Philips Capacitors L4010

Made in U.K.

† Made in Holland.

BALLASTS, IGNITORS & CAPACITORS

for mercury fluorescent
lamps HPL-N, HPL-R and
metal halide lamps HPI

A range of current-limiting ballasts, self-healing dry film capacitors for power factor correction and electronic ignitors for providing the high-voltage pulses needed to start HPI lamps.

Note: Mercury fluorescent lamps
UK marking MBF = Philips
International marking HPL-N
Metal halide lamps
UK marking MBI = Philips
International marking HPI
Mercury fluorescent reflector lamps
UK marking MBFR = Philips
International marking HPL-R

RANGE

A full range of control gear components is available for use with the following Philips mercury fluorescent and metal halide lamps:-
HPL-N mercury fluorescent 50W, 80W, 125W, 250W, 400W, 700W, 1kW and 2kW.
HPL Comfort mercury fluorescent 50W, 80W, 125W, 250W and 400W.
HPL-R mercury fluorescent reflector 125W, 250W, 400W, 700W and 1kW.
Metal halide HPI/T 250W, 400W, 1kW, 2kW (240V and 415V) and HPI/BUS, 400W.



11

DISCHARGE LAMPS

To reorder this Data Sheet quote

PL 1779/9

Issued 6/93

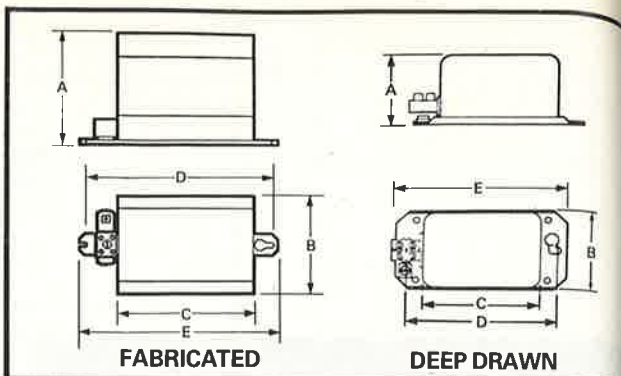
Replaces PL 1779/8

BALLASTS, IGNITORS & CAPACITORS - HPL-N, HPL-R & HPI

DISCHARGE BALLASTS (BHL)

Features

- All ballasts are suitable for mounting in columns with the terminal block downwards.
- Non-track terminal blocks, and a separate earth terminal which is easily accessible and mounted so as to ensure good electrical connection between cable and baseplate.
- Screen-printed labels include circuit diagrams which cannot peel off in damp or humid conditions.
- Low wattage losses ensure economical operation and conservation of energy.



DIMENSIONS, WEIGHTS & ELECTRICAL DATA

Mercury lamp ballasts for use on 50Hz mains supply to operate HPL-N, HPL-[Comfort] HPL-R lamps, metal halide HPI/T and HPI/BUS lamps. Manufactured in accordance with BS 4782.

Catalogue No.	For lamp type	Circuit Diagram No.	Mains Current Start(A)	Mains Current Run(A)	Total circuit Watts	Weight kg	Tw	Δt	Voltage range	Dimensions					Can*	Total third harmonic %	PFC capacitor
										A mm	B mm	C mm	D mm	E mm			
BHL 50	50W HPL-N	1	0.40	0.37	62	1.30	120	50	240	63	68	88	102	118	D	21	L4008
BHL 80	80W HPL-N	1	0.70	0.40	88	1.40	120	65	240	63	68	88	102	118	D	25	L4008
BHL 125	125W HPL-N & HPL-R	1	1.10	0.64	137	1.60	120	70	240	63	68	88	102	118	D	29	L4008
BHL 250	250W HPL-N & HPL-R	1	1.90	1.20	268	2.50	120	65	240	67	80	120	134	149	D	25	L4020
BHL 400	400W HPL-N & HPL-R	1	3.00	1.80	427	3.40	120	65	240	132	114	170	195	210	F	44	2 x L4016
BHL 700	700W HPL-N & HPL-R	1	5.60	3.50	730	10.10	120	60	240	132	114	170	220	235	F	44	2 x L4025
BHL 1000	1kW HPL-N & HPL-R	1	8.00	5.00	1040	11.60	120	70	240	132	114	170	220	235	F	44	3 x L4025
BHL 2000	2kW HPL-N	2	9.30	5.80	2080	27.70	120	70	415	170	169	215	240	255	F	48	3 x L4025
BHL 250	250W HPI/T	3	1.90	1.30	268	2.50	120	65	240	67	80	120	134	149	D	25	L4020
BHL 400	400W HPI/T	3	3.30	1.90	427	3.40	120	85	240	67	80	120	134	149	D	25	L4025
BHL 400	400W HPI/BUS	1	3.30	1.90	427	3.40	120	85	240	67	80	120	134	149	D	25	L4025
BHL 1000	1000W HPI/T	3	8.00	5.00	1040	11.60	120	70	240	132	114	170	220	235	F	44	2 x L4025
2 x BHL 1000	2kW HPI/T (240V)	5	18.00	10.20	2080	22.30	120	70	240	132	114	170	220	235	F	48	4 x L4020
BHL 2000	2kW HPI/T (415V)	4	10.00	5.90	2080	27.70	120	70	415	170	169	215	240	255	F	48	4 x L4020
BHL 250	250W SON/H	1	3.50	1.80	228	2.50	120	65	240	67	80	120	134	149	D	25	L4020
BHL 400	350W SON/H	1	5.20	2.90	374	3.40	120	85	240	67	80	120	134	149	D	25	L4025

* Can types: F - Fabricated, D - Deep Drawn

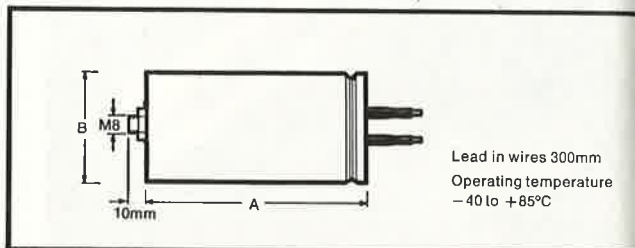
Total Third Harmonic values relate to measurements in the neutral of a balanced four wire, three phase supply. These values are divided by three to obtain values in single phase supplies.

CAPACITORS

for power factor correction

Features

- Wound from metallised polypropylene film which has 'self-healing' characteristics after electrical breakdown.
- 'Dry' construction eliminates the possibility of leakage.
- Internal resistor eliminates the danger of shock from a capacitor charged by the inductive kick-back of the ballast.
- Pin terminations with push-on leads 300mm (12in.) long.
- Extruded aluminium canister of circular cross-section with an M8 earthing and fixing stud.
- Operating temperature range -40°C to +85°C.



DIMENSIONS, WEIGHTS & ELECTRICAL DATA

Catalogue No.	Max. Working Voltage RMS	Capacitance μF	Diameter mm (B)	Length mm (A)	Approx. Weight kg
L4008	250	8 ± 10%	38	75	0-10
L4016	250	16 ± 10%	45	70	0-10
L4020	250	20 ± 10%	45	95	0-12
L4025	250	25 ± 10%	45	95	0-14

Operating Temperature: -40°C to +85°C. Lead in Wire Length 300mm (12in.)

BALLASTS, IGNITORS & CAPACITORS—HPL-N, HPL-R & HPI

IGNITORS

for metal halide lamps

Features

Reliable solid-state circuit provides high-voltage pulses to achieve virtually instantaneous ignition of lamp.

Low energy content of pulses present an electrical hazard to safety no greater than that of any mains voltage installation.

Ignitor is switched out of circuit after ignition; has zero watts loss during lamp operation.

Corrosion Proof polyamide casing with two slots the length of each side, two flexible lugs and two screw-holes offering a choice of methods of attachment.

Operates reliably at temperatures up to 80°C.

Wiring

Certain cables in the ignition circuit should be rated at 450/750V (800/1000V) AC (see circuit diagram), and must be capable of withstanding the ignition pulses in humid conditions. All cables should be capable of withstanding any temperature encountered, and should be protected against mechanical damage.

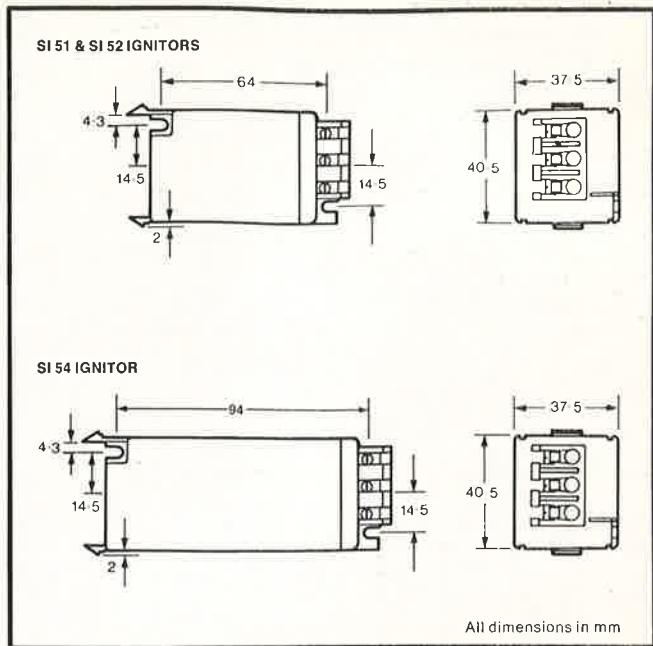
The following recommendations are for guidance only; the cable manufacturers' published data should be consulted for fuller cable specifications with regard to temperature.

Conductor temperatures up to 70°C:
PVC-insulated cable.

Conductor temperatures up to 90°C:
HT PVC-insulated cable.

Conductor temperatures up to 200°C:
Silicone rubber insulated cable with glass fibre sheath for mechanical protection.

Mineral-insulated cables are not recommended for use in these parts of the ignition circuit.



WEIGHTS & ELECTRICAL DATA

Catalogue No.	For Lamp	Voltage range	Min. Supply Voltage	Circuit Diagram	Weight kg.
SI 51	HPI/T 250W, 400W	200/250	200	3	0.07
SI 52	HPI/T 1000W, 2000W	200/250	200	5	0.07
SI 54	HPI/T 2000W	380/415	360	4	0.10

NB. HPI/BUS does not require an ignitor.

Cable length limitations

In circuits using ignitors, the maximum cable length between lamp and control gear is limited by the capacitance of the cable. This is obtained by adding together two values obtained in test.

The capacitance of the 'high' conductor (i.e. the conductor connecting the ballast to the lamp centre contact) and all other conductors bonded together.

The capacitance between the 'high' conductor and earth (usually the protective housing of the cable).

The maximum cable capacitances acceptable to these ignitors is as follows:-

SI 51 ignitor: 25,000pF

SI 52 ignitor: 20,000pF

SI 54 ignitor: 100,000pF.

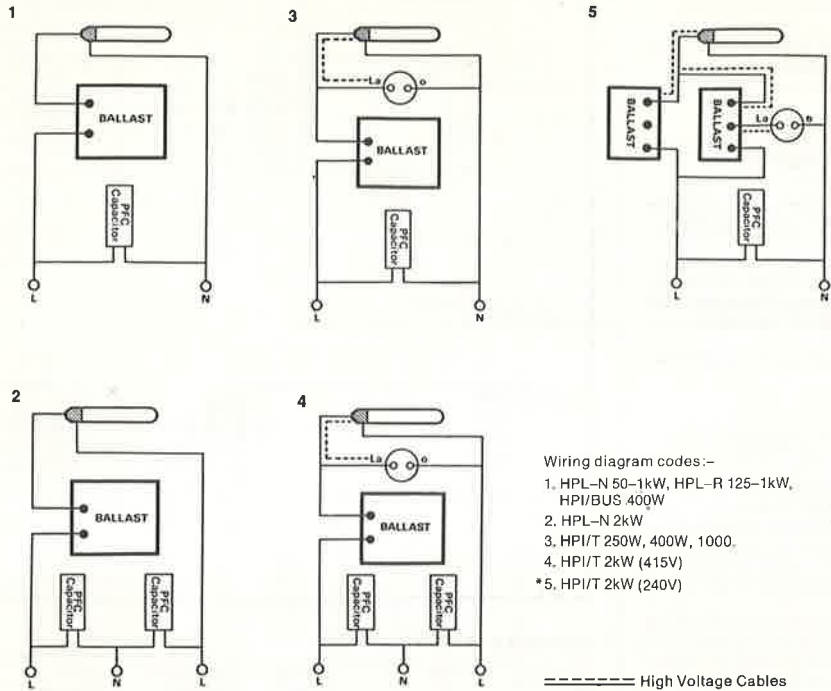
Tables giving maximum permissible cable lengths using typical cables in common applications are contained in Customer Information Sheet No. 80.

IMPORTANT NOTE: With the exception of certain special types, such as the PowerBlend mercury/ blended range of lamps with built-in control gear, all mercury and metal halide discharge lamps **MUST** be operated with a current-limiting device in the lamp circuit. Power factor correction capacitors should be used in accordance with the circuit diagrams and data in this leaflet to ensure that the power factor presented to the supply is in accordance with the requirements of the Electricity Authority and to reduce currents in the circuit supply cables.

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BALLASTS, IGNITORS & CAPACITORS - HPL-N, HPL-R & HPI

Circuit diagrams



- Wiring diagram codes:-
1. HPL-N 50-1kW, HPL-R 125-1kW, HPI/BUS 400W
 2. HPL-N 2kW
 3. HPI/T 250W, 400W, 1000.
 4. HPI/T 2kW (415V)
 - *5. HPI/T 2kW (240V)

----- High Voltage Cables

ORDERING DATA

Catalogue No.	Description	Packing quantity
BHL50	Ballast for 50W HPL-N	12
BHL80	Ballast for 80W HPL-N	12
BHL125	Ballast for 125W HPL-N	12
BHL250	Ballast for 250W HPL-N, HPL-R, HPI/T	8
BHL400	Ballast for 400W HPL-N, HPL-R, HPI/T and HPI/BUS	8
BHL700	Ballast for 700W HPL-N and HPL-R	4
†BHL1000	Ballast for 1kW HPL-N, HPL-R and 2kW HPI/T* (240V)	2
†BHL2000	Ballast for 2kW HPL-N and 2kW HPI/T (415V)	1
L4006	PF Capacitor	50
L4016	PF Capacitor	40
L4020	PF Capacitor	35
L4025	PF Capacitor	35
†SI 51	Ignitor for 250W, 400W HPI/T	48
†SI 52	Ignitor for 2kW HPI/T (240V)	48
†SI 54	Ignitor for 2kW HPI/T (415V)	6

*Two ballasts required for this circuit.

Please order control gear components in the form given in the following example in multiples of the packing quantity. Control gear ordered with luminaires can be supplied in the exact quantity required:-

- 200 Philips ballasts BHL2000
- 204 Philips ignitors SI 54
- 805 Philips Capacitors L4020

Made in UK
 † Made in Holland

LAMPS AND FITTINGS FOR SPECIAL PURPOSES

	Page
Heat Lamps Reflector Infra-Red	411
Miniature Halogen Lamps	415
IRK Linear Quartz Heat Lamps	417
Linear Heat	419
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HLRG 400W Horticultural Lamp	447

Please see pages II and III of General Introduction for information on how to use this Handbook.

HEAT LAMPS

Blown bulb internal reflector types

Tungsten filament heat lamps for directional short-wave infra-red heating purposes.

RANGE

IR250WS - 250W rating, normal glass, frosted finish (Industrial use only).

IR300WCH, IR300WRH - 300W rating, hard glass, clear or red finish.

IR375WCH - 375W rating, hard glass, clear finish.

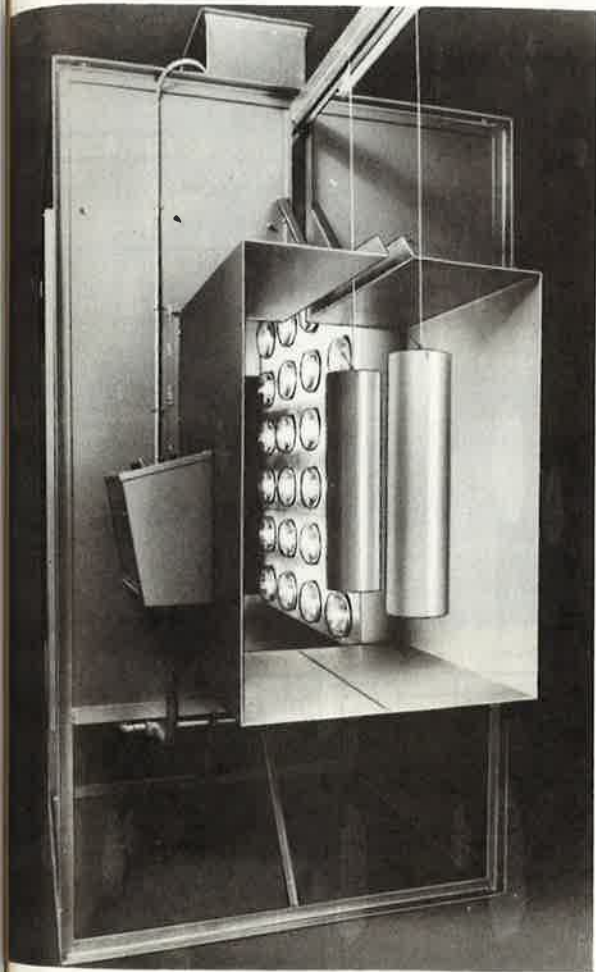
Available to special order only:-

IR150WS - 150W rating, normal glass, frosted finish (Industrial use only).

IR150WRS - 150W rating, normal glass, red finish (Industrial use only).

APPLICATIONS

- Livestock rearing
- Personnel comfort
- Entrance canopies, to provide light and warmth
- Low-intensity process heating
- Paint drying and curing
- Pre-heating

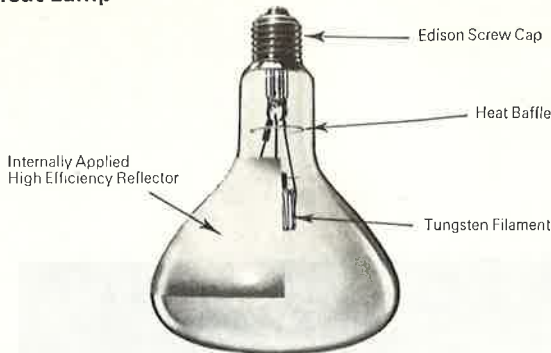


HEAT LAMPS – LAMPS SPECIAL PURPOSES

FEATURES

- Highly efficient conversion of electrical energy into radiant heat.
- Instant response – no warm-up or cool-down delay.
- High-efficiency parabolic reflector internally applied to bulb maintains installation efficiency.
- 5000 hours average life expectancy.
- Hard glass versions resist thermal shock due to splashing and are therefore suitable for all applications.
- Frosted lamp gives diffused light and heat output; particularly suitable for livestock rearing.
- Red lamp reduces visible light; is suitable for livestock rearing and open-sided process heating ovens.

Construction of Philips Heat Lamp



PROCESS HEATING APPLICATION NOTES

General

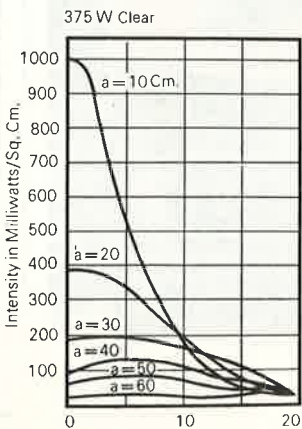
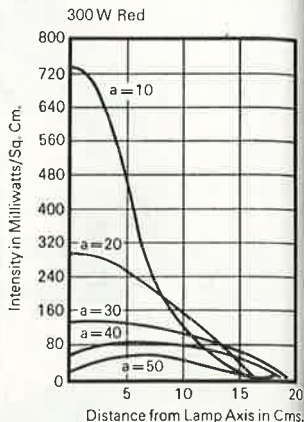
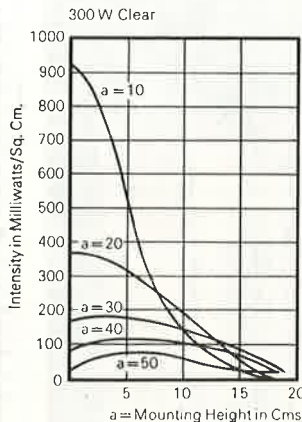
1. Shortwave infra-red penetrates translucent materials, unlike long-wave infra-red from dull or 'black' emitters, which is absorbed at most surfaces.
2. The virtually instant response to switching or dimming has important safety and energy-saving connotations, with flammable products and in batch control applications for example.
3. Infra-red output is unaffected by draughts, and if used on reduced voltage the life expectancy is increased while the output remains shortwave.
4. These lamps are for applications requiring intensities up to 10kW/m² installed. For higher intensities, use Philips Type IRK linear heat lamps.

Equipment design

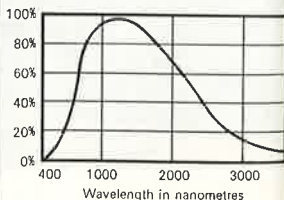
The simplicity of the lamps permits great versatility in the design of installations.

1. Heat lamp spacing and height is predetermined from a small-scale feasibility test, and may be made adjustable in practice.
2. Lamps must not be enclosed in insulated ovens. They heat by direct radiation, and must be given adequate ventilation around lampholders and wiring.
3. For enhanced efficiency on reflective or openwork products, highly reflective aluminium tunnel sides should be used with recessed heat lamps. Philips recessed fitting W4001 is suitable.
4. Heat control is possible by selective switching, series/parallel switching or dimming.

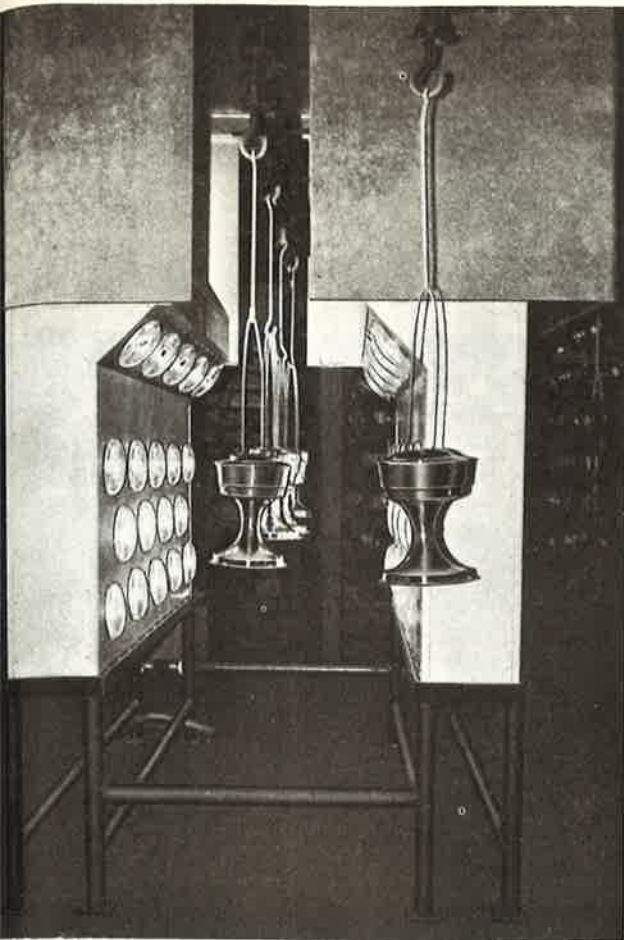
Radiation Intensity in planes perpendicular to lamp axis



Relative Spectral Energy Distribution



HEAT LAMPS – LAMPS SPECIAL PURPOSES



Applying of protective finish on brass lamps.

GLASS BULBS AND FINISHES

Bulbs are obtainable blown from normal 'soft' glass or from heat-resistant 'hard' glass. Soft glass lamps are marked 'For industrial use only', and must not be used where there is any chance of splashing, as the resultant thermal shock is likely to fracture the bulb.

Hard glass lamps have a much greater resistance to thermal shock, and are suitable for all applications.

ORDERING DATA

Please order lamps in the form given in the following example, quoting voltage, wattage and packing quantity:-

36 Philips heat lamps 240/250V, 300W, Type IR300WRH.

Made in Holland.

LAMP DATA

catalogue No.	Type No.	Wattage	Voltage	Cap	Finish	Glass	Overall length max. (mm)	Bulb diameter max. (mm)	Packing quantity
150WS	13346/E44	150	240/250	ES	Frosted	Normal	185	126	Special order only
150WRS	13346/E479	150	240/250	ES	Red	Normal	185	126	Special order only
250WS	13352/E44	250	110/120	ES	Frosted	Normal	185	126	9
			240/250						15
300WCH	13374/EO6	300	240/250	ES	Clear	Hard	185	126	9
300WRH	13374/E479	300	240/250	ES	Red	Hard	185	126	9
375WCH	13344/EO6	375	110/120	ES	Clear	Hard	185	126	9
			240/250						

Notes:

1. Filament temperature of filament approximately 2400K.

2. Average life is 5000 hours at rated voltage, but this may be affected by actual working conditions (vibration, switching frequency, etc.).

3. These lamps may be operated in any position.

catalogue suffixes

- Soft glass.
- Hard glass.
- Clear finish.
- Red finish.

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HEAT LAMPS – LAMPS SPECIAL PURPOSES

HARD GLASS MINIATURE HALOGEN LAMPS

A range of low voltage lamps of relatively low Wattage, with hard glass envelopes and using the halogen cycle for high efficiency, long life and minimum lumen depreciation.

The specially designed W4 x 9d capless wedge base gives simple but firm fixing and positions filaments accurately and reliably.

RANGE

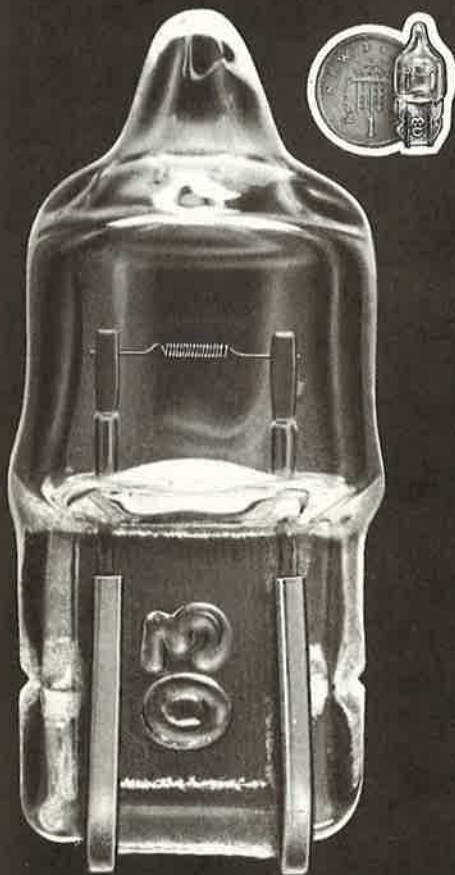
(Subject to availability)

HM 01 - 13.5V 6W	HM 08 - 6V 2.4W
HM 02 - 6V 3W	HMP 09 - 4V 4W
HM 03 - 6V 4W	HMB 12 - 6V 15W
HM 04 - 6V 4W	HMB 13 - 6V 3W
HM 06 - 12V 20W	

APPLICATIONS

For use in situations where as much light as possible is required from a small source, or where limited supply energy is available, as in:

- Cycle and moped lights
- Emergency lights
- Miners' cap lamps
- Spotlights (Machine/Reading)
- Industrial torches
- Warning lights
- Microscopes
- Temporary road signals
- Security lighting
- Fibre optics



To reorder this Data Sheet quote

PL 3018/1

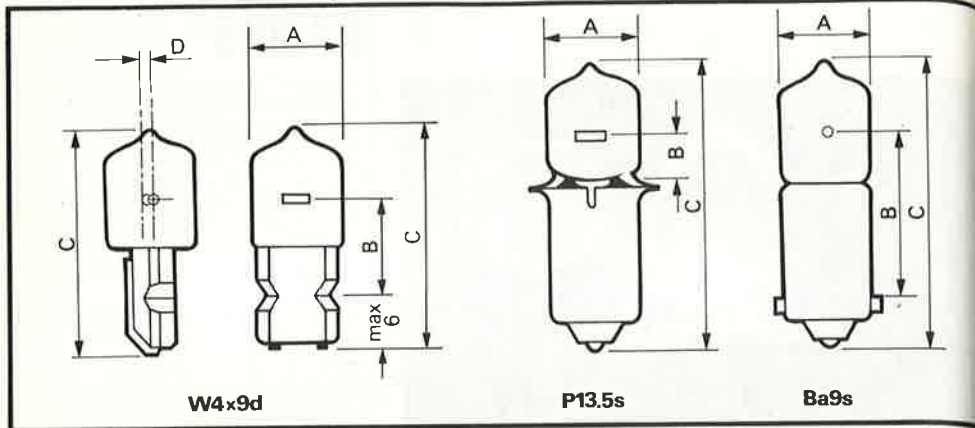
Issued 7/83

Replaces PL 3018

HARD GLASS MINIATURE HALOGEN LAMPS – LAMPS SPECIAL PURPOSES

FEATURES

- High efficiency
- Long life
- Low energy consumption (prolongs battery life)
- White light
- Small physical size
- Robust construction – high shock resistance
- Accurate filament positioning
- Hard glass (not quartz) for easy handling



DIMENSIONS

	Wedge base W4x9d		Prefocus P13.5s		Bayonet Ba9s	
	10W or less	Over 10W	10W or less	Over 10W	10W or less	Over 10W
Diameter (A)	max. 10	max. 10	max. 10	max. 10	max. 10	max. 10
Overall length (C)	max. 25	max. 26	max. 31	max. 31	max. 31	max. 32
Light centre length (B)	8.5 ± 0.5	9.5 ± 0.5	6.55 ± 0.25	6.55 ± 0.25	15 ± 1	15 ± 1
Lateral deviation (D)	± 0.6	± 0.6	± 0.6	± 0.6	± 1.0	± 1.0

All dimensions in mm.

LAMP DATA

Catalogue No.	Voltage (V)	Wattage (W)	Lumen output	Life (hours)
HM 01	13.5	6	96	300
HM 02	6	3	57	20
HM 03	6	4	76	50
HM 04	6	4	56	300
HM 06	12	20	320	2,000*
HM 08	6	2.4	38	100
HMP 09	4	4	54	300
HMB 12	6	15	240	2,000*
HMB 13	6	3	50	100

Note: Supplied with W4x9d (wedge) base as standard. Alternative bases to special order: e.g. HM designated lamps MCC (Ba9s), Prefocus (P13.5s), MES (EP10) under development. *Provisionally released with 1000 hours life.

ORDERING DATA

Lamps are supplied packed in multiples of 100 or 1000.

Please order in the form given in the following example, in multiples of the packing quantity:

100 Philips miniature halogen lamps HM 04.

Made in Holland

IRK LINEAR QUARTZ HEAT LAMPS

Tungsten filament heat-lamps for short-wave infra-red radiation in high-intensity applications

RANGE

Standard types rated from 500W to 3kW.
'X', 'Y' and 'Z' Terminators

APPLICATIONS

Used with suitable reflector units, IRK heat-lamps can give very high rates of heat transfer, reducing processing times and space requirements, in situations such as:-

- Preheating and mass heating
- Drying
- Paint drying and baking of powder paints
- Curing applications
- Food preparation
- Stress relieving, expanding, fusing, etc.
- Printing ink drying

FEATURES

- Fast response; full heat output is achieved within 1 second, and the lamps may be dimmed for fast process control.
- Lamp output is reduced by 80% within 1 second of switching off, greatly enhancing safety.
- Provides a highly-efficient, energy-effective source of infra-red radiation.
- Produces product temperatures up to 1350°C.
- Easily focussed for extra intensity.
- Reflectorised versions are available.
- Permit clean, lightweight, simple installations.

IRK Dryer fitted to Roland 800, Printing Press

To reorder this Data Sheet quote

PL 1814/5

Issued 7/84

Replaces PL 1814/4

LAMPS INCANDESCENT

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IRK LINEAR QUARTZ HEAT LAMPS – LAMPS INCANDESCENT

NOTES FOR USERS

Short-wave infra-red radiation behaves in a manner similar to red light, and penetrates translucent materials, unlike long-wave infra-red from 'dull' or 'black' emitters which is substantially absorbed at many surfaces. It is advisable to conduct small-scale feasibility tests before designing a new installation.

IRK lamps should be mounted flexibly to accommodate differential expansion, and ventilation and/or heat sinks should be provided for the end seals as necessary.

Maximum permissible quartz/metal end seal temperature is 300°C.

Maximum permissible quartz tube temperature is 900°C.

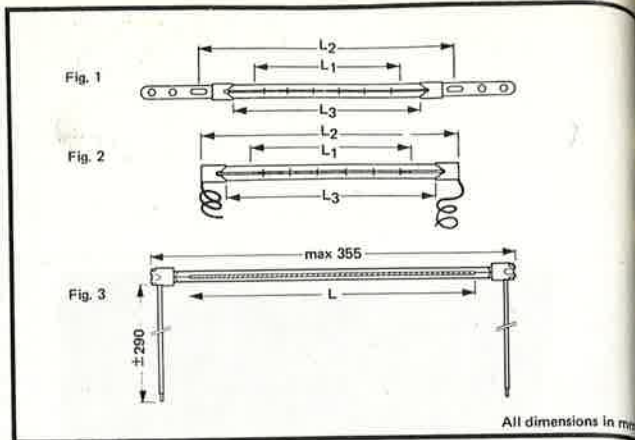
The danger of exceeding these temperatures occurs in high-intensity ovens where considerable re-radiation is taking place (e.g. heating metal sheet or billets to temperatures above 1000°C) and in these circumstances, forced cooling of the envelopes may be required.

Aluminium reflectors will normally require forced-air or water cooling for continuous operation.

Recently-introduced lamp types 13713Z/98 and 13168Z/98 have metal endcaps which may be clipped to an earthed frame, and are equipped with insulated flying leads.

IRZ 500 Linear heat lamp fitting (for lamp type 13169Z/98) see Data Sheet PL3038.

IRZ 1000 Linear heat lamp fitting (for lamp type 13713Z/98)



A special lampholder, Type Z9570, is available for use with strip terminated types.

The lamps should not be subjected to vibration or mechanical shock.

General characteristics

All types:

Filament colour temperature: about 2400K

Average life: 5000 hours at midpoint of voltage range

Peak wavelength: about 1.2 micron

SPECIFICATION

Standard types are designed to conform with the International Standard IEC 240.

ORDERING DATA

Please order in the form given in the following example, quoting Catalogue No., voltage and wattage, and in multiples of the packing quantity:—

12 Philips IRK heat lamps 13195Y 11

DIMENSIONS & LAMP DATA

Catalogue No.	Volts	Kilowatts	End connection	Tube	L1 (heated length) (mm)	L2 (fixing centres) (mm)	L3 minimum (mm)	Figure	Operating position*	Packing quantity
13169X	110/130	0.5	Strip	Clear	140±2	241±5	165	1	Horizontal	10
13169X/98	110/130	0.5	Strip	Reflector	140±2	241±5	165	1	Horizontal	10
13169Y	110/130	0.5	Wire	Clear	140±2	216±3	165	2	Horizontal	10
13195Y	220/250	1	Wire	Clear	272±2	348±5	295	2	Horizontal	10
13195X	220/250	1	Strip	Clear	272±2	368±5	295	1	Horizontal	10
13195X/98	220/250	1	Strip	Reflector	272±2	368±5	295	1	Horizontal	10
13713X	220/250	1	Strip	Clear	272±2	368±5	295	1	Vertical	10
13168X	220/250	2	Strip	Clear	280±2	368±5	295	1	Vertical	10
13765X	380/420	2	Strip	Clear	410±2	508±5	435	1	Horizontal	10
13245X/98	380/420	2	Strip	Reflector	410±2	508±5	435	1	Horizontal	10
13230X	380/420	3	Strip	Clear	700±2	798±5	725	1	Vertical	10
13230X/98	380/420	3	Strip	Reflector	700±2	798±5	725	1	Vertical	10
13169Z/98	220/250	0.5	Special	Reflector	162±5	178	227	3	Horizontal	10
13713Z/98	220/250	1	Special	Reflector	272±5	357±5	307	3	Vertical	10
13195Z/98	220/250	1	Special	Reflector	272±5	357±5	307	3	Horizontal	10
13168Z/98	220/250	2	Special	Reflector	280±2	357±5	307	3	Vertical	10
13213Z/98	220/250	2	Special	Reflector	280±5	357±5	307	3	Horizontal	10

Notes *Operating positions: Horizontal ± 15° (these types must not be operated vertically)

Vertically ± 75° (these types previously operated in 'any' position).



PETERBOROUGH ICE RINK

This Finance for Lighting scheme uses custom-built luminaires with 400W HPI/T lamps, selectively switched to provide different light levels. Lighting over seating areas is dimmable, and the system provides facilities for theatre lighting.



BISHAM ABBEY SPORTS WORKSHOP

A mixed installation of PAR 38 lamps angled at 15° to the vertical, and upward and downward fluorescent luminaires, switchable to give 900 lux, 750 lux or 600 lux with various lamp mixtures, gives the right lighting for any indoor sport in the National Training Centre.

LINEAR HEAT LAMP FITTING

IRZ 500 : IRZ 1000

Easily-installed fittings for Philips linear quartz heat lamps with fully-insulated end connections, for universal use in process heating systems, food warming and many other applications calling for an easily-controlled source of radiant heat. Supplied complete with reflector and fixing screws.

RANGE

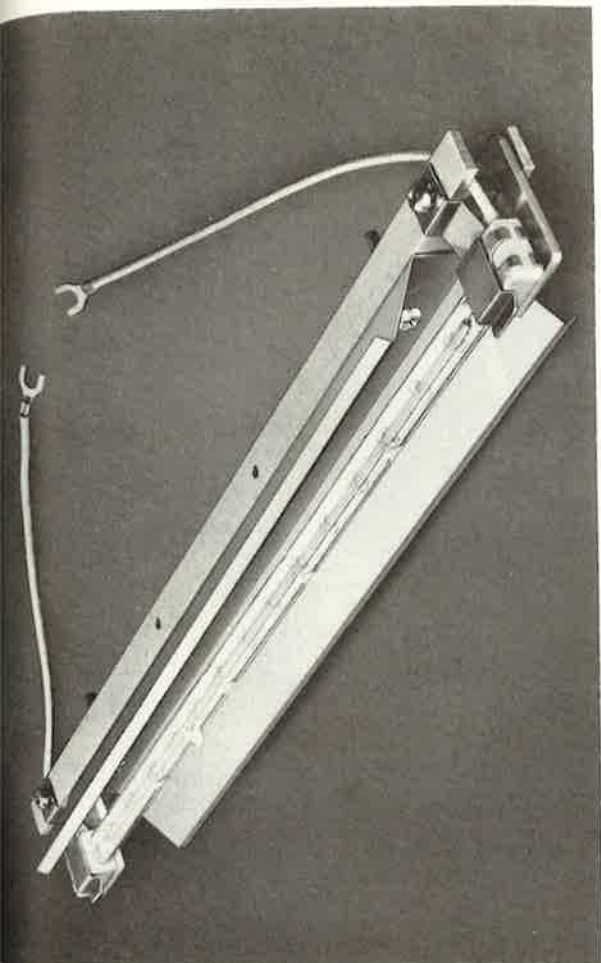
IRZ 500 – for use with Philips 13169Z/98 500W lamp.

IRZ 1000 – for use with Philips 13713Z/98 1kW lamp.

APPLICATIONS

Provides very high rates of heat transfer, reducing processing times and space requirements in situations such as:

- Preheating and mass heating
- Drying
- Paint drying and baking of powder paints
- Curing applications
- Fast food industry (keeping cooked food hot)
- Stress relieving, expanding, fusing, etc.
- Printing ink drying
- Energy-effective zone heating in large buildings (Churches, etc.)



LINEAR HEAT LAMP FITTING – SPECIAL PURPOSE

FEATURES

- Simple two-screw fixing on to metal structures.
- Fast response; full heat output is achieved within 1 second, and the lamp may be dimmed for process temperature control.
- Heat output is reduced by 80 per cent within 1 second of switching off, greatly enhancing safety.
- Provides a high-efficient, energy-effective source of infra-red radiation.
- Product temperatures up to 700°C are possible.
- Lamp clips on to heat sink with remote electrical connection.
- Reflector shields lamp from mechanical damage; also improves overall efficiency by redirecting radiant energy from workpiece.
- Lamp comes complete with heat-resisting cables and terminal connectors.
- Integral white diffuse reflector coating improves directional heating efficiency.
- Supplied as an easily-installed kit, complete with fixing screws.

MATERIALS & FINISH

Body: Brushed aluminium extrusion.

Reflector: Super-purity aluminium, anodised.

SPECIFICATION

Designed to comply with BS 4533 Class I (electrical) earth required.

To specify state:

Short-wave infra-red fitting for industrial processing, for Philips linear Z quartz heat lamp. To be supplied with fixing accessories. Similar to Philips IRZ 500/1000.

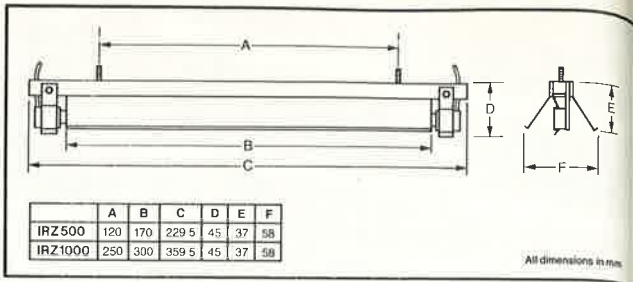
RANGE OF OPERATION

220/250V supplies.

Normal dry indoor conditions.

Note: The maximum permissible pinch temperature of the lamp is 275°C. In many cases, the metal structure on to which the fitting is mounted will act as an adequate heat sink, but in certain situations additional low-pressure forced-air cooling may be needed to ensure that the maximum pinch temperature is not exceeded. Without forced-air cooling, the ambient air temperature must not exceed 80°C.

DIMENSIONS



WEIGHTS

Weight complete with lamp:

IRZ 500 – 140g.

IRZ 1000 – 200g.

LAMP DATA

Burning position: Universal.

Filament colour temperature: c. 2400K.

Average life: 5000 hours at mid-point of voltage range (235V).

Peak wavelength: c. 1.2 microns.

ORDERING DATA

Catalogue No.	Description	Packing Qty.
IRZ 500	Fitting for 500W linear quartz heat lamp	1
IRZ 1000	Fitting for 1kW linear quartz heat lamp	1
Lamps		
13169Z/98	500W linear quartz heat lamp	1
13713Z/98	1kW linear quartz heat lamp	1

Please order in the form given in the following example:

10 Philips IRZ 1000 heat lamp fittings.

10 Philips 13713Z/98 linear quartz lamps.

Notes for users

Short-wave infra-red radiation behaves in a manner similar to red light, and penetrates translucent materials, unlike long-wave infra-red from 'dull' or 'black' emitters which is substantially absorbed at many surfaces. It is advisable to conduct small-scale feasibility tests before designing a new installation.

Maximum permissible quartz-metal end seal temperature is 275°C; maximum quartz tube temperature is 900°C. In applications where these temperatures will be exceeded, low-pressure forced-air cooling of the quartz envelope and lamp ends will be required.

Lamp: Made in Belgium

Fitting: Made in UK

BLACKLIGHT LAMPS

A range of four tubular fluorescent lamps with filter envelopes, a mercury/tungsten blended lamp and a mercury lamp (both with Woods glass envelopes) for producing long-wave UV radiation for the activation of fluorescent materials.

RANGE

TL6W/08 – tubular fluorescent lamp
225 × 16mm (9in. × $\frac{5}{8}$ in.), 6W rating.

TL8W/08 – tubular fluorescent lamp
300 × 16mm (1ft × $\frac{5}{8}$ in.), 8W rating.

TL20W/08 – tubular fluorescent lamp
600 × 38mm (2ft × 1 $\frac{1}{2}$ in.), 20W rating.

TL40W/08 – tubular fluorescent lamp
1200 × 38mm (4ft × 1 $\frac{1}{2}$ in.), 40W rating.

MLW 160W – mercury lamp with
integral stabilising filament (ballast
not required), Woods glass ovoid
envelope, 160W rating.

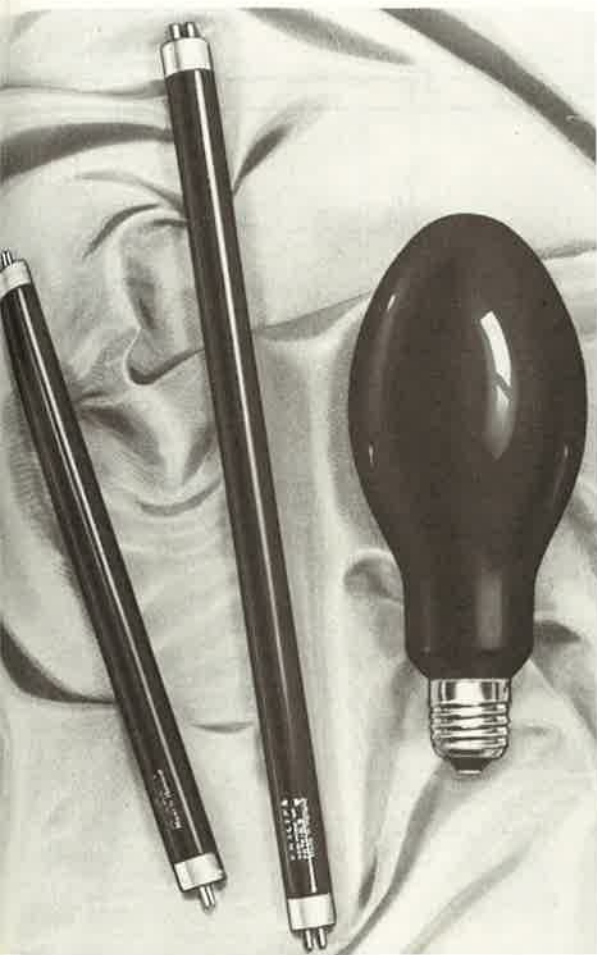
HPW 125W – mercury lamp, Woods
glass ovoid envelope, 125W rating.
TL 4W/08 and TLD 15W/08 to special
order only

Caution: These lamps emit UV radiation.

Precautions must be taken in the design of process installations to avoid exposure for operatives and users (especially to skin and eyes).

All equipment manufacturers incorporating this lamp should provide instructions to users with warnings for avoidance or limitation of UV exposure as appropriate.

Users of UV equipment should carefully observe instructions for use provided by equipment manufacturers.



To reorder this Data Sheet quote

PL 1813/3

Issued 7/84

Replaces PL 1813/2

BLACKLIGHT LAMPS – LAMPS SPECIAL PURPOSES

FEATURES

- Output is mainly in the long-wave UV region for response from common fluorescent materials.
- Black filter envelopes reduce radiation in the visible spectrum.
- Tubular fluorescent lamps run from same control gear as standard white lamps, and are interchangeable in standard switchstart luminaires.
- Integral stabilising filament of MLW lamp eliminates the need for a ballast; enables lamp to run directly from the mains.
- Ovoid mercury lamps provide a compact, easily-directed UV source; tubular fluorescent lamps are more suitable for general UV irradiation.

RANGE OF OPERATION

240V 50Hz supplies (all types except MLW 160W require suitable control gear).

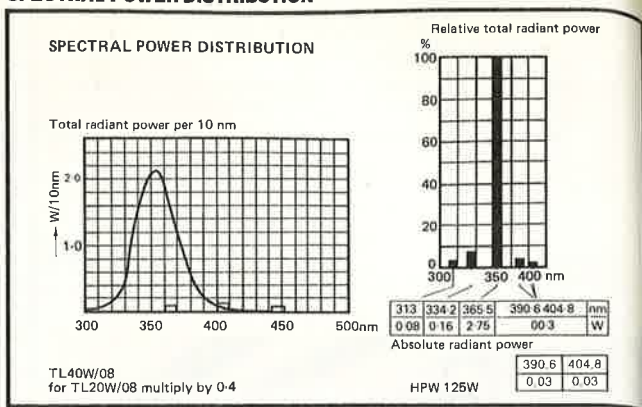
MATERIALS & FINISH

Tubular fluorescent lamps: Mini-bi-pin or bi-pin caps, cobalt filter glass envelope.

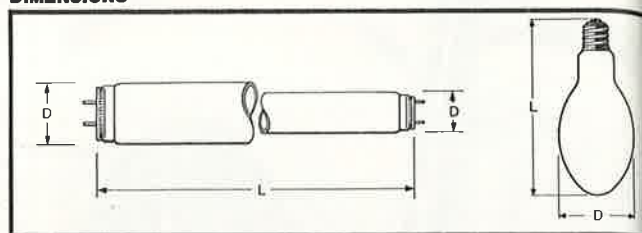
HPW: 3-pin BC or ES cap, Woods glass envelope.

MLW: ES cap, Woods glass envelope.

SPECTRAL POWER DISTRIBUTION



DIMENSIONS



Replacement Period

It is recommended that UV lamps should be group replaced and with a shorter period than for white lamps. A guide to UV depreciation is in the Lamp Data table.

LAMP DATA

Catalogue No.	Description	Length L max (mm)	Diameter D nom (mm)	Cap	BS Lamp Voltage (V)	BS Lamp Current (A)	UV Depreciation % per thousand hours
TL4W/08*	4W 150mm (6in.) miniature fluorescent	136	16	Mini bi-pin	30	0.15	5
TL6W/08	6W 225mm (9in.) miniature fluorescent	212	16	Mini bi-pin	45	0.16	5
TL8W/08	8W 300mm (12in.) miniature fluorescent	288	16	Mini bi-pin	58	0.17	5
TLD15W/08*	15W 460mm (18in.) fluorescent	439.2	26	Bi-pin	56	0.31	5
TL18W/08	20W 600mm (2ft) fluorescent	590	26	Bi-pin	57	0.37	5
TL36W/08	40W 1200mm (4ft) fluorescent	1200	26	Bi-pin	103	0.43	5
HPW 125W	125W mercury	177	75	3-pin BC or ES	125	1.20	15
MLW 160W	160W mercury/tungsten blended 220/240V	172	75	ES		0.67	15

*To special order only.

Note: All lamps any operating position except MLW 160W – vertical, cap up or down $\pm 75^\circ$.

CONTROL GEAR COMPONENTS

Note: Type MLW is stabilised by its tungsten filament, and requires no control gear. Other types MUST be operated in conjunction with suitable current-limiting control gear (ballast).

Lamp type	Ballast	Starter
1 x TL6W/08	BAS 8	S2 or S10
2 x TL6W/08	BAS 13	2 x S2
1 x TL8W/08	BAS 8	S2 or S10
2 x TL8W/08	BAS 13	2 x S2
1 x TL18W/08	BCS 20	S2 or S10
2 x TL18W/08	BCS 40	2 x S2
TL 36W/08	BCS 40	S10
HPW 125W	L5125BX	—

ORDERING DATA

Catalogue No.	Packing Qty.
TL6W/08	25
TL8W/08	25
TL18W/08	6
TL36W/08	6
HPW 125W*	12
MLW 160W	12

*Specify cap 3-pin BC or ES.

Please order lamps in the form given in the following example, in multiples of the packing quantity:—

36 Philips blacklight lamps TL40W/08.

Made in Holland

TUV GERMICIDAL LAMPS

A range of lamps with sharply-defined output at 253.7 nm, close to the wavelengths most effective in inhibiting bacteria and moulds.

RANGE

TUV 6W: Single-ended discharge lamp, for operation direct from 220/240V 50 Hz supplies.

TUV 15W: Linear discharge lamp, for use with normal fluorescent control gear.

TUV 30W: Linear discharge lamp, for use with normal fluorescent control gear.

TUV 40W: Linear discharge lamp, for use with normal fluorescent control gear.

APPLICATIONS

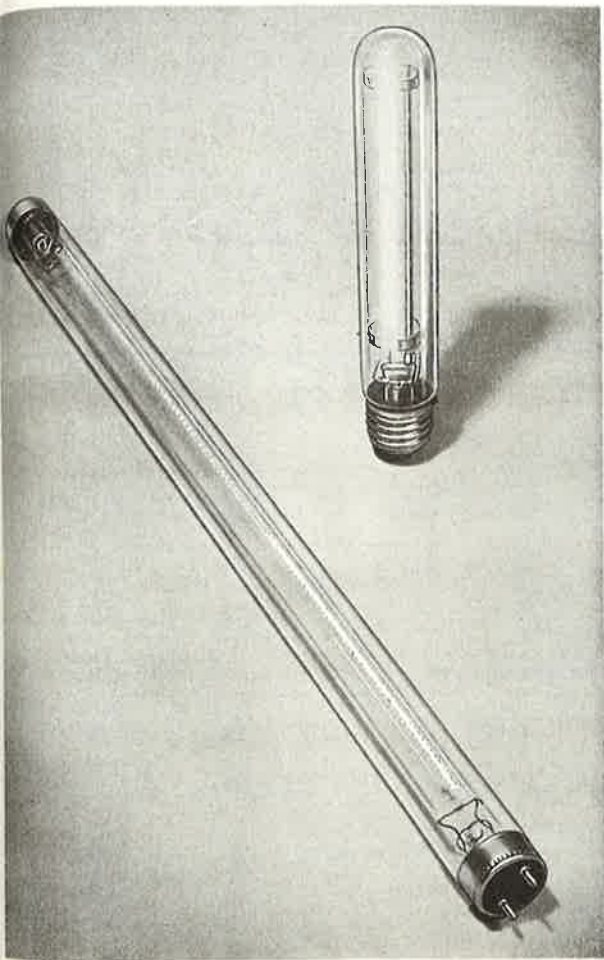
Suitable for inhibiting bacteria and moulds in many situations, including:

- Sterilisation in hospitals
- Bacteriological research
- Pharmaceutical manufacture
- Dairies
- Breweries
- Food storage rooms
- Air conditioning systems

Caution: These lamps emit UV radiation
Precautions must be taken in the design of process installations to avoid exposure for operatives and users (especially to skin and eyes).*

All equipment manufacturers incorporating this lamp should provide instructions to users with warnings for avoidance or limitation of UV exposure as appropriate.

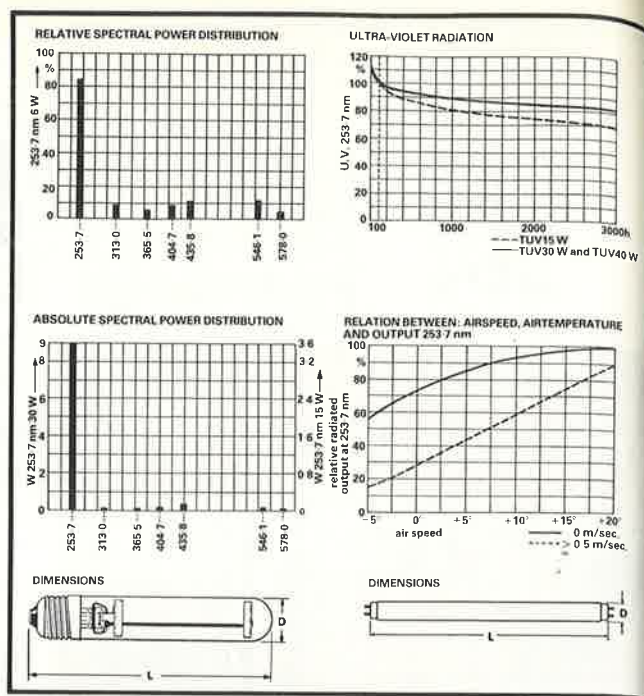
Users of UV equipment should carefully observe instructions for use provided by equipment manufacturers.



TUV GERMICIDAL LAMPS – SPECIAL PURPOSES

FEATURES

- Majority of output occurs at 253.7 nm line, making the lamps an efficient source of germicidal radiation
- Type TUV 6W operates on normal a.c. power supplies (ballast internal) provides an inexpensive and convenient source of UV radiation
- Linear lamps can be used in conventional fluorescent switch start circuits
- Negligible ozone formation



LAMP DATA

Catalogue No.	Lamp Voltage V	Lamp Current A	Cap	UV 253.7 nm $\mu\text{W}/\text{cm}^2$ *	UV 253.7 nm W (Total output)
TUV 6W	220/240	0.027	ES	0.85	0.085
TUV 15W	56	0.31	Bi-pin	37	3.5
TUV 30W	96	0.36	Bi-pin	83	9.0
TUV 40W	103	0.43	Bi-pin	94	12.6

*at 1 m from centre.

DIMENSIONS & WEIGHTS

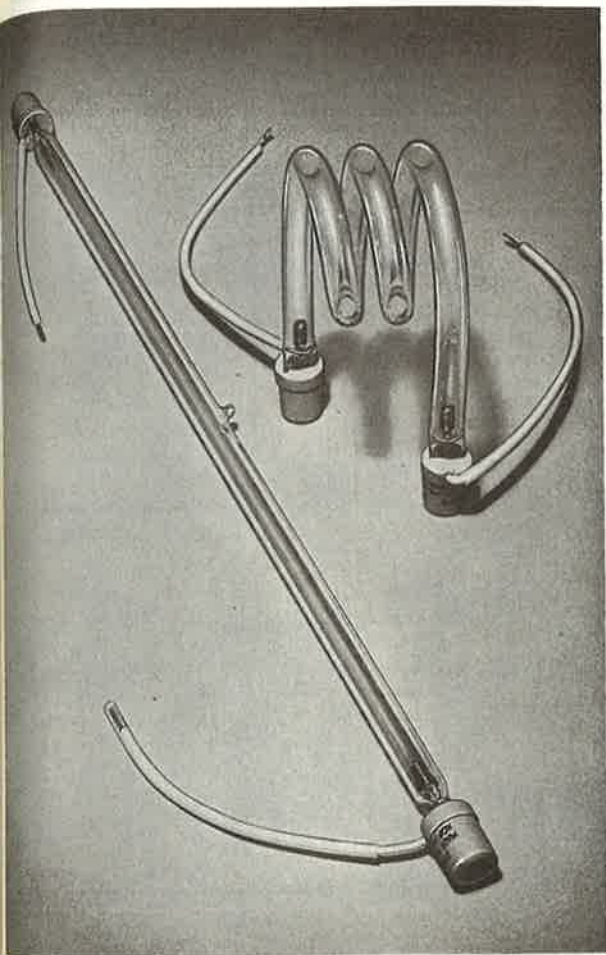
Catalogue No.	L (mm) max.	D (mm) nom.	Weight (g)	Packing quantity
TUV 6W	150.0	26	40	10, 100
TUV 15W	437.4	26	75	6
TUV 30W	894.6	26	140	6
TUV 40W	1199.4	38	292	6

ORDERING DATA

Please order lamps in the form given in the following example, in multiples of the packing quantity:

12 Philips germicidal lamps TUV 30W

Made in Holland



XOP

Low-pressure pulsed Xenon lamps

A range of discharge lamps of the low-pressure xenon type, with spectral characteristics approximating to those of normal daylight.

RANGE

- XOP 7: Linear lamp, arc length 158mm, 750W.
- XOP 15: Linear lamp, arc length 312mm, 1500W.
- XOP 25: Linear lamp, arc length 457mm, 2000W.
- XOP 30: Linear lamp, arc length 615mm, 3000W.
- XOP 40: Compact-source lamp, 4000W.
- XOP 80: Compact-source lamp, 8000W.

APPLICATIONS

- Eminently suitable for the lighting of horizontal and vertical copy-boards in the graphic arts industry.
- Since the lamps strike instantly, they are also suitable for use in stop-and-repeat copying machines.

Caution: These lamps emit UV radiation.

Precautions must be taken in the design of process installations to avoid exposure for operatives and users (especially to skin and eyes).*

All equipment manufacturers incorporating this lamp should provide instructions to users with warnings for avoidance or limitation of UV exposure as appropriate.

Users of UV equipment should carefully observe instructions for use provided by equipment manufacturers.

LAMPS SPECIAL PURPOSES

12

To reorder this data sheet quote **PL 1837/1**

Issued 6/79

Replaces PL 1837

XOP - LAMPS SPECIAL PURPOSES

FEATURES

- Immediate start and re-start - no warm-up time required.
- Full light output is obtained immediately.
- Colour temperature and efficacy remain constant throughout working life.
- Small diameter simplifies the design of efficient reflector systems.
- High efficacy.
- Spectral characteristics approximate to daylight; the lamps are suitable for both colour and black-and-white reproduction.
- 300 hour working life.
- Ozone-free quartz envelopes.

LAMP DATA

Cat. No.	Lamp Watts	Lamp Volts	Lamp Current (A)	Luminous efficiency lm/W	Colour temp. °K	Pulse frequency c/s	Light depreciation %	Packing quantity
XOP 7*	750	52 ± 3	18	20-25 ¹	5600	100-120	approx. 20 ²	6
XOP 15*	1500	105 ± 5	18					6
XOP 25*	2000	115 ± 5	18					6
XOP 30*	3000	210 ± 10	18					6
XOP 40*	4000	210 ± 10	19					4
XOP 80*	8000	420 ± 15	19					4

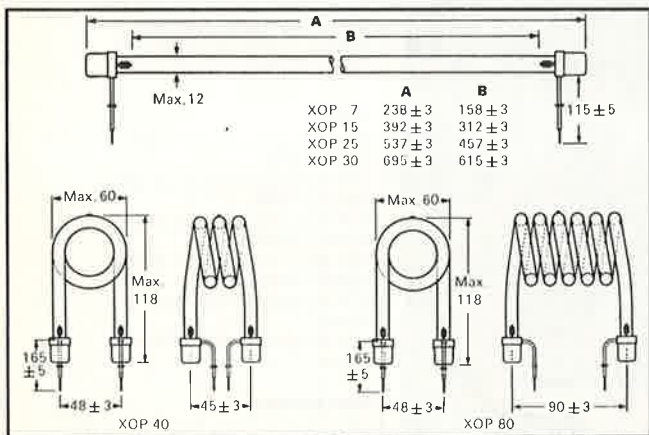
*Max temp. tube 750°C, Pinches 400°C, Av. life hours 300

ORDERING DATA

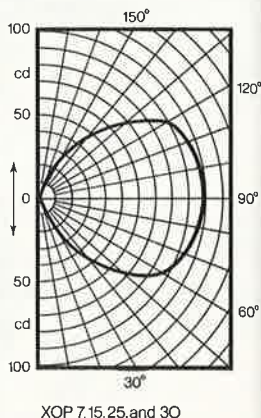
Please order lamps in the form given in the following example, in multiples of the packing quantity:

18 Philips xenon lamps XOP 25

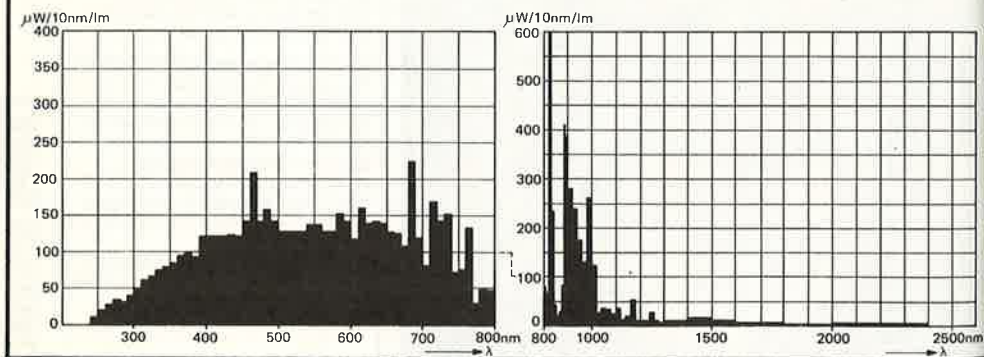
DIMENSIONS



RELATIVE LUMINOUS INTENSITY DISTRIBUTION (without reflector)



ABSOLUTE SPECTRAL ENERGY DISTRIBUTION



Made in Holland



CSX

Xenon projection lamps

A range of ozone-free compact-source xenon lamps with excellent colour rendering and high light output combined with high efficacy.

RANGE

Horizontal burning

CSX 500W-HC-OF
CSX 500W-H-OF
CSX 700W-HSC-OF
CSX 1000W-HSC-OF
CSX 1600W-HSC-OF
CSX 1600W-HSC-I-OF
CSX 700W-HS-OF
CSX 1000W-HS-OF
CSX 1600W-HS-OF
CSX 2000W-HC-OF
CSX 3000W-HC-OF
CSX 2000W-HTP-OF
CSX 2500W-HC-OF
CSX 3000W-HTP-OF
CSX 4000W-HTP-OF
CSX 4000W-HSC-OF

Vertical burning

CSX 75W-2 OF
CSX 150W-1 OF
CSX 150W-1 AS-OF
CSX 450W-OF
CSX 900W-OF
CSX 1600W-OF
CSX 2500W-OF
CSX 6500W-OF

APPLICATIONS

- Professional cinema projection
- Optical systems
- Fading tests

LAMPS SPECIAL PURPOSES

12

To reorder this Data sheet quote

PL 3054

Issued 1 84

NEW

CSX-LAMPS SPECIAL PURPOSES

FEATURES

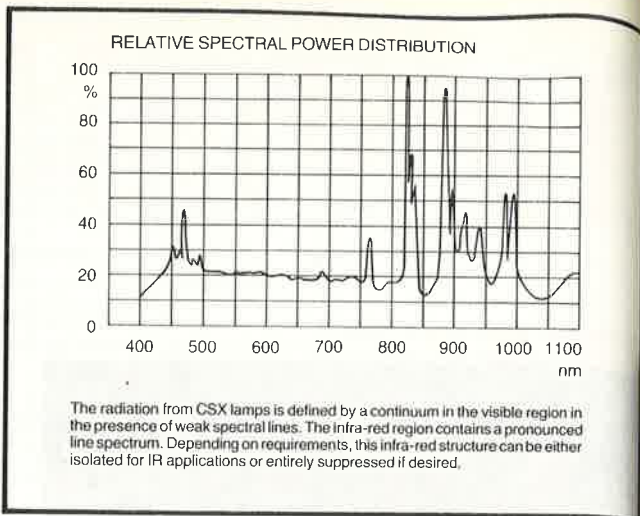
- Ozone-free quartz glass envelopes.
- Small source permits high optical efficiency.
- Good colour rendering combined with high efficacy.

CONTROL GEAR

Supplied by equipment manufacturers – details on request.

ORDERING DATA

Please order lamps by Catalogue Number in the form given in the following example, in multiples of the packing quantity:- 3 Philips xenon projector lamps CSX 1600W-HSC-OF



The radiation from CSX lamps is defined by a continuum in the visible region in the presence of weak spectral lines. The infra-red region contains a pronounced line spectrum. Depending on requirements, this infra-red structure can be either isolated for IR applications or entirely suppressed if desired.

LAMP DATA

Catalogue No.	Fig.	Wattage W	Supply Voltage V(DC)	Luminous flux lm	Arc length mm	Length mm	Packing Qty.
Vertical burning							
CSX 75W-2 OF	1	75	50	1000	0.6	90	4
CSX 150W-1 OF	—	150	65	3000	2.2	150	4
CSX 150W-1 AS-OF	—	150	65	2900	1.9	150	4
CSX 450W-OF	2	450	70	12000	2.4	250	1
CSX 900W-OF	2	900	70	30000	3.3	325	1
CSX 1600W-OF	2	1600	70	60000	4.2	370	1
CSX 2500W-OF	3	2500	85	100000	6.0	428	1
CSX 6500W-OF	4	6500	110	325000	9.0	482	1
Horizontal burning							
CSX 500W-HC-OF	5	500	65	14500	2.5	170	1
CSX 500W-H-OF	—	500	65	14500	2.5	190	1
CSX 700W-HSC-OF	6	700	70	20000	2.9	233	1
CSX 1000W-HSC-OF	6	1000	70	33000	2.8	233	1
CSX 1600W-HSC-OF	6	1600	70	60000	3.3	233	1
CSX 1600-HSC-I-OF	—	1600	65	60000	3.3	236	1
CSX 700W-HS-OF	—	700	70	20000	2.9	233	1
CSX 1000W-HS-OF	—	1000	70	33000	2.8	233	1
CSX 1600W-HS-OF	—	1600	70	60000	3.3	233	1
CSX 2000W-HC-OF	7	2000	85	80000	4.5	365	1
CSX 3000W-HC-OF	7	3000	85	130000	5.5	428	1
CSX 2000W-HTP-OF	—	2000	85	80000	4.5	365	1
CSX 2500W-HC-OF	8	2500	85	100000	4.5	340	1
CSX 3000W-HTP-OF	—	3000	85	130000	5.5	400	1
CSX 4000W-HTP-OF	—	4000	100	180000	6.0	423	1
CSX 4000W-HSC-OF	8	4000	100	180000	6.0	408	1



HPR 125W

Mercury Discharge Reprographic Lamp

A lamp with an internal reflector, producing a bluish-white light with strong actinic radiation.

RANGE

HPR 125W: Mercury discharge reprographic lamp.

APPLICATIONS

High actinic content of beam makes the lamp particularly suitable for use in equipment for black-and-white copying and reproduction.

Used with a separate Woods glass filter, the lamp can be used as a 'black light' source, the internal reflector ensuring a homogeneous beam of radiation.

The lamp also has applications as a floodlight lamp.

Suitable applications include:

- Reprographic industry – particularly for copy board lighting.
- Silk screen processing.

Caution: These lamps emit UV radiation.

Precautions must be taken in the design of process installations to avoid exposure for operatives and users (especially to skin and eyes).*

All equipment manufacturers incorporating this lamp should provide instructions to users with warnings for avoidance or limitation of UV exposure as appropriate.

Users of UV equipment should carefully observe instructions for use provided by equipment manufacturers.

LAMPS SPECIAL PURPOSES

12

To reorder this data sheet quote

PL 1836/1

Issued 6/84

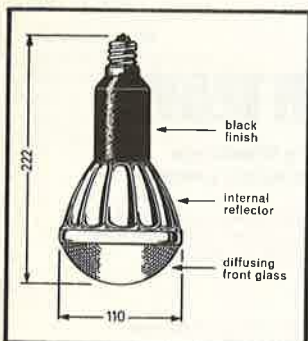
Replaces PL 1836

HPR 125W – LAMPS SPECIAL PURPOSES

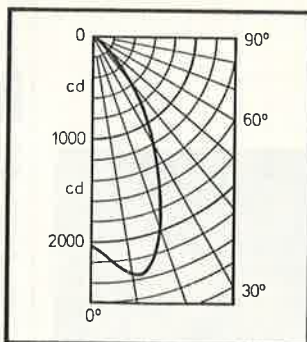
FEATURES

- High output coupled with long life reduces installation and running costs.
- Simply installed into standard ES lampholder; runs from normal mercury discharge control gear.

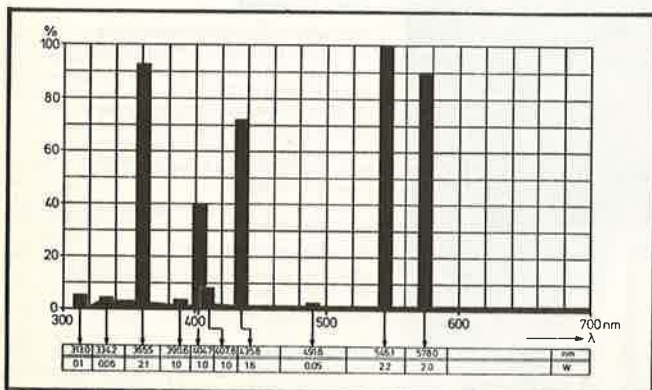
DIMENSIONS



LIGHT DISTRIBUTION DIAGRAMS



RELATIVE SPECTRAL ENERGY DISTRIBUTION



LAMP DATA

Catalogue No.	Minimum Start Volts	Lamp Volts	Lamp Current Amps	Light/energy depreciation (%)*	Cap	Burning position	Ballast	P.F.C. capacitor	Life (hrs)	Packing quantity
HPR 125W	180	125	1.15	20	ES	Any	BHL25	L4008	2000	16

*The percentage by which the radiation decreases with respect to the nominal value, after 2000 hours.

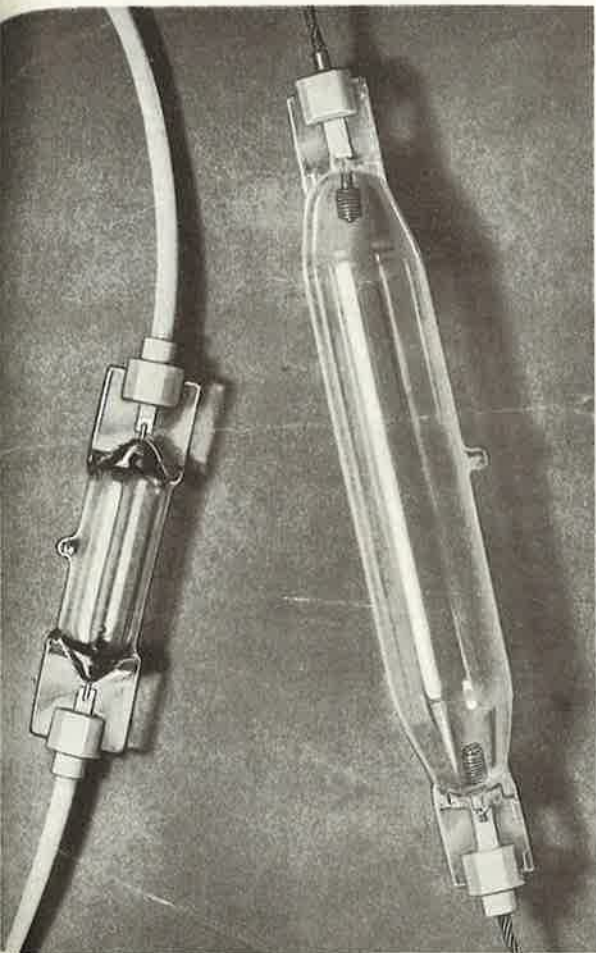
Weight: 200 g.

ORDERING DATA

Please order lamps in the form given in the following example, in multiples of the packing quantity:

32 Philips reprographic lamps
HPR 125W

Made in Holland.



HPM12, HPM13, HPM15, HPM17

Metal halide printing lamps

A range of high-pressure mercury discharge lamps with lead and gallium iodide additives to produce an activation wavelength between 320 nm and 440 nm.

RANGE

HPAB: 400W rating.
HPM 12: 400W rating.
HPM 13: 1000W rating.
HPM 15: 1000–4000W rating.
HPM 17: 1000–4000W rating.

APPLICATIONS

Suitable for any application requiring an activation wavelength between 320 nm and 440 nm, including:

- Photochemical processes
- Plate-making for lithographic printing
- Exposure of photo-resists for chemical milling and printed circuit etching

Caution: These lamps emit UV radiation.

Precautions must be taken in the design of process installations to avoid exposure for operatives and users (especially to skin and eyes).*

All equipment manufacturers incorporating this lamp should provide instructions to users with warnings for avoidance or limitation of UV exposure as appropriate.

Users of UV equipment should carefully observe instructions for use provided by equipment manufacturers.

LAMPS SPECIAL PURPOSES

12

To reorder this Data Sheet quote

PL 1850/3

Issued 7 81

Replaces PL 1850/2

HPM 12, HPM 13, HPM 15, HPM 17 – LAMPS SPECIAL PURPOSES

FEATURES

- Ozone-free quartz glass envelopes
- Short run-up time – only three minutes
- High output coupled with long life reduces installation and running costs

CONTROL GEAR

Supplied by equipment manufacturers—details on request.

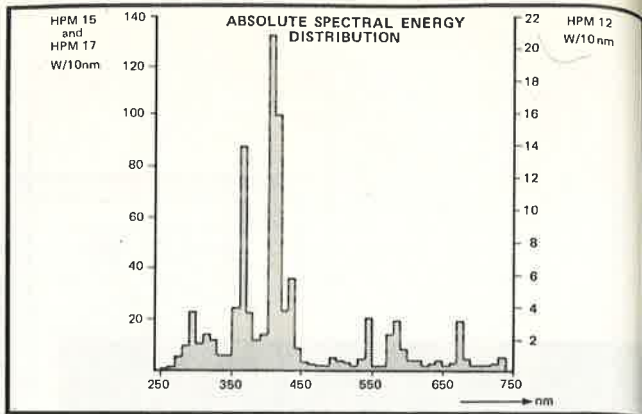
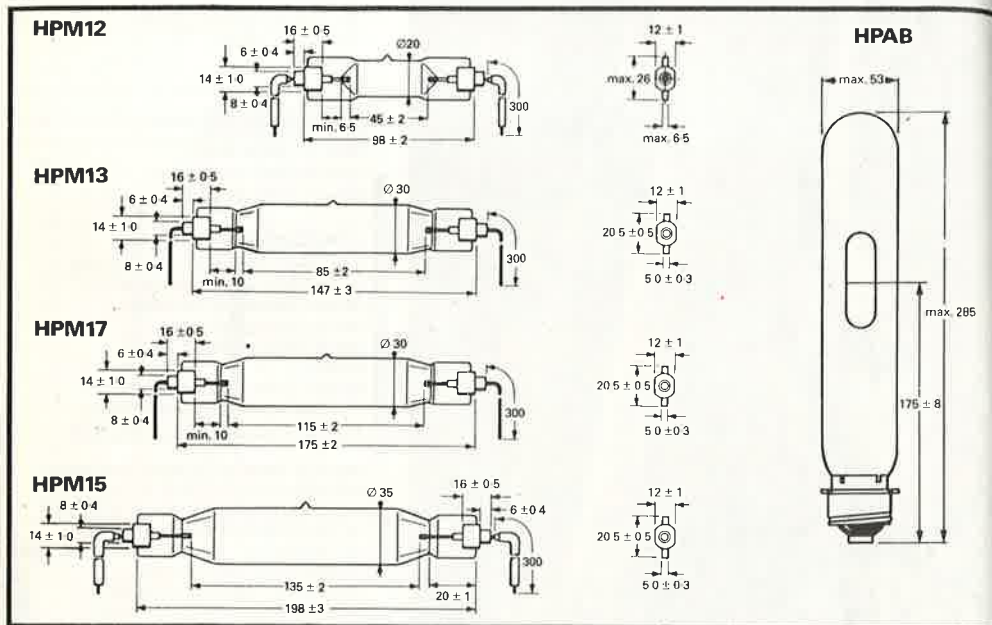
ORDERING DATA

Please order lamps in the form given in the following example, in multiples of the packing quantity:-

4 Philips metal halide lamps HPM 15

Made in Holland.

DIMENSIONS

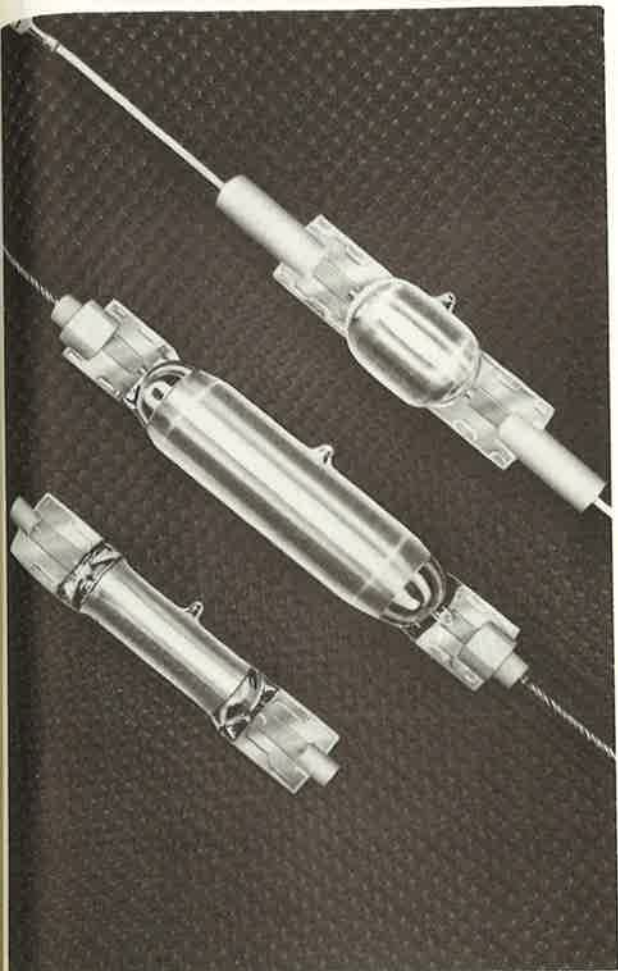


LAMP DATA

Catalogue No.	Lamp Wattage W	Lamp Voltage V	Starting Voltage kV	Run-up time (minutes)	Output between 330 & 440 nm at 1m distance $\mu\text{W}/\text{cm}^2$	Light/energy depreciation (%)*	Average life (H)	Weight g	Packing quantity
HPAB	400	125 ± 10	3	6	620 (400W)	20	1000	230	4
HPM 12	400	120 ± 10	3	3	710 (400W)	30	500	50	4
HPM 13	1000	135 ± 10	1	3	2400 (1kW)	25	750	75	4
HPM 15	1000-4000	240 ± 20**	5	3	4200 (2kW)	15	750	92	4
HPM 17	1000-4000	220 ± 15**	1	3	4500 (2kW)	15	750	82	4

*After 500 hours' burning

**Measured at 2000W



HPA

Metal halide printing lamps

A range of medium-pressure metal halide lamps with iron and cobalt additives to produce an activation wavelength mainly between 300 and 400 nm.

Caution: These lamps emit UV radiation. Precautions must be taken in the design of an installation to prevent harm to personnel, especially to the skin and eyes.

RANGE

Nominal Lamp Wattage

HPA 400: 380 Watt rating.
HPA 1000: 930 Watt rating.
HPA 1000/20: 1100 Watt rating.
HPA 2000: 1750 Watt rating.

APPLICATIONS

Suitable for any application requiring an activation wavelength between 300 and 400 nm, including:

- Photochemical process
- Plate-making for lithographic printing.
- Exposure of photo-resists for chemical milling and printed circuit etchings.
- Solaria (with filters to remove radiation below 315nm).

LAMPS SPECIAL PURPOSES

12

To reorder this Data sheet quote

PL 3053

Issued 1.84

NEW

HPA-LAMPS SPECIAL PURPOSES

FEATURES

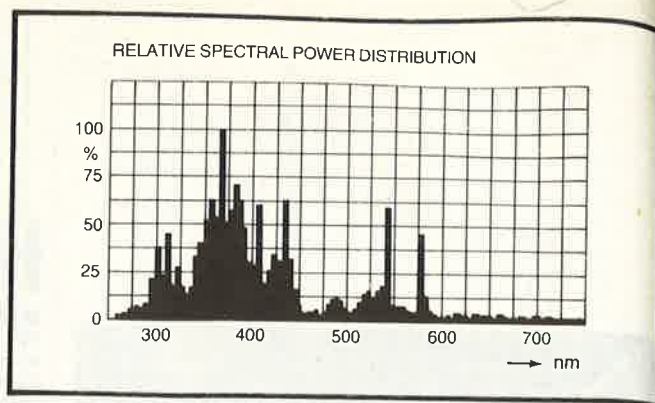
- Ozone-free quartz glass envelopes.
- Safe in use – overpressure is only 0.2 bar.
- High output combined with long life reduces installation and running costs.

CONTROL GEAR

See circuit details.

ORDERING DATA

Please order lamps by Catalogue Number in the form given in the following example, in multiples of the packing quantity:- (lamps are packed in boxes of 4):- 4 Philips Metal halide lamps HPA 2000



LAMP DATA

Catalogue No.	Nominal Lamp Watts W	Lamp Volts V	Lamp Current A	Min. supply voltage	Run-up time (min)	Radiation output $\mu\text{W}/\text{cm}^2$			Radiation depreciation %	Average life (hours)
						UVA	UVB	UVC		
HPA 400	380	135 ± 15	3.3	198	4	750	130	13	30	500
HPA 1000	930	145 ± 15	7.5	198	5	2300	900	230	25	500
HPA 1000/20	1100	120 ± 10	10.5	198	4	2100	—	—	30	750
HPA 2000	1750	265 ± 15	7.8	342	3	4800	1900	450	20	500

Notes

Burning position horizontal $\pm 10^\circ$, preferably with pinches vertical and dimple pointing up.

Life is determined by 5% failures; radiation depreciation is at end of life.

Minimum/maximum bulb temperatures: 750/950°C.

Maximum pinch temperature 350°C.

Radiation output measured at 1m.

Made in Holland

HTQ 7 & HTQ 14

High-pressure mercury discharge lamps

A range of linear lamps of the high-pressure mercury vapour discharge type, with outputs suitable for light-printing applications and for the polymerisation of photo-sensitive additives in polyester lacquers.

RANGE

HTQ 7: Nominal rating 2000W.

HTQ 14: Nominal rating 4000W.

APPLICATIONS

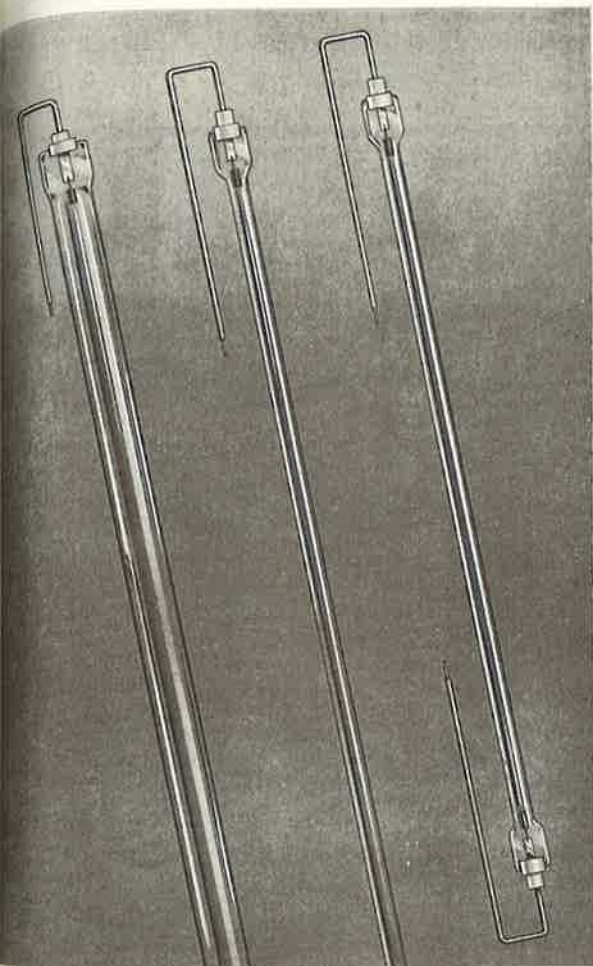
Although originally developed for light-printing purposes, the lamps now find major application in the hardening of synthetic lacquer coatings in considerably shorter times than can be achieved using conventional drying processes.

Caution: These lamps emit UV radiation.

Precautions must be taken in the design of process installations to avoid exposure for operatives and users (especially to skin and eyes).*

All equipment manufacturers incorporating this lamp should provide instructions to users with warnings for avoidance or limitation of UV exposure as appropriate.

Users of UV equipment should carefully observe instructions for use provided by equipment manufacturers.



12

LAMPS SPECIAL PURPOSES

To reorder this Data Sheet quote

PL 1846/2

Issued 6/83

Replaces PL 1846/1

HTQ 7 & HTQ 14 – LAMPS SPECIAL PURPOSES

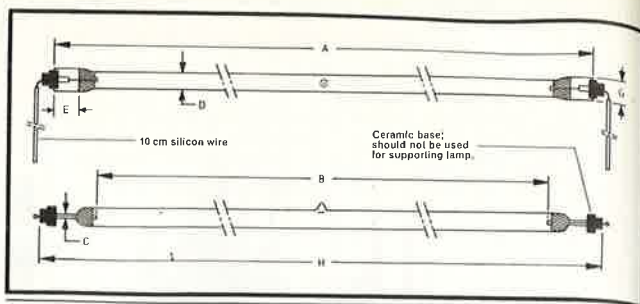
FEATURES

- Lamps do not produce ozone in operation.
- High output coupled with long life reduces installation and running costs.

CONTROL GEAR

Lamp type	Ballast
HTQ 7	139.1095 (2 off)
HTQ 14	139.1095 (4 off)

DIMENSIONS



Type	A	B	C (max)	D	E	G	H
HTQ 7	755 ± 2	700 ± 2	3.4	12.5 ± 1	18 ± 1	15 ± 1	762.5 ± 3
HTQ 14	1460 ± 2	1400 ± 2	4.0	24 max	17 ± 1	23 ± 1	1485.0 ± 3

All dimensions in mm

WEIGHTS & ELECTRICAL DATA

Catalogue No.	Lamp Wattage (W)	Lamp Voltage (V)	Minimum Starting Voltage (V)	Lamp Starting Current (A)	Lamp Operating Current (A)	Permissible Load (W)	Run-up time (minutes)	Average Life (hours)*	Weight (g)	Burning Position	Packing quantity
HTQ 7	2000	1400 ± 50	1,700	2.4	1.63	1500-2600	5	1000	85	Horizontal	4
HTQ 14	4000	1400 ± 50	1,500	4.6	3.35	3000-5000	5	1000	158	Horizontal	4

*At 4 burning hrs. per switching. Max. Pinch Temperature 300°C

ORDERING DATA

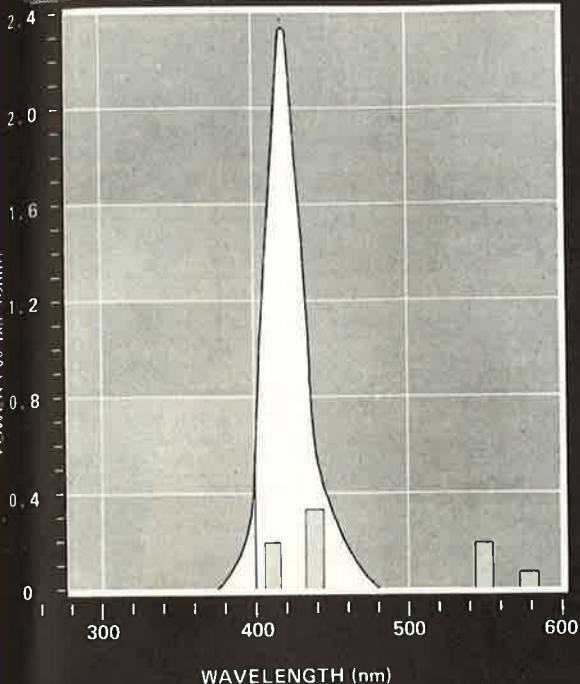
Please order lamps in the form given in the following example, in multiples of the packing quantity:-
12 Philips mercury discharge lamps HTQ 14.

Made in Holland.

PHILIPS



SUPER ACTINIC LAMPS 03



ACTINIC 03

Fluorescent lamps for use as long-wave UV sources

A range of linear fluorescent lamps, identical in dimensions and electrical characteristics to the corresponding standard white lamps, providing highly efficient sources of actinic (long-wave UV and Violet) radiation.

RANGE

TL 20W/03T	- 600mm (2ft)
TLADK 30W/03	- 450mm (18in)
TL 40W/03RS	- 1200mm (4ft)
TLK 40W/03	- 600mm (2ft)
TLM 120W/03RS	- 1500mm (5ft)
TL 140W/03	- 1500mm (5ft)

APPLICATIONS

Applications include:-

- Printing and copying processes
- Lacquer prehardening
- Photochemical processes

Note: The output of Actinic 03 lamps peaks at approximately 420nm.

Details of Actinic 05 and Actinic 09 lamps, which are intended for applications requiring radiation peaking at shorter wavelengths, are given on Data Sheets PL 1830 and PL 1853.

Caution: These lamps emit UV radiation

Precautions must be taken in the design of process installations to avoid exposure for operatives and users (especially to skin and eyes).*

All equipment manufacturers incorporating this lamp should provide instructions to users with warnings for avoidance or limitation of UV exposure as appropriate.

Users of UV equipment should carefully observe instructions for use provided by equipment manufacturers.

LAMPS SPECIAL PURPOSES

12

To reorder this data sheet quote **PL 1829/3**

Issued 6/83

Replaces PL 1829/2

ACTINIC 03 — LAMPS SPECIAL PURPOSES

FEATURES

- Low installation, running and maintenance costs make possible inexpensive apparatus with short run-up times and simple cooling arrangements.
- Spectral power distribution suits spectral sensitivity of most diazo papers used in photo-printing machines.

Temperature dependence

The output of these lamps is at a maximum when the temperature of the coldest part of the glass (usually central, underneath) is 40-50°C. In enclosed machines, it is usually necessary to employ forced-air cooling. This applies especially to the high-loaded lamps TLADK 30W, TLK 40W and 120/140W.

Note:

TL...T lamps — Silicone coated (as MCFE).

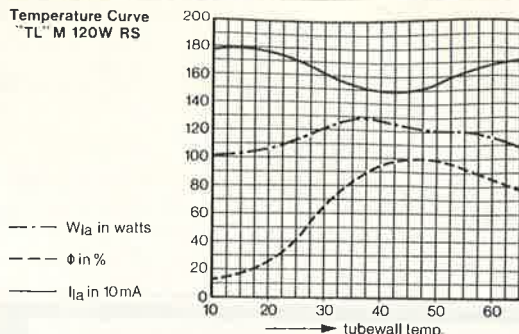
TLADK lamps — with external strip, to be connected to earth.

TL...RS lamps — with 3V electrodes.

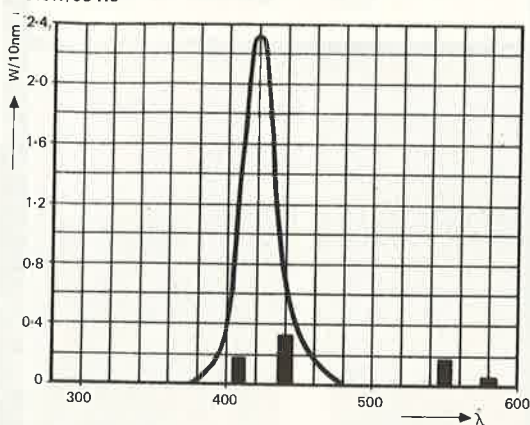
TLM...RS lamp — with 3V electrodes and internally-connected external strip, not to be earthed.



Temperature Curve
"TL" M 120W RS



ABSOLUTE SPECTRAL ENERGY DISTRIBUTION FOR
TL40W/03 RS*



DIMENSIONS & WEIGHTS

Catalogue No.	Dimension L (mm) max.	Diameter (mm) nom.	Cap	Weight (g)	Packing quantity
TL 20W/03T	589.8	38	Bi-pin	156	25
TLADK 30W/03	437.4	26	Bi-pin	76	25
TL 40W/03RS	1199.4	38	Bi-pin	292	25
TLK 40W/03	589.8	38	Bi-pin	156	25
TLM 120W/03RS	1500.0	38	Bi-pin	380	25
TL 140W/03	1500.0	38	Bi-pin	402	25

LAMP DATA

Catalogue No.	Lamp Voltage V	Lamp Current A	For circuits	Depreciation (%)*†
TL 20W/03T	57	0.37	Switchstart & 10V XS	15
TLADK 30W/03	44	0.84	Special circuit	30
TL 40W/03RS	103	0.43	Switchstart & 3V XS	15
TLAK 40W/03	47	0.88	Switchstart	30
TLM 120W/03RS	100	1.50	Special circuit	40
TL 140W/03	125	1.40	Special circuit	40

*Measured after 2000 hours' operation, compared with output at 100 hours.

All data are averages, measured under standard conditions.

Conventional lamp circuits are shown on Data Sheet PL 1830.

*W/10nm applies to TL 40W/03RS, and must be multiplied by the following factors for the other lamp types:-

Catalogue No.	Factor
TL 20W/03T	0.4
TLADK 30W/03	0.45
TLK 40W/03	0.6
TLM 120W/03RS	2.2
TL 140W/03	2.5

ORDERING DATA

Please order lamps in the form given in the following example, in multiples of the packing quantity:-

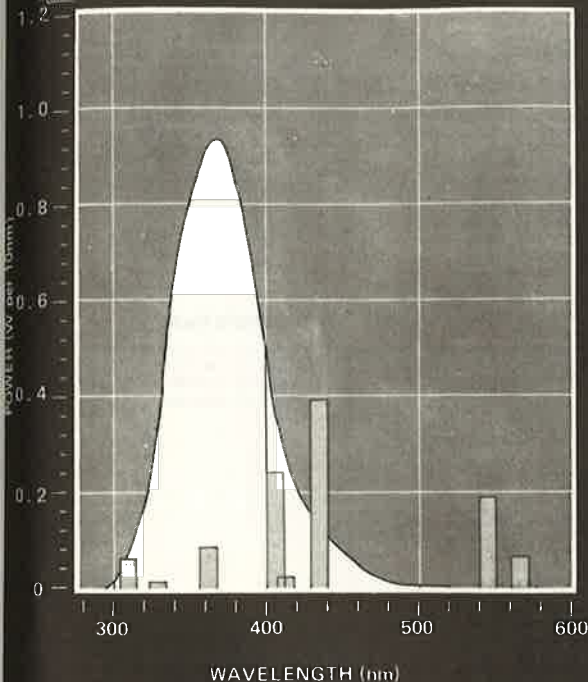
50 Philips fluorescent lamps
TL 40W/03RS

Made in Holland.

PHILIPS



ACTINIC LAMPS 05



ACTINIC 05

Fluorescent lamps with long-wave UVA output

A range of linear fluorescent lamps, identical in dimensions and electrical characteristics to the corresponding standard white lamps, with high efficiency output of actinic (long-wave UVA output) radiation.

RANGE

- TL 6W/05 – 225mm (9in.) mini bi-pin cap.
- TLD 15W/05 – 450mm (18in.) bi-pin cap.
- MCFE 20W/05 – 600mm (2ft) bi-pin cap.
- TLADK 30W/05 – 450mm (18in.) bi-pin cap.
- MCFEK 40W/05 – 600mm (2ft) bi-pin cap.
- MCFE 40W/05 – 1200mm (4ft) bi-pin cap.
- MCFE 65/80W/05 – 1500mm (5ft) bi-pin cap.
- TLM 120W/05RS – 1500mm (5ft) bi-pin cap.

Caution: These lamps emit UV radiation.

Precautions must be taken in the design of process installations to avoid exposure for operatives and users (especially to skin and eyes).

All equipment manufacturers incorporating this lamp should provide instructions to users with warnings for avoidance or limitation of UV exposure as appropriate.

Users of UV equipment should carefully observe instructions for use provided by equipment manufacturers.

Caution:— These lamps emit UV radiation. Precautions must be taken in the design of an installation to avoid harm to personnel, especially to skin and eyes.

LAMPS SPECIAL PURPOSES

12

To reorder this data sheet quote **PL 1830/2**

Issued 7/83

Replaces PL 1830/1

ACTINIC 05 – LAMPS SPECIAL PURPOSES

APPLICATIONS

For applications where a low-cost, linear source of long-wave UV radiation is required, such as:-

- Printing and copying processes
- Lacquer prehardening.
- Insect traps

Note:- The output of Actinic 05 lamps peaks at approximately 370nm. Details of Actinic 03 lamps, which are intended for applications requiring radiation peaking at rather longer wavelengths, are given on Data Sheet PL 1829.

FEATURES

- Low installation, running and maintenance costs make possible inexpensive apparatus with short warm-up times and simple cooling arrangements.
- Identical in dimensions and electrical characteristics to standard white fluorescent lamps; can operate in the same luminaires and on the same control gear.

Note:

- TL and TLD lamps – switchstart circuits only.
- TLADK lamps – with external strip, to be connected to earth.
- TLM...RS lamps – with 3V electrodes and internally-connected external strip, not to be earthed.
- *MCFE lamps – with silicone coat.
- MCFEK – high loaded MCFEK.

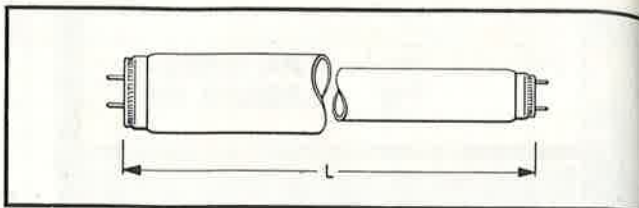
Temperature dependence

The output of these lamps is at a maximum when the temperature of the coldest part of the glass (usually central, underneath) is 40-50°C. In enclosed machines, it is usually necessary to employ forced-air cooling. This applies especially to the high-loaded lamps TLADK 30W, MCFEK 40W 600mm, TLM 120W.

LAMP DATA

Catalogue No.	BS Lamp Voltage V	BS Lamp Current A	For circuits	Depreciation (%)*
TL 6W/05	44	0.16	Switchstart	25
TLD 15W/05	56	0.31	Switchstart	15
MCFE 20W/05	57	0.37	Switchstart & 10V XS	15
TLADK 30W/05	44	0.84	Special circuit	25
MCFE 40W/05 600mm	47	0.88	Switchstart & 10V XS	25
MCFE 40W/05	103	0.43	Switchstart & 10V XS	15
TLS 40W/05	109	0.42	Special circuit	15
MCFE 65/80W/05	110	0.67	Switchstart & 10V XS	20
TLM 120W/05RS	100	1.50	Special circuit	30

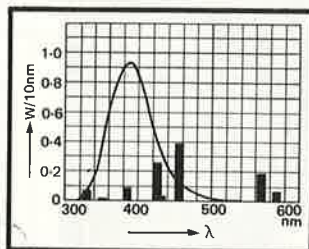
*Measured after 2000 hours' operation, compared with output at 100 hours. All data are averages, measured under standard conditions. Data for MCFE 65/80W/05 measured in 65W circuit. Conventional lamp circuits are shown on Data Sheet PL 1839.



DIMENSIONS & WEIGHTS

Catalogue No.	Dimension L (mm) max	Diameter (mm) nom	Cap	Weight (g)	Packing quantity
TL 6W/05	212	16	Mini bi-pin	22	25
TLD 15W/05	437	26	Bi-pin	76	25
MCFE 20W/05	590	38	Bi-pin	156	25
TLADK 30W/05	437	26	Bi-pin	76	25
MCFEK 40W/05	590	38	Bi-pin	156	25
MCFE 40W/05	1200	38	Bi-pin	292	25
MCFE 65/80W/05	1500	38	Bi-pin	360	25
TLM 120W/05RS	1500	35	Bi-pin	380	25

Absolute spectral energy distribution for MCFE 40W/05*



*W/10nm applies to MCFE 40W/05, and must be multiplied by the following factors for the other lamp types:-

Catalogue No.	Factor
TL 6W/05	0.1
TLD 15W/05	0.3
MCFE 20W/05	0.4
TLADK 30W/05	0.45
MCFEK 40W/05	0.6
MCFE 65/80W/05	1.6 (65W circuit)
TLM 120W/05RS	2.2

ORDERING DATA

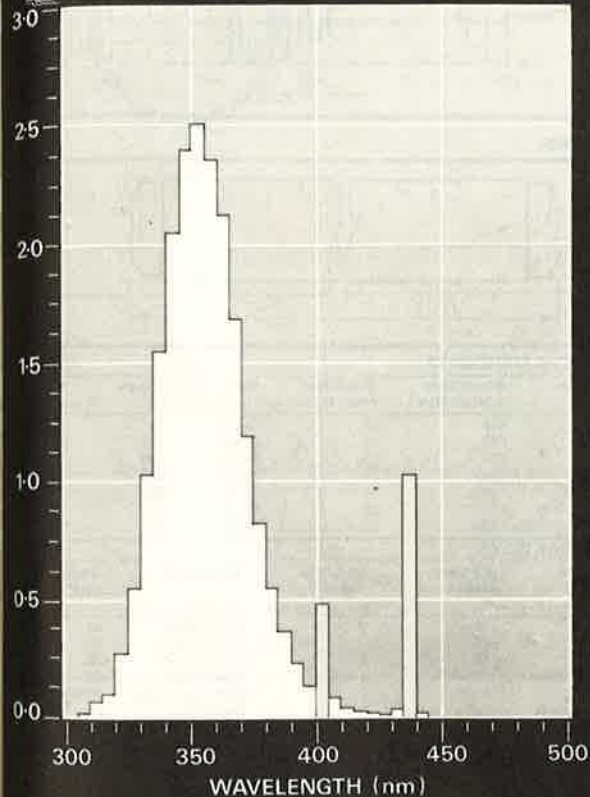
Please order lamps in the form given in the following example, in multiples of the packing quantity:-
50 Philips fluorescent lamps TLADK 30W/05

Made in Holland.

PHILIPS



**ACTINIC LAMPS
09**



ACTINIC 09

Fluorescent lamps with long-wave UVA output

A range of linear fluorescent lamps, identical in dimensions and electrical characteristics to the corresponding standard white lamps, with high efficiency output of actinic (long-wave UVA) radiation.

RANGE

- TLD 15W/09 450mm (18in.)
- TL 20W/09 600mm (2ft)
- TLK 40W/09 600mm (2ft)
- TL 40W/09 1200mm (4ft)
- TL 65/80W/09 1500mm (5ft)
- TL 85W/100W/09N 1800mm (6ft)
- TL 85W/100W/09 Pink 1800mm (6ft).

APPLICATIONS

1. Process Installations

- Printing and photo-copying
- Photochemical processes
- Insect traps

2. Skin Treatment

- Cosmetic UV sun-tanning in Solaria/ Sunbeds.

Caution: These lamps emit UV radiation.

Precautions must be taken in the design of process installations to avoid exposure for operatives and users (especially to skin and eyes).

All equipment manufacturers incorporating this lamp should provide instructions to users with warnings for avoidance or limitation of UV exposure as appropriate.

Users of UV equipment should carefully observe instructions for use provided by equipment manufacturers.

LAMPS SPECIAL PURPOSES

12

To reorder this Data Sheet quote **PL 1853/4**

Issued 7/84

Replaces PL 1853/3

ACTINIC 09 – LAMPS SPECIAL PURPOSES

FEATURES

- High efficiency, low running costs.
- Operate on standard switch start fluorescent control gear.
- Short run-up times and simple cooling arrangements.

Note:—

TL TLD and TLK lamps – for switchstart circuits only.

Temperature dependence

The output of these lamps is at a maximum when the temperature of the coldest part of the glass (usually central, underneath) is 40–50°C. In enclosed equipment, it is usually necessary to employ forced-air cooling.

Note:—

The output of Actinic 09 lamps peaks at about 355 nm. UVB content is less than 0.5% of UVA output.

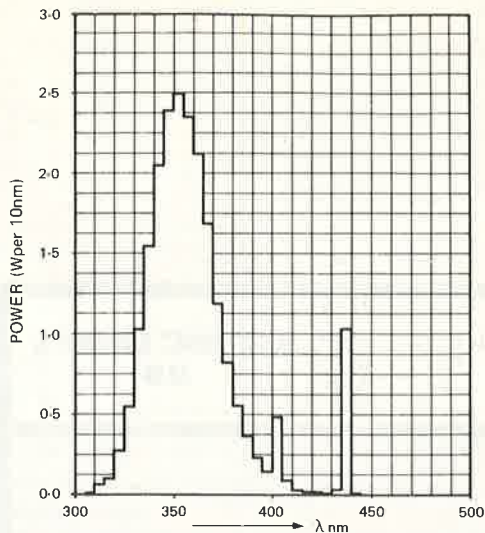
ORDERING DETAILS

Please order lamps in the form given in the following example, in multiples of the packing quantity:—
50 Philips fluorescent lamps
TL 20W/09.

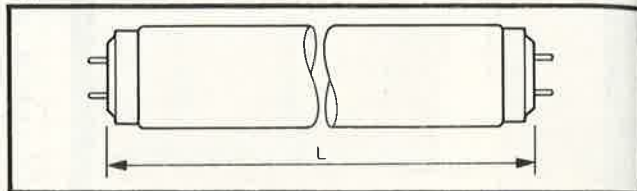
+W/10 nm applies to TL 40W/09 and the following factors should be applied for other ratings.

Catalogue No.	Factor
TLD 15W/09	0.25
TL 20W/09	0.4
TLK 40W/09	0.6
TL 40W/09	1.0
TL 65/80W/09	1.9
TL 85/100W/09N	2.2
TL 85/100W/09 Pink	2.2

ABSOLUTE SPECTRAL POWER DISTRIBUTION
FOR TL 40W/09 †



DIMENSIONS



DIMENSIONS & WEIGHTS

Catalogue No.	Dimension L (mm) Max	Diameter (mm) Nom	Cap	Weight (g)	Packing quantity
TLD 15W/09	437	26	Bi-pin	76	25
TL 20W/09	590	38	Bi-pin	156	25
TLK 40W/09	590	38	Bi-pin	156	25
TL 40W/09	1200	38	Bi-pin	292	25
TL 65/80W/09	1500	38	Bi-pin	360	25
TL 85/100W/09N	1764	38	Bi-pin	451	12
TL 85/100W/09 Pink	1764	38	Bi-pin	451	12

ELECTRICAL DATA

Catalogue No.	BS Lamp Voltage V	BS Lamp Current A	For circuits	Depreciation (%)*
TLD 15W/09	56	0.31	Switchstart	30
TL 20W/09	57	0.37	Switchstart	25
TLK 40W/09	47	0.88	Switchstart	30
TL 40W/09	103	0.43	Switchstart	25
TL 65/80W/09	110	0.67	Switchstart	30/35
TL 85/100W/09N	120	0.80	Switchstart	30
TL 85/100W/09 Pink	120	0.80	Switchstart	30

*Measured after 2000 hours' operation, compared with output at 100 hours.

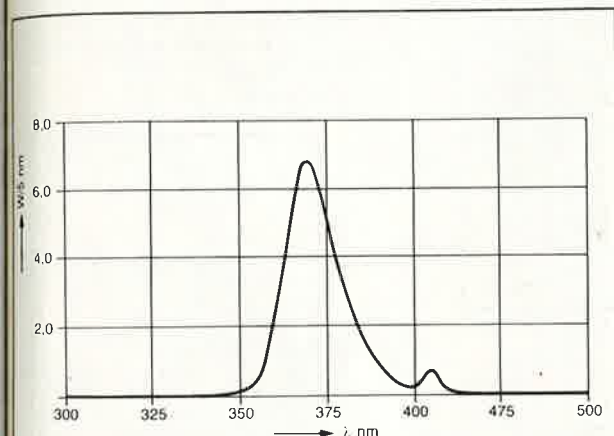
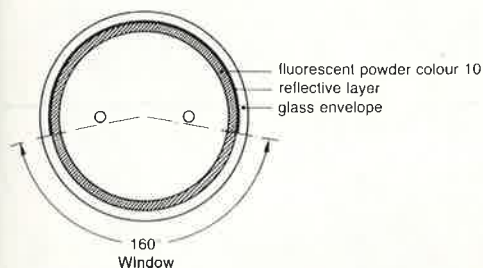
All data are averages, measured under standard conditions.

Data for TL 65/80W/09 measured in 65W circuit, and for TL 85/100W/09N in 85W circuit.

Conventional lamp circuits are shown on Data Sheet PL 1839.

Made in Holland.

Cross section through Reflector Lamp



Spectral energy distribution

R-UVA

Fluorescent reflector lamps with long-wave UVA output

A range of linear fluorescent cosmetic UVA reflector lamps, primarily for cosmetic UV sun-tanning. The lamps combine high UVA efficiency with a UVB content less than 0.1 per cent.

RANGE

TLK 40W/10R – 600mm (2ft) bi-pin cap.
TL 80W/10R – 1500mm (5ft) bi-pin cap.
TL 100W/10R – 1800mm (6ft) bi-pin cap.

APPLICATIONS

Skin treatment, especially cosmetic UV sun-tanning in sunbeds and canopies.

Caution: These lamps emit UV radiation. All equipment manufacturers incorporating these lamps should provide instructions to users with warnings for limitation of UV exposure. Users of UV equipment should carefully observe instructions for use provided by equipment manufacturers.

To reorder this Data Sheet quote

PL 3060

Issued 7/84

New

R-UVA – LAMPS SPECIAL PURPOSES

FEATURES

- New Actinic 10 phosphor with integral reflector increases UVA output by up to 40% compared with equivalent Actinic 09 lamp/reflector combination for high-speed tanning.

- Actinic 10 phosphor and lamp glass combination reduces UVB erythema-producing wavelengths to below 0.1% of UV output, for even safer tanning.

- Integral reflector eliminates external reflector, simplifying construction of sunbeds and eliminating loss of efficiency due to reflector deterioration.

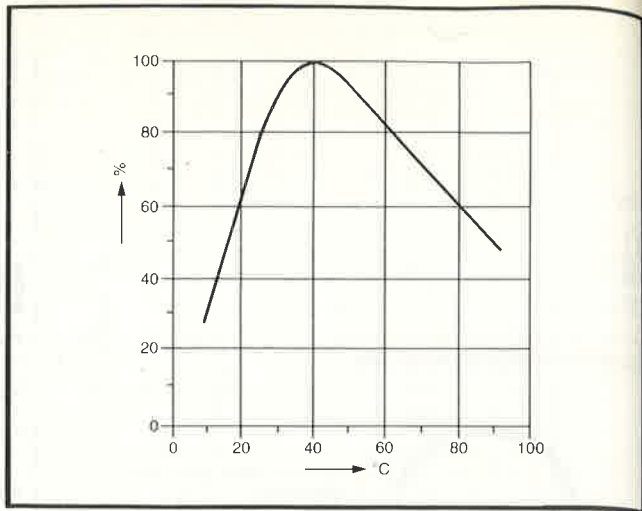
- Elimination of external reflector permits lamps to be mounted closer together; up to 40% more lamps can be accommodated; tanning times can be halved.

- Stable Actinic 10 phosphor reduces UVA depreciation to 20% (between 100 hours and 1,000 hours); thereby extending useful life.

- Available in standard lengths and ratings, to operate in standard switchstart control gear.

Temperature dependence

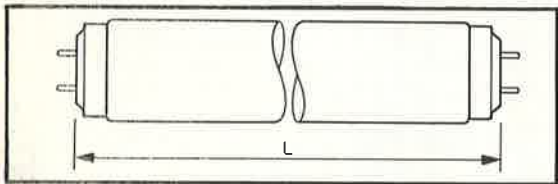
The output of these lamps is at a maximum when the temperature of the coldest part of the glass (usually central, underneath) is 40°C. In enclosed equipment, it is usually necessary to employ forced-air cooling. Existing sunbed designs modified to take an increased number of R-UVA lamps may require additional cooling.



Radiant flux as a function of the tube-wall temperature of the lamp.

DIMENSIONS & WEIGHTS

Catalogue No.	Dimension L mm Max.	Diameter mm Nom.	Cap	Weight g	Packing quantity
TLK 40W/10R	590	38	Bi-pin	156	25
TL 80W/10R	1500	38	Bi-pin	380	25
TL 100W/10R	1764	38	Bi-pin	453	25



ELECTRICAL DATA

Catalogue No.	Nom. lamp voltage V	Nom. lamp current A	Circuit	Depreciation %*
TLK 40W/10R	50	0.88	Switchstart	15
TL 80W/10R	114	0.80	Switchstart	20
TL 100W/10R	128	0.95	Switchstart	20

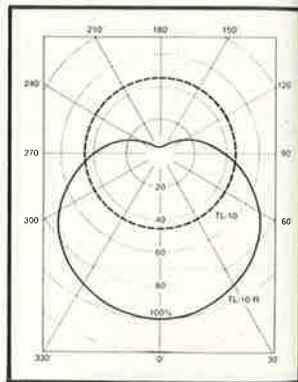
*Measured after 1,000 hours' operation, compared with output at 100 hours. All data are averages, measured under standard conditions.

Note: -

Power (W/5nm) applies to TL 100W/10R lamp. The following factors should be applied for other ratings: -

TLK 40W/10R - 0.30

TL 80W/10R - 0.87





LL

Spectral lamps

A range of light sources with identical dimensions and interchangeable electrical characteristics, for producing monochromatic lines of known wavelength for physical and chemical research.

RANGE

Twenty-five lamps, containing high-purity gases or vapour as follows:

Glass envelopes

Hg (low pressure)	A
Hg (high pressure)	Kr
Cd	Xe
Zn	Na
Hg, Cd, Zn	Rb
He	Cs
Ne	K

Quartz envelopes

In	*Hg, Cd, Zn
Tl	*In
Ga	*Tl
*Hg (low pressure)	*Ga
*Hg (high pressure)	
*Cd	
*Zn	

*These lamps are primarily intended for producing ultra-violet spectra.

APPLICATIONS

- Biology
- Chemistry
- Interferometry
- Polarimetry
- Spectroscopy

Caution: Certain lamps emit UV radiation and some may generate ozone.

Precautions must be taken in the design of process installations to avoid exposure for operatives and users (especially to skin and eyes).*

All equipment manufacturers incorporating this lamp should provide instructions to users with warnings for avoidance or limitation of UV exposure as appropriate.

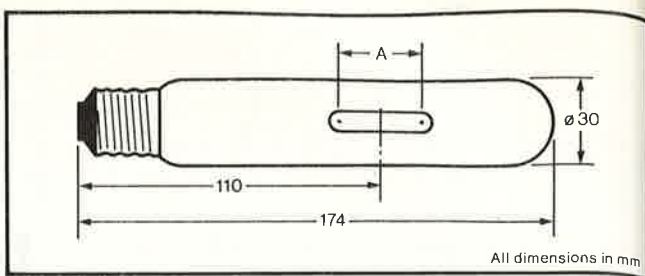
Users of UV equipment should carefully observe instructions for use provided by equipment manufacturers.

LL SPECTRAL – LAMPS SPECIAL PURPOSES

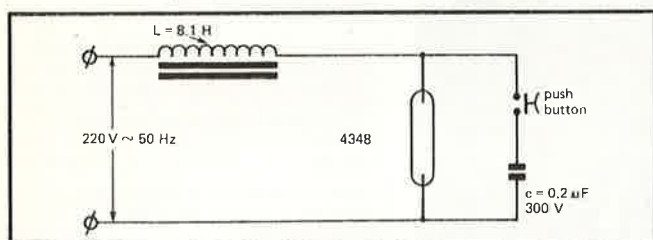
FEATURES

- Combination of ultra-pure gas/vapour filling and electrodes that permit a very high current density produce light sources capable of emitting high energy in a single line, or in a few lines.
- Lamps are physically identical and electrically interchangeable to permit comparative tests.
- Lamps with quartz discharge tubes and outer envelopes permit UV investigations.
- All lamps are fitted with standard ES cap.

DIMENSIONS



CIRCUIT DIAGRAM



LAMP DATA

Catalogue No.	Gas or vapour filling	Outer bulb	Wattage W	Useful arc length A (mm)	Main use
93123	Hg (low pressure)	Glass	12	38	1
93136	Hg (high pressure)	Glass	90	25	1
93162	Cd	Glass	16	24	1
103137	Zn	Glass	16	24	1
93145	Hg, Cd, Zn	Glass	75	24	1
93098	He	Glass	60	32	1
93099	Ne	Glass	20	27	1
93100	A	Glass	16	27	1
93101	Kr	Glass	11	27	1
93102	Xe	Glass	07	27	1
93122	Na	Glass	14	19	1
93104	Rb	Glass	08	33	1
93105	Cs	Glass	08	33	1
93103	K	Glass	10	33	1
103778	In	Quartz	25	25	2
126162	Tl	Quartz	20	30	2
126121	Ga	Quartz	20	30	2
93109	Hg (low pressure)	Quartz	12	40	3
93110	Hg (high pressure)	Quartz	90	25	3
93107	Cd	Quartz	16	24	3
93106	Zn	Quartz	16	24	3
93146	Hg, Cd, Zn	Quartz	75	24	3
103778	In	Quartz	25	25	3
126162	Tl	Quartz	20	25	3
126121	Ga	Quartz	20	20	3

Main uses

- 1- Primarily for investigations of visible spectra.
- 2- For investigations of visible and UV spectra.
- 3- Primarily for investigations of UV spectra.

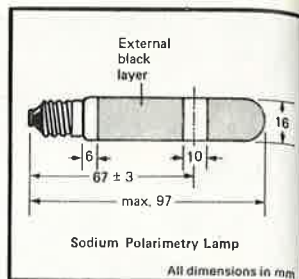
Common characteristics

- Cap: - ES
 Lamp current: - approx. 0.9A
 Weight: - 60 g
 Burning position: - Any

SODIUM POLARIMETRY LAMP

Type No.	Minimum supply voltage V	Lamp voltage V	Lamp current mA	Average life H*	Base
4348	200	50	82	100	MES

* On an average of 1 burning hour per switching.



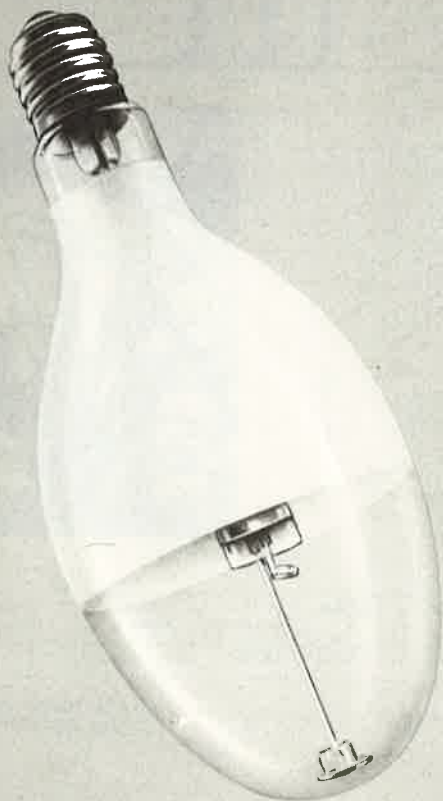
ORDERING DATA

Please order lamps in the form given in the following example, in multiples of the packing quantity:

4 Philips spectral lamps 93104

Packing quantity for all lamps: 4

Made in Holland.



HLRG 400W

Horticultural lamp

A mercury fluorescent lamp with internal reflector to concentrate the light on the plants, and spectral characteristics chosen to promote plant growth.

RANGE

HLRG 400W: Mercury fluorescent horticultural lamp.

APPLICATIONS

Suitable for use wherever a high-output lamp with good spectral characteristics is required to promote plant growth.

FEATURES

- High output coupled with long life reduces installation and running costs.
- Fluorescent coating increases radiation in the red portion of the spectrum, thus improving plant growth.
- UV radiation is limited to prevent damage to plants.
- Easily installed to standard GES lampholder; runs in conjunction with normal mercury discharge control gear.

Caution: These lamps emit UV radiation

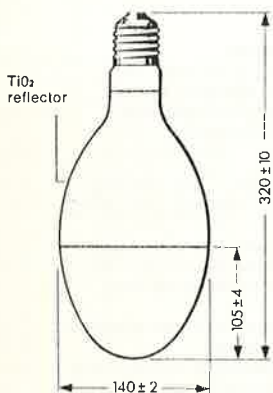
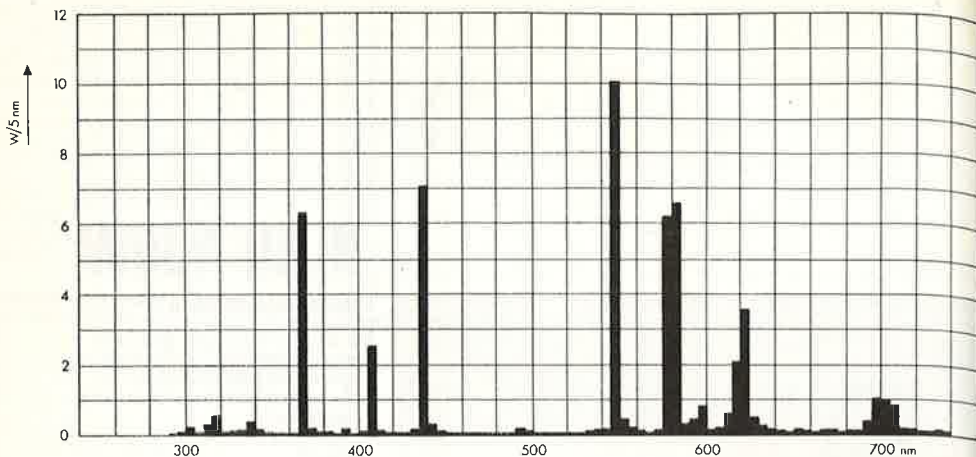
Precautions must be taken in the design of process installations to avoid exposure for operatives and users (especially to skin and eyes).*

All equipment manufacturers incorporating this lamp should provide instructions to users with warnings for avoidance or limitation of UV exposure as appropriate.

Users of UV equipment should carefully observe instructions for use provided by equipment manufacturers.

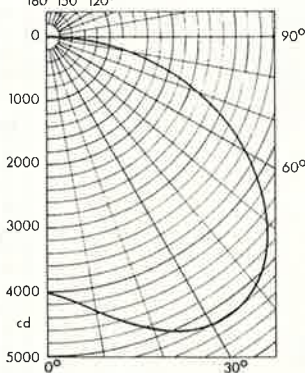
HLRG 400W – LAMPS SPECIAL PURPOSES

ABSOLUTE SPECTRAL ENERGY DISTRIBUTION



LIGHT DISTRIBUTION DIAGRAM

180° 150° 120°



LAMP DATA

Catalogue Number	Luminous flux (Lm)* (1)	Lamp Volts	Lamp Current	Cap	Ballast	PFC Capacitor	Packing Quantity	Depreciation (2)
HLRG 400W	20,000	140 ± 10	3.2	GES	BHL400	L4025	6	15%

Weight:- 380g.

Made in Holland.

(1) After 100 burning hours.
(2) After 5000 burning hours.

ORDERING DATA

Please order lamps in the form given in the following example, in multiples of the packing quantity:-

36 Philips horticultural lamps HLRG 400W.

AUTO LAMPS

Page

Tungsten Auto Bulbs

451

Halogen Auto Bulbs

453

**Please see pages II and III of General
Introduction for information on how to use
this Handbook.**



THE GUILDHALL, YORK

The 100W GLS lamps in the chandeliers in York's beautiful 600-year-old Guildhall have been replaced with SL18 s. The electrical load of the ten 8-lamp fittings has been reduced from 8kW to only 1440 Watts.

TUNGSTEN AUTO BULBS

Lamps for side, tail and auxiliary lighting.

Festoon lamps.

Double-filament (Duplo-D) automobile headlight lamps.

RANGE

Side or tail:— 12V, with wedge or MCC base.

Indicator:— 12V 3W or 1.2W with wedge base.

Auxiliary:— 6V, 12V or 24V, with BA7s or MCC base.

Festoon:— 6V, 12V or 24V, in ratings from 3W to 21W.

Headlight:— 12V 45/40W, Duplo-D, clear or cadmium yellow finish.

APPLICATIONS

For use in all British and European road vehicles fitted with suitable lampholders and headlight reflector systems.



13

LAMPS AUTO

To reorder this data sheet quote

PL 1818/1

Issued 6/83

Replaces PL 1818

TUNGSTEN AUTO BULBS – LAMPS AUTO

FEATURES

■Duplo: Dipped filament shield prevents light from reaching the bottom half of the reflector, giving a sharp cut-off to the top of the beam to improve visibility and reduce dazzle.

■Where appropriate, lamps are 'E' marked, signifying compliance with International Standards and approval for use in new vehicles, and ensuring high standards of performance when used for service replacements.

LAMP DATA

Catalogue No.	Volts*	Watts	Length		Bulb Diameter	Cap	Packing quantity
			A (nominal)	A (max) (mm)			
Side or Tail bulbs							
501	12	5	20.7	10.3	Wedge	10	
12929	12	4	27.4	8.6	MCC	10	
Indicator lamps							
504	12	3	20.7	10.3	Wedge	10	
12516	12	1.2	14.5	5	Wedge	10	
Auxiliary lamps							
282	6	0.6	20.7	6.8	BA7s	10	
281	12	2	20.7	6.8	BA7s	10	
283	24	3	20.7	6.8	BA7s	10	
6913	6	2	23.9	8.6	MCC	10	
12913	12	2	23.9	8.6	MCC	10	
13913	24	2	23.9	8.6	MCC	10	
Festoon lamps							
253	6	5	36	11	Festoon	10	
256	12	3	33	8	Festoon	10	
239	12	5	36	11	Festoon	10	
12854	12	10	36	11	Festoon	10	
265	12	10	41	11	Festoon	10	
267	12	15	41	15.5	Festoon	10	
12807	12	18	41	15.5	Festoon	10	
273	12	21	41	15.5	Festoon	10	
653	24	5	36	11	Festoon	10	

*Design voltages are 6.75, 13.5 and 28V

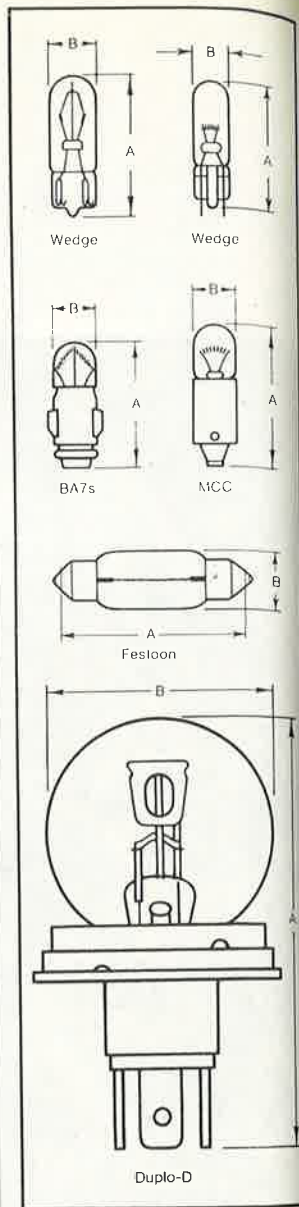
DUPLO-D LAMP DATA

Cat. No.	European No.	Volts	Watts	Length		Bulb Diameter	Cap	Finish	Packing quantity
				A (max) (mm)	B (max) (mm)				
423	6620	6	45/40	82	41.5	P45t	Clear	200	
410	12620	12	45/50	82	41.5	P45t	Clear	200	
411	12620/86	12	45/50	82	41.5	P45t	Cadmium yellow	200	
429	13620	24	55/50	82	41.5	P45t	Clear	200	

Please order lamps in the form given in the following example, in multiples of the packing quantity and quoting the Catalogue No., voltage and wattage of the lamps:—

200 Philips headlight lamps 12V 45/50W, No. 411.

For details of tungsten halogen headlight bulbs, see Data Sheet PL 1820



Drawings not to scale

See packing for country of origin.

HALOGEN AUTOBULBS

Tungsten halogen single and double filament types

Single filament tungsten halogen lamps to provide the main beam in four-headlamp systems, and for use in auxiliary lighting equipment such as spot and fog lamp units.

Double filament tungsten halogen with shielded dip filaments to provide anti-dazzle, sharp cut-off beams.

A miniature lamp for applications where a lower wattage is appropriate.

RANGE

Single filament:- Types H1 (axial filament) and H3 (transverse filament), in 6V 55W, 12V 55W and 24V 70W versions.

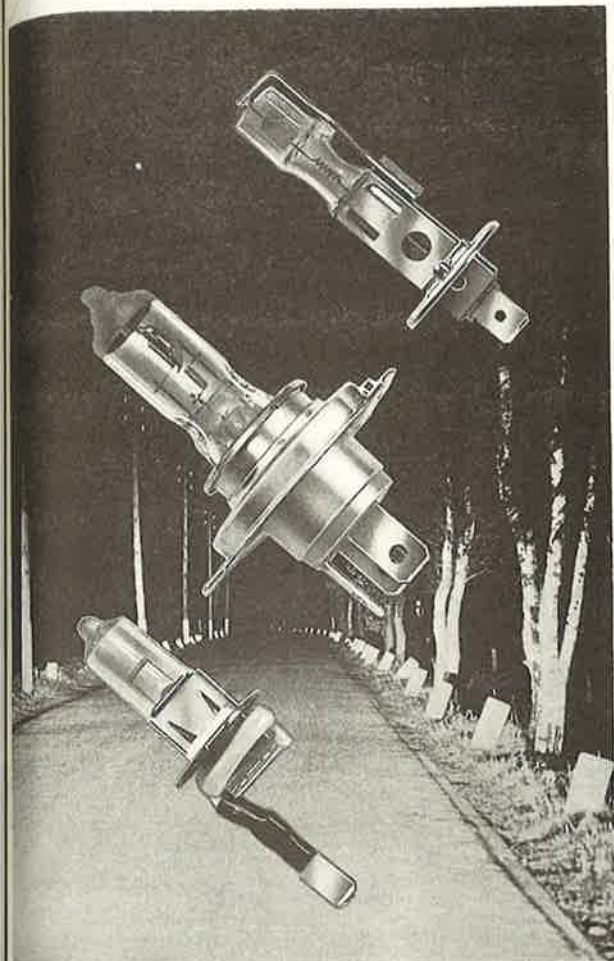
Double filament:- Types H4 12V 60/55W and 24V 75/70W, in clear or cadmium yellow versions.

Miniature:- Type 12452, 12V 20W.

APPLICATIONS

For use in purpose-designed headlight units to bring the advantages of high-intensity tungsten halogen lighting to road vehicles, Type 12452 is suitable for any application where a miniature lamp with relatively high output is appropriate, including:-

- Reversing lights
- Fog rear warning lights
- Inspection lamps
- Mo-ped headlights
- Portable lamps for camping
- Heavy-duty torches
- Instrument illumination in scientific instruments.



To reorder this data sheet quote

PL 1820

Issued 2/78

NEW

13
LAMPS AUTO

HALOGEN AUTO BULBS – LAMPS AUTO

FEATURES

- Tungsten halogen regenerative cycle maintains high light output throughout rated life of lamp.
- Lamps are 'E' marked signifying approval for use in new vehicles, and assuring high standards of performance when used for service replacement purposes.
- Accurately constructed, with precise positioning of the filaments and dip shield, where appropriate, to ensure correct focus and beam control.
- Miniature type provides high levels of illumination with low heating effect.
- All products are of proven reliability.

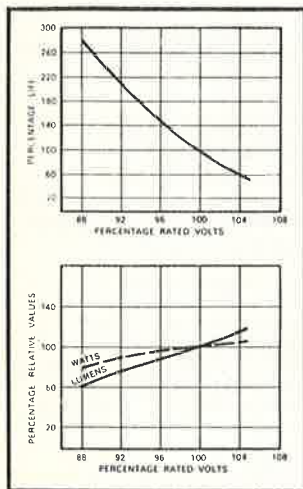
SPECIFICATION

- Manufactured to International and EEC standards.

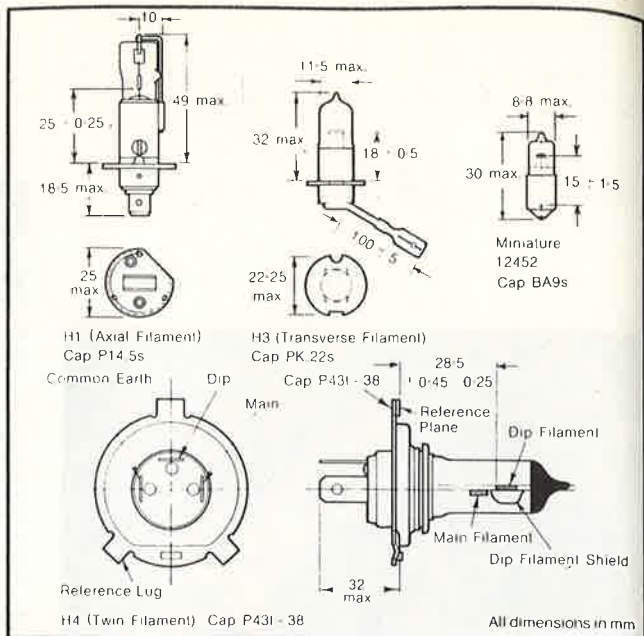
For full specifications see ECE Regulation No. 37.

Miniature type 12452 is not Internationally standardised.

Variation of Electrical and Light Characteristics with Applied Voltage



These curves are based on averages obtained with many lamps, and may be used as an approximate guide to performance. Theoretical values of extended life may not be realised in practice, since factors such as vibration, handling, cleaning and frequency of switching have an appreciable effect on lamp life.



LAMP DATA

International Type	Catalogue No.	Volts	Watts	Cap	Filament axis	Finish	Packing quantity
H1	6258	6	55	P14.5s	Axial	Clear	10
H1	12258	12	55	P14.5s	Axial	Clear	10
H1	13258	24	70	P14.5s	Axial	Clear	10
H3	6336	6	55	PK22s	Transverse	Clear	10
H3	12336	12	55	PK22s	Transverse	Clear	10
H3	13336	24	70	PK22s	Transverse	Clear	10
H4	12342	12	60/55	P43t	Axial	Clear	10
H4	12342/86	12	60/55	P43t	Axial	Cadmium yellow	10
H4	13342	24	75/70	P43t	Axial	Clear	10
H4	13342/86	24	75/70	P43t	Axial	Cadmium yellow	10
—	12452	12	20	BA9s	Transverse	Clear	10

ELECTRICAL CHARACTERISTICS

Type	Catalogue No.	Filament	Test Voltage*	Maximum Wattage*	Nominal luminous flux (lumens)*	Average life (hours)*
H1	6258	—	6.3	63	1350	150
H1	12258	—	13.2	68	1550	150
H1	13258	—	28	84	1900	150
H3	6336	—	6.3	63	1050	150
H3	12336	—	13.2	68	1450	150
H3	13336	—	28	84	1750	150
H4	12342	Dip	13.2	68	1000	200
H4	12342	Main	13.2	75	1650	100
H4	13342	Dip	28	80	1200	200
H4	13342	Main	28	85	1900	100
—	12452	—	13.2	20	400	100

*The test voltages chosen relate to the circuit volts of a lead-acid battery under full charge. Wattage, luminous flux and average life are measured at the test voltage.

HANDLING: If the quartz bulb has been handled, it should be cleaned with a solvent such as methylated spirits to remove traces of grease before lighting.

SEAL TEMPERATURE: Precautions must be taken to ensure that the temperature of the quartz-metal seal does not exceed 350°C, though the bulb temperature must be greater than 250°C.

PHOTOGRAPHIC LAMPS

Photographic and Darkroom Lamps
Projection Lamps
Miscellaneous Projector Lamps
Studio and Theatre Lamps

Page

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**Please see pages II and III of General
Introduction for information on how to use
this Handbook.**

PHOTOGRAPHIC AND DARKROOM LAMPS

Classes P1, P2 and P3

A range of photoflood and photoparl lamps, single- and double-ended tungsten halogen photo lamps, darkroom safelight lamps and high-intensity enlarger lamps for both amateur and professional use.

APPLICATIONS

Class P1 Photoflood:- High light output balanced for 3400K colour cine films and suitable for black and white photography.

Class P1 tungsten halogen:- Maintained high light output balanced for 3400K colour cine films.

Class P2 Photoparl:- Longer life lamps balanced for 3200K colour films and suitable for TV camera lighting.

Class P3 Photocrescenta:- Enlarger lamps for both amateur and professional use.

Darkroom:- Safelight lamps made from dark red or yellow/green coloured glass, for use with orthochromatic film and bromide papers respectively. A simple, plug-in, alternative to more expensive safelight fittings.

FEATURES

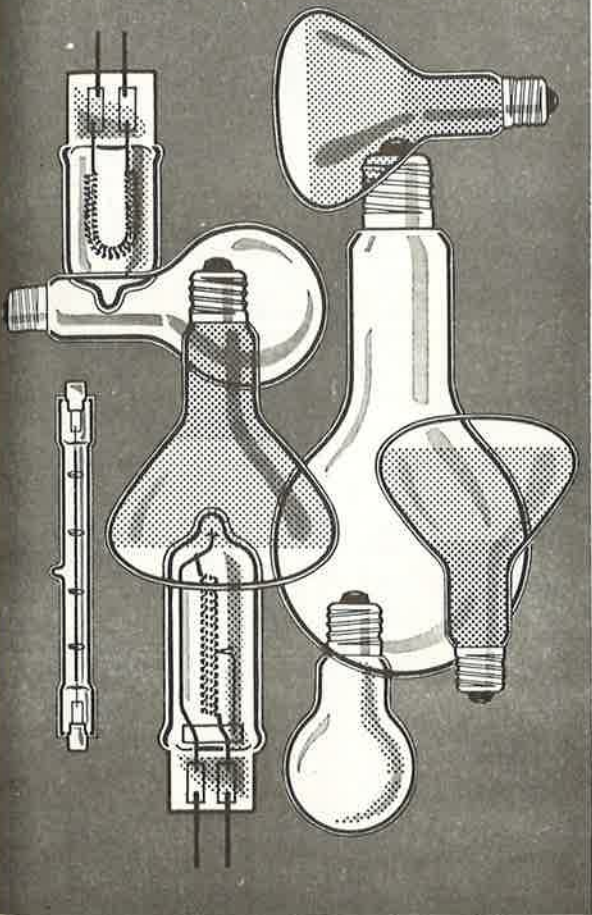
■ Photoflood (Photalita) and Photoparl (Argaphoto) lamps are available in pearl or reflector versions; the latter provide an efficient forward illumination without external reflector housings.

■ Tungsten halogen lamps maintain constant light output throughout their life.

■ The revolutionary PF820 and PF821 halogen lamps for cine and video lights operating with atmospheric pressure internally, to remove the risk of explosion in use.

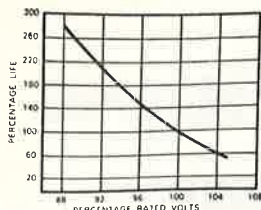
■ Special opalising process for enlarger lamps ensures even illumination on the baseboard.

■ Darkroom lamps give no stray white light, also safe with variable-contrast paper.



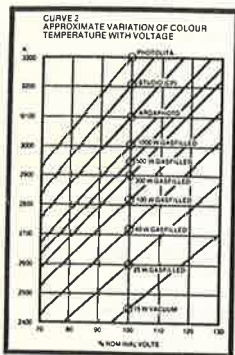
PHOTOGRAPHIC AND DARKROOM LAMPS

PERFORMANCE CHARACTERISTICS



Curve 1 - Variation of life to applied voltage

This is a general lamp curve showing voltage variation from 88-104%; photolamps have high-temperature filaments and must not be over-volted. The curve shows average figures, and indicates that life is considerably dependent on applied voltage. Gross undervolting may not achieve expected results, particularly for halogen lamps, as other factors influence lamp life.



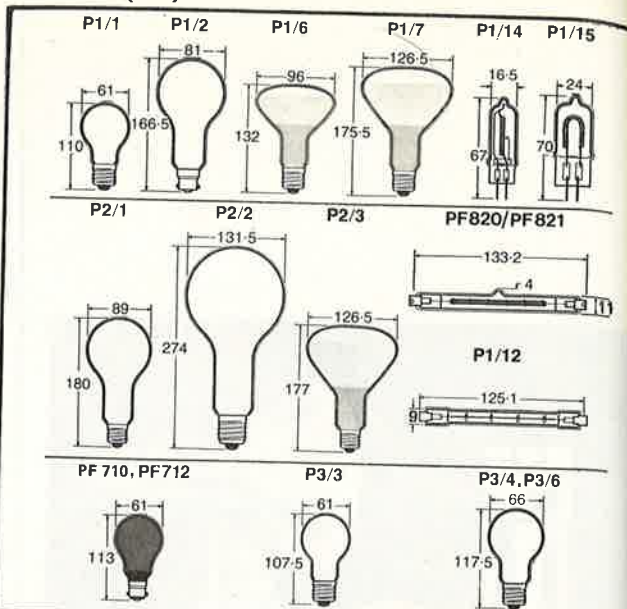
PRODUCT DATA

Type	Catalogue Number	Lamp reference	Watts	Volts	Cap	Film rating K	Finish	Average Life hours	Nominal Light output	Packing quantity
Photoflood (Photolita)	PF207	P1/1	275	240/250	B22d/E27	3400	Pearl	3	8300 lm	25
"	PF208	P1/2	500	240	B22d/E27	3400	Pearl	6	15000 lm	25
"	PF215	P1/6	375	240	E27	3400	Reflector	4	1300*	25
"	PF218	P1/7	500	240	E27	3400	Reflector	6	8000*	9
Photopearl (Argaphoto)	PF308	P2/1	500	240	E27	3200	Pearl	100	11000 lm	32
"	PF210	P2/2	1000	240	E40	3200	Pearl	100	22000 lm	9
"	PF318	P2/3	500	240	E27	3200	Reflector	100	3000*	9
Tungsten halogen †	PF801	P1/12	1000	240/250	R7s	3400	Clear	10	33000 lm	72
"	PF810	P1/14	650	240/250	G6.35	3400	Clear	15	20000 lm	10, 100
"	PF811	P1/15	1000	240/250	G6.35	3400	Clear	15	32000 lm	10, 100
"	PF820	Movie	1000	240/250	R7s	3400	Clear	6	32000 lm	72
"	PF821	Video	500	240/250	R7s	3200	Clear	75	11000 lm	72
Darkroom	PF710	Yellow-green	—	240/250	B22d	—	Yellow-green	—	—	50
Photocrescenta	PF712	Dark red	—	240/250	B22d	—	Dark red	—	—	50
"	PF603	P3/3	75	240	B22d/E27	3200	Opalized	100	1150 lm	50
"	PF605	P3/4	150	240	B22d/E27	3200	Opalized	100	2500 lm	50
"	PF607	P3/6	250	240	B22d/E27	3400	Opalized	3	6500 lm	50

*Light output in centre beam candles.

†For Class P2 Tungsten-halogen lamps see 'Studio & Theatre Lamps', PL 1812.

DIMENSIONS (max)



Curve 2 - Variation of colour temperature with applied voltage

Whilst a nominal colour temperature is quoted for various types, it should be noted that there is a tolerance of $\pm 100K$ for photolamps, and that ordinary lamps are not controlled in this respect.

ORDERING DATA

Please order quoting Catalogue Number and Lamp reference, in multiples of the packing quantity.

NOTES FOR USER

General: Photographic lamp filaments are particularly brittle. Handle gently, and avoid vibration and jolts when alight. Lamps may be operated via dimmers or series/parallel switching while setting-up, to extend useful life.

If using Photoflood 3400K lamps with still colour film balanced for 3200K lighting it is advisable to fit a Kodak 81A filter or equivalent over the camera lens. For daylight colour film fit a Kodak 80B filter.

Lamp P1/1: Made in UK.

Remainder: Made in Holland and Belgium.

PROJECTION LAMPS

Class A1

Lamps held in stock for use in slide and film projectors.

RANGE

Halogen and non-halogen types, tabulated separately in LIF Classification sequence.

APPLICATIONS

For use in slide and film projectors, and for further applications such as:

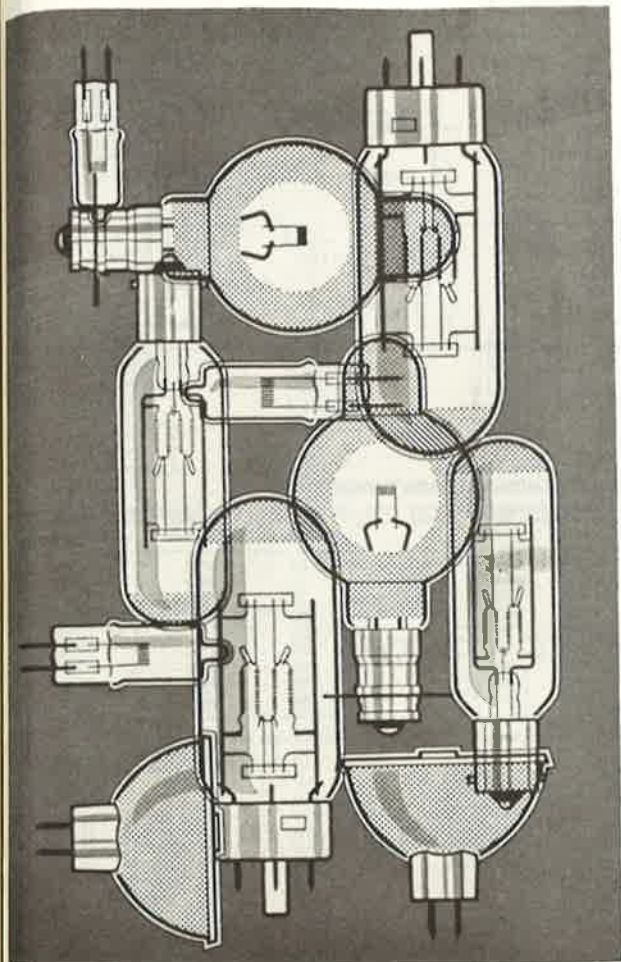
- Overhead projectors
- Microfilm and microfiche readers and copiers
- Medical apparatus
- Fibre optics

FEATURES

- Tungsten halogen lamps give the benefits of increased output and life, small dimensions and high lumen maintenance throughout life.
- Manufactured to a consistently high degree of accuracy.

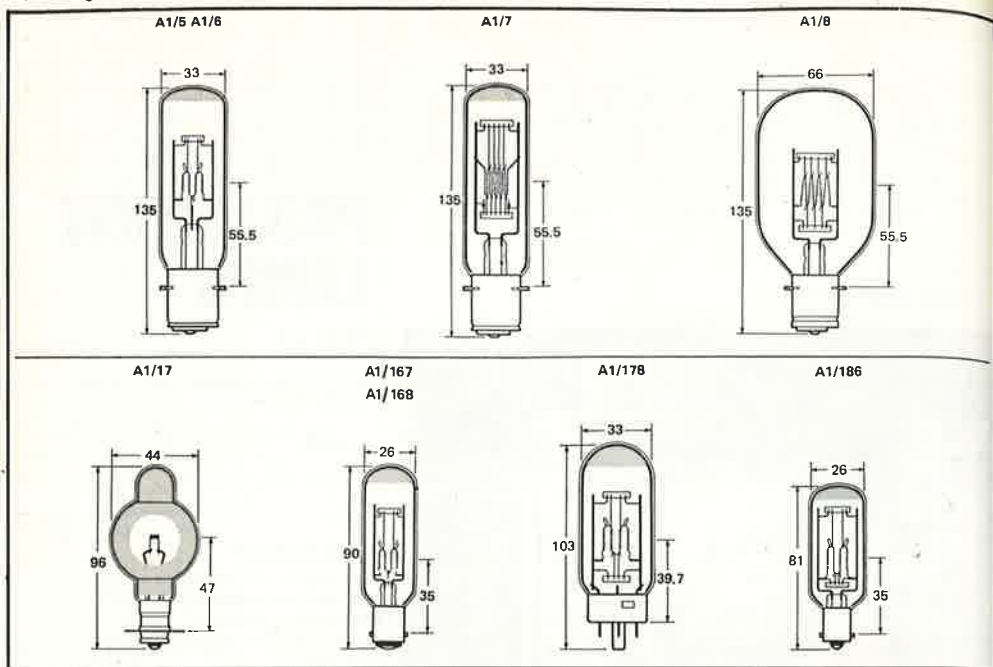
SPECIFICATION

Manufactured in accordance with International standards where applicable.



PROJECTION LAMPS

Non-Halogen Types



All dimensions in mm

Burning position

D: Vertical cap down $\pm 15^\circ$

E: Vertical cap down $\pm 30^\circ$

The lamps shown on these two pages are **STOCKED TYPES** (see Price List for non-stock types).

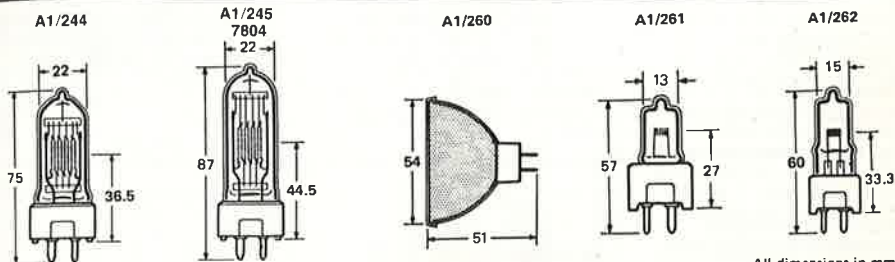
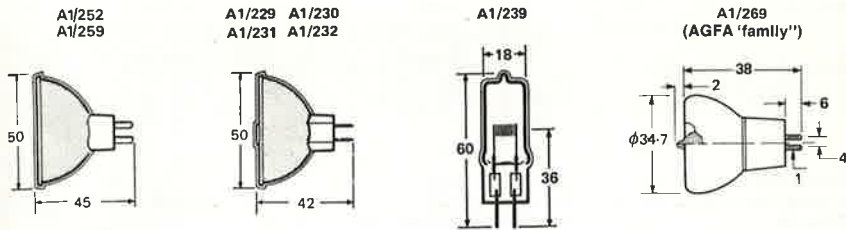
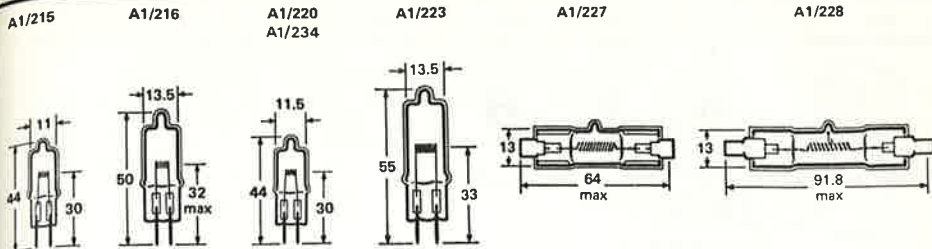
LAMP DATA (NON-HALOGEN TYPES)

LIF No.	Catalogue No.	Watts	Volts	Cap	Average Life (hrs)	Nominal Lumens	Burning position	Packing quantity
† A1/5	6070C	250	240	P28s	50	5200	D	50
† A1/6	6131C	300	240	P28s	25	6900	D	50
† A1/7	6152C	500	240	P28s	25	11400	D	50
A1/8	375C	500	240	P28s	100	11000	E	32
† A1/17	13120C	50	8	P30s	25	—	D	50
A1/167	1314N	150	240	BA15s	25	2700	D	50
A1/168	13141W	150	240	BA15d	25	2700	D	50
† A1/178	6280C	300	240	G17q	25	6900	D	50
A1/186	7238N	100	12	BA15s	25	2800	D	50

† Will become non-stock types. See Price List for non-stocked types.

PROJECTION LAMPS

Halogen Types



All dimensions in mm

LAMP DATA (HALOGEN TYPES)

LIF No.	Catalogue No.	Watts	Volts	Cap	Average Life (hrs)	Nominal Lumens	Burning position	Packing quantity
A1/215	7023	100	12	GY6.35	50	3000	A	100
A1/216	7158	150	24	G6.35	50	5000	A	100
A1/220	7027	50	12	G6.35	50	1400	A	100
A1/223	*7748S	250	24	G6.35	50	8500	A	100
A1/227	12216R	420	120	R7s	75	10000	Any	50
A1/228	12260R	600	120, 240/250	R7s	75	16250	Any	50
A1/229	6847	50	8	GZ6.35	50	—	B	50
A1/230	6853	75	12	GZ6.35	50	—	B	50
A1/231	6834	100	12	GZ6.35	50	—	B	50
A1/232	6423	150	15	GZ6.35	50	—	B	50
A1/234	6550	150	15	G6.35	50	5000	A	100
A1/239	7787	400	36	G6.35	50	14500	A	100
A1/244	7389	500	240/250	GY9.5	75	14500	Any	50
A1/245	7764	800	240/250	GY9.5	75	21500	A	50
A1/252	13164-EJL	200	24	G5.3	25	—	B	50
A1/259	13163-ELC	250	24	G5.3	35	—	B	50
A1/260	6604	75	12	GZ6.35	50	—	B	50
A1/261	5973	100	12	GY9.5	50	3000	A	100
A1/262	5974	150	24	GY9.5	50	5000	A	100
—	7804	900	220/230	GY9.5	50	(proximity)	A	10/100
A1/269	13390	20	8	GZ4	50	—	B	50

*Type A1/223 cat No 7748S is now suitable for cyclic switching and type A1/267 now becomes obsolete

Burning position.

Do not mount with tilt in plane of filament see Fig. 1.

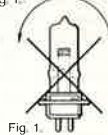


Fig. 1.



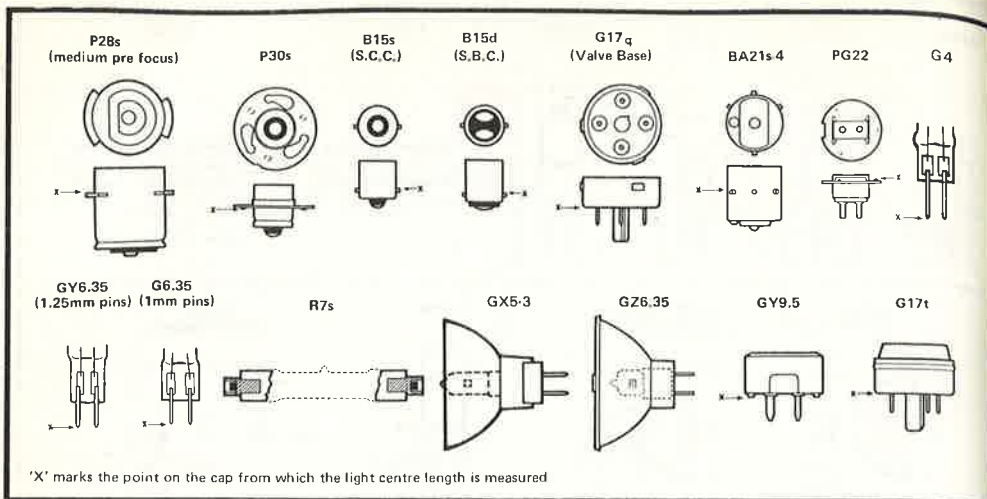
Fig. 2.

Burning position

- A: Vertical cap down $\pm 90^\circ$
- B: Vertical cap down $\pm 105^\circ$
- C: Vertical cap down $\pm 15^\circ$

PROJECTION LAMPS

Lamp Caps



'X' marks the point on the cap from which the light centre length is measured

NOTES FOR USERS

General

Read packing instructions.

Handling – Projection lamps are designed for high light output, and consequently have particularly brittle filaments. Always handle with care, and avoid jolts and vibration, particularly when switched on.

Spherical mirrors – When used with a rear spherical mirror, ensure that the lamp is correctly aligned in accordance with the equipment manufacturer's instructions to avoid uneven screen illumination or overheating of the filament.

Tungsten halogen lamps

Handling – Avoid touching the quartz bulb; fingermarks leave permanent brown stains when the lamp is switched on. Clean with methylated spirits if inadvertently touched.

Fuse – Lamps rated for supplies above 130V must be operated in series with the prescribed HBC fuse.

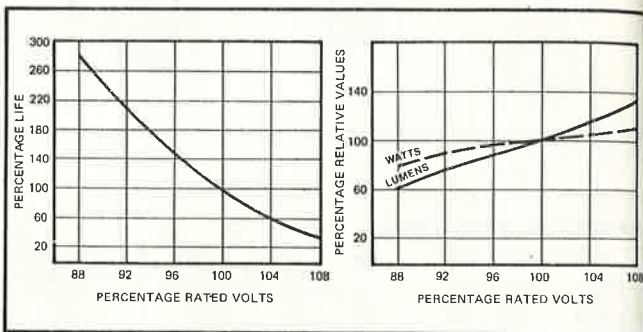
Operating temperature – Avoid overheating as this can cause the lamp to explode. The maximum permissible temperature for the 'pinch' (glass-to-metal seal) is 400°C. The bulb must be kept above a minimum temperature of 250°C and must not exceed 900°C.

Burning position – Attitudes other than the prescribed burning positions will reduce lamp life. Where lamps are used in a horizontal burning position, the filament plane must also be horizontal to prevent coils collapsing on to each other.

EFFECT OF VOLTAGE VARIATION ON LAMP LIFE

The theoretical extended life calculated from the curves below is not always realised in practice as many other causes influence this factor considerably, e.g. vibration, handling, cleaning, frequency of switching.

These curves are based on averages of many lamps, and can only be used as an approximate guide to performance.



ORDERING DATA

Please order lamps in the form given in the following example, quoting LIF Number, Catalogue Number, Wattage and Voltage, and in multiples of the packing quantity:

50 Philips projector lamps A17, Catalogue No. 6152C, 500W, 240V.

Made in Belgium and Germany

MISCELLANEOUS PROJECTOR LAMPS

Classes M, F and G

Single-ended tungsten and tungsten halogen lamps for a variety of applications.

RANGE

A comprehensive range of popular types, including certain types unique to Philips, tabulated in LIF Classification sequence.

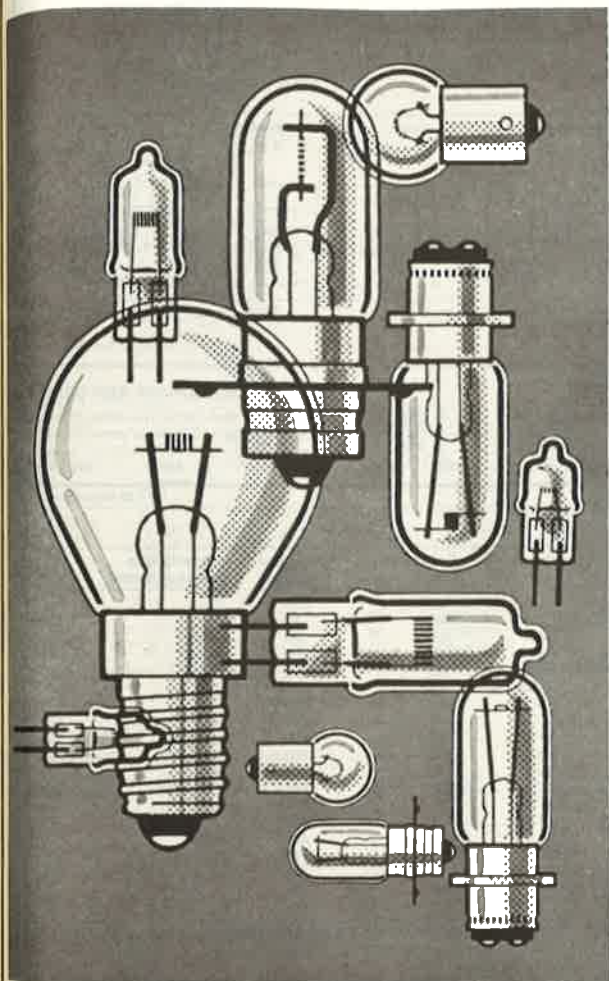
APPLICATIONS

Suitable for use in miscellaneous equipment such as:

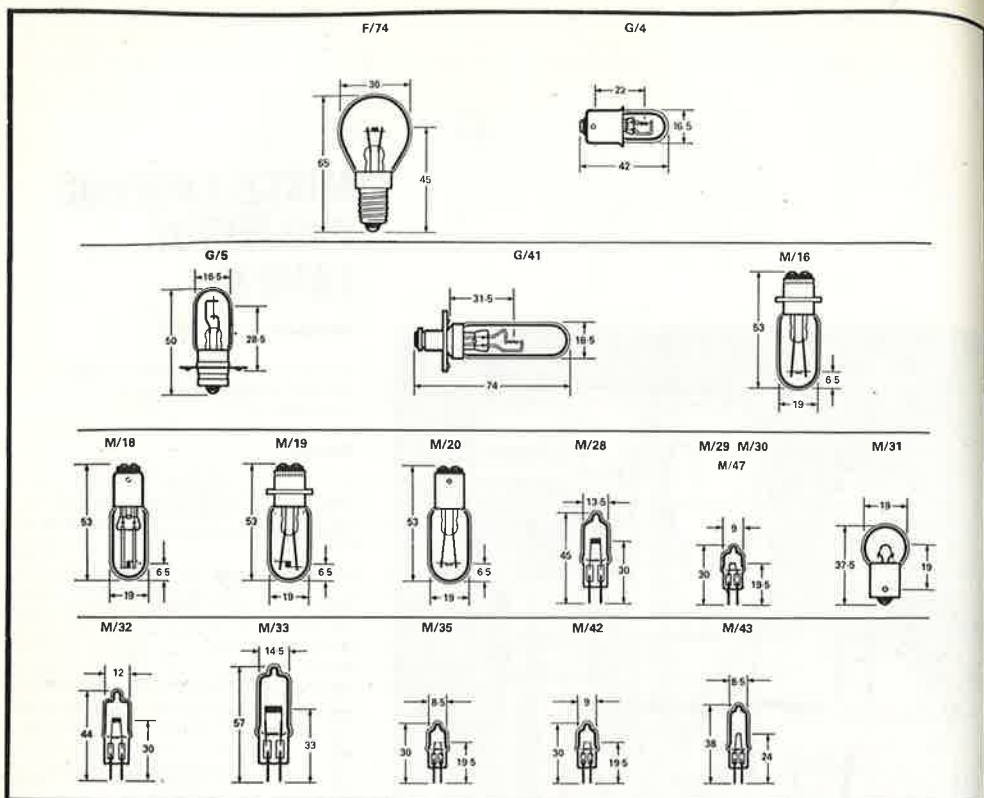
- Micro-projectors
- Cine editors
- Microscopes
- Microfiche and microfilm readers and copiers
- Traffic signals
- Display and floodlight narrow spot fittings
- Optical sound projectors
- Disco effects projectors

FEATURES

- Increased light output of tungsten halogen types is maintained throughout longer working life.
- Manufactured to high standards of accuracy.



MISCELLANEOUS PROJECTOR LAMPS



All dimensions in mm

LAMP DATA

LIF No.	Catalogue No.	Volts	Watts	Cap	Average Life (hours)	Nominal Lumens	Other details (see key below)	Packing quantity
F/74*	6106M	6	30	E14	100	510	f	100
G/4*	6142N	6	1.0 Amp	B15s	100	77	a, d	100
G/5	7210C	6	1.0 Amp	P30s	100	80	a, e	50
G/41	7251C	5	4.0 Amp	PX28s	1000	270	a, m	50
M/16	13347C	6	15	PX22d	100	210	c, h, k	100
M/18	13702W	6	15	B15d	100	210	c, h, l	100
M/19	13702C	6	15	PX22d	100	210	c, h, l	100
M/20	13347W	6	15	B15d	100	210	c, h, k	100
M/28	7724	12	100	GY6.35	2000	2150	a, d, j	100
M/29	7387	6	10	G4	100	200	a, d, j	500
M/30	7388	6	20	G4	100	450	a, d, j	200
M/31	6814	6	10	B15s	200	115	Editor lamp	500
M/32	13512	12	50	GY6.35	3000†	850	a, d, j	100
M/33	6958	24	250	G6.35	300	8400	a, g, i	100
M/35	—	12	20	G4	250	450	a, d	100
M/42	6605	6	10	G4	1000	140	a, d, j	200
M/43	5972	6	10	G4	300	150	a, d, j	200
M/47	—	12	20	G4	2000	350	a, d, j	—
Solar	13117	17	150	GX5-3	1000	—	d, n	—

Code to details

a - tubular
b - spherical

Burning position

c - any except within $\pm 45^\circ$ vertical cap down
d - any
e - vertical cap down $\pm 45^\circ$
f - any except within $\pm 45^\circ$ vertical cap up
g - vertical cap down $\pm 90^\circ$
m - horizontal + 90° , - 45°

* Lamps not held in stock, minimum order quantity required.
† Total burning time based on 30 sec on/off cycle.

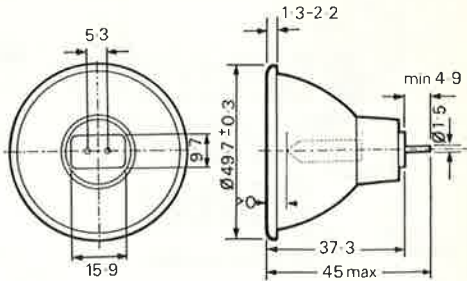
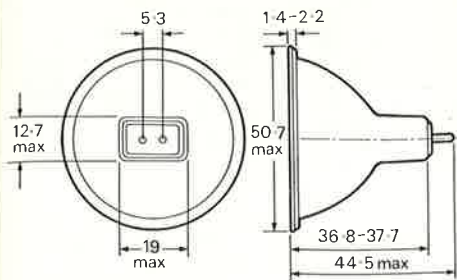
Other details

h - in this case, light centre length is measured from filament to crown of bulb
j - indicates a tungsten halogen lamp with quartz envelope
k - light output taken in axis of lamp
l - light output taken at right angles to lamp axis
n - special dichroic reflector

MISCELLANEOUS PROJECTOR LAMPS

ELD/EJN

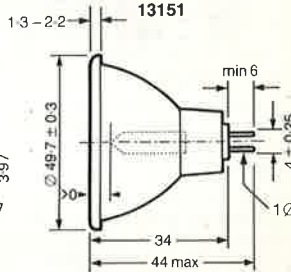
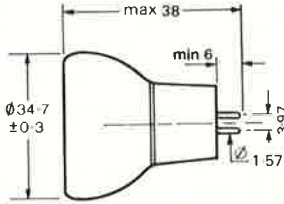
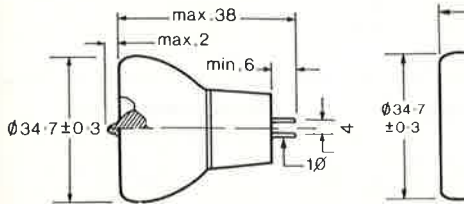
13117 EPZ/DJT DED FHX EWJ EPX/EPV FJX



13527 13528 13529

FJY

13151



All dimensions in mm

LAMPS FOR MICROFILM READERS

By using optically correct axial filaments in smooth glass dichroic reflectors, Philips have designed lamps to replace either of two similar faceted mirror types of American origin, with no compromise in performance.

Catalogue No.	ANSI Codes	Volts	Watts	Base	Average Life (hours)	Nominal focal distance (mm)	Burning Position	Packing quantity
13151	—	6.0	15	GZ4	500	100	Basedown ± 105°	50
13137	FHX	13.8	25	GX5.3	250	350	Basedown ± 105°	50
13075	EWJ	12.0	28	GX5.3	1000	350	Basedown ± 105°	50
13155	FJX	13.8	30	GX5.3	500	350	Basedown ± 105°	50
13189	EPZ/DJT	13.8	50	GX5.3	1000	350	Basedown ± 105°	50
13139	—	12	75	GZ6.35	50	100	Basedown ± 105°	50
13194	DED	13.8	85	GX5.3	1000	350	Basedown ± 105°	50
13186	EPX/EPV	14.5	90	GX5.3	500	30	Basedown ± 105°	50
13158	ELD/EJN	21.0	150	GX5.3	40†	30	Basedown ± 90°	50

†500h on 17.5V.

MINIATURE TYPES

Newly developed lamps for small microfilm readers.

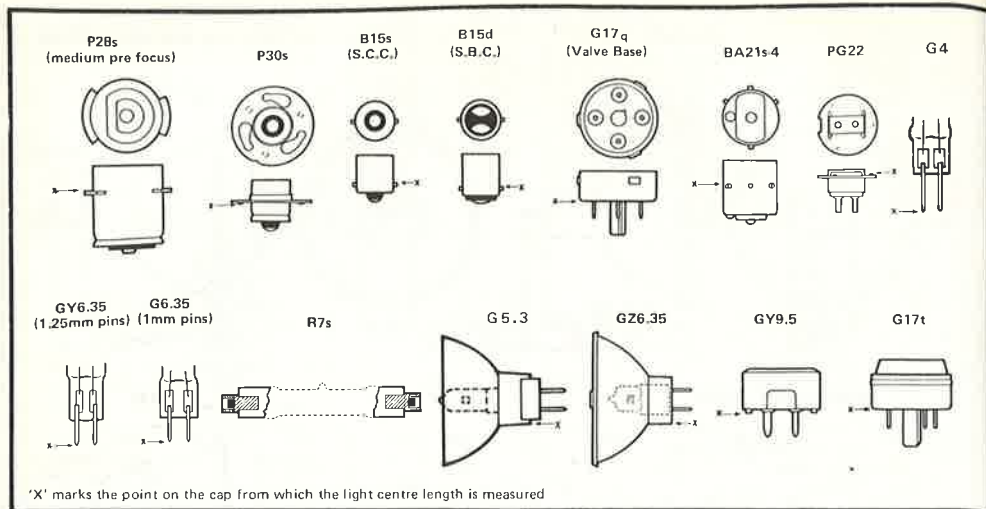
Catalogue No.	ANSI Codes	Volts	Watts	Base	Average Life (hours)	Nominal focal distance	Burning Position	Packing quantity
13529	—	6	9	G4	250	α	Basedown ± 105°	—
13528	—	6	15	G4	500	30	Basedown ± 105°	—
13074	FJY	12	28	G3.9	1000	α	Basedown ± 105°	—
13527	FJZ	13.8	30	G4	500	α	Basedown ± 105°	—

GUIDE TO OTHER HALOGEN LAMPS USED IN MICROFILM READERS

LIF Code	Replaces ANSI Code	LIF Code	Replaces ANSI Code	LIF Code	Replaces ANSI Code
A1/215	FCR	A1/262	FDS	M/32	—
A1/216	FCS	M/28	EVA	M/33	—
A1/220	BRL	M/29	ESA	M/35	—
A1/261	FDT	M/30	ESB	—	—

Philips are continually developing lamps for micrographic applications and we would be pleased to hear of requirements for types not included above.

MISCELLANEOUS PROJECTOR LAMPS



NOTES FOR USERS OF HALOGEN LAMPS

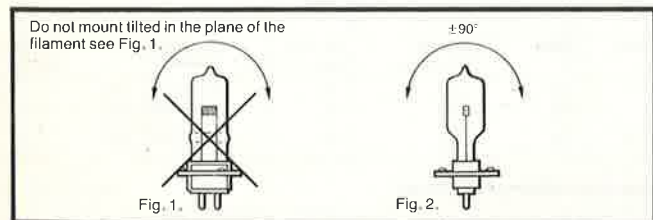
Handling – Avoid touching the quartz bulb of halogen lamps, since finger-marks appear as indelible brown stains when the lamp is operated. Lamps must be cleaned with a solvent such as methylated spirits if they are inadvertently handled.

Avoid jolting or vibrating the lamps while they are operating.

Seal (pinch) temperature – Precautions must be taken to ensure that the quartz/metal seal temperature does not exceed 350°C, while retaining the temperature of the bulb wall over 250°C and below 900°C.

Spherical reflectors – Care must be taken to prevent the reflected image of the filament being superimposed on the filament itself, since this will lead to overheating of the filament and premature failure of the lamp.

Burning position.



LAMP APPLICATIONS

Types M/16, M/18, M/19, M/20 – These lamps have optically clear glass for operation cap-up, and like Class F lamps are often used for micro-projection and microscope illumination.

Type M/29 and M/30 – These miniature types give a relatively high output at about 3200K in a compact size.

Type M/33 – This lamp is similar to type A1/233 but with a life of 300 hours is useful for discotheque projectors, microfilm readers, etc.

Type M/35 – This lamp may be operated at 13.5V for use in boats or on motor vehicles.

Type M/28 is specially designed to withstand traffic signal operating conditions.

Type 13117 is specifically designed for experimental evaluation of solar collector devices.

MICROREADER TYPES

The integral mirror lamps are individually focused in production to give superior performance in machines originally designed for American faceted mirror lamps. Our improved optical design enables some types to take the place of two similar ANSI versions; e.g. type 13189 can replace American types EPZ or DJT.

The nominal focal distance shown is for design guidance. In practice, the working distance to the film aperture will be different, with a condenser lens used.

Types 13151 and 13139 may be used without a condenser lens, thereby reducing the optical length and increasing efficiency.

ORDERING DATA

Please order in the form given in the following example, quoting LIF No., Catalogue No., voltage and wattage and in multiples of the packing quantity:

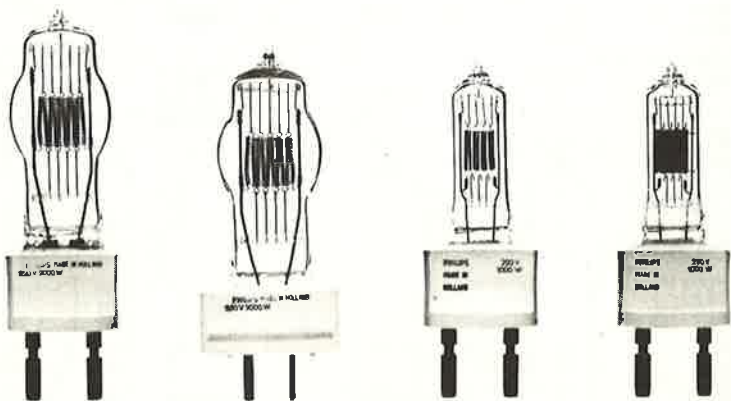
100 Philips projector lamps Type M/30, Catalogue No. 7388, 6V 20W. ELD made in USA. All lamps made in Belgium except M/31 – made in W. Germany.

Made in Belgium, Germany and U.S.A.

STUDIO & THEATRE LAMPS

Classes CP, T & P2

Including a comprehensive range of 'Biplane' halogen studio and theatre lamps which replace previous halogen and conventional lamps



RANGES

CP Fourteen "Biplane" versions of the popular 650, 1kW, 2kW and 5kW ratings, including new proximity mirror types.

T Eight "Biplane" versions of the popular 500W, 650W and 1kW ratings.

Four conventional glass types still in demand.

P2 Double-ended 3200K linear lamps.

APPLICATIONS

CP Prefix – Studio spotlighting etc, in conjunction with materials balanced for 3200K.

T Prefix – for theatre spotlighting, where long life is of greater importance than 3200K.

P2 Prefix – for floodlighting in studios etc, in conjunction with materials balanced for 3200K. (see Photolamps data sheet for movielight types).

FEATURES

■ Quartz Halogen lamps offer long life and maintain virtually constant lumen output and colour temperature.

■ Biplane filaments – compact with excellent beam.

SPECIFICATION

■ Designed to comply with International specifications, where applicable.

LAMPS PHOTOGRAPHIC

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To reorder this Data Sheet quote

PL 1897/4

Issued 8/83

Replaces PL 1897/3 and PL 1812/2

STUDIO & THEATRE LAMPS

SINGLE ENDED QUARTZ HALOGEN LAMPS

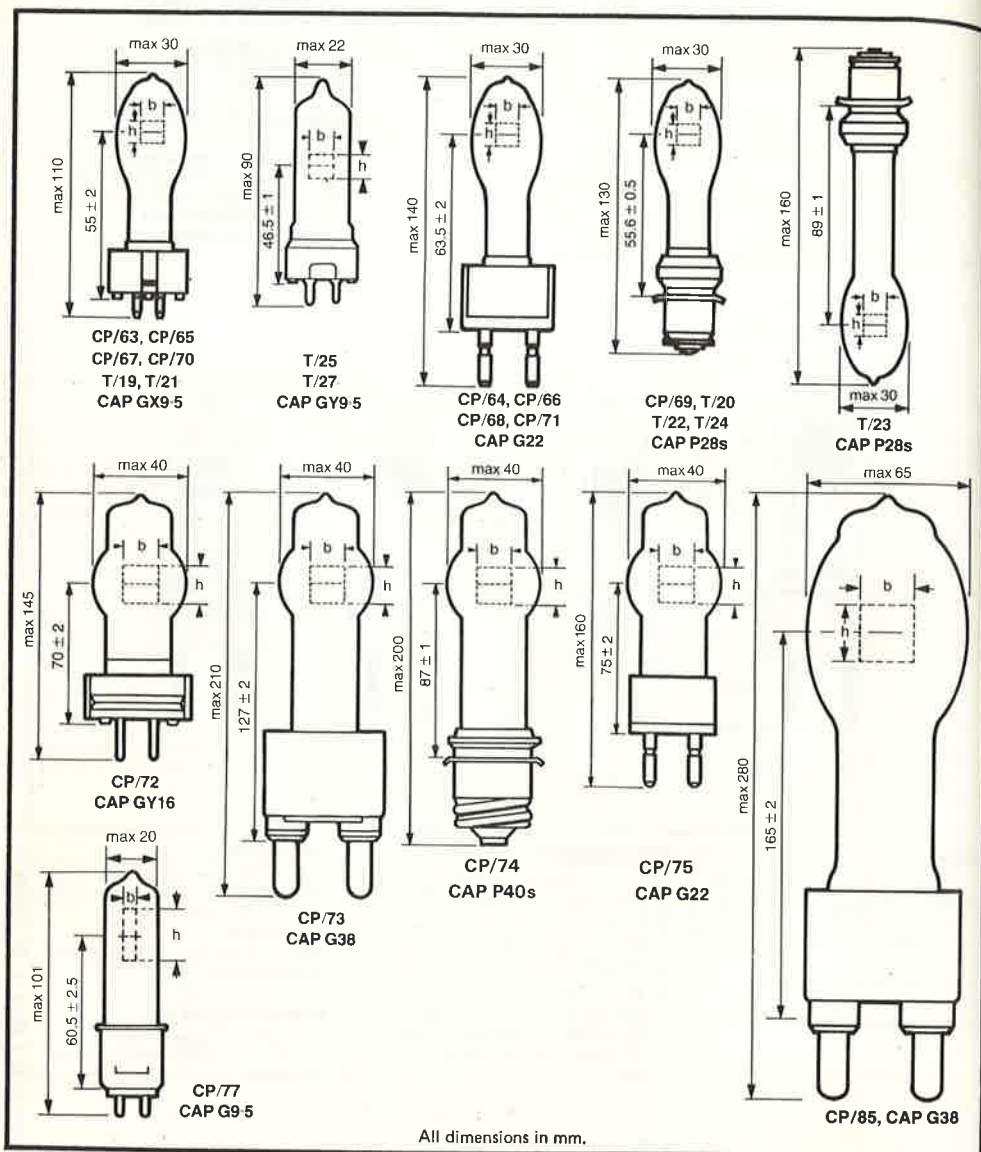
BIPLANE RANGE

Biplane lamps, illustrated below are compatible with existing halogen and conventional types in respect of light centre length and overall dimensions to permit direct replacement, (see Replacement Guide).

FEATURES

■ Compact filament construction improves the efficiency of spotlights, notably in narrow beam luminaires, to produce useful gains in beam intensity.

■ Same life expectancy as existing halogen 'monoplane' filament types.
 ■ Internal proximity reflector types eliminate overheating, adjustment and dust problems associated with external spherical reflectors.



All dimensions in mm.

BIPLANE LAMP REPLACEMENT GUIDE

CLASS 'CP' STUDIO LAMPS 3200K

Watts	Base	Biplane Type	Replaces Quartz Halogen Type	Replaces Conventional Type	Biplane Type with Proximity Reflector
650	GX9.5	CP/67	CP/23		CP/65
650	G22	CP/68	CP/39	CP/33	CP/66
650	P28s	CP/69	CP/51	CP/49	
1000	GX9.5	CP/70	CP/24		CP/63
1000	G22	CP/71	CP/40	CP/44, CP/19	CP/64
2000	GY16	CP/72	CP/43, CP/79		
2000	G38	CP/73	CP/56, CP/41	CP/34, CP/42, CP/12	
2000	P40S	CP/74	CP/53	CP/28	
2000	G22	CP/75	CP/55		
5000	G38	CP/85	CP/29	CP/35, CP/13	

CLASS 'T' THEATRE LAMPS

Watt	Base	Biplane Type	Replaces Halogen Type	Replaces Conventional Type
500	P28s	T/24	T/17	T/1 (T/7)
500	GY9.5	T/25	T/18	
650	P28s	T/22	T/13	
650	GX9.5	T/21	T/12	
650	GY9.5	T/27	T/26	
1000	P28s	T/23	T/15	T/4
1000	P28s	T/20	T/14	T/6
1000	GX9.5	T/19	T/11	

STUDIO LAMPS. CLASS 'CP' BIPLANE TYPES

Ref. No.	Phillips Cat. No.	Watts	Volts	Cap	Filament Area bxh	Nominal* total lumens	Average life (h)	Burning position	Packing quantity
CP/63	6984P	1000	240	GX9.5	11 x 14.5	(proximity)	150	VBD ± 90°	4
CP/64	6984Z	1000	240	G22	11 x 14.5	(proximity)	150	VBD ± 90°	4
CP/65	6999P	650	240	GX9.5	11 x 10	(proximity)	100	VBD ± 90°	4
CP/66	6999Z	650	240	G22	11 x 10	(proximity)	100	VBD ± 90°	4
CP/67	6993P	650	240	GX9.5	11 x 10	16000	100	VBD ± 90°	4
CP/68	6993Z	650	240	G22	11 x 10	16000	100	VBD ± 90°	4
CP/69	6993C	650	240	P28s	11 x 10	16000	100	VBD ± 90°	4
CP/70	6995P	1000	240	GX9.5	11 x 14.5	25000	200	VBD ± 90°	4
CP/71	6995Z	1000	240	G22	11 x 14.5	25000	200	VBD ± 90°	4
CP/72	6994P	2000	240	GY16	19 x 19	50000	400	VBD ± 90°	4
CP/73	6994Z	2000	240	G38	19 x 19	50000	400	VBD ± 90°	4
CP/74	6994C	2000	240	P40s	19 x 19	50000	400	VBD ± 90°	4
CP/75	6994Y	2000	240	G22	19 x 19	50000	400	VBD ± 90°	4
CP/77	6983P-FEP	1000	240	G9.5	- x 21	26000	200	ANY	4
CP/85	6963Z	5000	240	G38	26 x 26	130000	350	VBD ± 90°	4

THEATRE LAMPS. CLASS 'T' BIPLANE TYPES

Ref. No.	Phillips Cat. No.	Watts	Volts	Cap	Filament Area bxh	Nominal* total lumens	Average life (h)	Burning position	Packing quantity
T/19	6996P	1000	240	GX9.5	11 x 14.5	21000	750	VBD ± 90°	4
T/20	6996C	1000	240	P28s	11 x 14.5	21000	750	VBD ± 90°	4
T/21	6998P	650	240	GX9.5	11 x 12	13000	750	VBD ± 90°	4
T/22	6998C	650	240	P28s	11 x 12	13000	750	VBD ± 90°	4
T/23	6997C	1000	240	P28s	11 x 14.5	21000	750	VBU ± 90°	4
T/24	6800C	500	240	P28s	11 x 10	9500	750	VBD ± 90°	4
T/25	6820P	500	240	GY9.5	11 x 10	11000	300	VBD ± 90°	4
T/27	6823P	650	240	GY9.5	11 x 13	14500	400	VBD ± 90°	4

*The figures stated are for the total lumens given by the lamp and are not representative of the lumens achieved within the spotlight beam.

Please order lamps in multiples of the packing quantity.

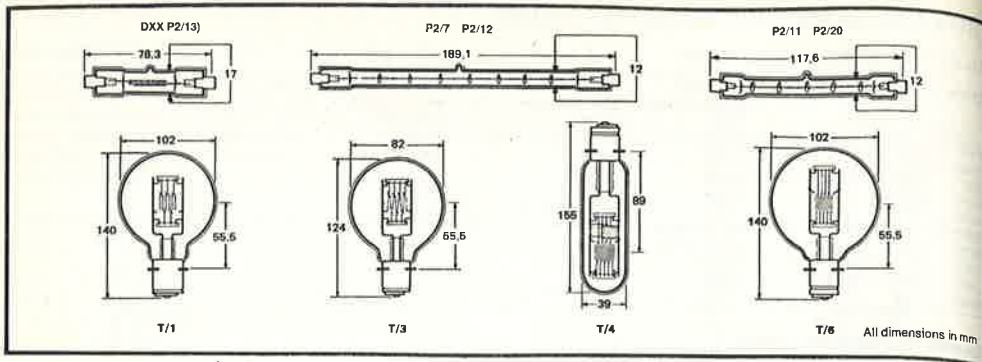
Burning positions

VBD - Vertical, base down.

VBU - Vertical, base up.

Burning angles refer only to orientation in a plane which is at right angles to the filament plane.

STUDIO & THEATRE LAMPS



STUDIO LAMPS. CLASS 'P2'

Lamp ref. No.	Philips Type No.	Watts	Volts	Cap	Average Life (hrs)	Nominal light output (lumens)	Burning Position	Packing quantity
P2/7	13989R	1000	240/250	R7s	200	26000	H ± 4°	72
P2/11	13477R	800	240/250	R7s	150	21000	H ± 4°	72
P2/12	6358R	1250	240/250	R7s	200	33500	H ± 4°	72
P2/13 (DX)	13162	800	240/250	R7s	75	19000	Any	100
P2/20	7786R	1000	240/250	R7s	150	25500	H ± 4°	60
P2/27 (FEX)	13134R	2000	240/250	R7s	300	50000	Any	—

Other Linear studio lamps are available to special order.

THEATRE LAMPS. CLASS 'T' - Non-halogen types

Lamp ref. No.	Philips Type No.	Watts	Volts	Cap	Average Life (hrs)	Nominal light output (lumens)	Burning Position	Packing quantity
T/1	559C	500	240	P28s	200	9700	VBD ± 45°	18
T/3	558C	250	240	P28s	200	4000	VBD ± 45°	50
T/4	6291C	1000	240	P28s	200	22000	VBU ± 15°	30
T/6	7401C	1000	240	P28s	200	21500	VBD ± 75°	18

Burning position

VBD - Vertical, base down VBU - Vertical, base up H - Horizontal

DIMMING

At 75% of rated voltage, colour temp of CP & T lamps will be approximately 2900K and 2750K respectively.

SURGE CURRENT

Due to the low cold resistance of the filament, a switch-on surge current occurs. With typical supply impedance of 0.3 ohms a theoretical maximum instantaneous current of approximately 20 times running current can occur. This falls to 1/10th of a second (240V 2kW lamp).

SAFETY

Halogen lamps are pressure-filled and can shatter in use if overheated, incorrectly fused, damaged or operated above the rated voltage. It is advisable to shield these lamps wherever possible for safety reasons.

FUSING

It is important to ensure that halogen lamps are protected by the correct HBC fuse to reduce the risk of shattering due to internal arcing at the instant of filament rupture.

Lamp Watts	500/650	800/1250	1.5	5kW
	2kW			

HBC Fuse (UK)	4A	6A	10A	30A

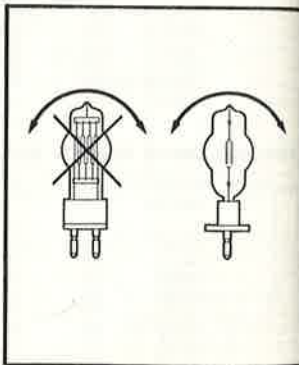
These fuse ratings are for 240/250V lamps only.

HANDLING

Do not touch the quartz bulb with bare hands, as finger marks burn into indeleible brown stains. Clean with methylated spirits if inadvertently handled. Avoid jolting or vibrating lamps while operating.

BURNING POSITIONS

Life expectancy may be reduced if lamps are operated in attitudes other than recommended burning positions.



BATTERIES

Page

Batteries: Normal, Extra, Super and Alkaline Ranges

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BATTERIES

Please see pages II and III of General Introduction for information on how to use this Handbook.

BATTERIES



Four ranges of primary batteries of outstanding quality covering the majority of normal requirements from low drain use to continuous use in high drain applications

RANGE

Normal – Three types ideal in low drain applications.

Extra – Six popular types with ammonium chloride electrolyte, well suited to average, intermittent use.

Super – Four popular types with zinc chloride electrolyte for more intensive power applications.

Alkaline – Five popular types for lasting top performance, when longest service life is needed.

To reorder this Data Sheet quote

PL 3019/3

Issued 11/83

Replaces PL3019/2

BATTERIES

FEATURES

■ Clear, striking, colour coding provides easy distinction of the four ranges:

Normal – Blue and black

Extra – Red and black

Super – All black

Alkaline – Black and gold

■ Choice of tray or card blister packaging to suit varying display and storage requirements.

■ Superior construction for prevention of leakage and for long life with extra robust steel jacket.

■ Every battery is double checked for charge retention.

■ Complies with International Standard IEC 86, and exceeds the performance requirements of the Standard.

■ Both Normal and Extra types have good recuperation capacity, so life is increased with intermittent use.

■ Alkaline types have a high efficiency at high current drains over long periods without recuperation.

■ Alkaline batteries operate at temperatures as low as -20°C .

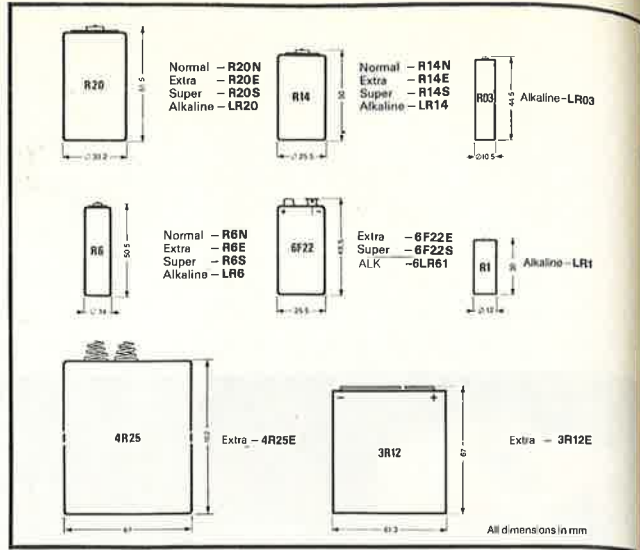
■ Open date coded to show extent of available shelf life.

Normal, Extra, Super and

Alkaline: Made in Belgium

Unless otherwise stated on packaging.

BATTERIES



APPLICATIONS

	Intermittent Use	Intensive Use
1. Long Life Applications e.g. Calculators, remote control, flash guns, test equipment.	Super	Alkaline
2. Motorised Equipment e.g. Tape recorders, kitchen equipment, toys, cine cameras.	Super	Alkaline
3. Lower Power Equipment e.g. Clocks, computer games, torches, portable radios, emergency lights, shavers, toys.	Extra	Super
4. Low drain uses torches, clocks	Normal	Extra

ORDERING & TECHNICAL DATA

Philips Type No.	Replaces	Voltage	Traypack Tray	Outer	Blister Pack	Outer
NORMAL						
R20N	SP2	1.5	25	200	2	60
R14N	SP11	1.5	25	200	2	60
R6N	—	1.5	40	480	4	120
EXTRA						
R20E	HP2	1.5	25	200	2	60
R14E	HP11	1.5	25	200	2	60
R6E	HP7	1.5	40	480	4	120
6F22E	PP3-P	9.0	10	150	1	30
3R12E	1289	4.5	20	120	1	30
4R25E	PJ996	6.0	—	12	—	—
SUPER						
R20S	R20PP	1.5	25	200	2	60
R14S	R14PP	1.5	25	200	2	60
R6S	R6PP	1.5	40	480	4	120
6F22S	—	9.0	10	150	1	30
ALKALINE						
LR20	MN1300	1.5	25	200	2	24
LR14	MN1400	1.5	25	200	2	24
LR6	MN1500	1.5	40	200	4	128
LR03	MN2400	1.5	50	500	4	48
LR1	MN9100	1.5	50	500	2	60
GLR61	MN1604	9.0	10	150	1	20

TECHNICAL SECTION

Part 1 –RADIATION AND VISION

RADIATION

- 1.1 Visible radiation (light)
- 1.2 Ultraviolet and infra-red radiation

VISION

- 1.3 Central and peripheral vision
- 1.4 Visual performance

LIGHTING QUANTITIES AND UNITS

- 1.5 Quantities, units and symbols

COLOUR

- 1.6 Colour appearance
- 1.7 Colour rendering

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- 2.2 Incandescent lamps
- 2.3 Discharge lamps
- 2.4 Fluorescent lamps

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- 2.6 Lamp Life (Service Period)

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- 2.8 Ballasts for fluorescent lamps
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- 3.3 Limits for Spacing
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- 4.2 Lighting objectives
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- 6.1 Calculation of illuminance at a point
- 6.2 Worked example
- 6.3 Calculations for line and area sources
- 6.4 Isolux diagrams and lux tables

Part 7 –ENERGY/COST EFFECTIVE LIGHTING

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- 7.2 Cost elements in lighting
- 7.3 Good, energy-effective lighting – the six basic rules
- 7.4 Energy utilization appraisal for lighting installations
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Part 8 –FLOODLIGHTING OF BUILDINGS AND MONUMENTS

- 8.1 Floodlighting techniques
- 8.2 Recommended illuminances
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Part 9 –ROADLIGHTING

- 9.1 Design criteria
- 9.2 Road surfaces
- 9.3 Calculation methods
- 9.4 Evaluation of design criteria
- 9.5 Official recommendations
- 9.6 Luminance calculations

Part 1 RADIATION AND VISION

RADIATION

1.1 Visible Radiation (Light)

Light may be defined as any radiation capable of causing a visual sensation directly. Light waves occupy only a very small part of the spectrum of electromagnetic waves (Fig 1.1). The limits of visible radiation are not well defined – the lower limit is generally taken as being between 380 and 400 nm and the upper limit between 760 and 780 nm (1 nanometre (nm) = 10^{-9} m).

The visible spectrum can be divided into a number of approximate wavelength ranges each of which makes a certain colour impression on the human eye:

380 – 436 nm violet	556 – 589 nm yellow
436 – 495 nm blue	589 – 627 nm orange
495 – 566 nm green	627 – 780 nm red

1.2 Ultraviolet and Infra-red Radiation

Electromagnetic radiations with wavelengths just beyond the violet and red ends of the visible spectrum are known as ultra-violet and infra-red radiation respectively.

The limits of the spectral range of ultra-violet radiation are not well defined but are usually considered as lying between 100 and 400 nanometres ($1 \text{ nm} = 10^{-9}\text{m}$). For practical purposes this wavelength range is subdivided into three bands:

UV – A from 315 to 400 nm
 UV – B from 280 to 315 nm
 UV – C from 100 to 280 nm

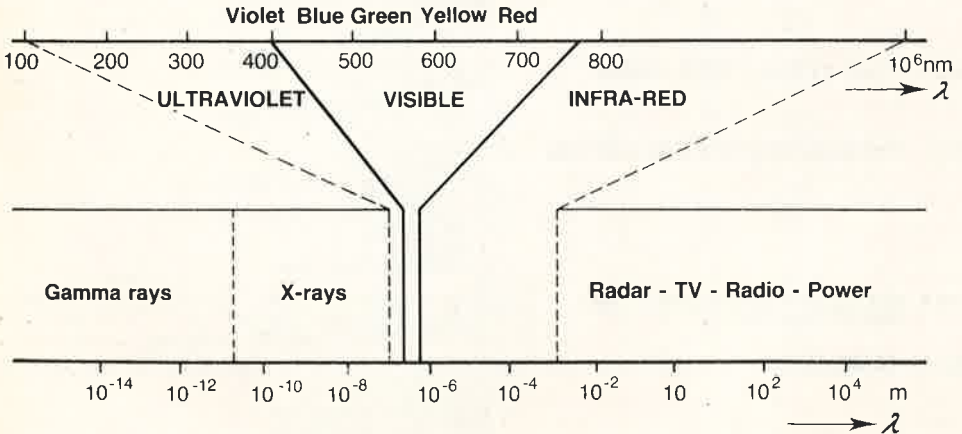
Radiation in the UV – A band passes through most types of glass and produces slight erythema (reddening of the human skin). Radiation in this band has the property of causing certain materials to fluoresce and of causing photochemical reactions in others. It is therefore used in various industrial processes; also in UV – A sunlamps.

Radiation in the UV – B band has erythema effect on the human skin. It is used mainly for therapeutic purposes (UV – B sunlamps). Radiation in the UV – C band has a germicidal effect. Erythema and conjunctivitis can be caused. Radiation at wavelengths less than 200 nm forms ozone from oxygen or air. Care must be taken in the design and use of UV equipment to ensure that personnel and surroundings cannot be harmed. Medical authorities should be consulted.

The limits of the spectral range of infra-red radiation are not well defined, but are usually considered to be between 780 nm and 1mm.

For practical purposes, this wavelength range is subdivided into three bands:

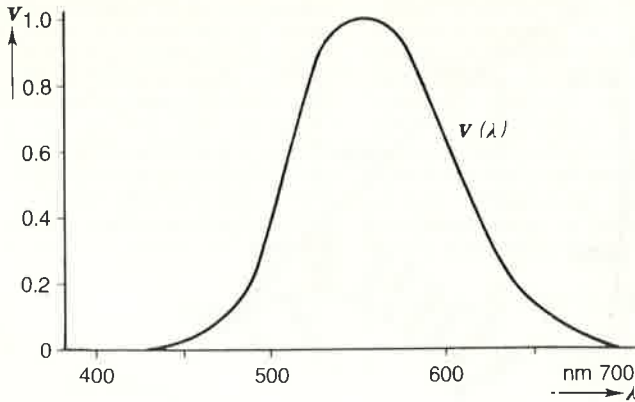
Fig. 1.1. The electromagnetic spectrum



780 nm to 2 μm (short-wave infra-red)
 2 μm to 4 μm (medium-wave infra-red)
 4 μm to 1 mm (long-wave infra-red)
 Shortwave infra-red radiation can be

concentrated onto an area, thus obviating many of the heat-loss problems associated with other methods of heating.

Fig. 1.4 Spectral sensitivity of the average eye



VISION

1.3 Central and Peripheral Vision

Central vision:

The centre of the retina can resolve an image showing the greatest detail of which the eye is capable.

Peripheral vision:

The periphery of the retina does not produce sharp vision and objects seen by this area appear as fuzzy silhouettes. The periphery is, however, highly sensitive to movement and flicker.

1.4 Visual performance

a. Contrast

Contrast refers to the difference in luminance or colour of an object compared with that of the surroundings. The performance of a visual task becomes easier if contrast is increased.

b. Visual acuity

Visual acuity is a measure of the smallest detail that can be perceived. It varies with illuminance.

c. Speed of perception

Speed of perception is related to the time interval between the presentation of an object and the perception of its form. It varies with illuminance.

d. Spectral sensitivity

The spectral sensitivity of the average eye is shown in Fig. 1.4. It is taken into consideration when defining units of light.

LIGHTING QUANTITIES AND UNITS

1.5 Quantities, units and symbols

The unit of LUMINOUS FLUX is the LUMEN. This measures the quantity of light. By definition one Watt of radiation at 555 nm is equal to 682 lumens. Other wavelengths are evaluated according to $V(\lambda)$ —Fig. 1.4.

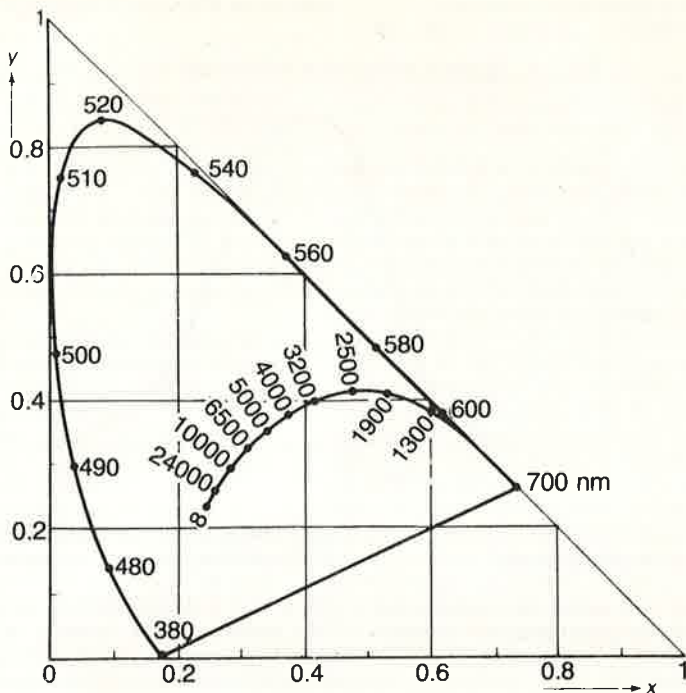
The unit of ILLUMINANCE is the LUX. This is an illuminance of one lumen over an area of one square metre. (One foot-candle, i.e. one lumen per square foot, is equal to 10.76 lux: this unit is now obsolete).

The unit of LUMINOUS INTENSITY is the CANDELA. It is a measure of light output in a given direction. A uniform point-source with a luminous flux of 4 lumens has an intensity of one candela in every direction.

The unit of LUMINANCE is the CANDELA per SQUARE METRE of apparent surface in a given direction. Luminance is the intensity per unit area of a surface (by emittance or reflection) in a given direction. It should not be confused with *illuminance*.

The LUMINOUS EFFICACY of a lamp is measured in LUMENS per WATT. Note that the power dissipated by a discharge lamp may not be the same as its named rating. Also, to calculate circuit efficacy, it is necessary to take into account both lamp power and ballast losses.

Fig. 1.6. The CIE chromaticity diagram



Quantity	Quantity symbol	Unit	Unit symbol
Luminous Intensity	I	Candela	cd
Luminous Flux	ϕ	Lumen	lm
Illuminance	E	Lux	lx
Luminance	L	Candela per sq. metre	cd/m ²
Luminous Efficacy	η	Lumen per Watt	lm/W

Notes: ϕ is the Greek letter phi (pronounced fie).
 η is the Greek letter eta (pronounced eeta).

COLOUR

1.6 Colour Appearance

CIE chromaticity co-ordinates

The CIE chromaticity system (see CIE Recommendation No. 15) permits the specification of colour appearance in terms

of two chromaticity co-ordinates x, y (Fig. 1.6). These can be published by a lamp manufacturer for each lamp type, and are calculated from the lamp's spectral power distribution.

Points on the curve marked 1300-24000 may also be specified by colour temperature.

Colour Temperature

Colour temperature is a term used to describe the colour of a near-white light source by comparing it with the colour of a full radiator. The temperature of the full radiator, in Kelvin, at which a colour match is obtained, is said to be the colour temperature of the source.

The curve formed on the CIE chromaticity diagram by plotting the chromaticities of a hypothetical full radiator at various temperatures, is known as the full radiator locus. Any source that has a chromaticity on this locus may be specified by a colour temperature.

A source not on the locus but near it can be

described by means of its 'correlated' colour temperature, that is, the temperature of the full radiator at which its colour resembles most closely that of the source.

1.7 Colour Rendering

In order to be able to compare the colour rendering characteristics of various types of light source, the concept of a colour rendering index, based on the appearance of a number of test colours under different illuminants, was introduced by the CIE (CIE Recommendation No. 13). The average of the colour differences occurring when the test colours are alternately illuminated, first by the lamp under test and then by a reference source, provides a measure of the colour rendering properties of the test

source.

The general colour rendering index is calculated for an average of 8 surface colours and is also referred to as the Ra 8 index. The value of the index varies from 50 to 100. The value 50 corresponds to the colour rendering of the original Warm White fluorescent lamp. The maximum value of 100 is only likely to occur when the spectral distributions of the test source and the reference source are identical. The reference light source used for sources with a correlated colour temperature of 5000K and below is a full radiator of the nearest colour temperature. (Above 5000K, the reference source is 'reconstituted' daylight of the appropriate colour temperature).

Part 2 LAMPS AND LUMINAIRES

LAMPS

2.1 Lamp Types

Electric lamps fall into seven principal families (Fig. 2.1b). This part reviews the principal types in each category. For more detailed information see the Data Sheets. The characteristics of the principal types are summarised in the Table: (Fig. 2.1a).

descence. The higher the temperature the greater will be the portion of radiation falling within the visible region of the spectrum. Tungsten wire is used because of its relatively high melting point.

The luminous output and life of filament lamps vary with applied voltage. For further details see the Data Sheets.

2.2 Incandescent Lamps

(a) Principles

Almost all incandescent lamps produce light because of the passage of current through a filament which is heated to incan-

(b) Tungsten Halogen Lamps

Tungsten Halogen have bromide or iodide added to the gas filling. This re-cycles tungsten and enables the filament to be operated at a higher temperature for a given hours rating, and hence at a higher efficacy.

Fig. 2.1a Characteristics of principal lamp types.

Light Source	Dimming Facility	Restrike time (mins)	Efficacy	Colour Rendering	Lifetime	Initial Costs	Ra8	Colour Temp. K
Incandescent (normal lamps)	yes	0	moderate	excellent	moderate	low	100	2700-2900
Pressed-glass (incandescent)	yes	0	moderate	excellent	medium	low	100	2700-2900
Tungsten halogen	yes	0	moderate	excellent	medium	relatively low	100	3000
Fluorescent	yes	0	high	good	long	medium	50-100	2700-6500
Mercury	no	> 4	high	medium	long	high	20-47	3750-4500
Metal halide	no	4-5	high	good	long	high	65-70	4000-4600
Sodium (high pressure)	no	> 4	very high	medium	long	high	12-29	1950-2250
Sodium (low pressure)	no	7-12*	very high	poor	long	high	—	—

*With ignitor type circuits quick restriking is possible.

(c) Lamps with Internal Reflectors

Reflectorised lamps have increased in variety.

Some lamps also have a refractive finish to the front glass. Pressed glass lamps have more efficient reflectors and more controlled beams.

(d) Photographic and Projector Lamps

Photographic and studio lamps have light output of nominal colour temperature of 3400K or 3200K to match the sensitivity characteristics of photographic materials. Projector lamps are constructed with precise filament size and position for high

Fig. 2.1b The seven principal families of lamps.

Filament Lamps	<i>(Including Tungsten Halogen)</i>	
Fluorescent Lamps	<i>(including SL)</i>	
Low Pressure Sodium	Low Pressure	DISCHARGE LAMPS
High Pressure Sodium	High Pressure	
High Pressure Mercury		
High Pressure Mercury Blended		
Metal Halide		

NOTES:

1. *Fluorescent Lamps incorporate a low-pressure discharge, but the majority of the light output is from phosphors.*
2. *High Pressure Mercury Blended Lamps have some light output from a filament.*
3. *In the U.S.A. high pressure discharge lamps are known as high-intensity discharge lamps (H.I.D. lamps).*

efficiency in appropriate optical systems. The requirements of high colour temperature and high light output entail relatively short nominal lives. All recently introduced types are tungsten halogen lamps.

(e) Infra-Red Lamps

A characteristic of all incandescent lamps is the preponderance of short wave infra-red emission. This is used to advantage in lamps especially designed for heating applications, with high efficiency of conversion of input power into radiation, and with almost instant response.

2.3 Discharge Lamps

(a) Low Pressure Sodium

In these lamps sodium metal is vaporized to a low pressure and produces monochromatic yellow light with very high efficacy.

(b) High Pressure Sodium

These lamps operate with sodium vapour at high pressure and produce a golden white light. The discharge tube is of aluminium oxide.

(c) High Pressure Mercury

These lamps operate with a mercury vapour arc at high pressure. The light from the arc is

supplemented by light from phosphors activated by ultra-violet radiation.

(d) Metal Halide

These lamps are similar to high pressure mercury lamps but contain metallic halides, e.g. of thallium, indium and sodium. This enables the lamp designer to tailor the spectral power distribution. Lamps of different makes are not interchangeable.

(e) Mercury Blended

These lamps combine a high pressure mercury discharge tube with a tungsten filament. The filament acts as a ballast to the discharge tube and also increases emission at the red end of the spectrum.

2.4 Fluorescent Lamps

The fluorescent lamp is physically a low pressure discharge lamp, but is regarded as a separate category of lamp because the majority of the light is produced by phosphors activated by the discharge. The phosphors are coated on the inside of the envelope and can be blended to give the lighting properties desired.

A range of 'colours' is available. There is a choice of colour appearance (e.g. cool or warm). There is also a choice of colour rendering.

LUMEN DEPRECIATION AND 'LIFE'

2.5 Lumen Depreciation

The depreciation of light output of filament lamps is about 10% over life. The rate of depreciation of light output of discharge lamps and fluorescent lamps varies from type to type, and usually lies between 2% and 6% per thousand hours, following the 2000 hour point. See Fig. 2.5. Note that if two lamps have the same 2000 hour output, the lamp with the better maintenance has the lower 100 hour output.

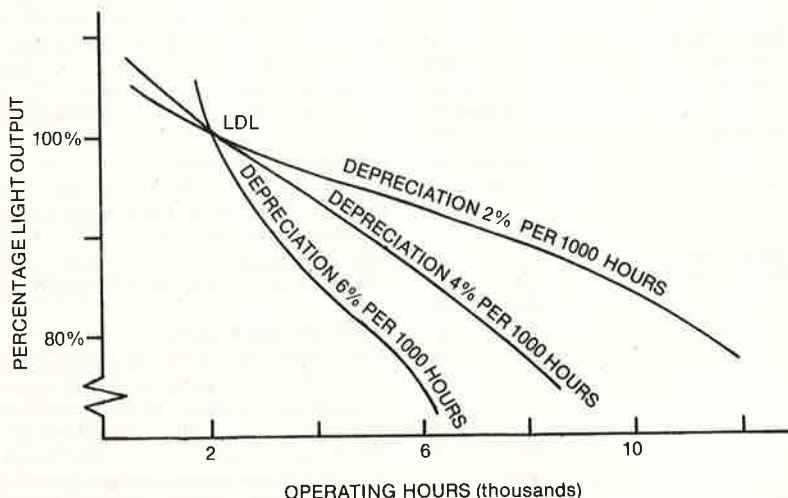
From 0 to 100 hours output is not stable, and the 'Initial' lumen value is measured at 100 hours: from 100 hours to 2000 hours light output falls exponentially. The output at 2000 hours is known as the LDL value (LDL = Lighting Design Lumens), since this is the base value for lighting calculations. To find the light output halfway through a lamp's service period, calculate the depreciation below the 2000 hour level (U.K. practice) or below the 100 hour level (Continental practice). Both methods give the same results but the 2000 hour calculation has the advantage of being linear. See also Section 5.2.

2.6 Lamp Life (Service Period)

When applied to lamps, the word 'life' has two distinct meanings:

- Filament Lamps – life is the time after which the lamp ceases to operate (electrical life). The rated life of common types is defined in Standards and is based on a compromise between duration and efficacy (a longer life lamp must have lower efficacy). Life expectancy in a practical installation is strongly affected by supply voltage variations – see Data Sheet PL 1789
- Fluorescent and Discharge Lamps – life is the time after which light output has dropped to a level at which it is more economic to replace the lamp than to let it consume electricity (economic life, service period). Lamps should be replaced as a group after the economic time. The replacement period may in practice be determined by a limit for maintained illumination level – see Section 5.4. (Note: claims in U.S. publications are based on electrical life.)

Fig. 2.5
TYPICAL LUMINOUS DEPRECIATION CURVES
FOR DISCHARGE AND FLUORESCENT LAMPS



CONTROL GEAR FOR LAMPS

2.7 Ballasts for Discharge Lamps

All discharge lamps require a means of controlling their current. The device used is known as a ballast, and on 50Hz supplies

usually takes the form of an inductor. Some discharge lamps require also an ignitor, for starting.

2.8 Ballasts for Fluorescent Lamps

Fluorescent lamps, like discharge lamps, require a ballast. The most common circuit is the Switch Start circuit, in which the main elements are the ballast and a starter. When the starter contacts close, the lamp electrodes are pre-heated. The starter contacts then open, and the inductive pulse from the ballast helps to start the lamp.

A recent development is the Electronic Start circuit. This combines the absence of

moving parts of Starterless circuits with the low losses of the Switch Start circuit.

2.9 Capacitors

The principal use of capacitors in lighting circuits is in shunt across the supply terminals, to increase the Power Factor. (Note: $PF = W/VA$). Shunt capacitors do not affect the lamp circuit. They reduce the supply current but not the power consumption. The tolerance on their capacitance is 10%.

Fig. 2.11a Classification according to luminous flux distribution.

Luminaire class	Flux distribution about horizontal %	
	Above	Below
Direct	0 – 10	90 – 100
Semi-direct	10 – 40	60 – 90
General-diffuse	40 – 60	40 – 60
Direct-indirect	40 – 60	40 – 60
Semi-indirect	60 – 90	10 – 40
Indirect	90 – 100	0 – 10

Fig. 2.11b Classification in terms of maximum spacing/mounting-height ratio.

Luminaire class	Max spacing/mounting-height ratio
Highly concentrating	Up to 0.5
Concentrating	0.5 to 0.7
Medium spread	0.7 to 1.0
Spread	1.0 to 1.5
Wide spread	Over 1.5

LUMINAIRES

Luminaires are described in detail in the data sheets. Here some of the ways of classifying luminaires are explained.

2.10 Guide to fuse rating

The following is a guide to fusing circuits supplying discharge lamps and their associated control gear i.e. SON, SOX, HPL, HPI and ML.

When circuits containing discharge lamps are switched on, the current drawn from the supply can be split into three stages:-

1. A surge current lasting a few milliseconds.
2. The starting current which changes over a few minutes to –
3. The running current. This is the steady current after the lamp has stabilised.

The surge current is due partly to the charging current of the power factor correction capacitor and partly to lamp rectification during starting. Once the arc has been struck, the starting current will begin to flow.

As the lamp warms up, the lamp voltage rises and the lamp current gradually falls. (For a low pressure sodium lamp running on an autoleak transformer, the lamp voltage begins high then falls).

The fuse that is used to protect the circuit must be capable of withstanding all the above currents, but in practice meeting the requirement of (1) will usually mean that (2) and (3) are also met.

The surge current (1) will depend on the lamp type and ballast type, the number of lamps per circuit, the shunt capacitance, and the impedance of the mains supply.

For example, the surge current could be up to 25x the starting current for the first 3 milliseconds after switch on, dropping to 7x the starting current during the next two seconds. This is for a single circuit. Where multiple circuits are connected to the same fuse, the surge current will be multiplied by the number of circuits.

When designing an electrical installation according to the 15th edition of the IEE wiring regulations, the fuse rating is determined using the time/current curve. This is primarily to ensure that the required disconnect time is achieved and the electrical installation is protected against overload. Having decided on the appropriate rating of fuse it should then be checked that the surge current can be handled: This is also done using the time/current curve for the particular fuse.

e.g. A400W SON Lamp circuit has a starting current of 3.0 amps.

The surge current for a single circuit would be $25 \times 3.0 = 75A$; for two circuits, a surge current of up to $2 \times 75A = 150A$ would have to be allowed for.

If we assume that based on the starting current, a fuse rating was initially chosen of 8A. Using the time/current curves shown opposite it can be seen that a surge of 150A for 3 milliseconds only just falls inside the range of an 8A fuse and it would be advisable to

move up to a 16A rating.

This of course means that the fuse rating may be higher than the expected value if just the starting current(s) are considered. Increasing the fuse rating will also mean the size of cable used in the installation should be checked to ensure that it is compatible with the higher fuse rating.

Apart from applying specifically to fuse ratings, surge and starting currents should be taken into consideration when choosing switching equipment to control discharge lighting equipment. Switches should be rated for inductive currents – sometimes denoted by the letter X in the rating.

As a guide, the following table shows suggested fuse ratings for the range of Philips Discharge Lamp Circuits. The ratings are based on the time/current curves continued in BS88: Part 2: 1975* Specification for Cartridge Fuses for Industrial Purposes – and are chosen from the following range.

4A 6A 8A 10A 12A 16A 20A 25A 32A 40A 50A 63A 80A 100A 125A

Fig. 2.10

Lamp Wattage \ No. of Circuits	FUSE RATING (BS 88)					
	1	2	3	4	5	6
50	4	4	6	6	8	8
70/80	4	6	6	8	10	10
100/125/150	6	6	8	10	10	12
250	10	10	12	16	20	25
400	16	16	20	25	25	32
700	16	20	25	32	40	50
1000 (LV)	20	25	32	40	50	60
2000 (LV)	25	50	63	80	100	125
2000 (HV)	20	32	40	50	63	80

If more than 6 circuits are fed from a single fuse, it is possible the starting current requirement will take precedence over the surge current requirement. The fuse should then be rated according to the individual starting current and number of circuits.

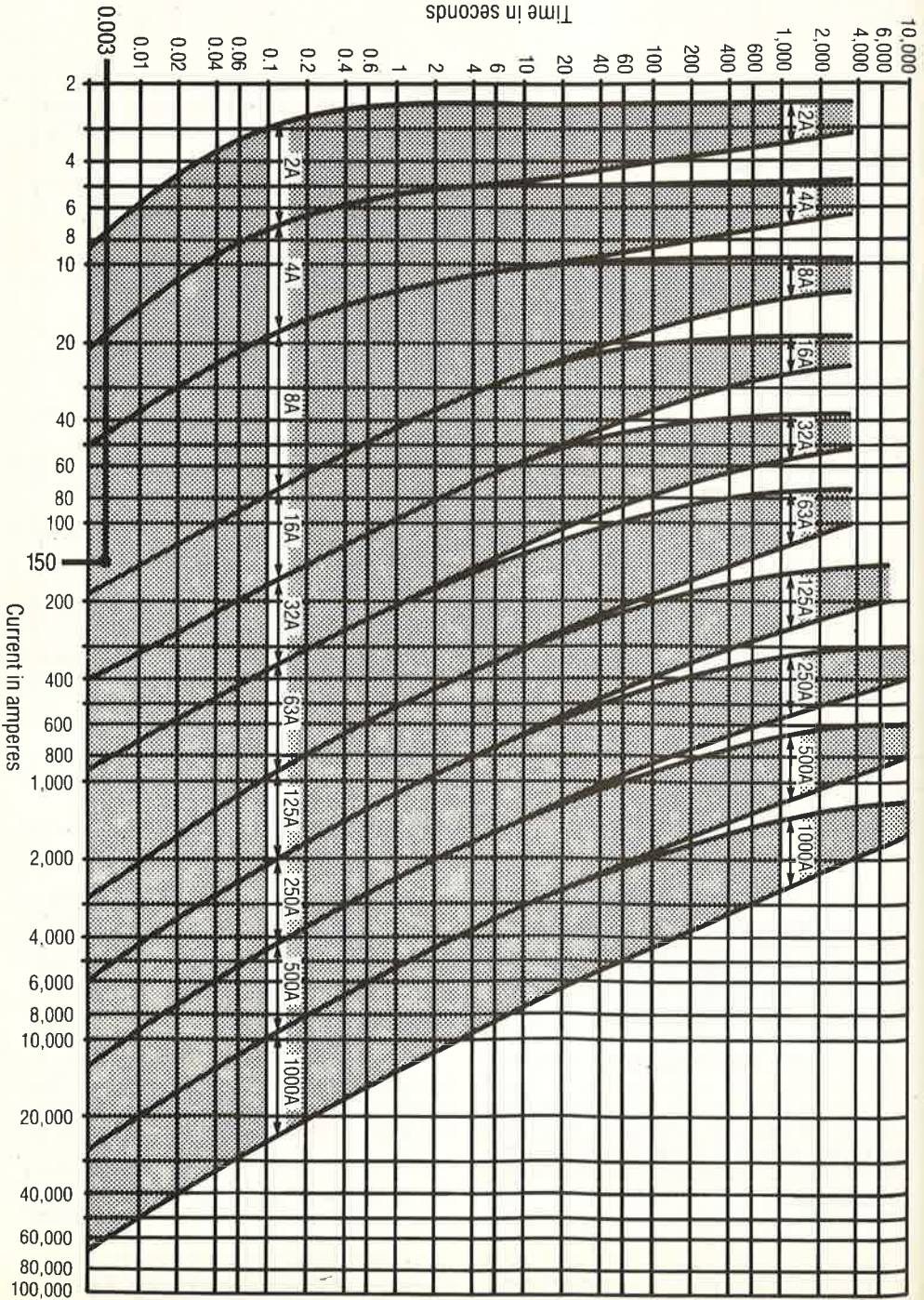
Similar data for domestic cartridge fuses is contained in BS1361, where a different range of standard fuse ratings are used.

5A 15A 20A 30A 60A 80A 100A

The following table shows suggested fuse

ratings for single circuits; for multiple circuits the above standard should be consulted.

Lamp Wattage	Fuse Rating (BS 1361)
50	5A
70/80	5A
100/125/150	5A
250	10A
400	15A
700	20A
1000	20A



Where circuit breakers are used, the surge current requirement must also be met i.e.
 25 x Circuit Start Current for the first 3 milliseconds
 7 x Circuit Start Current for the first 2 seconds.

NOTE: Low voltage lamps (LV) are those designed for operation on 240V supplies, High Voltage lamps (HV) are those designed for operation on 415V supplies.

For circuits with fluorescent lamps, it has been found to be adequate to calculate fuse ratings on the basis of steady current only. Surge Currents can be ignored provided that fuses with a steady current rating less than 3A are not used.

The information contained here is for guidance only.
 If in doubt, please contact Technical Services Dept., Philips Lighting where further guidance can be obtained.
 * Material from BS88: Part 2: 1975 is reproduced by permission of the British Standards Institution from whom complete copies can be obtained.

2.11 Photometric Classifications

Luminous flux distribution. Luminaires for general indoor lighting are classified by the CIE in accordance with the percentage of total luminous flux distributed above and below the horizontal. See Fig. 2.11a.

Distribution of direct component. Industrial lighting luminaires can be

Fig. 2.13

Derivation of the two IP Classification numerals. Numerals used for luminaires are in **bold type**.

<i>Degrees of protection indicated by the first characteristic numeral</i>		
First characteristic numeral	Short description	Degree of protection Details of objects which will be 'excluded' from the enclosure
0	Non-protected	No special protection
1	Protected against solid objects greater than 50mm	A large surface of the body, such as a hand (but no protection against deliberate access). Solid objects exceeding 50mm in diameter
2	Protected against solid objects greater than 12mm	Fingers or similar objects not exceeding 80mm in length. Solid objects exceeding 12mm in diameter
3	Protected against solid objects greater than 2.5mm	Tools, wires, etc., of diameter or thickness greater than 2.5mm. Solid objects exceeding 2.5mm diameter
4	Protected against solid objects greater than 1.0mm	Wires or strips of thickness greater than 1.0mm Solid objects exceeding 1.0mm in diameter
5	Dust-protected	Ingress of dust is not totally prevented but dust does not enter in sufficient quantity to interfere with satisfactory operation of the equipment
6	Dust-tight	No ingress of dust

classified according to the distribution of their direct component of light. The classification is derived from maximum spacing/mounting-height ratios. See Fig. 2.11b

BZ Classification:

Luminaires are classified according to the way that their Direct Ratio varies with Room Index, see CIBS Tech. Mem. No. 5. The BZ number may be used in calculations of UF for luminaires for which UF tables are not published. A number of common fallacies should be noted. The BZ number is not a figure-of-merit: also, it is not an index of intensity distribution or of luminance distribution. (The BZ number has however been borrowed for the IES system of glare calculation, which is at present under revision).

2.12 Classification by protection against electric shock

The following notes are a guide to the official definitions, which can only be interpreted in conjunction with detailed requirements for construction.

Class I: A luminaire with an earthing terminal, and so constructed as to comply with the requirements of BS 4533 for protection against electric shock. Usually, protection is by a metal enclosure bonded to the earthing terminal.

Class II: A luminaire without an earthing terminal, and so constructed as to comply with the requirements of BS 4533 for protection against electric shock. Usually, protection

Degrees of protection indicated by the second characteristic numeral

Second characteristic numeral	Short description	Degree of protection
		Details of the type of protection provided by the enclosure
0	Non-protected	No special protection
1	Protected against dripping water	Dripping water (vertically falling drops) shall have no harmful effect
2	Protected against dripping water when tilted up to 15°	Vertically dripping water shall have no harmful effect when the enclosure is tilted at any angle up to 15° from its normal position
3	Protected against spraying water	Water falling as a spray at an angle up to 60° from the vertical shall have no harmful effect.
4	Protected against splashing water	Water splashed against the enclosure from any direction shall have no harmful effect.
5	Protected against low-pressure water jets	Water projected by a standard nozzle against the enclosure from any direction shall have no harmful effect.
6	Protected against heavy seas	Water from heavy seas or water projected in powerful jets shall not enter the enclosure in harmful quantities
7	Protected against the effects of immersion	Ingress of water in a harmful quantity shall not be possible when the enclosure is immersed in water under defined conditions of pressure and time
8	Protected against submersion	The equipment is suitable for continuous submersion in water under conditions which shall be specified by the manufacturer.

is by two separate barriers of insulating material. Class II equipment bears a mark consisting of a square in an outer-square.

- Notes: 1. Class 0 luminaires have no earthing terminal and have reduced protection against shock. By law, Class 0 equipment is not permitted in the U.K.
2. Class III luminaires derive protection against shock by being for use on safety-type extra-low voltage supplies.

2.13 Classification according to enclosure

Luminaires are classified according to the type of protection against ingress of dust and moisture. The type of compliance is indicated by the letters IP followed by two numerals, the first referring to dust and the second to moisture. (Note: the two numerals should be pronounced separately.) The full classification for equipment in general is listed in Fig. 2.13.

The IP system supersedes the earlier classification of equipment as "rainproof" etc. accompanied by marking with symbols. Normally, the only IP classifications relevant to luminaires are:

IP 23	IP 24	IP 25
—	IP 54	IP 55
—	IP 64	IP 65

2.14 Classification for Explosive Zones

Places where explosive gases may be present (e.g. in a refinery) are designated by the authorities as Zone 1 (high risk) or Zone 2 (low risk). In both these zones only specially protected luminaires may be used. The following is a guide to the meaning of the classifications: the classification of each type of luminaire must have the approval of the appropriate certifying authority.

ex 'd': luminaire so constructed that internal hot gases cannot reach the external atmosphere. Note: this classification corresponds to the previous 'flameproof'.

ex 'e': non-sparking luminaire for TLX fluorescent lamps.

Type N: non-sparking luminaire for bipin fluorescent lamps (also for filament and discharge lamps).

Only ex 'd' and ex 'e' luminaires are permitted in Zone 1: all the above three luminaires are permitted in Zone 2.

Luminaires for explosive zones are not necessarily suitable also for adverse conditions of dust and moisture. The IP classification also must be considered.

Part 3

PHOTOMETRIC DATA FOR LUMINAIRES

3.1 Published Photometric Data

This Part provides explanatory notes on Philips published photometric data for luminaires. It deals with the standard form of presenting data for indoor luminaires used in regular arrays (e.g. fluorescent lamp luminaires). For explanatory notes on data for Roadlighting lanterns see PL 8180

Photometric measurements are made in accordance with the British Standard (BS 5225 Part 1). Calculations are in accordance with CIBS Technical Memorandum No. 5.

The heading identifies the luminaire and states whether the measurement was made with the luminaire suspended or on the standard ceiling board. For most fluorescent lamp luminaires, because of thermal effects, output is higher suspended than ceiling mounted.

3.2 Polar Curves

The curves indicate the shape of intensity distribution, usually in the Transverse and Axial planes. (The curves should not be scaled - intensity tables are available on request). The value of nadir intensity (i.e. intensity vertically downwards) may be added, e.g. 120 cd/1000 lm (candelas per thousand lumens total of the lamps). Flux in cumulative zones is quoted in accordance with the CIE code.

3.3 Limits for Spacing

The CIBS (IES) Lighting Code recommends limits for acceptable diversity of illuminance. The minimum repeated illuminance in an installation (i.e. in the central area) should not be less than 80% of the average illuminance.

To keep within this limit, luminaires should not be spaced further apart in either direction than SHR MAX (the maximum ratio of the centre-to-centre spacing to the mounting height above the horizontal plane).

For linear luminaires it is assumed that the mounting height does not exceed the length of the luminaire. Otherwise, it may be necessary to mount the luminaires closer axially. Special care should be taken if the intensity distribution in the axial plane is concentrating. A useful rule is that the ratio

of the gap to the mounting height should not exceed S-1, where S is SHR MAX.

If linear luminaires are mounted end-to-end (or nearly so) it may be possible to increase the spacing between rows above the limit of SHR MAX. The limit becomes SHR MAX TR, i.e. the limit in the transverse direction for end-to-end mounting.

Published limits are calculated for direct illuminance only. The limits may be slightly exceeded where there is a high indirect component.

The nominal spacing (SHR NOM) is the nearest rounded value (integral multiple of 0.25) which is less than SHR MAX. SHR NOM is the spacing normally selected for calculation of e.g. tables of Utilization Factor.

3.4 Light Output Ratio

The light output ratio is quoted on the basis of LORL, i.e. ignoring the characteristics of the ballast. It should be multiplied by each Service Correction Factor. DFF may be derived from DLORL ÷ LORL : similarly for UFF. FFR is equal to ULORL ÷ DLORL.

UFF = Upward flux fraction

DFF = Downward flux fraction

FFR = Flux fraction ratio

3.5 Utilization Factors

Utilization factors are quoted in tabular form, usually for the floor cavity, i.e. UF(F). The factors are calculated for an ideal room, which is square and has the luminaires in regular square array (at SHR NOM) with half-spacing at the walls. Utilization factors must be multiplied by each Service Correction Factor.

For the use of Utilization Factors in lighting calculations see Section 5.5.

3.6 Service Correction Factors

These factors are described in Section 5.7. They should be applied to values of UF and light output ratios: also to values of intensity and luminance.

3.7 Glare Data

Glare information is listed according to the CIBS (IES) system. The BZ classification is quoted for a Room Index of 2.5 and for a spacing of SHR NOM. It should be noted that the BZ classification is based on Direct

Ratio, and is not an Index of intensity distribution or of luminance distribution, and is not a figure of merit. There is no allowance in the BZ system for run-back of luminance near the horizontal, nor for the softening effect of a halo of light around the luminaire. While it is important to avoid

glare, the BZ system should not be applied mechanically so as to reject luminaires that would be in practice satisfactory.

If a luminaire has a run-back in luminance (e.g. a louvred luminaire) a BZ number for glare purposes would, in effect, be less than the number based on Direct Ratio.

Part 4 INTERIOR LIGHTING DESIGN

4.1 Information for lighting designer

Because of the importance of design in the lighting installation for a new building, there should be close collaboration between the architect, the client, the lighting designer and the heating and air-handling engineer.

4.2 Lighting Objectives

The most important aim when designing the lighting installation for a room in which work is to be carried out is the provision of good visual conditions at the working plane. This plane is not necessarily horizontal.

A secondary aim should be the creation of a complete visual environment that will have a positive influence on the performance and well-being of the occupants.

4.3 Illumination Levels

Recommendations for service illuminances can be found in the complete schedule of the CIBS (IES) Lighting Code for Interiors. Fig. 4.3 is a summary of parts of that schedule.

Fig. 4.3 Examples of recommended service illuminances. For complete schedule, refer to CIBS (IES) Lighting Code for Interiors. 'Service'—see Section 5.1.

	Code service illuminance (lux)	Examples of area or activity
General lighting for rooms and areas used either infrequently and/or casual or simple visual tasks	20	Exterior circulation areas
	30	Outdoor stores, stockyards
	50	Exterior walkways and platforms, indoor car parks
	75	Docks and quays
	100	Theatres and concert halls, hotel bedrooms, bath rooms
	150	Circulation areas in industry, stores and stock rooms
General lighting for working interiors	200	Simple tasks.
	300	Rough bench and machine work; general processes in chemical and food industries, casual reading and filing activities
	500	Medium bench and machine work, motor vehicle assembly, printing machine rooms; general offices, shops and stores
Additional localized lighting for visually exacting tasks	750	Proof reading; general drawing offices, offices with business machines
	1000	Fine bench and machine work, office machine assembly, colour work; critical drawing tasks
	1500	Very fine bench and machine work, instrument and small precision mechanism assembly, electronic components, gauging and inspection of small intricate parts May be partly provided by local lighting
	2000	Minutely detailed and precise work, e.g. very small parts of instruments, watch making and engraving operating area in operating theatres 2000 lux minimum

Fig. 4.4. Lighting Systems

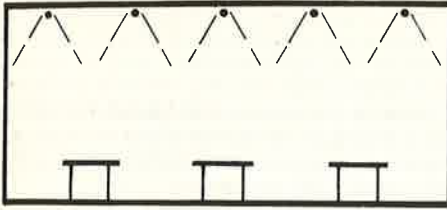


Fig. a. General lighting

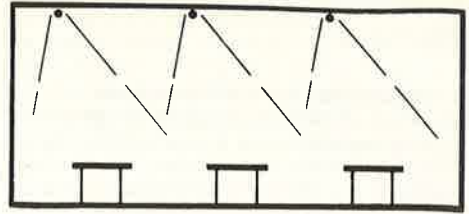


Fig. b. Directional lighting.

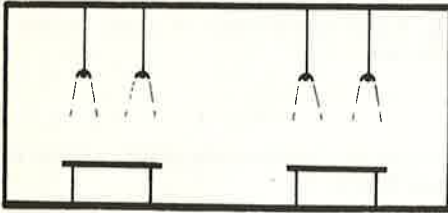


Fig. c. Localized lighting

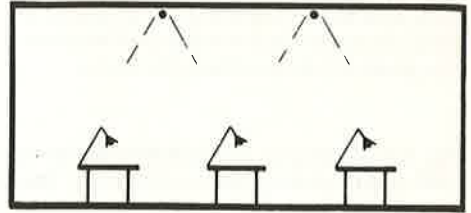


Fig. d. Local lighting

4.4 Lighting Systems

The most common lighting systems are shown in Fig. 4.4.

a. General Lighting

General lighting is obtained by placing a number of luminaires in a more or less regular arrangement over the whole ceiling area (Fig. 4.4a). The result is a horizontal illuminance of a certain average level and with adequate uniformity.

General lighting, which gives uniform lighting conditions, should be used for rooms in which there are no fixed working places – especially offices where the layout of desks and furniture may frequently change.

b. Directional Lighting

This term is used to describe lighting in which the light comes predominantly from one direction (Fig. 4.4b).

c. Localized Lighting

This type of lighting (Fig. 4.4c) is useful for localized working areas in factories, where the production equipment is not likely to be moved.

d. Local Lighting

Local lighting (Fig. 4.4d) is useful when:

- The work involves very critical visual tasks.
- The viewing of forms or textures requires that the light comes from a particular direction.
- The general lighting, due to obstructions, does not penetrate certain areas.
- Higher illuminances are necessary for the benefit of older workers or workers with reduced visual performance.

Local lighting should essentially be used to supplement general lighting, and not as a means of effecting economies in general lighting. (If work stations with in-built lighting are transferred, subsequent occupants will have inadequate lighting.)

4.5 Glare

Glare, either direct or reflected, can occur if luminaires or windows are too bright compared with the general brightness within the interior.

Fig. 4.5 illustrates the glare zone within which the luminance of luminaires should be restricted to avoid direct glare i.e. between 5° and 30° below the horizontal plane of the luminaires.

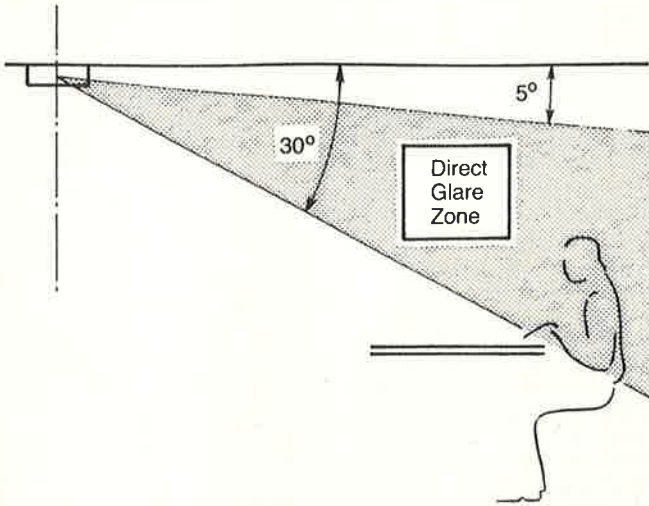
The IES Glare Index system, described in CIBS (IES) Technical Report No. 10, attempts to evaluate the degree of discomfort glare for some interiors. It does not however allow fully for the luminance distri-

bution of luminaires and of adjacent surfaces, and is being revised.

Reflected Glare and Veiling Reflection

If light sources are reflected by objects having glossy surfaces, light patches occur which may obscure the details of the objects. If the patches are bright the effect is called reflected glare. If the effect is a reduction of contrasts within the area of the task it is referred to as veiling reflection.

Fig. 4.5. Direct glare zone



Part 5
CALCULATION OF AVERAGE
ILLUMINANCE – THE
'LUMEN METHOD'

Part 5 CALCULATION OF AVERAGE ILLUMINANCE – THE 'LUMEN METHOD'

5.1 The 'Lumen Method' formula

The lighting level of workrooms and offices is usually prescribed in terms of the average illuminance on a horizontal working plane considered to be at the height of the work above the floor (normally 0.85m) and covering the entire floor area.

By the Lumen Method, the average illuminance is calculated from:

$$E = \frac{F \times UF \times MF}{A}$$

where:

E = Average illuminance over the working plane (lux). Calculated for average output through lamp service and halfway through a cleaning cycle, i.e. **service illuminance** (see Fig. 4.3).

F = Total luminous flux of the lamps. LDL or a lower value (see 5.2 and 5.4).

A = Area of working plane (sq. metres).

UF = Utilization Factor for the luminaire, the spacing, and the room.

Note: Printed values of UF must first be multiplied by the appropriate Service Correction Factors (See Section 5.7).

MF = Maintenance Factor for the installation. (See Section 5.3.)

In some instances it may also be necessary to apply Correction Factors for abnormal conditions, e.g. low supply voltage, high ambient air temperature, absorption by tall furniture.

Worked Example

An office measuring 6 metres × 10 metres is illuminated by 15 single lamp luminaires each housing lamps with a light output (service) of 4800 lumens. The decor is light in colour. What will be the average illuminance assuming the MF is 0.9, the corrected UF is 0.5, and that the lamps are group replaced?

$$E = \frac{(15 \times 4800) \times 0.5 \times 0.9}{6 \times 10}$$

$$E = 540 \text{ lux.}$$

5.2 Lamp Output for Lighting Calculations

For the purpose of standard lighting calculations the value to be adopted for lamp light output is the average light output

during the relevant service period. For fluorescent and discharge lamps, data sheets show declared lumen outputs based on measurements at 2000 hours. Because the light output curve is not linear during the first 2000 hours, this value represents the average output over approximately the first 6000 hours and is known as the LDL value. (LDL = Lighting Design Lumens). For the simplest calculations it has been common for lighting designers to adopt the LDL value without further adjustment. (Note: the 100 hour value, if published, must not be used in the same way.)

If the lamp replacement period is to be greater than 6000 hours, as is usual, the reduced value of average light output has to be calculated. The percentage reduction from the LDL value is:

$$d \left(\frac{R}{2} - 2 \right) \%$$

where:

d is the lamp's depreciation rate in percent per thousand hours.

Notes: 1. depreciation may be taken as linear after 2000 hours.

2. If **d** is not known, **d = 4** may be taken for common lamps.

R is the replacement period in thousands of hours.

Example:

The planned replacement period is to be 8000 hours and for the lamp selected **d = 4**; then, the LDL value should be reduced by 8%.

It should be noted that **d** for Colour 80 Series lamps is less than for ordinary fluorescent lamps. For discharge lamps, luminous depreciation curves are included in the data sheets.

If the lighting installation is not to have planned replacement, the average time to electrical failure may be over 10,000 hours.

The lamp light output must be calculated for the 5000 hour point or later. This increases the number of lamps required, and the running costs will be increased proportionately. In almost all instances, planned replacement will be found to be more economic (See Section 5.4).

5.3 Maintenance Factor

For lighting calculations the lighting designer has to select an appropriate Maintenance Factor. This factor is the ratio of the illuminance halfway through a cleaning cycle to what the illuminance would be if the installation was clean. Thus, the Maintenance Factor allows for depreciation of illuminance due to dust and dirt on the lamps, the luminaires and the room surfaces: it does not allow for depreciation in the light output of the lamp, which is assessed separately (See 5.2 and 5.4).

Sometimes lighting designers use fixed values of MF (e.g. MF = 0.8 for commercial installations). This practice is deprecated, since it produces over-design for an installation which is to be regularly cleaned, and produces under-design for an installation where there is no cleaning schedule. Guidance on the assessment of Maintenance Factors is contained in CIBS (IES) Technical Report No. 9.

Installations should be regularly cleaned for reasons of hygiene. In addition, adoption of regular cleaning permits the lighting designer to raise the MF, e.g. from 0.8 to 0.9. For the two values quoted, there would be a saving of approximately 10% in capital costs (luminaires and installation time), and also in running costs (electrical energy and number of replacement lamps). The cleaning cycle should be planned to fit in with the lamp replacement cycle.

5.4 Effect of lamp replacement cycle

In all but the smallest installations, it is sensible to replace the lamps as a group, at planned intervals. The following comments refer to replacement of fluorescent lamps, but apply also to the majority of discharge lamps. The advantages of planned replacement are as follows. Item 6 explains the connection between lamp replacement cycle and lighting calculations by the Lumen Method.

1. Labour cost can be substantially reduced by phasing the replacement cycle to fit the cleaning cycle.
2. Where lamp quantities are large, special discount and delivery arrangements may be possible.
3. Where there would be an interruption to a production process, replacement can be planned for a non-production period.
4. Lamps will be of matching output and colour, initially and over the service

period.

5. Replacing lamps before electrical wear-out reduces the possibility of failure of control gear.
6. The value of lumens to be used in lighting calculations is increased compared with the value applicable to random replacement. (See Section 5.2.) This means that the installation will require fewer luminaires, with consequent savings in capital costs and running costs. Savings in electricity cost alone are likely to be greater than the extra cost of replacing lamps at shorter intervals.

The optimum replacement period depends partly on the energy costs and labour costs of the particular installation. The theoretical rule is that the lamps should be group-replaced when the cost of wasted energy has become as high as the cost of lamp replacement. A further limit, often adopted as the practical rule, is that lamps should be replaced before their output has depreciated 20% below the LDL value (corresponding roughly to 30% below Initial value). If the depreciation rate of a particular lamp is not known, a rate of 4% per thousand hours may be taken.

Random early failures have negligible effect on the general illuminance but considerable effect on local illuminance. They should be replaced promptly.

5.5 Utilization Factor

The Utilization Factor UF(F) can be regarded as an indication of the effect of the lighting equipment and the interior combined in producing horizontal illuminance. For example, a UF of 0.3 means that the lumens reaching the horizontal plane are 30% of the lumens of the lamps operated bare under standard conditions. The UF allows for the direct illuminance and for the indirect illuminance due to reflections from room surfaces.

The Utilization Factor is dependent on:

- Light distribution of the luminaire.
- Light output ratio of the luminaire.
- Reflectances of the ceiling, walls and floor.
- Room index.
- Arrangement of the luminaires in the room.

For each type of luminaire the Utilization Factor is given in the Photometric Data Sheets as a function of room index and of selected reflectances for room surfaces. If

Fig. 5.5 Example of table of utilization factors

Utilization Factors UF (F) at SHR NOM

Room Reflectances			Room Index								
C	W	F	0.75	1.0	1.25	1.5	2.0	2.5	3.0	4.0	5.0
70	50	20	X	X	X	X	X	X	X	X	X
	30		X	X	X	X	X	X	X	X	X
	10		X	X	X	X	X	X	X	X	X
50	50	20	X	X	X	X	X	X	X	X	X
	30		X	X	X	X	X	X	X	X	X
	10		X	X	X	X	X	X	X	X	X
30	50	20	X	X	X	X	X	X	X	X	X
	30		X	X	X	X	X	X	X	X	X
	10		X	X	X	X	X	X	X	X	X
0	0	0	X	X	X	X	X	X	X	X	

Multiply by each Service Correction Factor

the reflectances are not known, the combination, ceiling = 70%; walls = 50%; floor = 20% is usually taken as typical for rooms having rather light surface colours.

Note: if later the room is given a dark decor, the illuminance will be reduced.

Luminaire data sheets carry UF tables as illustrated in Fig. 5.5.

The following should be noted:

1. The UF entries are to be read as decimals. for example, 37 represents 0.37.
2. The UF entries must be multiplied by each Service Correction Factor (See Section 5.7).
3. 'Floor' reflectance refers to the floor cavity reflectance, at the horizontal plane. It does not refer e.g. to the published reflectance of tiles or carpets. Floor reflectance should not normally be taken as over 20%, and is often nearer 10%.
4. Similarly, 'ceiling' reflectance refers to the ceiling cavity. 'Walls' are the portions between the two planes. (Allow for the effect of windows.)
5. A UF table is calculated for square spacing, usually at SHR NOM - See section 3.3. If luminaires are spaced closer, the UF will be slightly reduced: it would be wise to multiply the published value by 0.95.
6. Allow for non-standard spacing at the

walls. See C.I.B.S. Tech. Mem. 5.

7. Unless otherwise stated, UF refers to the UF of the floor cavity, i.e. UF (F).

5.6 Room Index

The room index is a means of representing the proportions of a room. The RI is calculated from the following equation.

Note: All dimensions must be consistent, e.g. metres throughout.

$$RI = \frac{L.W}{M(L+W)}$$

where:

M = Mounting height above the working plane.

The working plane is usually regarded as 0.85m above the floor.

L = Length of room

W = Width of room

Worked Example

Length L of room = 10m.

Width W of room = 6m.

Mounting height above the working plane = 2.75 minus 0.85m.

$$RI = \frac{60}{1.9 \times 16} = 2.0 \text{ approx.}$$

Note: for long narrow rooms point-by-point calculations may be more reliable.

Fig. 5.7 Example of table of service correction factors

Service Correction Factors

	36W 1200mm	58W 1500mm	70W 1800mm	100W 2400mm	
Length Factor	0.98	1.00	1.02	1.03	
Colours 80 Factor	1.02	1.02	1.02	1.02	
38mm Factor	0.97	0.97	0.97	1.00	
Ballast Lumen Factor	0.97	0.99	0.96	0.99	

5.7 Service Correction Factors

For fluorescent lamp luminaires, each UF table should be accompanied by a table headed 'Service Correction Factors'. Fig. 5.7 shows a typical table. The service correction factors give the corrections which should be made to the basic UF value obtained from the UF table:

- (i) a correction to be used if the luminaire length selected is different from that for which the photometric information was measured.
- (ii) a correction for using a Colour 80 Series lamp in this particular luminaire instead of a halophosphate lamp.
- (iii) a correction to be used if a 38mm dia. lamp is used instead of the 26mm dia. lamp measured.
- (iv) a correction for the extent to which the ballast provides power to the lamp. According to design, ballast lumen factor (BLF) usually varies between 0.92 and 1.02. Where there is a choice of SS (switchstart) or XS (starterless) ballast, these are shown separately.

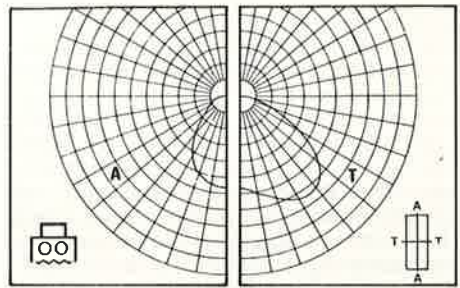
Note: Some luminaire manufacturers do not publish BLF. Where the information is not available it may be wise to assume 0.95.

SPACING/HEIGHT RATIO (SHR)

5.8 Maximum Spacing/Height Ratio

Once UF is known, the required number of luminaires may be calculated, and then the spacing. It should be checked that the spacing does not exceed limits such as SHR MAX. See Section 3.3. If luminaires are close-spaced, the UF will be slightly lower than as calculated in UF tables (since these are based on SHR NOM).

Fig. 5.9 Example of polar curve showing 'widespread' intensity distribution in the transverse plane.



5.9 Wide Spacing

Some luminaires, notably the 'WideSpread' range of fluorescent luminaires, have a widespread transverse light distribution (Fig. 5.9), which allows these luminaires to be spaced apart more widely transversely than many conventional luminaires. Where the room proportions permit, economies in installation costs can be made by reducing the number of rows required.

There is a further consideration. Luminaires having conventional light distributions with limited spacing/height ratios often make it impossible to design down to CIBS (IES) Code lighting levels. The result is that the schemes are over-designed, providing higher illuminances than necessary. Wide-Spread distributions provide the opportunity to spread the rows and to reduce the number of luminaires to the calculated number, while meeting Code limits on diversity of illuminance.

At a wider average spacing the UF values are slightly higher than the UF values at a closer spacing. This implies a slightly smaller quantity of luminaires being required for a given illuminance.

Part 6 POINT-BY-POINT CALCULATIONS

6.1 Calculation of illuminance at a point

Where sources can be regarded as 'small' sources (i.e. their size is small relative to the distance) the Inverse Square Law and Cosine Rule are used to calculate the illuminance. (Fig. 6.1a.)

This relation can be expressed as follows:

$$E = \frac{I \cos^3 \theta}{D^2}$$

Where:

E = Illuminance at a point P.

I = Luminous intensity of the source towards the point.

D = Distance from source to point.

θ = Angle between the line of the incident light and a line at right angles to the surface at the point i.e. a 'normal'.

Note: θ is the Greek letter theta (pron. 'theeta'), and is used to denote angles.

When the point on the surface is displaced to one side of a light source (Fig. 6.1b), it is easier to express D in terms of H and the equation then becomes:

$$E = \frac{I \cos^3 \theta}{H^2}$$

Where:

E = Illuminance at the surface at P.

I = Luminous intensity of the source towards P.

H = Mounting height of the source above P.

θ = Angle between the line of the incident light and a line at right angles to the surface at the point. This is equal to the angle between the vertical through the source and the line from the source to P.

(i) The angle θ can be determined by trigonometry or by drawing to scale and using a protractor.

(ii) Values of $\cos^3 \theta$ are listed in the table. (Fig. 6.1c).

(iii) Given the angle θ , the luminous intensity value I may be read from the intensity table of a luminaire.

Fig. 6.1c

Table of selected values of $\cos^3 \theta$

θ	$\cos^3 \theta$	θ	$\cos^3 \theta$
0°	1.00	50°	0.27
5°	0.99	55°	0.19
10°	0.96	60°	0.13
15°	0.90	65°	0.08
20°	0.83	70°	0.04
25°	0.74	75°	0.02
30°	0.65	80°	0.00
35°	0.55	85°	0.00
40°	0.45	90°	0.00
45°	0.35		

Fig. 6.1a. Illuminance at a surface due to 'small' source

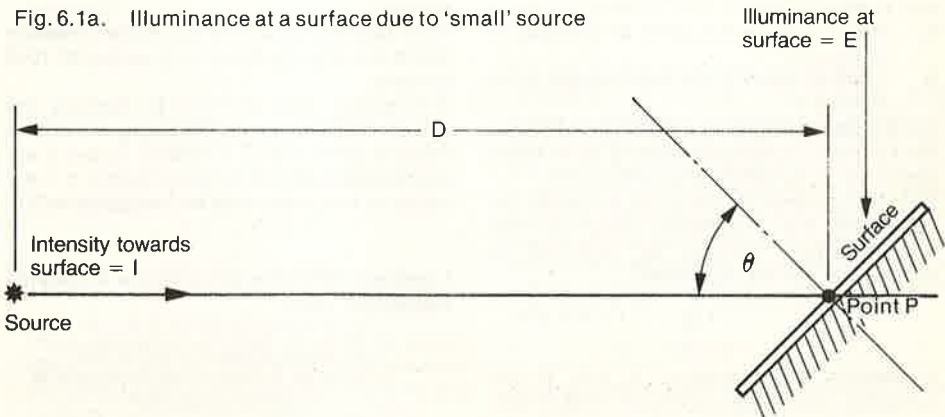
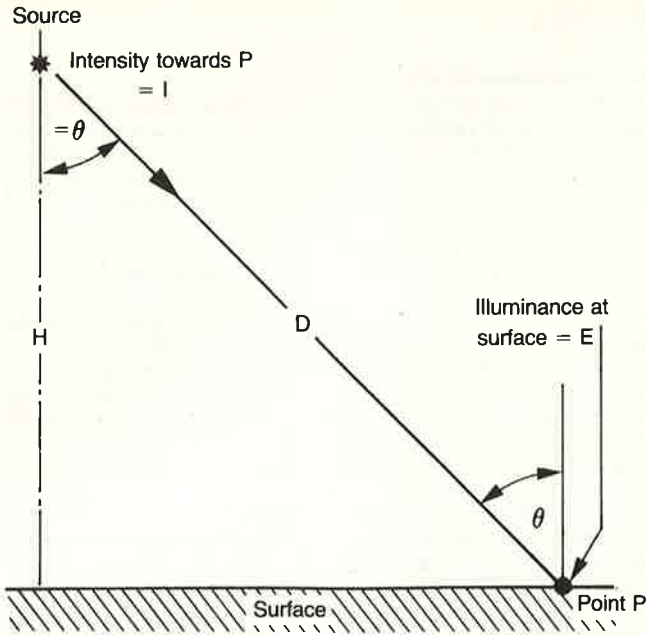


Fig. 6.1b. Illuminance at a point not beneath the source



6.2 Worked Example

A chemical plant requires an illuminance of 300 lux at an inspection cover in a pit. Due to chemical plant obstructions the inspection cover receives illumination from two luminaires A and B only:

- and B only:
- A directly above the cover at a height of 10 metres.
 - B 7 metres away at the same height of 10 metres.

For the general lighting it is proposed to use the Hermes 2 luminaire housing SON 400W lamps set at lampholder position zero.

Will the general lighting be sufficient to illuminate the inspection cover or will supplementary lighting be required to provide the 300 lux specified?

$$\text{By trigonometry, } \frac{7}{10} = \tan \theta = 0.7$$

$$\therefore \theta = 35^\circ$$

Intensities for luminaires A and B are obtained from the luminous intensities

table provided on the Hermes 3 data sheet. See also Fig. 6.2.

The 'elevation angle' in the first column corresponds to the angle θ used in the calculation. All planes in azimuth are similar.

Note that the values of luminous intensity relate to a standardised lamp output of 1000 lumens.

This means that we have to multiply the values once for every thousand lumens in the real lamp output. The lamp output is assumed to be 45,000 lumens; therefore every value in the table must be multiplied by 45.

Luminous Intensity of luminaire A towards inspection cover

Lampholder position 0; $\theta = 0^\circ$

Luminous Intensity = 45×570

Luminous Intensity for luminaire A
= 25,650 candelas

Fig. 6.2. Luminous intensities (cd/1000lm) for Hermes 3 luminaire with SON 400W lamp.

Elevation Angle	Lamp Position				
	0	1	2	3	5
0	570	470	372	301	189
5	570	474	377	307	192
10	562	476	387	320	205
15	546	478	403	343	231
20	515	467	413	369	271
25	461	438	406	381	310
30	387	388	378	370	330
35	298	318	328	337	328
40	218	245	265	286	305
45	148	175	200	226	263
50	88	109	132	156	202
55	44	57	74	93	134
60	21	27	35	45	73
65	10	13	16	20	33
70	6	7	7	9	14
75	4	4	4	5	6
80	2	3	2	3	3
85	1	2	1	2	2
90	1	1	1	1	1

Luminous Intensity of luminaire B towards inspection cover

Lampholder position 0; $\theta = 35^\circ$

Luminous Intensity = 45×298

Luminous Intensity for luminaire B
= 13,410 candelas

Two inverse square law calculations are required:

Contribution at P from luminaire A

$$E = \frac{I}{H^2} \times \cos^3 \theta,$$

$$E = \frac{25,650}{10^2} \times 1.0 = \frac{25,650}{100}$$

$E = 256$ lux from luminaire A

Contribution at P from luminaire B

$$E = I \times \cos^3 \theta,$$

$$E = \frac{13,410}{100} \times 0.55$$

$E = 73$ lux from luminaire B

Total illuminance from A plus B equals $256 + 73 = 329$ lux. This is sufficient to meet the specification provided that the lamp and reflector have a high maintenance factor.

6.3 Calculations for line and area sources

Such calculations are beyond the scope of these pages. For details see text books, (e.g. Light Calculations and Measurement by Keitz), or the Lighting Design Handbook published jointly by the Lighting Industries Federation and the Electricity Council. Also see CIBS (IES) Tech. Report No. 11.

6.4 Isolux diagrams and lux tables

Computerised design programmes have made it possible to produce economically and quickly design aids (e.g. isolux diagrams) for applications such as interior and exterior floodlighting, sports lighting, road-lighting, interior lighting for offices or for high and low bay industrial areas.

An isolux line is a line on the working plane where illuminance has a constant value. (Fig. 6.4.)

Such diagrams can be produced for all types of luminaire, e.g. tubular fluorescent, high

bay discharge floodlights, road lighting lanterns, plotted to a scale to match the scale of the plans of the building or area, to allow direct reading of the illuminances. In the example shown, the isolux diagram for a fluorescent luminaire has been placed on the plan of the lighting installation over the point P where an illuminance check is required. The total illuminance at P is determined by summing the contributions from surrounding luminaires which are

touched by an isolux line. In this example the sum is $40 + 10 + 5 + 5 = 60$ lux per 1000 lamp lumens. Similar isolux diagrams can be produced for floodlights mounted at various mounting heights and aimed at different angles. Alternatively, lux tables can be produced for areas such as tennis courts, play areas, minor league football and rugby pitches, practice areas, etc. For example see Figs. 6.4a and 6.4b.

Fig. 6.4. The use of an isolux diagram to determine the horizontal illuminance at a point. Lux per thousand lumens.

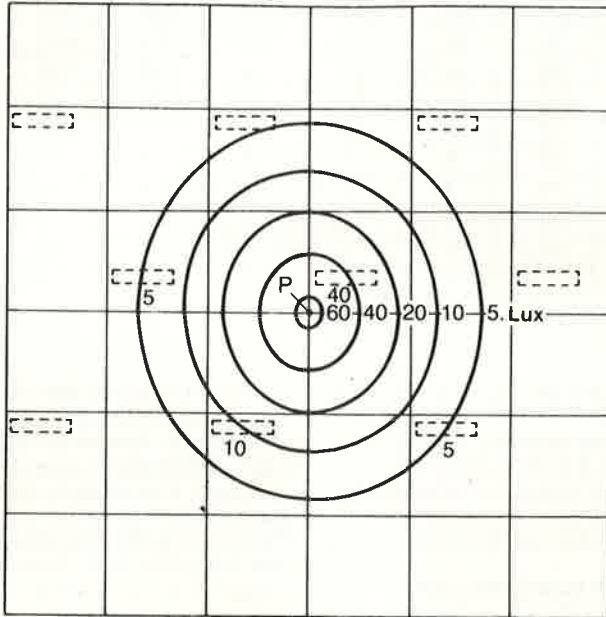


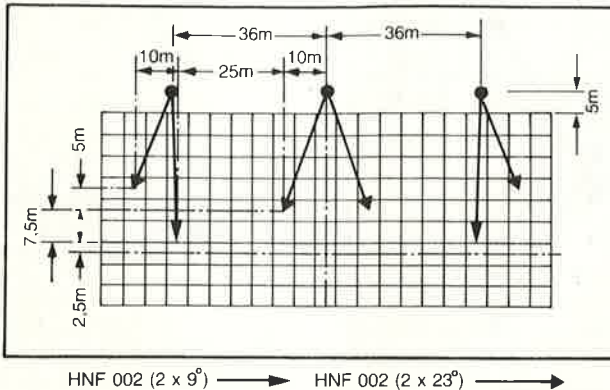
Fig. 6.4a Floodlighting of football training field
(115 lux)

Y-Values	X-Values												
	-30.0	-25.0	-20.0	-15.0	-10.0	-5.0	0.0	5.0	10.0	15.0	20.0	25.0	30.0
50.0	95	92	90	89	103	103	101	103	103	89	90	92	95
45.0	123	130	117	112	124	121	117	121	124	112	117	130	123
40.0	134	149	124	120	144	143	139	143	144	120	124	149	134
35.0	105	123	109	122	158	157	152	157	158	122	109	123	105
30.0	101	108	107	117	146	145	141	145	146	117	107	108	101
25.0	81	91	95	101	122	121	119	121	122	101	95	91	81
20.0	76	90	90	94	108	108	106	108	108	94	90	90	76
15.0	84	100	94	98	108	107	106	107	108	98	94	100	84
10.0	91	119	125	118	114	108	107	108	114	118	125	119	91
5.0	105	165	159	132	113	102	99	102	113	132	159	165	105
0.0	102	151	148	126	108	96	93	96	108	126	148	151	102

Computer-calculated values of the illuminance (in lux) on football field at the positions shown. (X and Y values are in metres).

The X axis coincides with the centre line.

The Y axis coincides with a line drawn through the centres of the two goals.



Plan of part of a football training field showing the positions of the masts and the aiming points of the floodlights.

HNF 002 (2 x 9°) → HNF 002 (2 x 23°) →

LIGHTING INSTALLATION DATA

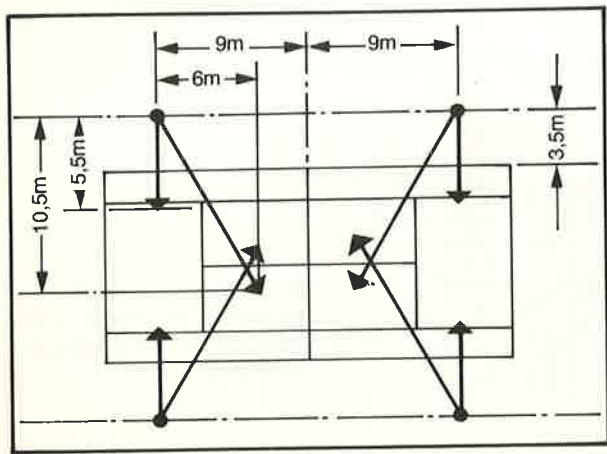
Lamp type	: HPI/T 2000 W/415 V	Mounting height	: 20 m
Floodlight type	: HNF 022, narrow beam and wide beam	Light distribution	: narrow beam 2 x 9° wide beam, 2 x 23°
Number of lamps per floodlight	: one	Luminous flux per lamp	: 190 000 lm
Number of floodlights per mast	: two	Luminous flux installed	: 2 196 000 lm
Number of masts	: six	Arrangement of the floodlights	: see sketch
Total number of lamps	: 12	Average horizontal illuminance	: 115 lux
Total number of floodlights	: 12 (4 narrow beam, 8 wide beam)	Supply voltage	: 415 V
		Total installed load	: 25 kW, ballasts included

Fig. 6.4b Floodlighting of tennis court
Tournament level (300 lux)

Y-Values		-18.0	-16.0	-14.0	-12.0	-10.0	-8.0	-6.0	-4.0	-2.0	0.0	2.0	4.0	6.0	8.0	10.0	12.0	14.0	16.0	18.0
X-Values	9.0	34	62	97	136	184	198	193	189	171	162	171	189	193	198	184	136	97	62	34
	7.0	44	84	139	196	261	277	264	260	236	228	236	260	264	277	261	196	139	84	44
	5.0	53	95	149	218	285	314	312	294	268	253	268	294	312	314	285	218	149	95	53
	3.0	61	106	161	240	310	349	341	322	292	276	292	322	341	349	310	240	161	106	61
	1.0	64	108	167	241	305	338	339	322	304	296	304	322	339	338	305	241	167	108	64
	-1.0	64	108	167	241	305	338	339	322	304	296	304	322	339	338	305	241	167	108	64
	-3.0	61	106	161	240	310	349	341	322	292	276	292	322	341	349	310	240	161	106	61
	-5.0	53	95	149	218	285	314	312	294	268	253	268	294	312	314	285	218	149	95	53
	-7.0	44	84	139	196	261	277	264	260	236	228	236	260	264	277	261	196	139	84	44
	-9.0	34	62	97	136	184	198	193	189	171	162	171	189	193	198	184	136	97	62	34

Computer-calculated values of the illuminance (in lux) on court at the positions shown. (X and Y values are in metres).

400W SON/T at 12m Wide Beam



HNF 003 (2 x 29°) →

Lighting scheme for a tennis court, showing positions of masts and aiming points of floodlights.

LIGHTING INSTALLATION DATA

Lamp type	: SON/T 400 W/240 V	Light distribution	: wide beam, 2 x 29°
Floodlight type	: HNF 003, wide beam	Luminous flux per lamp	: 47 000 lm
Number of lamps per floodlight	: one	Luminous flux installed	: 376 000 lm
Number of floodlights per mast	: two	Arrangement of the floodlights	: see sketch
Number of masts	: four	Average horizontal illuminance,	
Total number of lamps	: eight	on the court	: 300 lux
Total number of floodlights	: eight	over the total area	: 210 lux
Mounting height	: 12 m	Supply voltage	: 240 V
		Total installed load	: 3.5 kW, ballasts included

Part 7
ENERGY/COST EFFECTIVE
LIGHTING

Part 7 ENERGY/COST EFFECTIVE LIGHTING

This important aspect of lighting is detailed and explained more fully in the Energy Effective Lighting Manual PL8179

7.1 Introduction

Increasing energy costs and the national need for energy conservation have resulted in 'Energy Management' being regarded as an important task in all organisations.

Significant savings in energy consumption, and therefore cost, of providing lighting without reducing standards can be achieved by applying an 'Energy Effective Design' approach to lighting installations.

Many existing lighting installations are far from energy/cost effective; consequently opportunities exist to convert such installations by using more efficient equipment to provide the same, or sometimes better, lighting for a lower energy consumption and cost. Whilst more comprehensive information on this subject is provided in the 'Energy Effective Lighting Manual' this section outlines the key aspects to be considered with respect to energy effectiveness, cost effectiveness, design and appraisal.

Lighting is however a complex matter, inevitably so because of the wide range of equipment and applications. Philips Lighting have therefore set up an Energy Advisory Group with a specific responsibility for seeing that the maximum guidance and help is available to customers in the total area of efficient application of electrical energy and lighting matters.

7.2 Cost elements in lighting

Any programme directed at energy conservation and cost avoidance in lighting is dependent in no small degree upon the identification and understanding of the individual cost elements that make up the total cost of providing lighting. The relationship between the various cost elements is frequently complex. However, let us first look at a simple example:

An ordinary 240V 100W tungsten filament lamp may cost, say 30p. During its 1000 hour life the cost of the electrical energy consumed (at say 4.0p per unit) will be £4.00. Therefore of the total lamp and energy cost expenditure of £4.30 the cost

component attributable to the lamp is 7% and to the energy 93%.

For lighting provision we can identify the following cost elements:

- | | |
|--|------------------------|
| 1. Capital cost of lighting equipment | } Initial capital cost |
| 2. Installation cost (labour and materials) | |
| 3. Cost of replacement lamps | } Operating cost |
| 4. Maintenance, cleaning and lamp changing cost (labour) | |
| 5. Electrical Energy cost | |

For convenience, incurred costs are normally expressed on an annual basis in order that the significance of individual cost sectors in relation to each other and the total cost may be assessed.

A study of the cost breakdown for almost all lighting situations reveals that electrical energy is the major cost element. The very essence of energy management in lighting entails altering the individual cost elements by using more efficient lighting equipment or practices to provide the same (or sometimes better) lighting result for a lower electrical energy consumption and lower total cost.

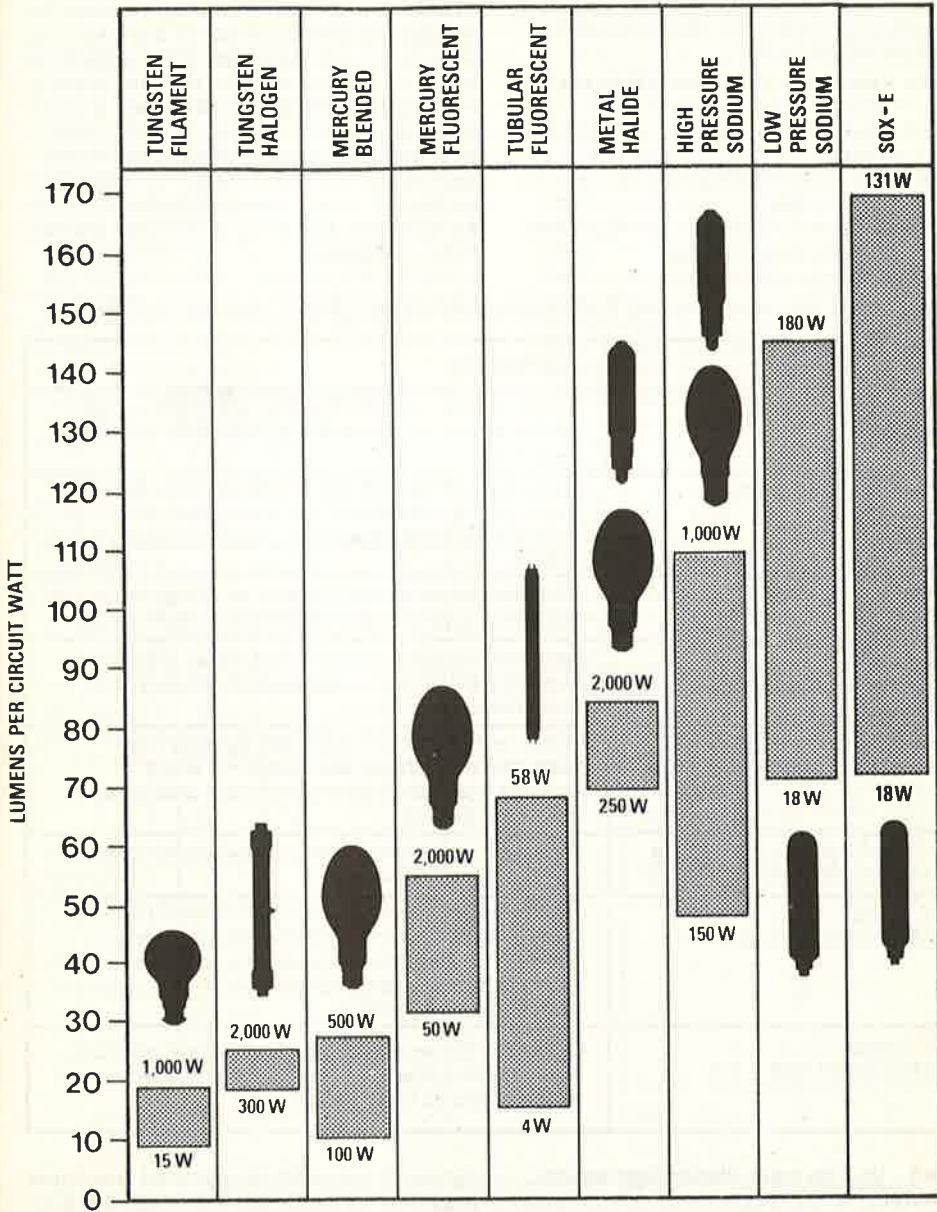
It is probably true to say that the large majority of lighting installations could be improved in terms of cost and energy consumption by the adoption of improved techniques and more efficient equipment. Some changes may require no, or very little capital investment to realise substantial benefits. In other cases investment in new equipment may be needed and evaluation of the capital investment required against the operational savings will be necessary.

Frequently the 'pay back' period is surprisingly short.

7.3 Good, energy-effective lighting – the six basic rules

Section 7.2 clearly indicates the close relationship between energy effectiveness and cost effectiveness. The objective is clearly to provide lighting to the standards,

Fig. 7.3a Lamp types - circuit efficacies - including control gear losses



both quantity and quality, required with the minimum usage of electrical energy; to meet this basic requirement it is necessary to evaluate the equipment, techniques and services available for both existing and proposed installations.

The six basic rules for achieving energy effective lighting are:

- Rule 1 – Use the most efficient light source suitable
- Rule 2 – Use the lamp light output efficiently
- Rule 3 – Maintain lighting equipment in good order
- Rule 4 – Use well designed energy effective lighting schemes

Rule 5 – Control the switching operation and usage of the lighting installation

Rule 6 – Consider the effect of surrounding decor; use light decor where suitable.

There is no simple or standard answer for all lighting situations but if both existing and proposed schemes are looked at logically in relation to the six rules there is little doubt that most situations will provide opportunities for savings in both energy and monetary terms. Whilst the detailed application of these rules is described more fully in the 'Energy Effective Lighting Manual' the following comments provide basic guidance.

Table 7.3b Recommended Energy Effective Lamp Types – Application Guide

Lamp Type	Applications
SOX, low pressure sodium	Road lighting, security lighting, area lighting, etc., where colour recognition/discrimination is not required.
SON, high pressure sodium	Medium/high bay industrial lighting, area lighting, road lighting, etc. where colour recognition/discrimination is required but colour rendering is not critical.
HPI, mercury halide	High bay industrial lighting only where good colour rendering is necessary, stadia/arena lighting, etc.
Colour 84, fluorescent (4000K CRI Ra8=85)	Department store, supermarket, shop, office and industrial lighting. (Combines high efficacy and good colour rendering).
Colour 83, fluorescent (3000K CRI Ra8=85)	Hotel, restaurant and domestic lighting. Also supermarkets, shops, etc. requiring 'warm' appearance (combines high efficacy and good colour rendering).
Colour White 35, fluorescent (3.500K CRI Ra8=58)	Industrial and office lighting where good colour rendering is unimportant.
SL Lamp (2800K CRI Ra8=80)	"Plug-in" replacement for 40W – 100W GLS lamps. A fairly compact lamp type for those applications where GLS lamps would be used – applications in all types of premises but especially in hotel, restaurant and domestic lighting.
PL Lamps (2700 K CRI Ra8 = 81)	Compact fluorescent lamps. Energy/cost effective equivalents to low wattage GLS incandescent lamps. Applications as for SL lamps.

Rule 1 – Use the most efficient light source suitable

It is clearly good sense to use a lamp type which provides the maximum light output

(lumens) per watt of installed electrical load having characteristics which are consistent with the other needs of the installation i.e. suitability.

Whilst the efficacies of each lamp type can be determined from the lamp and circuit data provided in the relevant sections of this Handbook, Fig 7.3a provides a general comparison of the wide range of efficacies attained by the main lamp types.

When designing a new installation the efficacies of suitable lamp types should be compared and those having the highest efficacies used.

When examining existing installations, identify the lamp type being used: if it has a low efficacy then it is possible it could be changed for a more efficient type. In some instances, no alterations are necessary, others may require certain modifications to the installation and/or equipment.

The criteria used to assess the suitability of a lamp type, with respect to the needs of the lighting installations, include:

- colour rendering
- colour appearance
- ratings (lumen outputs) available
- physical dimensions
- operational characteristics

Table 7.3b details the most energy/cost effective lamp types for various applications.

Rule 2 – Use the lamp light output efficiently

This relates to the efficiency of the luminaire in allowing the maximum proportion of the lamp light output to reach the working plane, or surfaces to be illuminated. The LOR (Light Output Ratio) of a luminaire is not, in itself, a measurement of this efficiency, for example a bare fluorescent lamp in a batten luminaire emits light in almost every direction and has a high LOR

but more light will reach the working plane beneath the luminaire if a suitable reflector is fitted to redirect some of the light even though the LOR is reduced. The only meaningful method of assessment is to compare the utilization factors of luminaires for each situation.

A similar method of comparison should be used to assess the efficiency of other types of luminaire for both interior and exterior lighting installations. Extreme care needs to be exercised when selecting luminaires for floodlighting of areas or buildings; the range of light distributions available is considerable and misapplication will result in significant energy wastage and higher costs.

Rule 3 – Maintain lighting equipment in good order

Lighting systems operate efficiently only when they are well maintained. Poor maintenance and the accumulation of dust and dirt reduces the useful light output and so in effect increases the cost. Section 4.3 provides more detailed guidance on this subject with particular reference to the design of new installations but it should be remembered that the purchaser of a lighting scheme intends to pay for the light provided only. Any circumstance which reduces the amount of light output whilst leaving the energy consumption constant is a situation to be avoided. For existing installations it may, in some circumstances, be possible to improve the maintenance schedule, reduce the number of lamp points operating, thus reducing the energy consumption, and still retain the illumina-

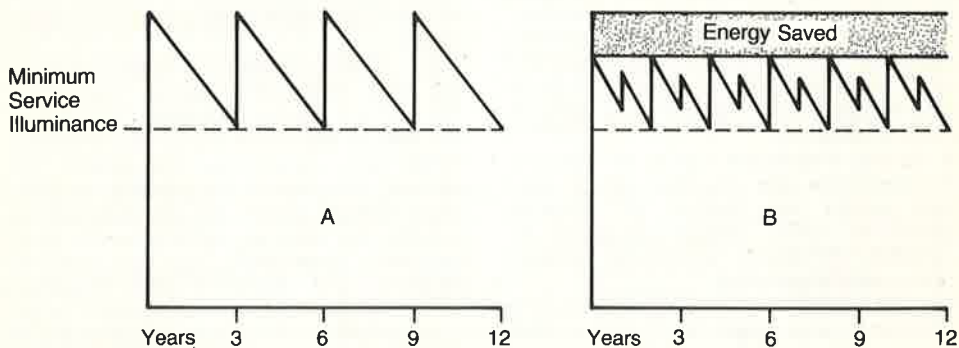


Fig. 7.3b 'A' is typical of an installation in which luminaires are cleaned and lamps changed every 3 Years. In 'B' the luminaires are cleaned annually and lamps changed every 2 years allowing a saving in energy consumption of some 15% due to the need for less installed lighting equipment.

tion level at the desired value. This is illustrated in Fig 7.3b.

Part of the maintenance programme for a lighting installation obviously includes the actual changing of the lamps. The light output of all lamps decreases with time, the rate of reduction in light output depending on the lamp type concerned. Economic considerations generally dictate that the best results are achieved when lamps are replaced as a group, thus minimising the labour costs involved in the physical task of lamp changing especially when combined with cleaning of the luminaire. Equally, it must be remembered that despite the fall in light output, the electrical energy consumption of the lamp remains virtually constant. Consequently, from this point of view, the time is reached when it is cheaper to change the lamp than waste electricity. (See also Section 5.4).

In total, planned maintenance provides the best overall efficiency and with it real economies can be gained. Few would argue against the regular planned maintenance of motor cars to ensure energy/cost effectiveness in terms of miles per gallon. The importance of planned maintenance of lighting installations should be similarly recognised.

Rule 4 – Use well designed energy effective lighting schemes

Certain aspects of this rule, which may be likened to 'bespoke tailoring', are dependent upon, or indeed may influence, decisions made with respect to the other rules. For example the energy effectiveness as well as the capital and operating costs of a lighting installation is dependent upon the scheduling and implementation of a suitable cleaning and lamp replacement programme.

A lighting installation should be 'tailored' to incorporate any available natural daylight within the design; so allowing luminaires within certain zones to be switched off when the natural daylight component is sufficient.

Designs should also allow for variations in occupancy and visual tasks within each area – this applies particularly to open-plan offices and retail premises such as department stores, supermarkets, etc. . . . This is best achieved by using multi-lamp luminaires (3, 4 or 5 lamps) and switching individual lamp ways within each luminaire

according to the illuminance required.

The uses, and therefore the illuminances required, of areas within commercial and industrial premises, often change, e.g. a drawing office to a general office or a machine shop to a storage area. If such changes are likely then it is desirable to use a flexible system such as a pre-wired plug-in lighting trunking system which simplifies and avoids the need for costly alterations to ensure energy effectiveness.

Rule 5 – Control the switching operation and usage of the lighting installation

Controlled switching of the lighting installation offers a number of possibilities for effecting energy saving by adjusting the numbers of luminaires, or lamps within multi-lamp luminaires, according to the amount of natural daylight available or occupancy.

The linking of artificial lighting installations to natural daylight may be accomplished by simple photocell controlled switching or by the more refined method of electronic controllers to vary automatically the amount of artificial lighting added to the natural daylight component.

Where zones within an area, such as an open plan office, are unmanned for periods of the normal working day the lighting should be so designed that it can be selectively reduced to not less than one-third of the normally required illuminance within the unoccupied zones. This is best achieved by using multi-lamp luminaires with locally positioned switches in each zone to control two-thirds or one-half of the lamps in each luminaire.

Rule 6 – Consider the effect of surrounding decor

It should be remembered that the surrounding decor will have a marked effect upon the lighting levels achieved. The lighter the surface decor, the higher the reflection factor and, conversely, the darker the surface, the greater the amount of electrical energy which will be required to provide the required lighting levels. It is frequently overlooked that the colours/finishes, and therefore the reflection factors of furniture and equipment to be installed within the interior will also affect the final result.

7.4 Energy utilisation appraisal of lighting installations

The Energy Effective Lighting (EEL) ratio method

A need exists for a simple method of

measuring the overall efficiency of a lighting installation in terms of the lighting result provided against the electrical energy used to achieve this result. This measurement must be made against a target or objective performance which sets a clear standard of lighting result with MINIMUM ELECTRICAL ENERGY USAGE.

Specifications for lighting schemes or installations will vary widely depending on the application in terms of required illuminance (illumination level) and colour rendering performance, etc.

Irrespective of the specification it is necessary to appraise the installation in terms of electrical energy usage in achieving the desired lighting result against the possible performance that can be obtained. Such an appraisal may be made by the use of:

- (a) A measure of actual performance achieved (or planned for a new installation) measured in terms of electrical load required to provide each 100 Lux of illuminance over each m² of area. (W/m²/100 lux).
- (b) A target performance in the same terms of electrical load to provide each 100 lux of illuminance over each m² of area (W/m²/100 lux). The target performance would represent approximately the best result possible (i.e. the designed lighting result with minimum energy consumption) for the location and installation type. This optimum performance obviously takes into account the individual contributing components of energy effective lighting e.g. efficient light sources/efficient luminaires, both optical and electrical, proper maintenance, good lighting scheme geometry, and surrounding decor.

The measure of the energy effectiveness for a lighting installation can then be derived from the Energy Effective Lighting Ratio (EELR) which is the ratio between (a) and (b).

$$EELR = \frac{\text{Target Performance W/m}^2/100 \text{ lux}}{\text{Actual Performance W/m}^2/100 \text{ lux}}$$

On this basis the objective for any installation must be the achievement of an EEL Ratio which approaches 1.0.

This objective is common for all general lighting situations irrespective of level of lighting or quality specified. The EEL Ratio is purely a measure of how efficiently we use electrical energy to achieve the lighting result we require in relation to the efficiency that could be achieved to obtain the same lighting result with proper scheme planning.

Tables of target performance figures in W/m²/100 lux are provided for various lighting installation types and situations in Table 7.4a.

The target figures provided in the Table are based on the use of the most efficient light sources suitable, the most advanced luminaire designs and modern scheme planning techniques to provide the most economic lighting result.

As more efficient lighting equipment becomes available it will become easier to provide a given illumination at a lower energy consumption, and the target figures will be continuously reviewed to reflect such advances as they become commercially available.

EELR Assessment

The EEL Ratio derived from the procedure outlined above may be assessed by referring to Table 7.4b and it will be seen that an installation having an EEL Ratio of 0.75 or over is a satisfactory situation. Schemes having ratios of 0.51-0.74 cer-

Fig 7.4a INTERIOR LIGHTING Target Performances - Watts/m²/100 lux

Type of Installation	Room Index	Standard and Good Colour Rendering CRI: 50-85	Non Critical Colour Rendering
Commercial Lighting e.g. Offices, Retail Premises	5.0+	2.10	
	4.0-5.0	2.15	
	3.0-4.0	2.27	
Industrial Lighting	5.0+	1.97	1.28
	4.0-5.0	2.03	1.30
	3.0-4.0	2.10	1.34

7.4b EEL Ratio assessment

EELR	ASSESSMENT
0.75 or over	Good
0.51 - 0.74	Review Suggested
0.5 or below	URGENT ACTION NEEDED

tainly merit investigation to see whether energy savings (and therefore monetary savings) can be made. In situations where the EEL Ratio is 0.5 or below, urgent action is necessary. Almost certainly the lighting result achieved in relation to the energy expenditures is unsatisfactory. Examination of the installation will almost certainly reveal areas where substantial savings could be made both in terms of energy and money.

In general it will be appreciated that it becomes more difficult to apply the EEL Ratio assessment in installations where a high decorative lighting content is used or for department stores, etc. using significant quantities of display lighting. Nevertheless, for the general lighting situation, the system is a very valid measure of energy performance.

In commenting on energy effective lighting performances it is to be understood that the installation is assessed in terms of the desired result as expressed in the illuminance achieved. This does not take sole preference over the other lighting scheme quality parameters and reference should be made to the relevant data in the 1977 CIBS (IES) Lighting Code for Interiors, or to Philips Energy Advisory Group for specialist advice.

Calculation of energy wastage

It will be apparent that having derived the EEL Ratio for an existing installation then the difference between the actual EEL Ratio and the best possible EEL Ratio (approx. 1.0) for the installation, provides guidance on the energy wastage.

Then for a given installation,
 $(1.0 - \text{EELR}) \times \text{Total Load (kW)} \times \text{annual operating hours}$

= ANNUAL ENERGY WASTAGE

e.g. An installation is evaluated and has an EEL Ratio of 0.5

Total installed load: 500 kW
 Operating Hours: 3,000 hrs p.a.
 then $(1.0 - 0.5) \times 500 \times 3,000 = 750,000 \text{ kWh}$.
 p.a. WASTE

Then at an electricity cost of £0.04/unit £30,000 is being unnecessarily spent every year on electricity charges for lighting.

If a more efficient lighting installation could be provided giving the same lighting result but having an EEL Ratio of 1.0 then the energy savings of the above order will be realised. An immediate guide is therefore provided for the justifiable financial investment in more efficient lighting equipment to save energy and money without loss of light.

A change to a new lighting scheme may alter some of the basic annual component costs of lighting (e.g. maintenance costs may slightly increase) but a breakdown of annual lighting costs will show that the major factor is always energy cost and a cost reduction in this sector should be the major objective.

7.5 Finance

Financial appraisal

As shown in Section 7.2, the largest single cost element in the provision of artificial lighting is the cost of electrical energy consumed. Therefore, in the vast majority of cases, the most energy effective lighting installation will also be the most cost effective.

Consider the cost elements of a Commercial Office lighting installation in Fig 7.5a. If a more efficient lamp type, i.e. TLD58 is used, in PSM 258 luminaires, the cost elements expressed as a percentage of the total annual cost of Fig 7.5a will be as shown in Fig 7.5b. Comparing the cost elements of alternative solutions in this manner illustrates the differences in annual lighting costs, for the same lighting result, which can occur and provides guidance when designing new, or reviewing existing, lighting installations.

The more cost effective designs for new lighting installations may require slightly higher capital investment; many conversions of inefficient lighting installations to utilise more economical equipment etc. will require some capital investment and such additional investment should be evaluated with reference to the savings in annual operating costs.

Office Lighting – Typical Cost Elements (of Annual Lighting Cost)

Fig. 7.5a

500 lux using twin 75W
Battens plus Diffusers

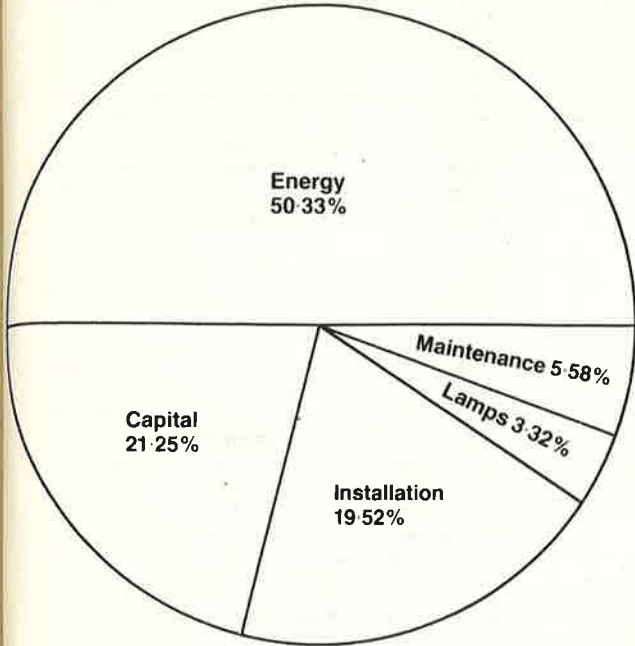
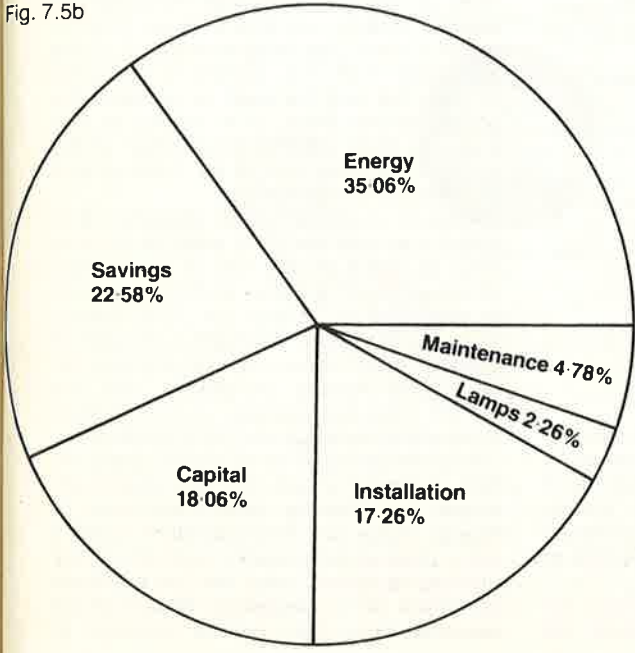


Fig. 7.5b

500 lux using PSM 258 luminaires
with TLD 58W fluorescent lamps



Methods of Evaluation

- (a) The Discounted Cash Flow (DCF) method is appropriate for most organisations as it allows all Taxation and Financing factors to be included and takes into account the rates of interest required and the depreciating value of money.
- (b) Other methods which may be used, possibly in conjunction with a DCF analysis or a simple cash flow statement, are:
 - (i) Pay back period
 - (ii) Return on investment.

Financing Methods

- (a) Outright Cash Purchases – dependent upon current cash flow situation.
- (b) Loan – depends upon availability of money; interest charges to be paid.
- (c) Hire Purchase – interest charges to be paid and will delay receipt of any capital allowances.
- (d) Leasing – also results in interest charges but all payments are of a revenue nature and automatically tax allowable.

Taxation

The following questions need to be considered:

- (a) Will HM Inspector of Taxes regard the investment for a conversion (renewal) on a replacement basis and allow the total cost as a revenue charge?
- (b) How much of the total investment can be considered 'Plant and Machinery' or 'Fixtures and Fittings' and eligible for 100% capital allowance in the first year?
- (c) Will any of the investment be considered to be part of the fabric of the building and, if so, be subject to an industrial buildings allowance claim (where the building is so defined)?

7.6 Management objectives

The general objectives of any energy management programmes are:

- (a) Energy Waste Avoidance
- (b) Cost Avoidance.

The actual task of formulation and implementation of energy saving programmes is frequently regarded as the responsibility of the engineering staff. Effective energy management in fact requires the assistance and co-operation of many other sectors of the energy-using organisation.

When we consider the requirement for energy management in lighting there are

only three basic sectors requiring attention (see Fig 7.6a).

These sectors are:

A review of Lighting Levels and Quality.

The Efficiency in obtaining the required lighting result.

Good Housekeeping applied to the installation.

The best result in each of these sectors will only be derived from the proper co-ordination of the activities of not only the engineering function but Finance, Purchasing, Company Secretariat and operational staff at all levels (Fig 7.6b).

Review of lighting level and quality

It is right that lighting levels in use should be reviewed. In practical terms it may frequently be found that following a review a clear need is established for an increase rather than a decrease in actual lighting levels required. An appraisal of all related factors such as productivity, working environment, etc., will generally show that the current recommended illumination levels indicated in the 1984 CIBS Lighting Code for Interiors are very valid even in today's energy situation.

Efficiency in obtaining the required lighting result

Here we are concerned with the electrical energy used to achieve a given lighting result. Clearly this measurement must be compared with the minimum electrical energy that can be used to achieve the same lighting result. It is helpful at this stage to have detailed knowledge of the current electricity usage for lighting and the charges being incurred.

A general appraisal of the efficiency with which electrical energy is used for lighting may be made by the use of the Energy Effective Lighting Ratio technique, which is described in section 7.4. This energy ratio measurement provides a means of assessing the annual energy wastage for any given lighting installation and the annual financial wastage resulting from such energy wastage may be evaluated.

Where the results of an appraisal using the EEL Ratio technique indicate significant scope for effecting economies both in energy usage and financial terms, then a more detailed engineering analysis of the lighting equipment used and the practices employed will be necessary. Details of the essential rules that must be observed in

Fig. 7. 6a

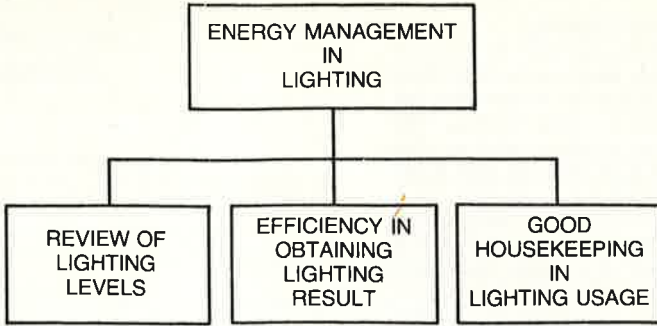
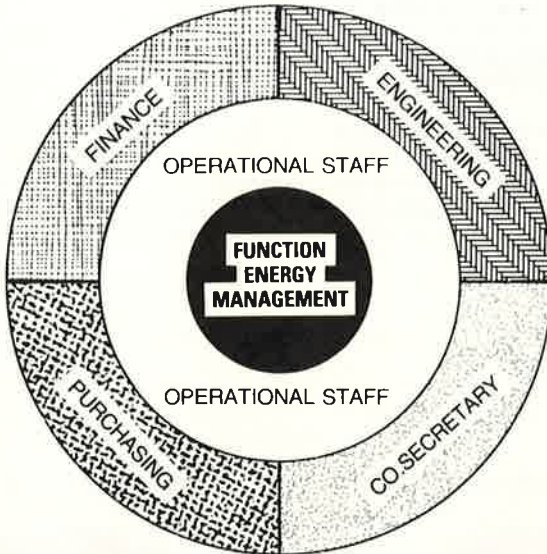


Fig. 7.6b Energy Management



achieving energy effective lighting are given in section 7.3.

Good Housekeeping in lighting

It is probably true to say that much poor housekeeping exists because no individual or group of individuals is responsible for good housekeeping in using lighting. The good housekeeping element requires that light is 'ON' when it is required and 'OFF' when it is not required.

This necessitates that certain operational staff are responsible for seeing that undue wastage is avoided. It is also necessary that operational staff made responsible for good housekeeping are given the opportunity to discuss any installation shortcomings with the engineer responsible.

Frequently one sees examples of installations where economies are not practicable because large banks of lighting are controlled from one switch position. The possibility of wiring alteration to enable good housekeeping practices to be effected should not be ignored. The installation of time switches provides a relatively inexpensive method of ensuring some degree of control. In major installations the use of Automatic Daylight Linked lighting systems can yield substantial economies.

Part 8

FLOODLIGHTING OF BUILDINGS AND MONUMENTS

8.1 Floodlighting techniques

Direction of view. There will generally be several directions from which a building can be viewed, but often a particular one can be decided upon as the main direction of view.

Distance. Viewing distance is important, as this will decide the amount of detail visible on the facade.

Surroundings and background. If the surroundings and background of the building are dark, a relatively small amount of light is needed to make the building lighter than the background (Fig 8.1a).

If there are other buildings in the close vicinity, their lighted windows will give a strong impression of brightness. More light will then be needed for the floodlighting if it is to have any impact. The same is true if, in addition, the background is also bright (Fig 8.1b). Another solution can be found in the creation of a colour contrast instead of a brightness contrast.

Obstacles. Trees and fences around a building can form a decorative part of an installation. An attractive way of dealing with these is to place the sources of light behind them. Two advantages are gained:

firstly, the light sources are not seen by the viewer and secondly, the trees and fences are silhouetted against the light background of the facade. The impression of depth is thereby increased.

Water. The design can also take advantage of any expanse of water in the foreground, such as a lake, moat, river or canal. The lighted building will be reflected in the surface of the water, which serves as a 'black mirror'.

The form of the building. Once the main direction of view has been chosen, the choice of the direction of the light will depend on the shape of the building, or rather on the form of its ground plan or horizontal section. The position of the light sources may then be more or less fixed.

The light should come from a direction across the line of sight. This will provide good modelling as well as making the most of the texture of the building's surface materials.

8.2 Recommended Illuminances

Fig 8.2 gives some recommended illuminances for a number of building surface-materials with surroundings that are either poorly lit, well lit or brightly lit.

Fig. 8.1. A floodlit building with a background that is a) dark, and b) bright.

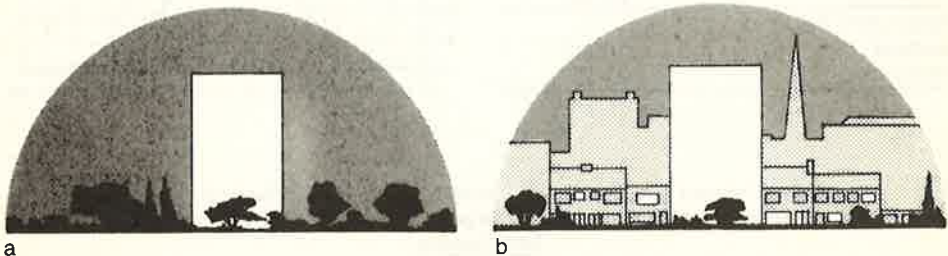


Fig 8.2 Recommended illuminances for flood lighting.

Surface			Illuminance (lux) Surroundings		
Type	Condition	Reflectance	Poorly lit	Well lit	Brightly lit
White brick	fairly clean	0.8	20	40	80
White marble	fairly clean	0.6-0.65	25	50	100
Light-coloured concrete or stone	fairly clean	0.4-0.5	50	100	200
Yellow brick	fairly clean	0.35	50	100	200
Dark-coloured concrete or stone	fairly clean	0.05-0.1	75	150	300
Red brick	fairly clean	0.15	75	150	300
Granite	fairly clean	0.1-0.15	100	200	400
Red brick	dirty	0.05	150	300	—
Concrete	very dirty	0.2	150	300	—

8.3 Floodlighting Calculations

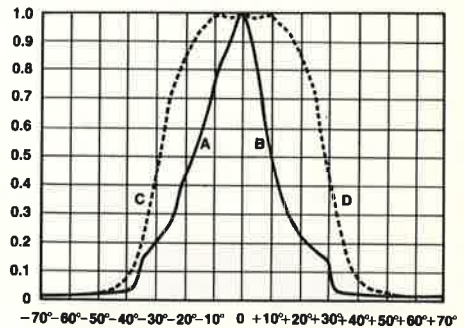
From the photometric data provided on the floodlight data sheets it is possible to calculate the illuminance on a surface by the point by point method.

To use this method it is necessary to know the

intensity of light in a given direction, coming from the floodlight. This can be obtained from the light distribution diagram. First select the diagram for the required beam (narrow, wide etc.), this gives the intensity distribution in two planes as shown below:-

Floodlight

Peak Intensity (cd/1000 lm)	1162
Beam Efficiencies	
Total Beam	63%
Beam to 10% Peak	58%
Beam to 50% Peak	32%
Beam (10% Peak)	
Vertical	31°/35°
Horizontal	2 x 39°
Beam (50% Peak)	
Vertical	10°/17°
Horizontal	2 x 29°



The diagrams are all scaled to 100% of peak intensity, so to convert them into absolute intensity the scale must be multiplied by the peak intensity in cd/1000 lm and by

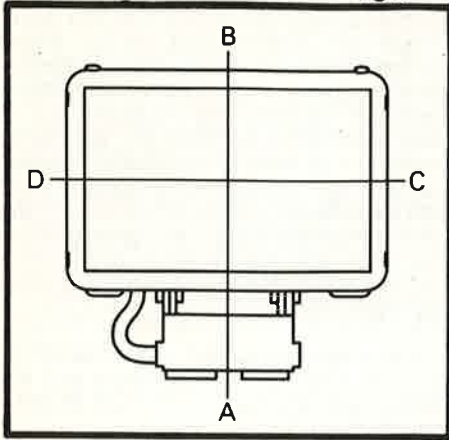
$$\frac{\text{Lamp lumens}}{1000}$$

For the example, with a 300W Halogen lamp:
Peak intensity is 1162 cd/1000 lm Lamp Flux is 5100 lm
Maximum on scale becomes $1.0 \times 1162 \times \frac{5100}{1000} = 5926 \text{ cd}$

For a scale reading of 0.5 the intensity is $0.5 \times 1162 \times \frac{5100}{1000} = 2963 \text{ cd}$

Thus for any of the four planes shown below, the intensity within that plane can be calculated

Planes used for Distribution Diagrams



The method described in Part 6-Point by Point Calculations is then used to determine the illuminance at a point.

Part 9 ROADLIGHTING

9.1 Design Criteria

The purpose of a road lighting installation may ultimately be judged on its ability to reveal objects on the road surface to a driver. This is usually achieved by illuminating the surface of a road in such a way that an object is seen in silhouette against a bright background. There have been a number of attempts to quantify this in terms of a general parameter which indicates the effectiveness of the installation in performing its task. (Visibility Distance, Detection Probability, Revealing Power, Visibility Threshold, Reaction Performance, Detection of Relative Movement).

This work has resulted in certain parameters being set down which specify not only the performance of the road lighting installation but also the level of comfort afforded to drivers. These are:-

Performance

Average Luminance
Overall Uniformity (ratio of minimum to average luminance)
Threshold Increment (Disability Glare)

Comfort

Average Luminance
Longitudinal Uniformity (ratio of minimum to maximum luminance)
Glare Control Mark (Discomfort Glare)

Others

Average Illuminance
Kerb ratio

It is possible to calculate all of these values so the characteristics of a particular installation can be evaluated and compared with the recommended limits.

9.2 Road Surfaces

For us to see the road surface, the light from the lantern will have to be reflected by it. This will create an impression of brightness or luminance, and it is the level and pattern of the road luminance that will effect the visibility of objects on the road surface and the comfort of the driver.

It is appropriate here to describe the reflection characteristics of road surfaces, as this will affect all calculations of road luminance.

A road surface reflects neither specularly (e.g. like a mirror) nor diffusely (e.g. like blotting paper), but as a combination of the two. Because of this it is impossible to describe the reflection characteristics mathematically. In practice they are determined by measurement of an actual sample of road surface, and a reflection table produced which uniquely describes a particular sample. The measurement of road reflectance is called the luminance coefficient (q_0) and is the relation between incident light falling onto the surface (Lux) and the reflected light or luminance coming off of the surface (cd m^{-2}) at a given point on the road. This will be for a given set of incident angles from the lantern and viewing angles from the observer.

These angles are α, β and γ as shown in fig. 9.1. For a typical viewing height and distance α will be between 0.5° and 1.5° and is usually fixed at 1° .

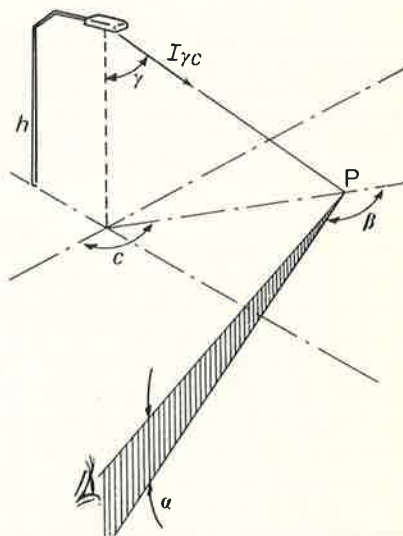


Fig. 9.1. Angles upon which the luminance coefficient is dependent:

- α = angle of observation (from the horizontal)
- β = angle between plane of incidence and plane of observation
- γ = angle of incidence

The lantern intensity (I) varies with C and γ , and the road reflection coefficient (q_0) varies with β and γ

The table of luminance coefficients is then two dimensional relating q_0 with β and γ . An example of such a table is given in Appendix 9.1, reproduced from CIE Publication No. 30, in this case a quantity called the reduced luminance coefficient is given. This is equal to the luminance coefficient (q_0) multiplied by the factor $\cos^3 \gamma$. As will be seen later, this term $q_0 \cos^3 \gamma$ is used directly in the evaluation of luminance. The table also expresses the angle in terms of $\tan \gamma$ rather than γ in degrees.

Alternatively the values may be given in the form of a reflection indicatrix (fig. 9.2). In this figure the length of an arrow drawn in a certain direction (defined by the β and γ angles) gives the value of luminance coefficient for that direction of light incidence.

The luminance coefficient q_0 is measured for a particular point on the road surface and will be used in determining the luminance at that point. In order to simplify the classification of road surfaces, three quantities are selected from the q_0 table which describe the reflection characteristics of a particular sample and can be easily measured. These are used in the simpler calculation of average luminance.

These are:-

$$Q_0 - \text{Average luminance coefficient} = \frac{\int q_0 \cdot dw}{\int dw}$$

(average of q_0 values over solid angle)

$$S1 - \text{Specular factor 1} = \frac{q_0 \text{ at } \beta=0 \tan \gamma=2}{q_0 \text{ at } \beta=0 \tan \gamma=0}$$

$$S2 - \text{Specular factor 2} = \frac{Q_0}{q_0 \text{ at } \beta=0 \tan \gamma=0}$$

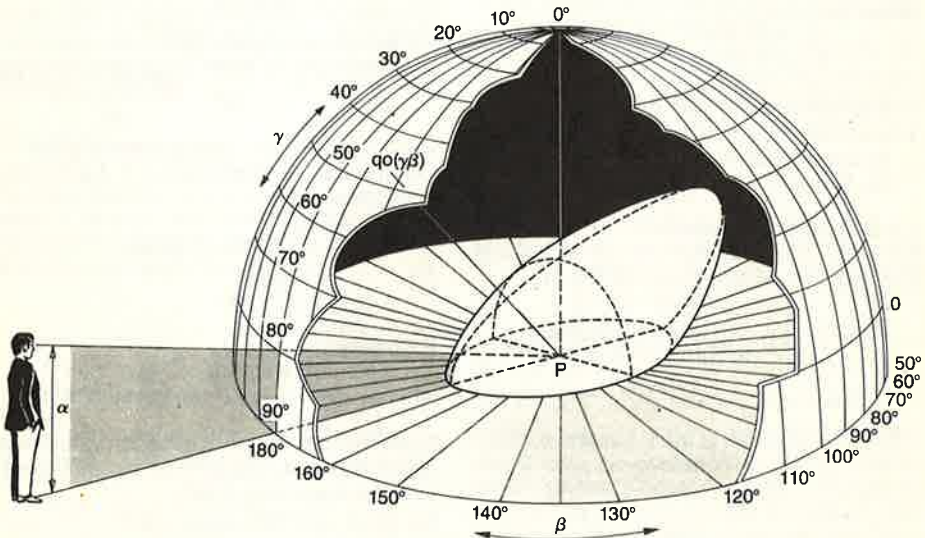


Fig. 9.2. Luminance coefficient indicatrix showing:

- q = luminance coefficient
- β = angle between plane of observation and light incidence
- γ = angle at which the light is incident (from the vertical)

If a single plane is taken through the reflection indicatrix, the influence of the S_1 , S_2 and Q_0 values can be seen.

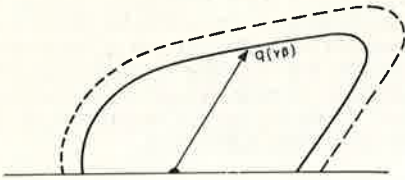


Fig. 9.3a. q -indicatrix through one β -plane with differing Q_0 -values (volume) and constant S_1 and S_2 values.

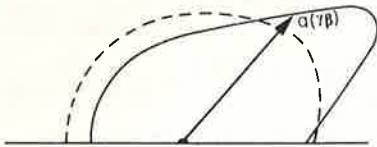


Fig. 9.3b. q -indicatrix through one β -plane with differing S_1 and S_2 values (shape) and constant Q_0 -value (volume)

For the table shown in Appendix 1 these values are:-

- $Q_0 = 0.07$
- $S_1 = 1.11$
- $S_2 = 2.38$

In the subsequent text it is important to differentiate between the two quantities:-

- q_0 Luminance coefficient
- Q_0 Average luminance coefficient

9.3 Calculation Methods

9.3.1 To calculate illuminance at a point (inverse square law) (See section 6)

$$E = \frac{I \cos \gamma}{d^2}$$

Where: E is the horizontal illumination at point P

$$d \cos \gamma = h$$

$$(1) E = \frac{I \cos^3 \gamma}{h^2}$$

I is the intensity of light towards point P

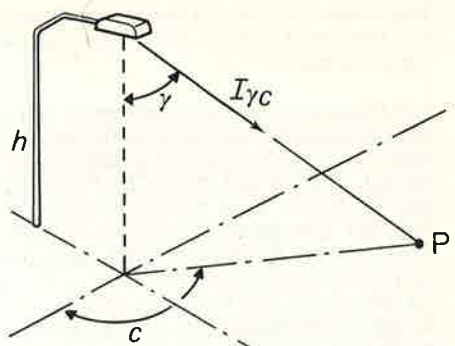


Fig. 9.4. Illuminance at point P.

Example 1

For a 180W SOX lantern, calculate the illuminance at P where the peak intensity hits the road. From the lantern data sheet we find the peak intensity is 274 cd/1000 lm at 70° elevation (γ), 0° azimuth (C)

$$\begin{aligned} \text{Actual Intensity} &= \frac{274 \times \text{Lamp Flux}}{1000} \\ &= \frac{274 \times 31500}{1000} \\ &= 8631 \text{ cd} \end{aligned}$$

For a 12m mounting height

$$E = \frac{I \cos^3 \gamma}{h^2} = \frac{8631}{12^2} \cdot \cos^3 70^\circ = 2.4 \text{ Lux}$$

9.3.2 To calculate Luminance at a point.

Luminance = Illuminance x Luminance coefficient (q_0)

$$(2) L = E q_0$$

Putting (1) into (2) gives

$$(3) L = \frac{I \cos^3 \gamma}{h^2} \cdot q_0$$

Example 2

To calculate the luminance at a point P when $\beta=0$ $C=0$ $\gamma=70^\circ$ (as in example 1)

From the table of road reflection values we obtain the "reduced luminance coefficient" which is equal to $q_0 \cos^3 \gamma$.

$$\text{for } \beta=0 \quad \gamma=70^\circ \quad \tan \gamma = 2.7$$

$$q_0 \cos^3 \gamma = .0247$$

$$\text{for } C=0 \quad \gamma=70^\circ \quad I = 8631 \text{ cd}$$

$$L = \frac{I \cos^3 \gamma}{h^2} \cdot q_0 = \frac{8631}{12^2} \times .0247 = 1.5 \text{ cdm}^{-2}$$

Having calculated the illuminance and luminance at a point on the road surface,

the process may be repeated for a number of points set out in a grid over the road surface. From all these points the average luminance and illuminance may be calculated together with the longitudinal and overall uniformities. To obtain values that equate to the CIE recommendations it will be necessary to specify variables such as observer position and calculation grid spacing. There are however graphical methods which may be used to calculate the average values of illuminance and luminance.

9.3.3 Calculation of average Illuminance over the surface of the road using utilisation factor curves.

The lumen method gives

$$(4) E_{av} = \frac{\phi}{A} \eta$$

Where

E_{av} = Average Illuminance

ϕ = Lamp Flux

η = Utilization factor (percentage of lamp flux that reaches the road surface)

A = Area.

For a road, the area A is equal to the road width (w) x spacing between lantern (s). Only one column spacing is used if we only take the lamp flux ϕ from one lantern.

(4) then becomes

$$(5) E_{av} = \frac{\phi \eta}{ws}$$

To calculate the average illuminance on a road, ϕ , w and s will be known and it is just necessary to evaluate η . This is obtained from the utilization factor curves

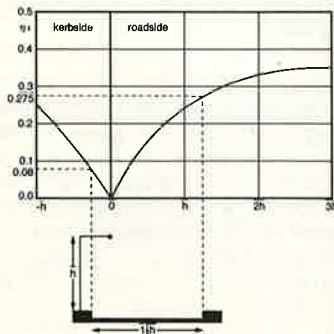


Fig. 9.5. Utilisation factor curve

The curves are drawn to a scale of mounting height and should be used in conjunction with a plan of the road cross section drawn to the same scale. The utilisation factor is obtained by placing the lantern over the zero point of the diagram and projecting the kerb edges onto it. The two components for the roadside and kerbside are read off and summed to give the total utilisation factor.

Example 3

Placing the scale plan of the road under the utilisation factor curve, positioning the zero in line with the lantern. Reading off where the kerb edges meet the curves.

Road Side Component = 0.275

Kerb Side Component = 0.08

Total Utilization factor η = 0.355

Average Illuminance $E_{av} = \frac{\Phi \eta}{ws}$

For a 12m height the scale plan gives

width (w) = $1.5h = 18m$

For a spacing (s) of 3.0h or 36m

$E_{av} = \frac{31500 \times 0.355}{18 \times 36} = 17 \text{ Lux}$

9.3.4 To calculate the average Luminance over the surface of the road.

For road lighting we have to multiply the light falling onto the road by the reflection factor for the road surface to give the light coming off i.e. luminance.

(6) $L_{av} = E_{av} Q_o$

Where

L_{av} = Average luminance (cdm^{-2})

E_{av} = Average illuminance (lm m^{-2})

Q_o = Average reflection factor for road surface (cdlm^{-1}) sometimes called average luminance coefficient.

Note that the *average luminance coefficient* is now used as we are calculating *average luminance*.

The luminance yield η_L term is now introduced which is presented on the luminance yield curves. These operate in the same way as the utilisation factor curves, in conjunction with a scaled cross-section drawing of the road. The lantern is positioned at the zero point of the diagram and the kerb edges projected onto the curve. The two components for the roadside and kerbside are read off and summed to give the total luminance yield value. As with the table of reduced luminance coefficients, the luminance

ance yield curve applies only to the road surface for which it was calculated. The value obtained is used in the following equation.

$$(7) L_{av} = \frac{\eta_L \phi Q_0}{ws}$$

Where η_L = Luminance yield
 w = road width
 s = column spacing
 ϕ = lamp flux

The known values for an installation will be:-

$$\phi ws$$

The Q_0 value will be known for a particular road surface. This leaves η_L - luminance yield which can be evaluated from the luminance yield diagram.

The diagram below shows a typical curve where the road widths are expressed as multiples of the mounting heights. Curve A B or C will be used depending on the observer position; A being h metres on the kerbside of the lantern B being in line with the lantern and C being h metres on the roadside of the lantern.

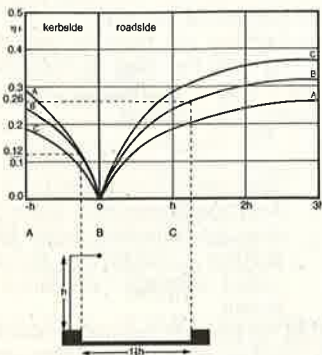


Fig. 9.6. Luminance yield diagram in respect of observer on line A B or C for CIE class CII road - $Q_0 = 0.07$

Example

With the scale plan of the road under the diagram, read off where the kerb edge meets the curve for observer position B.

Road Side Component	=	0.26
Kerb Side Component	=	0.12
Total Luminance yield η_L	=	0.38
Average luminance L_{av}	=	$\frac{\eta_L \phi \cdot Q_0}{ws}$

For a 12m height the scale plan gives

$$\text{width} = 1.5h w = 18m$$

For a spacing of 3.0h $s = 36m$

Average luminance coefficient for the road surface $Q_0 = 0.07$

$$L_{av} = \frac{0.38 \times 31500}{18 \times 36} \times 0.07 = 1.29 \text{ cdm}^{-2}$$

9.4 Evaluation of Design Criteria

The Utilisation factor and luminance yield curves may be used for evaluating average values. More often the point by point calculation will be repeated many times by a computer in order to obtain a grid of values of both illuminance and luminance, adjacent to and on the road surface. With this we can calculate our original parameters which affected the visibility of objects on the road and the performance of the driver.

Average Luminance

The average of all the calculated luminance values on the road surface or part thereof.

Overall Uniformity

The ratio of the minimum to average luminance in the calculated grid.

Longitudinal Uniformity

The ratio of the minimum to maximum luminance in a line in front of the observer along the length of the road.

Average Illuminance

The average of all the calculated illuminance values on the road surface or part thereof.

Surround Ratio

The ratio between the illuminance on two 5m wide strips either side of the edge of the carriageway.

Glare Control Mark G

This is an empirical value which assesses the amount of discomfort glare. Its value is determined by from the lantern intensity distribution, the average road surface luminance and the installation geometry.

G is given by the following formula.

$$G = 13.84 - 3.31 \log I_{a0} + 1.3 (\log I_{a0}/I_{aB})^{0.5} - 0.08 \log I_{a0}/I_{aB} + 1.29 \log F + 0.97 \log L_{av} + 4.41 \log h' - 1.46 \log p.$$

Where

I_{80} : luminous intensity at an elevation angle of 80° in the direction parallel to the road axis (cd).

$\frac{I_{80}}{I_{88}}$: ratio of luminous intensity at 80 and 88° (runback ratio)

F : flashed (light emitting) area of the luminaires as projected in the 76° elevation direction (m^2)

L_{av} : average road surface luminance (cd/m^2)

h' : distance between eye level and the luminaire mounting height (m)

p : number of luminaires per km

Threshold Increment

Disability Glare is the reduction in visual performance due to the introduction of a glare source to the field of view. When an object is viewed, an image is formed on the retina of the eye of that object. If a glare source is introduced to the field of view, light is scattered within the eye which causes a veil to be superimposed on the retinal image. Experimenters have found that this veiling luminance can be given by the empirical formula

$$L_v = \frac{10 \times E_{eye}}{\theta^2}$$

Where

L_v = equivalent veiling luminance (cdm^{-2})

E_{eye} = illuminance at the eye produced by glare source, in a plane perpendicular to the line of sight (lux).

θ = angle between direction of view and direction of light incidence from glare source (degrees).

The veiling luminance has two effects:—

- (i) decreasing the contrast threshold
- (ii) decreasing the effective contrast

As the positive effect of (i) is insufficient to compensate for the negative effect of (ii), the net result is that an object which could just be perceived without a glare source, cannot be seen when the glare source is introduced. This effect forms the basis of a measure of loss of visual performance due to glare – Threshold Increment. This is defined as the amount of extra contrast required to just make the object visible again under glare conditions. In practice, contrasts will not be increased to make the object visible so the Threshold Increment represents the loss in visual performance

due to glare. The calculation of threshold increment is possible without any additional information being required above that needed for luminance calculations.

Example

For a given situation with a background luminance of 1 cdm^{-2} the contrast threshold is 0.081.

Introducing the glare source increases the background luminance to 3 cdm^{-2} , reduces the contrast threshold to 0.061 and reduces the effective contrast to 0.027.

To compensate for the glare source and make the object just visible, the contrast will have to be increased from 0.027 to 0.061 i.e. $125\% = TI$.

In the case of roadlighting we can use the average road surface luminance as our background luminance, and for the range 0.05 cdm^{-2} to 5 cdm^{-2} the Threshold Increment can be approximated to

$$TI = 65 \frac{L_v}{L_{av}^{0.8}}$$

Where TI = Threshold Increment (%)
 L_v = equivalent veiling luminance (cdm^{-2}) for an observer looking straight ahead in a direction parallel to the road axis and 1° down from the horizontal.
 L_{av} = average road surface luminance (cdm^{-2})

9.5 Official Recommendations

The standards that must be met by road lighting installations are outlined in various national recommendations. Several countries base their recommendations on the international recommendations formulated by the CIE.

The requirements that road lighting installations must meet in order to provide adequate visual conditions for a smoothly moving and safe traffic pattern, are dependent upon the intensity, speed and composition of the traffic and upon the complexity of the road system. Road lighting recommendations must, therefore, state the different requirements for the different categories of road. Fig. 9.7 gives the categories of road, as defined by the CIE, for this purpose, while Fig. 9.8 summarizes the values of the photometric parameters for these different classes of road as

recommended in CIE Publication No. 12 (second edition, 1977) 'Recommendations for the lighting of roads for motorized traffic'. As can be seen from Fig. 9.8, the CIE gives different recommendations for bright and dark surroundings for the same class of road. This is because great luminance differences in the field of view result in a lowering of the contrast sensitivity of the eye to the darker parts (i.e. in this situation, the road itself). To compensate for this loss of contrast sensitivity, the average road surface luminance level should be increased. The glare restriction under these circumstances may be somewhat less stringent, because of the higher adaptation level.

In the reverse situation, dark surroundings and a bright road surface, the driver's eyes become adapted to the road surface luminance level, thus reducing perception in the darker regions of the surroundings against which objects cannot therefore be seen. Therefore, in the case of roads with dark surrounds, more emphasis should be given to the lighting of these surrounds and to the control of glare. CIE Publication No. 12 states therefore, that it is desirable that a stretch some 5m in width beyond the carriageway is illuminated to an illuminance level not less than 50 per cent of that of the adjacent 5 metres of carriageway.

Mixed traffic

Motorized traffic

Category of road	Type and density of traffic	Type of road	Examples
A	Heavy and high speed motorized traffic	Road with separated carriageways, completely free of crossings at grade, complete access control	Motorway Express way
B		Important traffic road for motorized traffic only, possibly separate carriageways for slow traffic and/or pedestrians	Trunk road Major road
C	Heavy and moderate speed motorized traffic or Heavy mixed traffic of moderate speed	Important, all-purpose, rural or urban road	Ring road Radial road etc.
D	Fairly heavy mixed traffic of which a major part may be slow traffic or pedestrians	Roads in city or shopping centres, approach roads to official buildings and areas, where motorized traffic meets heavy slow traffic or pedestrians	Trunk road Commercial roads Shopping streets etc.
E	Mixed traffic of limited speed and moderate density	Collector roads between residential areas (residential streets) and A to D-type roads	Collector road Local street etc.

Fig. 9.7. Road classifications (based on the CIE Recommendations).

Category	Surrounds	Luminance level	Uniformity ratios			Glare restriction	
			Average road surface luminance L_{av} (cdm ²) ≥	Overall uniformity ratio U_o ≥	Lengthwise uniformity ratio U_l ≥	Glare control mark G ≥	Threshold increment TI (%) ≤
A	any	2				6	10
B ₁ B ₂	bright dark	2 1			0,7	5 6	10 10
C ₁ C ₂	bright dark	2 1	0,4			5 6	20 10
D	bright	2			0,5	4	20
E ₁ E ₂	bright dark	1 0,5				4 5	20 20

Fig. 9.8. Recommended (maintained) values of lighting parameters for road lighting (According to CIE publication No. 12, second edition, 1977).

Appendix 9.1

Table of Reduced Luminance Coefficients ($q \cdot \cos^2 \gamma$)

β° tan γ	0	2	5	10	15	20	25	30	35	40	45	60	75	90	105	120	135	150	165	180
0	329	329	329	329	329	329	329	329	329	329	329	329	329	329	329	329	329	329	329	329
0,25	362	358	371	364	371	369	362	357	351	349	348	340	428	312	299	294	298	288	292	281
0,5	379	368	375	373	367	359	350	340	328	317	306	280	266	249	237	237	231	231	227	235
0,75	380	375	378	365	351	334	315	295	275	256	239	218	198	178	175	176	176	169	175	176
1	372	375	372	354	315	277	243	221	205	192	181	152	134	130	125	124	125	129	128	128
1,25	375	373	352	318	265	221	189	166	150	136	125	107	91	93	91	91	88	94	97	97
1,5	354	352	336	271	213	170	140	121	109	97	87	76	67	65	66	66	67	68	71	71
1,75	333	327	302	222	166	129	104	90	75	68	63	53	51	49	49	47	52	51	53	54
2	318	310	266	180	121	90	75	62	54	50	48	40	40	38	38	38	41	41	43	45
2,5	268	262	205	119	72	50	41	36	33	29	26	25	23	24	25	24	26	27	29	28
3	227	217	147	74	42	29	25	23	21	19	18	16	16	17	18	17	19	21	21	23
3,5	194	168	106	47	30	22	17	14	13	12	12	11	10	11	12	13	15	14	15	14
4	168	136	76	34	19	14	13	11	10	10	10	8	8	9	10	9	11	12	11	13
4,5	141	111	54	21	14	11	9	8	8	8	8	7	7	8	8	8	8	10	10	11
5	126	90	43	17	10	8	8	7	6	6	6	6	6	7	6	6	7	8	8	9
5,5	107	79	32	12	8	7	7	7	6	5										
6	94	65	26	10	7	6	6	6	5											
6,5	86	56	21	8	7	6	5	5												
7	78	50	17	7	5	5	5	5												
7,5	70	41	14	7	4	3	4													
8	63	37	11	5	4	4	4													
8,5	60	37	10	5	4	4	4													
9	56	32	9	5	4	3														
9,5	53	28	9	4	4	4														
10	52	27	7	5	4	3														
10,5	45	23	7	4	3	3														
11	43	22	7	3	3	3														
11,5	53	22	7	3	3															
12	42	20	7	4	3															

Take for standard surface CII
 $O_o = 0.07$

1919-2

9.6

The previous sections have described the way in which roadlighting calculations can be made, however in practice the evaluation of the design criteria will require many calculations and can only sensibly be made with the aid of a computer.

In order to simplify these calculations so that they may be used for everyday design purposes, a BSI panel has developed a design method using tables published by the lantern manufacturer. For each light distribution available from a lantern, a design table is produced for mounting heights appropriate to the lantern (typically 10m and 12m). These may be used as shown below to evaluate all the design criteria required for planning an installation.

Step 1

Establish the design criteria for the installation e.g. average luminance, uniformity etc.

Step 2

Decide on the mounting height to be used and the arrangement of lanterns in the installation. eg staggered, opposite etc.

Step 3

Choose the appropriate design table for the chosen arrangement (these are available separately).

Step 4

The data for the road width concerned is displayed in the table as shown in fig. 9.7.

This is all the data that is now necessary to design an installation.

Step 5

The Surround Ratio ensures that sufficient light is falling outside of the carriageway. This is given by SR in the table and should be greater than 0.5.

Step 6

For a required luminance level, the spacing is calculated from the following formula:-

Spacing =

$$\frac{\text{SI} \times \text{Lamp Flux} \times \text{Maintenance Factor}}{\text{Required average luminance}} \quad (8)$$

Where SI is the Spacing Index and is obtained from the design table.

Alternatively, for an existing installation, the average luminance can be calculated by transposing formula (8).

Calculated Average Luminance =

$$\frac{\text{SI} \times \text{Lamp Flux} \times \text{Maintenance Factor}}{\text{Spacing}} \quad (9)$$

Step 7

The uniformity levels should be checked to ensure they meet the required design value at the spacing calculated spacing from (8) or at the existing spacing. This is done by means of the data in the design table headed U₀ (Overall Uniformity) and U₁ (Longitudinal Uniformity). If the table indicates that a reduced spacing is required to meet the uniformity requirements, the average luminance that will now be achieved can be calculated from formula (9).

Step 8

The glare resulting from an installation is quantified by term Threshold Increment (see 9.4). This is calculated by using the Veil Factor (VF) from the design table, at the chosen spacing, in the following formula.

Threshold Increment =

$$\frac{\text{Veil Factor} \times \text{Lamp Flux (klm)}}{10 \times \left(\frac{\text{Calculated road luminance}}{\text{Maintenance factor}} \right)^{0.8}}$$

Installations where TI is between 0-15% are generally equivalent to those using cut off lanterns. Installations where TI is between 15% and 30% are generally equivalent to those using semi cut-off lanterns.

Step 9

Where the road has a bend in it, a check should be made to ensure that the original design parameters are met. To start with the calculated straight road spacing is used around the bend. An isoluminance template (which is supplied with the design table) is then used to ensure adequate cover of the road is achieved.

The above is a brief summary of the way the design tables are used. For a more detailed explanation of this new design system the reader should consult the draft British Standard document.

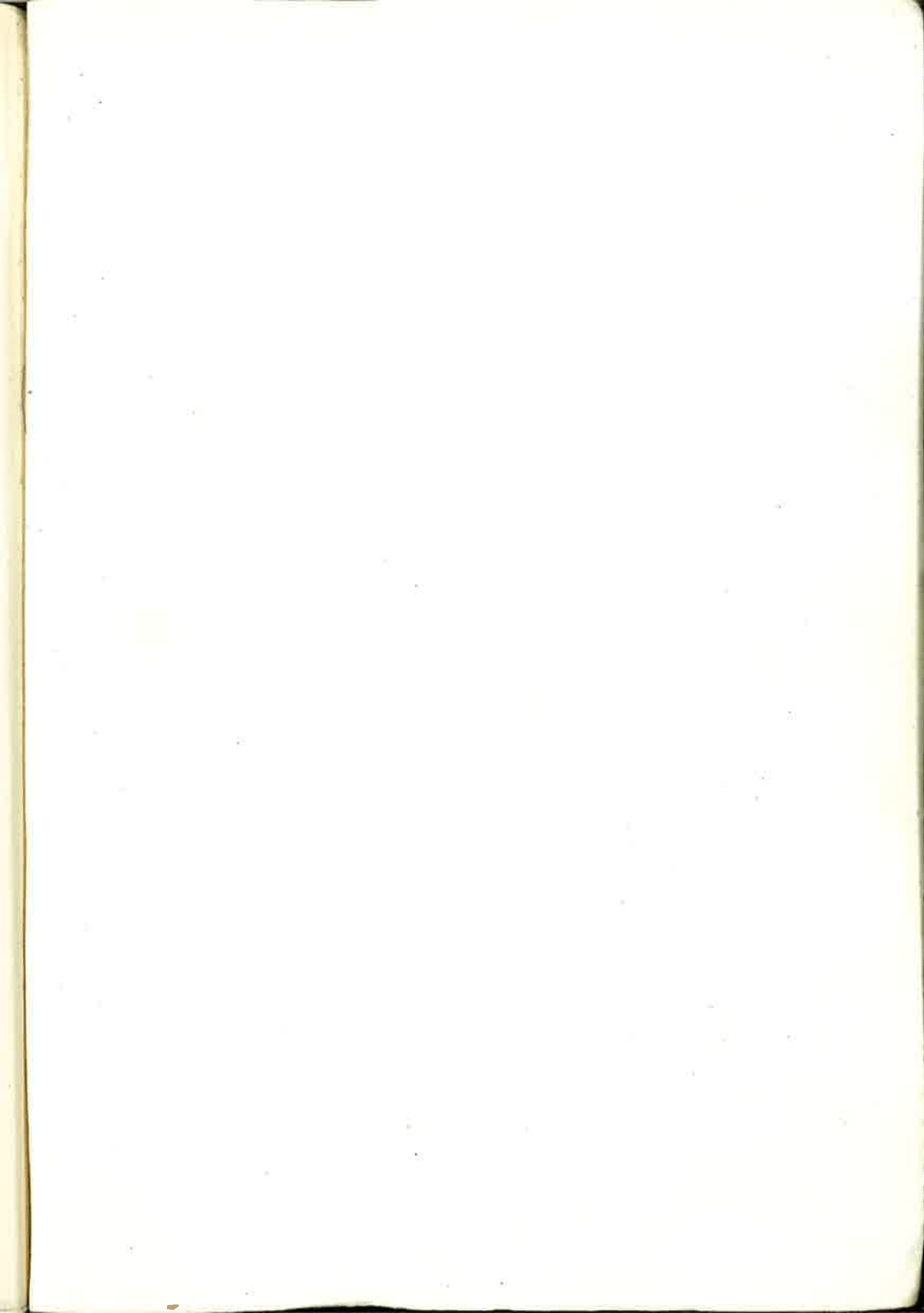
DESIGN TABLE - STANDARD PRESENTATION
10M MOUNTING HEIGHT

MA50 SC0
135W SOX

STAGGERED																														
Effective Width* SI SR			Effective Width 8m SI 2.20 SR 0.80			Effective Width 9m SI 2.00 SR 0.81			Effective Width 10m SI 2.00 SR 0.82			Effective Width 11m SI 1.95 SR 0.84			Effective Width 12m SI 1.78 SR 0.85			Effective Width 13m SI 1.70 SR 0.86			Effective Width 14m SI 1.6 SR 0.88			Effective Width* SI SR						
U ₀	U ₁	VF	U ₀	U ₁	VF	U ₀	U ₁	VF	U ₀	U ₁	VF	U ₀	U ₁	VF	U ₀	U ₁	VF	U ₀	U ₁	VF	U ₀	U ₁	VF	U ₀	U ₁	VF	U ₀	U ₁	VF	
.90	.90	15	.87	.91	15	.85	.90	15	.82	.91	14	.79	.92	13	.77	.93	13	.74	.93	12										
.90	.90	15	.88	.93	14	.86	.93	14	.83	.92	13	.81	.92	12	.78	.93	12	.75	.95	12										
.87	.88	14	.85	.90	13	.82	.92	13	.80	.93	12	.78	.93	12	.76	.92	11	.74	.95	11										
.83	.87	13	.82	.88	12	.79	.89	12	.76	.90	11	.74	.89	11	.73	.89	11	.71	.89	10										
.77	.83	12	.78	.84	12	.77	.85	11	.75	.86	11	.72	.87	11	.71	.86	10	.69	.89	9.7										
.74	.84	12	.74	.84	11	.74	.84	11	.72	.85	10	.71	.85	10	.69	.85	9.9	.67	.86	9.9										
.71	.83	11	.71	.83	11	.71	.84	10	.71	.85	10	.69	.86	9.8	.66	.86	9.2	.65	.85	9.2										
.68	.81	11	.68	.80	10	.67	.80	9.8	.67	.81	10	.66	.83	9.4	.64	.85	9.4	.62	.87	9.7										
.66	.78	10	.65	.78	9.5	.64	.78	9.7	.63	.80	9.2	.62	.82	9.3	.61	.83	8.6	.59	.83	8.6										
.62	.77	9.4	.62	.77	9.7	.61	.76	9.2	.60	.77	9.4	.59	.78	8.7	.58	.80	8.8	.57	.83	8.1										
.60	.75	9.6	.60	.76	9.2	.59	.77	9.4	.58	.78	8.8	.56	.79	8.9	.55	.81	8.2	.54	.83	8.3										
.59	.75	8.7	.57	.74	9.0	.57	.76	8.5	.57	.78	8.7	.55	.79	8.1	.54	.81	8.1	.53	.84	7.4										
.56	.75	8.9	.55	.74	8.4	.54	.75	8.7	.55	.76	8.1	.54	.76	8.2	.52	.77	7.5	.52	.81	7.6										
.54	.73	8.4	.54	.74	8.6	.53	.73	8.1	.53	.74	8.2	.52	.76	7.6	.50	.78	7.6	.49	.79	7.7										
.52	.70	8.6	.51	.72	8.1	.50	.72	8.2	.50	.72	7.6	.50	.74	7.8	.49	.74	7.8	.48	.77	7.3										
.50	.65	8.1	.50	.68	8.3	.49	.71	7.6	.49	.71	7.8	.49	.73	7.9	.48	.75	7.2	.48	.75	7.2										

OPPOSITE																														
Effective Width 12m SI 3.5 SR 0.85			Effective Width 13m SI 3.4 SR 0.86			Effective Width 14m SI 3.3 SR 0.88			Effective Width 15m SI 3.1 SR 0.89			Effective Width 16m SI 2.9 SR 0.90			Effective Width 17m SI 2.8 SR 0.91			Effective Width 18m SI 2.7 SR 0.92			Effective Width 20m SI 2.5 SR 0.94			Effective Width* SI SR						
U ₀	U ₁	VF	U ₀	U ₁	VF	U ₀	U ₁	VF	U ₀	U ₁	VF	U ₀	U ₁	VF	U ₀	U ₁	VF	U ₀	U ₁	VF	U ₀	U ₁	VF	U ₀	U ₁	VF	U ₀	U ₁	VF	
.80	.94	22	.77	.94	22	.75	.94	21	.73	.96	20	.70	.98	19	.68	.97	18	.66	.96	18	.61	.95	16							
.81	.93	21	.79	.95	21	.75	.96	19	.72	.97	19	.70	.97	18	.68	.96	18	.66	.95	16	.61	.94	16							
.81	.94	20	.79	.93	19	.76	.94	18	.72	.94	18	.69	.94	17	.67	.94	16	.64	.93	16	.61	.92	15							
.80	.92	19	.78	.92	18	.76	.92	18	.73	.93	17	.69	.93	16	.66	.95	16	.64	.94	15	.61	.91	14							
.79	.89	18	.76	.89	17	.74	.90	17	.73	.90	16	.70	.90	16	.66	.92	15	.63	.93	14	.59	.90	14							
.79	.90	17	.77	.89	17	.75	.90	16	.72	.90	15	.70	.90	15	.67	.91	14	.64	.91	14	.60	.91	12							
.79	.91	17	.77	.91	16	.74	.91	16	.72	.90	15	.69	.89	14	.67	.89	13	.64	.91	13	.59	.91	12							
.79	.89	16	.76	.90	15	.74	.91	14	.72	.90	14	.69	.90	14	.67	.89	13	.64	.89	12	.59	.90	11							
.76	.86	15	.74	.86	15	.71	.88	14	.69	.89	13	.67	.89	13	.66	.90	12	.64	.90	12	.60	.89	11							
.75	.83	15	.73	.86	14	.71	.87	14	.69	.89	13	.68	.91	13	.67	.91	12	.64	.89	12	.59	.90	10							
.77	.84	14	.75	.86	14	.73	.88	13	.71	.89	13	.69	.91	12	.66	.91	11	.63	.90	11	.58	.90	10							
.76	.81	14	.74	.84	13	.73	.87	13	.71	.89	12	.69	.89	12	.67	.91	12	.64	.92	11	.58	.90	9.9							
.78	.81	13	.74	.83	13	.72	.86	13	.71	.89	12	.69	.90	11	.67	.91	11	.64	.91	10	.57	.88	9.5							
.76	.78	14	.73	.79	13	.70	.82	12	.68	.85	11	.67	.87	11	.65	.89	10	.64	.88	10	.57	.87	9.5							
.74	.76	13	.72	.78	12	.70	.80	12	.67	.82	11	.66	.84	11	.64	.87	11	.64	.85	9.9	.58	.85	9.0							
.74	.76	13	.72	.76	12	.71	.78	12	.67	.80	11	.65	.83	11	.64	.85	10	.62	.85	10	.58	.83	9.2							

Fig 9.7





LIGHTING

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