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Introduction Thorn Lighting offers the widest choice of discharge lamps in the country. This range enables you to select lamps with the best combination of light output and colour to satisfy your particular requirements. And so, because you get the right lamp for the job, you enjoy maximum operating efficiency and minimum maintenance costs.

Kolorarc lamps, with their special metallic additives, have no challengers for really accurate colour rendering, so accurate that they have been proved suitable light sources for use with colour television. In any commercial or industrial situation where high light output combined with accurate colour rendering is demanded, Kolorarc lamps are ideal.

Kolorlux lamps combine good colour with a wide range, stretching from 50W to 1000W, giving exceptional flexibility. The MBFR version, with its internal coating, gives improved lumen maintenance in industrial situations and lowers operating costs.

Atlas Kolor-Plus MBTF lamps take this flexibility even further by requiring no control gear and make excellent long-life replacements for ordinary tungsten filament lamps—especially where maintenance is difficult and costly.

The KolorSON high pressure sodium lamp is the most efficient in the Kolor range, producing a brilliant golden light. It is becoming increasingly popular for exterior lighting where improved colour is needed, and also for interior use where warm colour is acceptable and high efficacy vital.

The Linear Sodium and SOX lamps are for outdoor and streetlighting applications and achieve the highest possible light output for the lowest cost.

All these discharge lamps have been developed by Thorn's incomparable research and design facilities and backed by Britain's largest distribution network.

Mercury lamp information

Lighting Design Lumens

The Lighting Design Lumens quoted are the lamp outputs at 2000 hours and are recommended as a guide to lighting engineers planning scheme lay-outs. Lumen output beyond 2000 hours use according to type.

Striking Voltage

Mercury lamps are provided with an auxiliary electrode to initiate starting. Diagram 1 shows that the lamp will start readily under all normal operating temperatures. The striking voltage of MBI and MBIF lamps is not affected by ambient temperature down to -30°C .

Mains Voltage Variation

Diagram 2 shows the effect of mains voltage variation on light output, lumens per watt and lamp watts.

Run-up Characteristics

These are shown in diagram 3. The time taken will vary slightly depending on the location and the type of fitting housing the lamp. Curves for metal halide lamps are shown in diagram 4.

Standards

Lamps conform to the following standards where applicable:

British

BS.3677 : High Pressure Mercury Vapour Lamps
BS.98 : 1962 Screw Caps and Holders

International

IEC publication 188 High Pressure Mercury Vapour Lamps

GENERAL

Dimensions

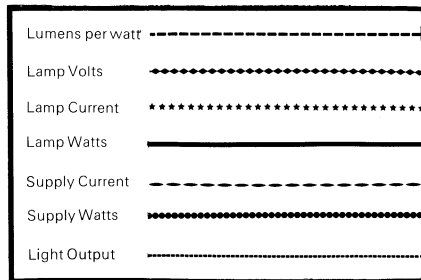
The dimensions shown are maximum

Cap Designations

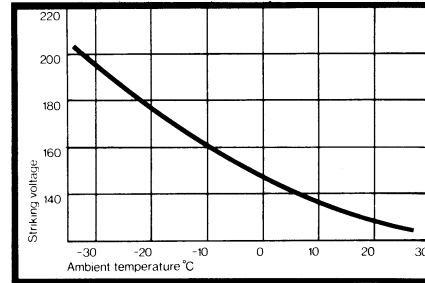
ES — E27
GES — E40
BC — B22
3 pin BC — B22-3
BIPIN — G13

Supply Voltage

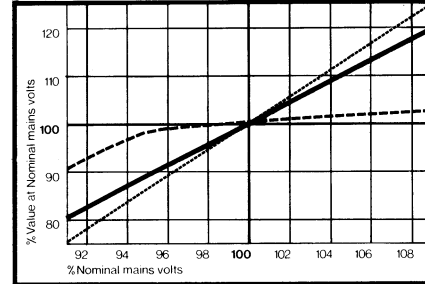
All lamps are suitable for use on 220V and 240V supplies in conjunction with control gear shown in Section 10.



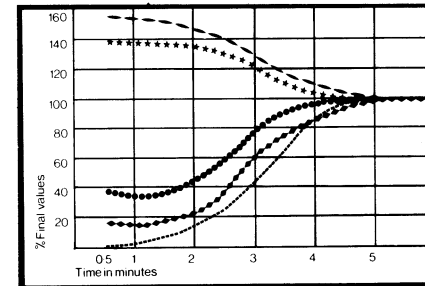
1 Variation of striking voltage with ambient temperature for mercury lamps



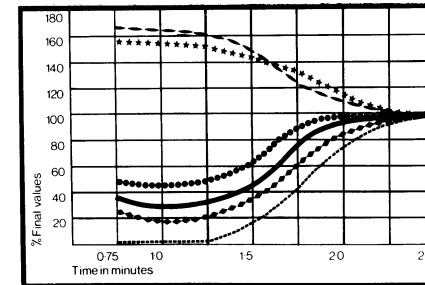
2 Effect of variation of mains voltage on the lamp characteristics of mercury discharge lamps



3 Typical mercury run-up curves



4 Typical metal halide run-up curves



Sodium lamp information

Lighting Design Lumens

The Lighting Design Lumens quoted are the lamp outputs at 3000 hours (2000 hours for SON) and represent an average over the first 6000 hours life.

Striking Voltage

The starting of low and high pressure sodium lamps is not affected by ambient temperature down to -30°C .

Mains Voltage Variation

Diagrams 1 and 2 show the effect of the variation of mains voltage on light output, lumens per watt, supply watts and supply current.

Run-up Characteristics

For low pressure lamps these vary between 10 and 20 minutes according to type but there is no delay in starting if the lamp is switched on while hot.

Typical run-up curves for linear lamps are shown in diagram 3. Run up characteristics of SON lamps are shown in diagram 4. Run-up characteristics of SOX lamps are shown in diagram 5.

Standards

Lamps described in this catalogue conform to the following standards where applicable:

British

BS.3767 : Low Pressure Sodium Vapour Lamps

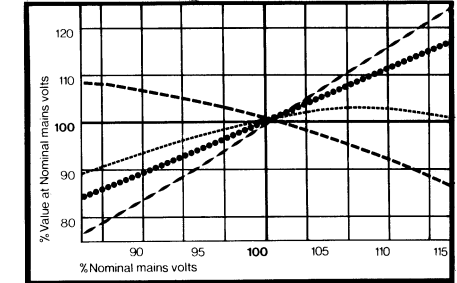
International

IEC publication 192: Low Pressure Sodium Vapour Lamps

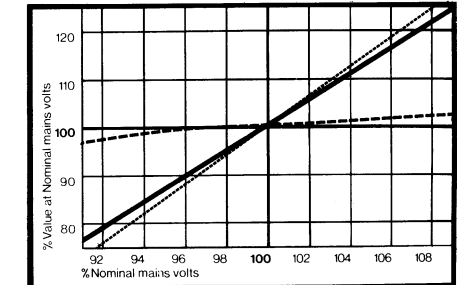
Guarantee

Any sodium lamp failing prior to 4000 hours burning, except through misuse, will be replaced free of charge

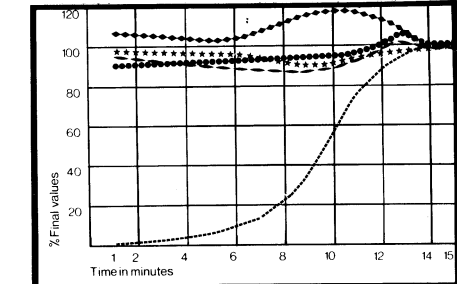
1 Mains voltage variation: sodium



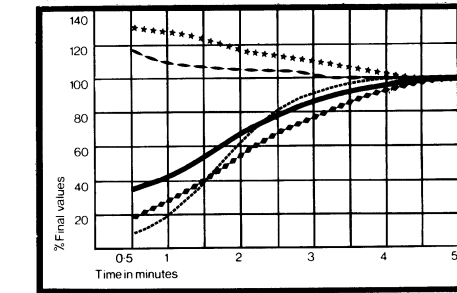
2 Mains voltage variation: high pressure sodium



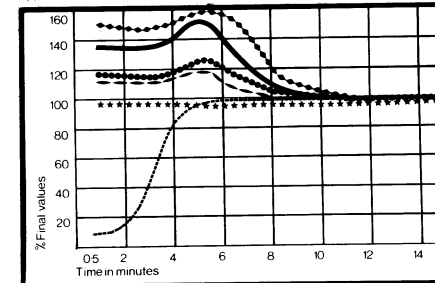
3 Typical Linear Sodium run-up curves



4 Typical SON run-up curves



5 Typical SOX run-up curves



Kolorarc MBIF and MBI metal halide lamps

Description High pressure discharge in mercury with metallic additives operating in a quartz arc tube. Kolorarc (MBIF) lamps have hard glass elliptical bulbs coated on the interior surface with fluorescent phosphor increasing the light output, improving the colour and diffusing the arc. MBI lamps have clear hard glass elliptical bulbs. The special additives in the arc help provide a more continuous spectral power distribution throughout the visible spectrum. At the same time the mercury resonance lines are reduced in comparison with ordinary mercury lamps, giving a light source with excellent colour rendering properties comparable to a Natural fluorescent tube.

Application In any situation where high light output must be combined with good colour rendering, Kolorarc lamps are ideal. They can be used indoors for offices, shops, supermarkets and stores, where colour is of primary importance, and are finding increasing application for illuminating interior sports halls, gymnasias and swimming pools.

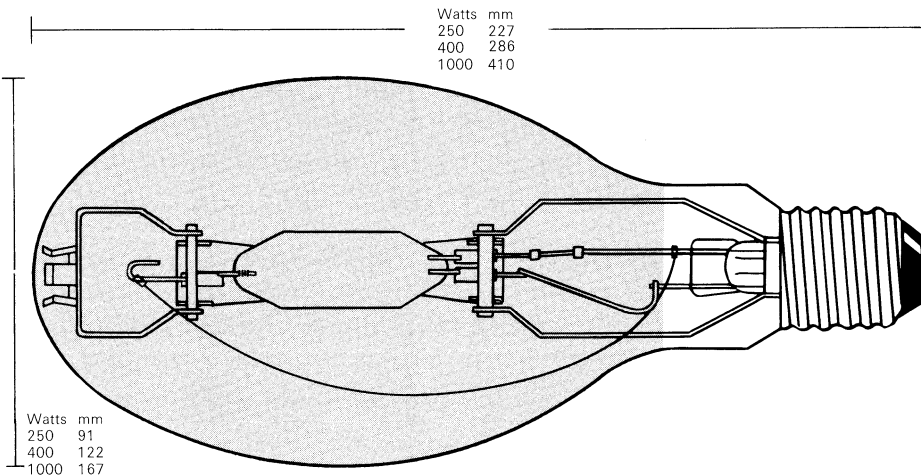
The excellent colour rendering of Kolorarc makes it suitable for museums and exhibitions where skilled lighting design can enhance the beauty of the exhibits. Industrially, Kolorarc lamps can be used in area and high-bay lighting where good colour qualities, coupled with high output efficiency, are required: Kolorarc lamps are 30% more efficient than MBF colour corrected mercury lamps. The high lumen output is of primary importance where the weight of fittings on the ceiling is a serious consideration. MBI lamps, with clear outer bulbs, are suitable where precise optical control is required, such as floodlighting. Kolorarc and MBI lamps have proved suitable light sources for use with colour television cameras. Other varieties of metal halide lamps are being increasingly used for stadia floodlighting, especially that of football grounds.

Burning Position BU: Base up lamps must **not** be operated with cap more than 15° below horizontal. BD: Base down lamps must **not** be operated with cap more than 15° above horizontal.

RANGE

	Watts	Burning Position	Nominal Lamp Voltage	Lamp Current Amps	Cap	Initial Lumens	Lighting Design Lumens	Standard Pack
MBIF	250	BU	90	3.1	GES	19000	16000	9
Kolorarc	400	BU†	135	3.3	GES	32000*	27000*	9
	1000	BU†	250	4.2	GES	92000*	85000*	1
	400	BU†	135	3.3	GES	29000*	24000*	9
MBI	1000	BU†	250	4.2	GES	85000*	78000*	1

*Applies to vertical position, when operated horizontally reduce by 10%
†BD available to order



Kolorlux MBF mercury fluorescent lamps

Description High pressure mercury vapour discharge operating in a quartz arc tube. The interior surface of the elliptical bulb is coated with a fluorescent phosphor which converts ultra-violet radiation from the discharge into visible light. Kolorlux lamps employ a new phosphor giving up to 10% higher light output than standard MBF lamps together with improved colour at the red end of the spectrum.

Applications MBF lamps are widely used in industrial lighting and streetlighting. The improved

colour of Kolorlux has extended the applications to commercial and display lighting, shopping centre and concourse lighting, and area floodlighting. In comparison with fluorescent tubes, higher output Kolorlux lamps need fewer fittings for an equivalent illumination level: giving a tidier ceiling and reduced maintenance costs

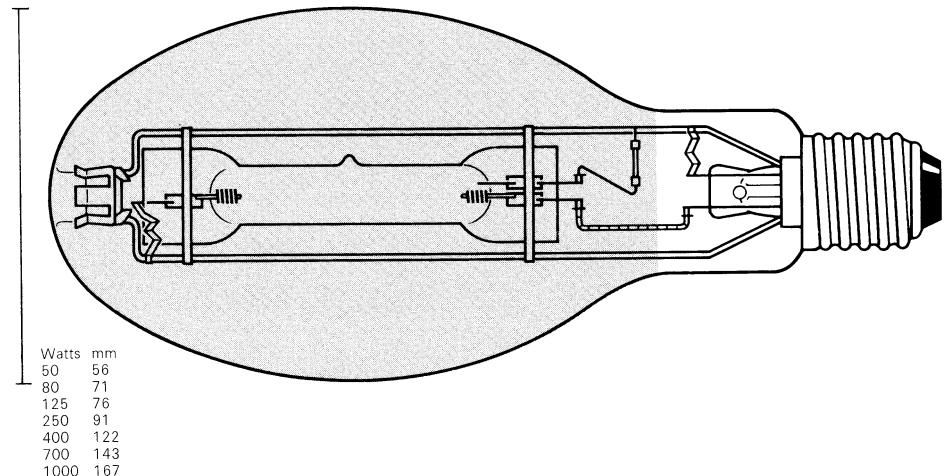
Burning Position Universal: lamps may be operated in any position.

RANGE

Watts	Nominal Lamp Voltage	Lamp Current Amps	Cap	Initial Lumens	Lighting Design Lumens	Standard Pack
50	95	0.61	ES	1900	1800	50
80	115	0.80	ES*	3600	3350	24
125	125	1.15	ES*	6250	5550	24
250	130	2.15	GES	13500	12000	9
400	135	3.20	GES	23000	21500	9
700	140	5.60	GES	40000	38000	1
1000	145	7.50	GES	56000	54000	1

13 pin BC cap also available

Watts	mm	Watts	mm
50	129	400	286
80	154	700	328
125	175	1000	410
250	227		



Kolorlux MBFR mercury reflector lamps

Description High pressure mercury vapour discharge operating in a quartz arc tube. A shaped outer bulb forms an integral reflector. The upper portion of the bulb is coated with a reflecting layer which directs most of the light downward but allows some upward light. This internal reflector is unaffected by atmospheric corrosion and dirt collection so that the lamp requires the minimum maintenance. The introduction of Kolorlux phosphor into the range of reflector lamps gives a greatly improved colour and up to 10% higher output than

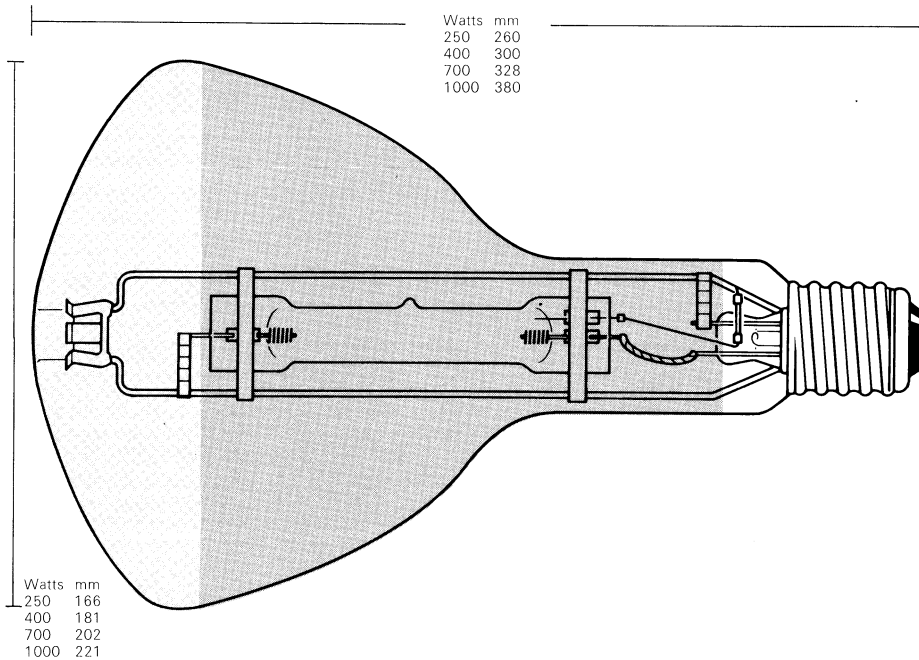
previously available with standard MBFR lamps.

Application Kolorlux reflector lamps are particularly suitable for medium and high bay lighting. The hard glass outer bulb allows the lamps to be used in exposed conditions for area lighting. The improved colour of Kolorlux has widened the use of reflector lamps into commercial applications such as display lighting.

Burning Position Universal: lamps can be operated in any position.

RANGE

Watts	Nominal Lamp Voltage	Lamp Current Amps	Cap	Lumens		
				Initial	Lighting Design	Standard Pack
250	130	2.15	GES	11500	10500	1
400	135	3.20	GES	20500	20500	1
700	140	5.60	GES	35000	32500	1
1000	145	7.50	GES	52000	48000	1



Kolor-Plus MBTF and 'Black Light' MBTW mercury tungsten lamps

Description Mercury tungsten lamps consist of a high pressure mercury discharge in a quartz arc tube. Mounted coaxially with the arc tube and connected in series with it is a coiled tungsten filament which provides light and colour correction to the output of the mercury discharge and acts as a ballast to the arc. No control gear is needed. Mercury tungsten lamps operate direct from the supply. All ratings have elliptical outer bulbs. Kolor-Plus MBTF lamps (illustrated below) have an outer bulb coated with a new phosphor giving higher light output and improved colour. The MBTW lamp has a pear shaped 'Black Light' outer bulb (length 184mm diameter 91mm) which effectively obscures all visible radiation, and emits long wave Ultra Violet.

The MBTW lamp is a very convenient way of providing Ultra Violet lighting ('Black Light') for fluorescent effects in dance halls, clubs, discotheques, parties etc.

Advantages Kolor-Plus MBTF lamps —offer eight times the life of GLS lamps —plug directly into the mains: no need for control gear —give a large proportion of their light output immediately after switch-on —give greater lumen output than equivalent GLS lamps —save labour costs on replacement.

Supply Voltage Kolor-Plus MBTF is available in two voltage ratings, 220/230V and 240/250V, and the MBTW in 240/250V only. The lamps must be operated on the correct supply. Sudden reductions in voltage may cause them to extinguish.

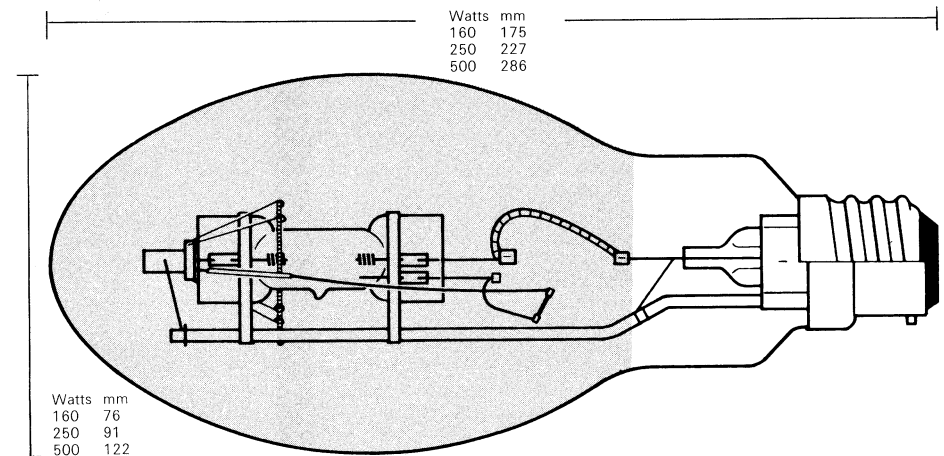
Rated Life MBTF—8000 hours
MBTW—1500 hours

Burning Position Kolor-Plus and MBTW lamps are designed for operation in the cap up position; 250 and 500W ratings may be operated in other positions provided there is negligible fluctuation in the supply voltage.

Application Kolor-Plus MBTF lamps can be used as direct replacements for tungsten filament lamps giving higher light output and longer life. They are particularly suitable where labour costs are high and access is difficult. Applications include shop windows, garages, warehouses, streetlighting and in wellglass and flameproof fittings.

RANGE

Watts	Supply Voltage	Lamp Current Amps	Cap	Lumens		
				Initial	Lighting Design	Standard Pack
MBTF 160	220/230	0.70	BC or ES	2900	2560	24
160	240/250	0.65	BC or ES	2900	2560	24
250	220/230	1.10	GES	5500	4840	9
250	240/250	1.05	GES	5500	4840	9
500	220/230	2.20	GES	12500	11500	9
500	240/250	2.10	GES	12500	11500	9
MBTW 175	240/250	0.67	BC	—	—	12



MB mercury lamps

Description High pressure mercury vapour discharge operating in a quartz arc tube. The 80 and 125W have elliptical pearl bulbs, the 250 and 400W ratings have clear tubular hard glass bulbs.

Application MB lamps have been largely superseded for industrial and streetlighting by MBF Kolorlux with its higher light output and improved colour. MB lamps are still

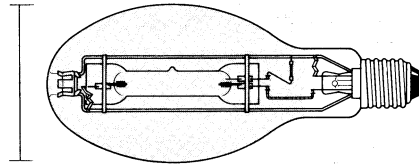
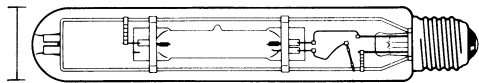
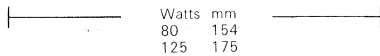
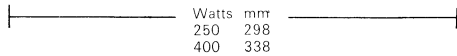
used, however, for general illumination where colour is not important and also where the typical characteristics of mercury spectral power distribution are advantageous, e.g. for graphic arts, laboratory and scientific purposes, plant growth, floodlighting.

Burning Position Universal: lamps can be operated in any position.

RANGE

Watts	Nominal Lamp Voltage	Lamp Current Amps	Cap	Lumens		Standard Pack
				Initial	Lighting Design	
80	115	0.80	ES*	3400	3200	24
125	125	1.15	ES*	5900	5900	24
250	130	2.15	GES	12900	11500	12
400	135	3.20	GES	21000	19600	12

13 pin BC cap also available



KolorSON high pressure sodium lamps

Construction The high-pressure sodium lamp differs from other discharge lamps in that it employs an arc tube made of sintered aluminium oxide. This material is necessary to withstand the intense chemical activity of sodium vapour at high temperature and pressure. Metal caps are sealed to its ends and support the electrodes, and the tube is mounted in a robust frame which locates on a depression in the crown of the bulb to give great strength and optical control. The elliptical hard glass outer tube has a diffusing coating and the GES cap is locked on to the moulded neck to eliminate any possibility of the lamp becoming detached from the cap during life. The lamp has the same dimensions and luminance ratio as an MBF mercury lamp so that it can be used in the same fittings (different control gear is required). Tubular 250 and 400W SON/T versions are also available with a clear bulb for floodlighting purposes.

Starting and Operation The lamp is started by a high-voltage pulse applied by an ignitor which ceases to function once the arc has struck. The ignitor may be mounted up to 45 metres from a 250W lamp and 30 metres from a 400W lamp. External starting simplifies lamp construction, ensures immediate striking and is very reliable. The lamp takes four or five minutes to run up to full brightness. KolorSON lamps will normally restrike within one minute of

extinction and rapidly regain full light output. This is a most important feature for interior use and a considerable improvement on the restriking times of mercury lamps.

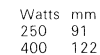
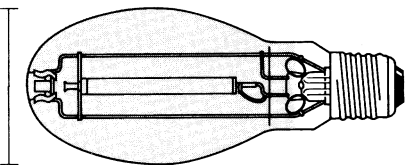
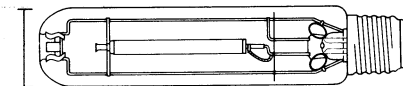
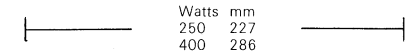
Colour The colour appearance of the lamp resembles that of a black body at 2100K, a pleasant golden white. When the arc is run up the monochromatic yellow characteristic of low-pressure sodium lamps disappears and is replaced by a broader distribution across the visible spectrum. This gives acceptable colour rendering with a warm appearance and, although blues and greens are somewhat subdued, reds and yellows are enhanced and all colours are easily distinguishable.

Applications Public lighting: traffic routes, city centres, shopping areas.
Area lighting: airports, dockyards, car parks, forecourts.
Floodlighting: stadiums, buildings, marshalling yards, sports grounds. Interior lighting: high-bay lighting for factories, warehouses, hangars, halls.
The Department of the Environment have recommended that high pressure sodium lamps be used for street lighting in conservation areas, both in the country and the town.

Burning Position Universal: lamps may be operated in any position.

RANGE

Watts/Type	Nominal Lamp Voltage	Lamp Current Amps	Cap	Initial	Lumens Lighting Design	Standard Pack
250 Tubular SON/T	100	3.0	GES	25000	22500	12
250 Elliptical SON	100	3.0	GES	23500	21000	9
400 Tubular SON/T	105	4.4	GES	47000	42000	12
400 Elliptical SON	105	4.4	GES	44000	40000	9



Linear SLI/H sodium lamps

Quality and Reliability

Since the introduction of the 140W linear sodium lamp by Thorn in 1966, it has achieved an unrivalled record of reliability. Installations throughout the country (including the first motorway lighting on the M4) have given fewer failures before relamping than any other type of sodium lamps to date. Statistical records show lamp survival to be more than 95% at the end of the rated life of 6000 hours. Thorn's improved 200W HO linear sodium lamp offers higher lumen output for 200W installations. Light output is increased by 10% to 27 500 lumens. This is achieved by the incorporation of a redesigned arc tube and a new improved reflected coating based on indium. Braided cathodes as used in the 140W lamp are embodied to give reliable life and freedom from earlier failures. The 200W HO lamp can be used in all existing 200W installations except early switch-start circuits for which the standard 200W is still available.

Research and Development

The shape of the inner tube contributes materially to the success of this lamp. In order to minimise energy losses due to atomic collisions and absorption of light by the sodium atoms themselves, the tube volume must be kept as small as possible, but its surface must be large in order to achieve a high light output. By careful design of the discharge tube cross section these apparently diametrically opposed conditions are satisfied and in addition there is direct linear path between the electrodes of the lamp which helps to achieve a low starting voltage. The lamp requires a sodium reservoir temperature of approximately 250°C to give optimum vapour pressure for efficient light radiation and a portion of the power to the tube is used to achieve this. The use of an infra-red reflecting film on the inside of the outer bulb, composed of the oxides of metals such as tin and indium, conserves the thermal energy of the arc, thus increasing the proportion of energy

Special Advantages

available to produce light. The thickness of this film is strictly controlled to give optimum transmission of the visible D-line sodium radiation ensuring maximum light output. Its electrical resistance is such that by connecting it on to one cathode, it acts as a secondary starting electrode.

The electrical characteristics and low starting voltage of the 140W lamp are designed for use on standard control gear used for 90W SOX and obsolete 140W integral ratings, giving completely reliable operation under normal and adverse conditions. The small source size and uniform distribution of both the 140W and 200W ratings conform to the design requirements of modern streetlighting lanterns. Light is emitted uniformly from an arc 780mm long and only 29mm wide. The compact and lightweight construction makes it easy to handle during relamping. The lamp is 908.8mm/3ft long and 39.5mm/1.5in in diameter and weighs less than 0.45kg/1lb. Transport and installation are further simplified by a 25-way pack which can easily be stored in a service truck or tower wagon.

Spectral Distribution

The discharge has a characteristic yellow colour, almost all the visible energy being concentrated at 589/589.6 nm.

Application

The primary application for linear sodium lamps is for streetlighting where their outputs are suitable for the DoE requirements for principal and trunk roads, and motorways. The construction of the lamp materially assists in the optical design and shape of lanterns to meet illuminance distribution and environmental criteria.

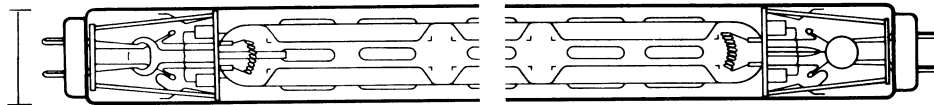
Burning Position

The lamps must operate in a horizontal position $\pm 20^\circ$

RANGE

Watts	Nominal Lamp Voltage	Lamp Current Amps	Cap	Lighting Design Lumens	Standard Pack
140	175	0.9	BIPIN	20000	25
200	145	1.6	BIPIN	25000	25
200 (HO)	145	1.6	BIPIN	27500	25

Watts mm
140 908.8
200 908.8
200HO 908.8



Watts mm
140 39.5
200 39.5
200HO 39.5

SOX sodium lamps

Description

Low pressure sodium discharge operating in a U-shaped arc tube. The U-tube is enclosed in a tubular outer bulb which has a reflector coating on the inside surface to provide thermal insulation. This construction provides a lamp of considerable higher efficacy than the Integral type which is now obsolete.

Application

The primary application for SOX lamps is for streetlighting where their higher efficacy has superseded earlier types as follows:
1/ The 90W SOX lamp replaces the 140W SOI/H integral lamp. Both lamps have the same dimensions and can be operated from the same control gear.

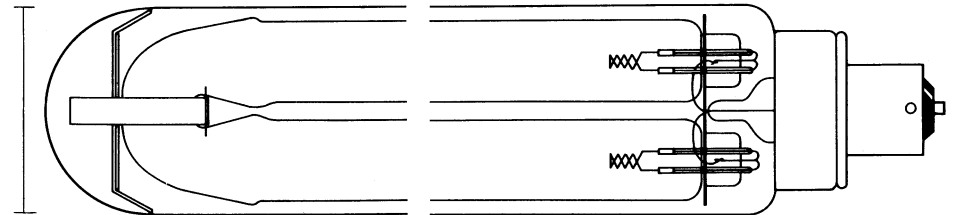
Burning Position

2/ The 55W SOX lamp replaces the 85W SOI/H integral lamp. Both lamps have the same dimensions and can be operated from the same control gear.
3/ The 35W SOX lamp replaces the 60W SOI/H integral lamp. Both lamps have the same dimensions and can be operated from the same control gear.
4/ The 35W SOX lamp is also electrically interchangeable with the 45W SOI/H integral lamp. Although the 35W SOX is longer than the 45W SOI/H it can be used as a replacement in lanterns originally designed for 45/60W SOI/H.
Horizontal $\pm 20^\circ$.
The 35W and 55W ratings may also be operated in the vertical cap up position.

RANGE

Watts	Nominal Lamp Voltage	Lamp Current Amps	Cap	Lighting Design Lumens	Standard Pack
35	70	0.6	BC	4300	9
55	109	0.59	BC	7500	9
90	112	0.94	BC	12500	9
135	164	0.95	BC	21500	9
180	240	0.91	BC	31500	9

Watts mm
35 311
55 425
90 528
135 775
180 1120



Watts mm
35 53
55 53
90 67
135 67
180 67

Hytek lamps are specialised discharge lamps manufactured to meet the needs of research and industry for advanced compact and high brightness light sources.

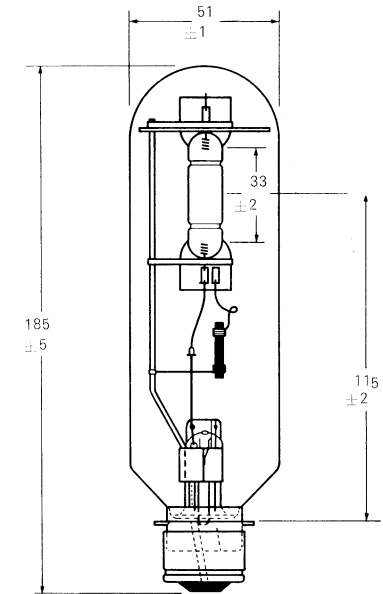
There is also a variety of ultra-violet sources.

These proven ranges of discharge lamps are used for inspection and development projects in many locations and they undoubtedly have done much to maintain the superior quality and advanced design of much British industrial and engineering equipment.

The lamps are manufactured to exacting specification with advanced or high techniques – hence the name Hytek.

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- 7:14, 7:15** Mercury lamps for projector purposes – Type ME/D
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- 7:17** Mercury lamps for long wave u-v – Types M1 and M2
- 7:18** Mercury lamp for short wave u-v – Type MBL/D
- 7:19** Short and long wave u-v and germicidal lamps
- 7:20** Compact source metal halide lamp for projector purposes 400W CSI
- 7:21** Compact source metal halide lamp for projector purposes 1000W CSI
- 7:22** Compact source sealed beam metal halide lamp 1000W
- 7:23** Metal halide lamp – Type MBIL/H 750W
- 7:24** Metal halide lamp – Type MBIL/H 1600W
- 7:25** Metal halide lamp – Type MBIL/H 1200W for photoprinting
- 7:26** Metal halide lamp – Type MBI sealed beam 400W for photoprinting
- 7:27, 7:28** Pulsed xenon arc lamps tubular and helical
- 7:29** Linear source xenon lamp – Type XB
- 7:30, 7:31** Compact source xenon lamps – Type XE/D
- 7:32** Compact-source xenon flash-tube type FA5
- 7:33** Standard xenon lamp '4 in 1' housings
- 7:34** Neon high intensity obstruction light



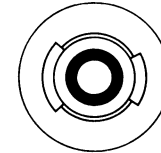
Supply voltage 200/250 a.c.

DESCRIPTION

Mercury vapour discharge lamps with quartz arc tubes loaded below 100W/cm of arc length and operating at pressures of 8/10 atmospheres.

The arc tubes are mounted in tubular outer bulbs, and the lamps are designed for vertical burning cap down. Restrictions in the arc tube ensure a stabilized and accurately focused linear light source for projection purposes.

The lamps require control gear consisting of a choke and power factor correction capacitor.



All dimensions in mm

TYPICAL APPLICATION

Optical instruments requiring accurate optical control, e.g. spectrosopes, comparators and other 'slit' instruments.

CONTROL GEAR See Section 10.

LAMPS

Reference no.	Watts	Arc length	Cap	Lamp operating Volts	Amps	Starting current	Design average Lumens	Life Hours
91-1159	125	33 : 2	P28/25	110/140	1.15	1.5/2	4000	1500

Mercury lamps for projector purposes-Type ME/D

Supply voltage 200/250.

DESCRIPTION

Mercury vapour discharge lamps with quartz arc tubes loaded above 100W/cm of arc length and operating at a pressure of about 30 atmospheres.

The arc operates between solid tungsten electrodes providing a compact stable light source of high brightness. The radiations have much photochemical value and little heating effect. In the 250W ratings the same basic lamp has various casings and bases, the three main types being shown in the table and illustrations. Windows are of quartz where short-wave u.v. radiation is required, or of glass where it must be excluded. The lamp with P28/25 prefocus cap is interchangeable with certain class A1 tungsten filament projector lamps.

The 1000W rating is a bare quartz arc tube. Lamps may be operated on d.c. or a.c. supplies in conjunction with appropriate control gear. For a.c. supplies this consists of a choke and power factor correction capacitor. In addition, the 1000W lamp utilises a starting capacitor in series with a pushbutton switch. For d.c. operation of 250W lamps a choke and series resistance are required, the choke being retained for starting purposes. The 1000W lamp on d.c. operation requires a series resistance, the lamp being started by means of a Tesla coil.

All lamps must be operated vertically, cap downwards. A tilt of more than 10° will cause damage to the arc tube.

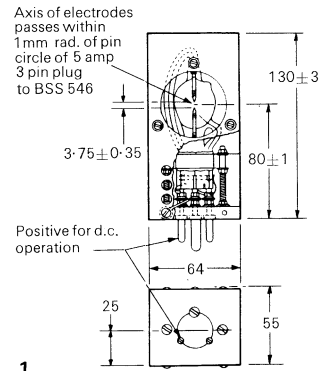
TYPICAL APPLICATIONS

Monochrome slide and film projectors, film printing, projection microscopes, profile projectors and industrial inspection purposes.

CONTROL GEAR

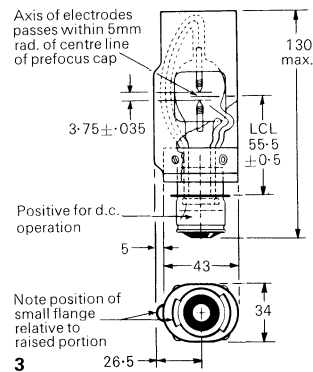
See Section 10
All dimensions in mm unless otherwise indicated

3-PIN BOX TYPE LAMP 250W



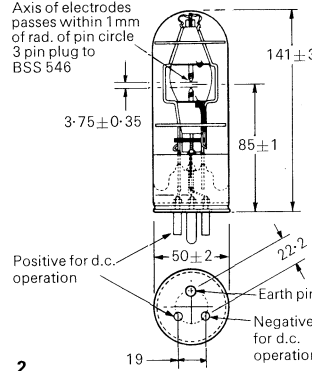
1

PREFOCUS LAMP 250W



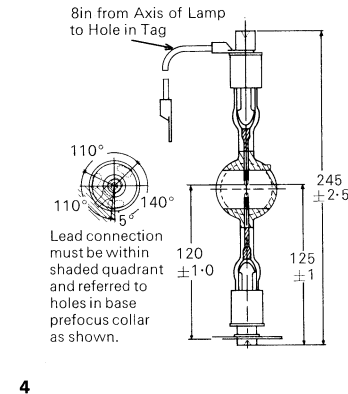
3

LAMP WITH TUBULAR GLASS ENVELOPE 250W



2

LAMP WITH TAG/LEAD CONNECTION 1000W



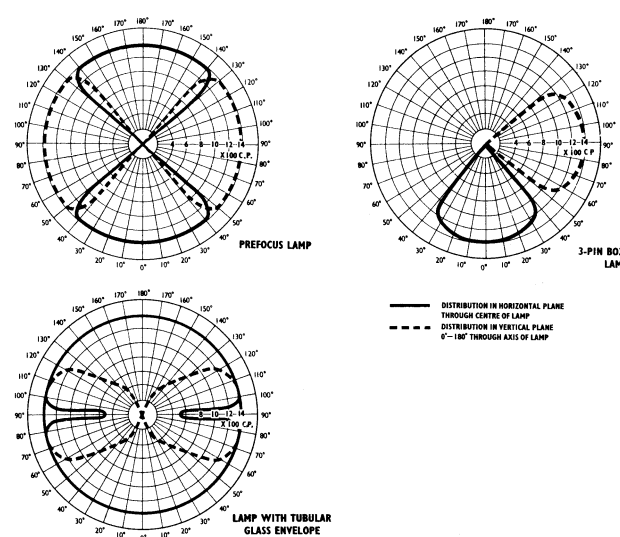
4

LAMPS

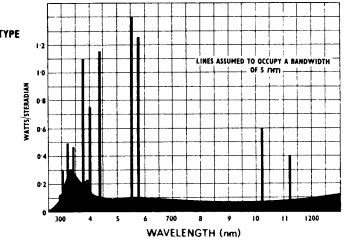
Reference no.	Watts	Arc		Outer Casing	Illus.	Lamp operating		Starting current Amps	Maximum brightness Stilbs	Mean HCP	Life Hours
		length mm	Cap			Volts	Amps				
94-0001	250	3.75	3-pin	Metal Box Glass Window	1	60/75	3.7/4.6	4/5	20000	1300	500
94-0006	250	3.75	3-pin	Metal Box Quartz Window	1	60/75	3.7/4.6	4/5	20000	1300	500
94-0051	250	3.75	3-pin	Tubular Glass Bulb	2	60/75	3.7/4.6	4/5	20000	1300	500
94-0101	250	3.75	P28/25	Oval Metal Case	3	60/75	3.7/4.6	4/5	20000	1300	500
94-0151	1000	6.5	Cylindrical with disc	—	4	60/75	16/18	20/22	40000	7000	500

Mercury lamps for projector purposes—Type ME/D

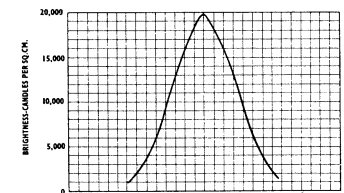
POLAR CURVES OF LIGHT DISTRIBUTION



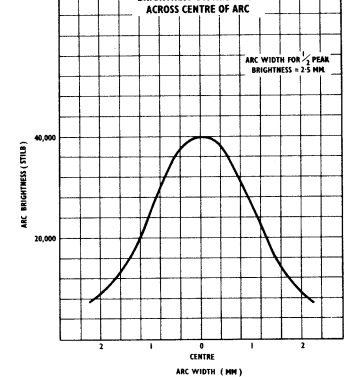
SPECTRAL DISTRIBUTION



BRIGHTNESS DISTRIBUTION ACROSS CENTRE OF ARC



BRIGHTNESS DISTRIBUTION ACROSS CENTRE OF ARC



LIGHT DISTRIBUTION

The light distribution of each of the three main variations of the 250W lamp is shown in the polar diagrams above.

SPECTRAL DISTRIBUTION

The diagram shows an appreciable level of continuous radiation with a number of lines the strongest of which lie in the U.V. area at 365nm and in the blue (at 405 and 436nm) the green (546 nm) and yellow (579nm) regions of the visible spectrum. It should be noted that this diagram shows the spectral distribution of a bare quartz tube. In lamps with glass envelopes or glass windows wavelengths shorter than 350nm are progressively filtered out until there is virtually no emission at wavelengths of 300nm and below.

WARNING

Short-wave u.v. radiations are harmful to the human eye and skin. Since they are readily transmitted through quartz, though absorbed by most kinds of glass, precautions must be taken to shield observers from direct or reflected radiation when operating a rectangular box lamp with a quartz window or an oval metal cased lamp with an unglazed aperture. Radiations from ME lamps with glass envelopes or glass windows are quite harmless.

The curve showing the brightness distribution is measured across the arc at the centre of the arc length. The brightness distribution along the arc length is almost constant except in the regions adjacent to the electrodes.

Mercury lamp for short wave u-v—Type MBL/D

Supply voltage 200/250

DESCRIPTION

Mercury discharge lamps with bare quartz arc tubes loaded below 100W/cm of arc length and operating at a pressure of 8/10 atmospheres. The lamp transmits both long wave and short wave u-v as well as visible light. Perforated diaphragms mounted above the electrodes ensure a stabilized and accurately focused linear light source for optical purposes.

The lamp is designed to operate in free air but should be shielded from draughts. Before it is put into service, the quartz envelope should be thoroughly cleaned with a grease solvent, such as ordinary methylated spirits. This avoids any contamination from handling causing devitrification of the quartz in operation.

When a lamp is operated direct from the supply mains and a high degree of stability of light-output is required, a current stabilization device, such as a constant current arrangement, is to be preferred to voltage stabilization.

TYPICAL APPLICATION

The lamp provides a stable linear source for optical purposes. As the light source is narrow and of uniform brightness along its length, it is very suitable for film printing or as a source of u-v radiation.

CONTROL GEAR

See section 10

Note

D.C. Operation. The A.C. circuit is conventional, but for D.C. circuits a quick-break switch across the lamp, an ohmic resistor and a choke are required, as shown in the diagram. The choke provides an inductive surge across the lamp when the quick-break switch is opened.

The value of resistors for various supply voltages are shown below:

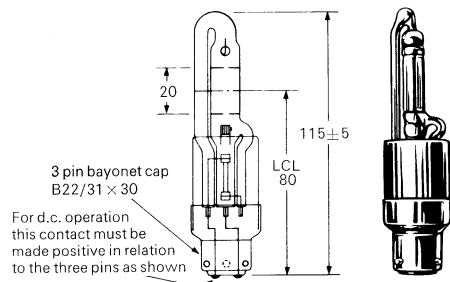
Supply Volts	Resistance Value (ohms)	Current Rating (amps)
200	79	
210	87	2.3
220	95	
230	105	
240	112	
250	123	

WARNING

This lamp emits short-wave u-v which is harmful to the human eyes and skin. Precautions must be taken to shield observers from direct and reflected radiation, as, for example by means of a clear glass screen which will filter out the radiation below 300 nm.

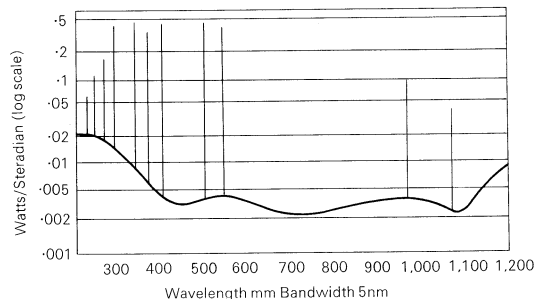
LAMPS

Reference no.	Watts	Arc length mm	Arc width mm	Cap	Light centre length mm	Lamp operating Volts	Amps	Starting current Amps	Max. brightness Stilbs	Life Hours
91-9006	125	20	1.5	B22/31 x 30 3-pin	80 ± 1	110	1.25	3	800	1000

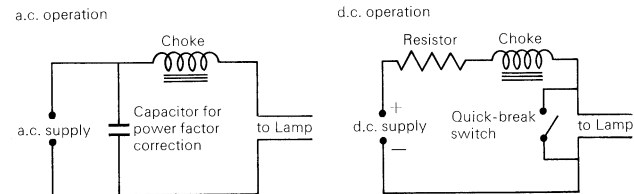


All dimensions in mm

SPECTRAL DISTRIBUTION



CIRCUIT DIAGRAMS



Short and long wave u-v and germicidal lamps

FLUORESCENT TYPE GERMICIDAL TUBES

These lamps are in standard fluorescent lamp sizes. The lamps are made without phosphors, and the tube is a special glass which transmits short wave u-v. Approximately 95% of the radiated energy is in the 253.7 nanometres band which is near the maximum for germicidal effectiveness. The lamps are useful for the irradiation of airborne bacteria or moulds, and for the irradiation of surfaces on which bacteria and/or mould spores have collected.

A publication, Germicidal Radiation and its Application, is available on request.

TYPICAL APPLICATION

For hospitals, etc., for sterilising purposes.

TUBES

Lamp Rating no.	Reference no.	Nominal Dimensions mm	Standard in	Standard pack
15W	92-2013	457 × 25	18 × 1	25
30W	92-4540	914 × 25	36 × 1	25
8W	92-1213	300 × 16	12 × 8	25

LONG WAVE ULTRA-VIOLET FLUORESCENT TYPE TUBES

The germicidal tubes described above are short wave ultra-violet sources. Long wave ultra-violet fluorescent type tubes are also available as below.

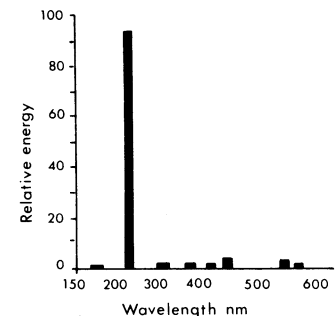
Type	Rated
Ultra-violet (non-filter)	1500mm/5ft 65/80W; 1200mm/4ft 40W; 600mm/2ft 20W; 450mm/18in 15W; 300mm/12in 8W
Blacklight blue u-v	1200mm/4ft 40W; 450mm/18in 15W; 300mm/12in 8W; 225mm/9in 6W; 150mm/6in 4W

FITTINGS AND CONTROL GEAR

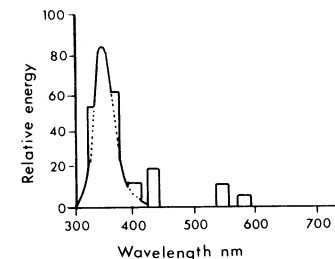
All tubes listed on this page go into standard fittings and operate on standard fluorescent control gear.

The 30W tube operates on 200/250V a.c. and the 15W on 100/250V a.c. Alternatively, two 15W tubes may be run as a series pair on 200/250V a.c.

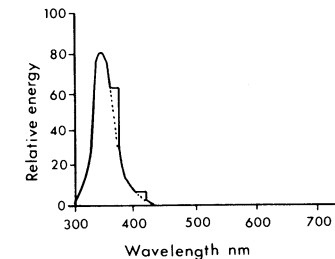
SPECTRAL ENERGY DISTRIBUTION GERMICIDAL TUBES



SPECTRAL ENERGY DISTRIBUTION ULTRA VIOLET TUBES



SPECTRAL ENERGY DISTRIBUTION BLACKLIGHT BLUE TUBES



Compact source metal halide lamp for projector purposes 400W CSI

DESCRIPTION

The 400 watt compact source iodide lamp is a new design of projector lamp giving white light of good colour rendering properties at an efficiency of 80 l/w for 100 hours. The source size is approximately 9 x 5mm and the brightness is about 8000 candelas per square cm.

The high efficiency is obtained by the use of an arc discharge. The iodide technique has been used to introduce additional elements into the arc and to keep the bulb wall clean throughout life.

The lamp is somewhat unconventional in appearance. It is extremely rugged. The small total physical size and the ability to operate in any position ensure that the lamp can be readily fitted into existing equipment and simplifies the design of new equipment. The single ended construction and the degree of pre-focusing provided means that lamp replacement is straight-forward.

APPLICATIONS

The major advantage of this lamp is its high efficiency, combined with its robustness, simplicity, small size and relatively low power consumption.

In general, considerations of source size, lamp size, lamp rating and efficiency indicate that it can be used in applications which at present use 100V-240V hard glass filament projector lamps of 250W-1000W rating to give a substantial advantage in terms of either increased light output or a reduction in input power and heat. It is useful in high-powered slide projectors and theatre spotlights (especially follow-spots), in overhead projectors projection microscopes enlargers and cine projectors. It is suitable for colour photography using daylight colour-film stock.

CONTROL GEAR See Section 10

LAMPHOLDER

A lampholder, Catalogue no. L1101, is available for use with this lamp.

DIMENSIONS

(in millimetres)

Arc length	9 ± 1
Arc size	9 × 5
Overall length (max)	55
LCL	34 ± 1
Diameter (max)	30
Pin length (min)	8.5
Pin spacing	9.0 ± 0.5
Pin diameter	0.76

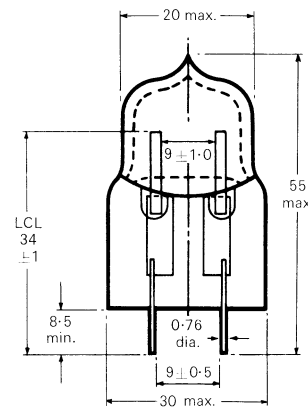
LIFE

Nominal objective: 500 hrs

OPERATING POSITION

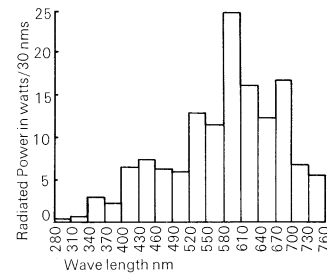
Universal

LAMP REFERENCE NUMBER 99-0201



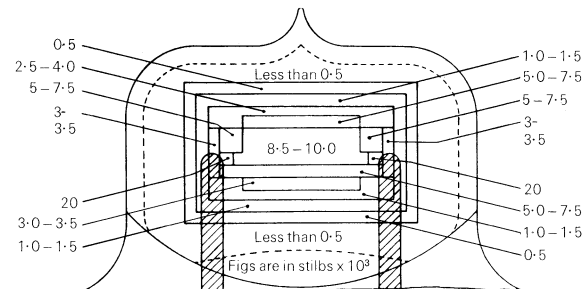
TYPICAL SPECTRAL POWER HISTOGRAM

for the 400W compact source iodide lamp



All dimensions in mm

TYPICAL BRIGHTNESS DISTRIBUTION DIAGRAM



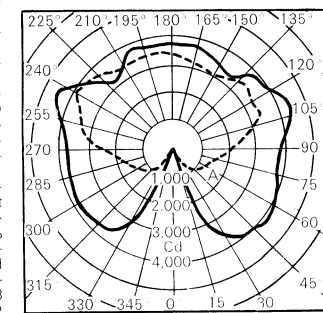
ELECTRICAL CHARACTERISTICS

Supply volts a.c.	240
Arc watts	400
Arc volts	100
Arc current (amps)	5
Run up time (secs)	30
Re-starting time (mins)	3/5

LUMINOUS CHARACTERISTICS

Initial lum. eff. (min)	80 lumens/watt
Lumen maintenance	85%
Colour rendering	Good
Chromaticity co-ordinates	X = 0.433 Y = 0.382

TYPICAL CANDLEPOWER DISTRIBUTION IN VERTICAL PLANES

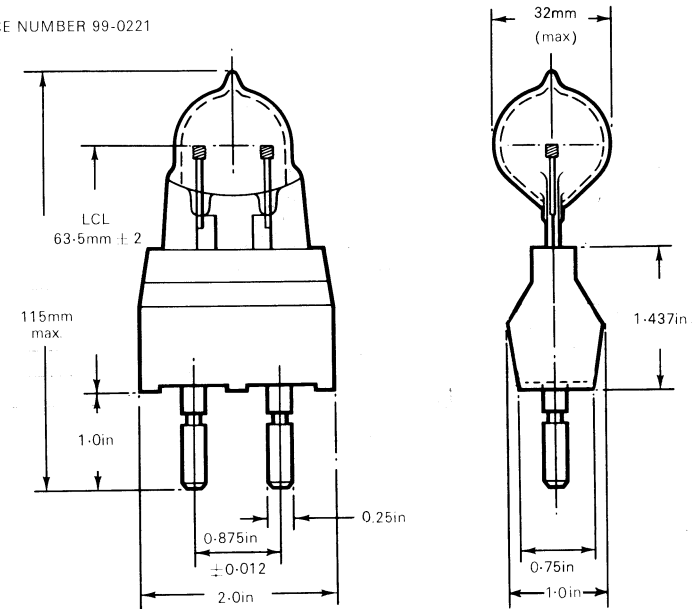


A - through electrodes
B - normal to electrodes



Compact source metal halide lamp for projector purposes 1000W CSI

LAMP REFERENCE NUMBER 99-0221



DESCRIPTION

The 1000W compact source iodide lamp gives white light of good colour rendering at an efficiency of 93 l/w for 200 hours.

APPLICATIONS

The high efficiency, robustness and small size of this lamp make it eminently suitable for projector purposes such as for follow spotlights.

ELECTRICAL CHARACTERISTICS

Supply volts	240
Arc watts	1000
Arc volts	70-85
Arc current (amps)	15
Run-up time (secs)	30
Re-start time (mins)	2.5

DIMENSIONS

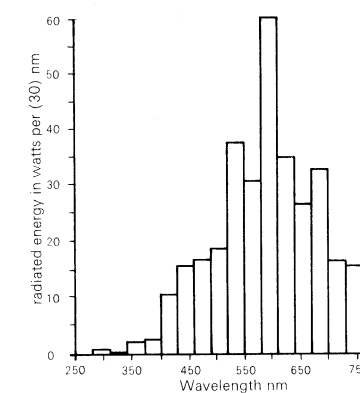
(in millimetres)

Arc length	14 ± 1
Overall length (max)	115
Light centre length	63.5 ± 2
Diameter (max)	32
Cap	Medium Bipost—G22

LUMINOUS CHARACTERISTICS

Initial efficiency	93 lumens/watt
Lumen maintenance	80%
Colour rendering	Good
Chromaticity coordinates	X = 0.424 Y = 0.402

TYPICAL SPECTRAL POWER HISTOGRAM



LIFE

Nominal objective: 200 hours

OPERATING POSITION

Universal

CONTROL GEAR

See Section 10.

Compact source sealed beam metal halide lamp 1000W

DESCRIPTION

The 1kW sealed beam compact source iodide lamp consists of the standard 1kW CSJ lamp 99-0221 (see previous page) enclosed in a 205mm/8in diameter sealed beam reflector envelope. This results in a beam intensity of 1.5 million candelas with a beam spread of 18° (to 0.1 peak intensity).

APPLICATIONS

Floodlighting, especially for filming TV outside broadcasts, also as a general replacement for carbon arcs.

ELECTRICAL CHARACTERISTICS

Supply voltage	220, 240 a.c.
Arc watts	1000
Arc volts	70/85
Arc current (amps)	15 approx.
Run-up time (secs)	50
Restart time (mins)	5

DIMENSIONS

(in millimetres)	
Diameter	205
Overall length (max)	175
Cap	Bi-post G38

LUMINOUS CHARACTERISTICS

Initial beam candlepower (peak)	1.5 million candelas			
Beam spread $\frac{1}{2}$ peak	$\frac{1}{3}$ peak	$\frac{1}{5}$ peak	$\frac{1}{10}$ peak	
	$\pm 3^\circ$	$\pm 4^\circ$	$\pm 6^\circ$	$\pm 9^\circ$
Colour rendering	Good			
Chromaticity co-ordinates	X=0.424 Y=0.402			

LIFE

Nominal objective 1000 hours

OPERATING POSITION

Universal

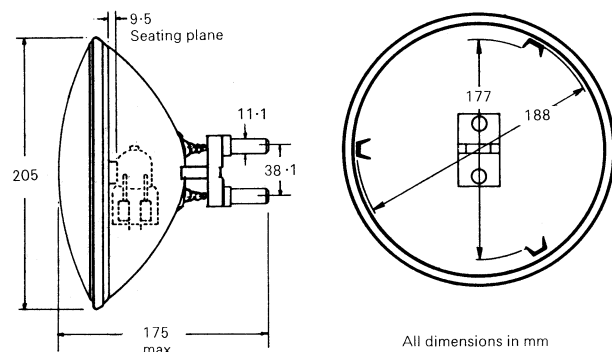
CONTROL GEAR

See also Section 10
Control gear and box, G53255, consisting of series ballast circuit and high voltage pulse starter unit. The starter unit is mounted on a detachable chassis and may be removed and fixed separately. This enables the starter unit to be mounted on the lamp housing ensuring a short, totally enclosed HT lead.

LAMP FITTINGS

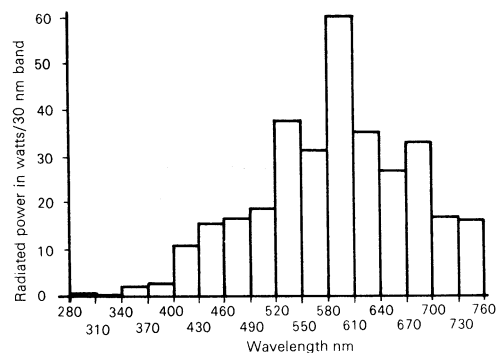
Suitable fittings, COM 1000 series, are available for use with this lamp, giving a variety of light distributions and incorporating the starter unit in the fitting housing.

LAMP REFERENCE NUMBER 99-1222



All dimensions in mm

SPECTRAL ENERGY HISTOGRAM



WARNING

The unit generates high voltage pulses for lamp starting. Suitable safety precautions should be taken during installation and operation of the unit.
The control unit and associated lamp house must be earthed. The HV cable should be protected from accidental damage.
The supply must be disconnected before servicing. For outdoor use the lamp must be protected from rain.

Metal halide lamp—Type MBIL/H 750W

Supply voltage 200/250 a.c.

Lamp Reference no. 91-7476

DESCRIPTION

The lamp consists of a quartz tube in which an electrical discharge takes place between tungsten electrodes in an atmosphere of mercury-vapour to which has been added certain metal halides. The halides are chosen to give a high efficacy with good colour appearance and colour rendering approximating to daylight.

The lamp is designed to be used with the Compact Atlas projector ON1600 with which it forms an integral unit.

The arc-tube should not be touched with the bare hand, if this is unavoidable, it should be cleaned with methylated spirit before operation, to avoid crazing of the surface.

CONTROL GEAR

(see Section 10)

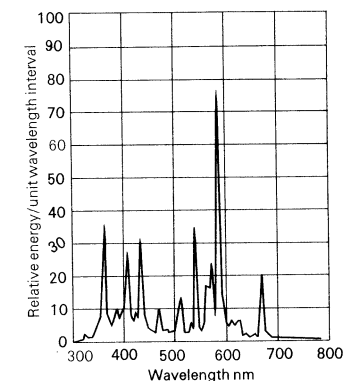
LAMP CHARACTERISTICS

Rating	750W
Arc volts	500
Operating current	1.75 amp
Run-up time	2½ mins
Light output: initial,	67000 lumens
throughout life	58500 lum
Nominal life	5000 hours
Bulb finish	frosted
Operating position	horizontal

APPLICATIONS

Outdoor Floodlighting.

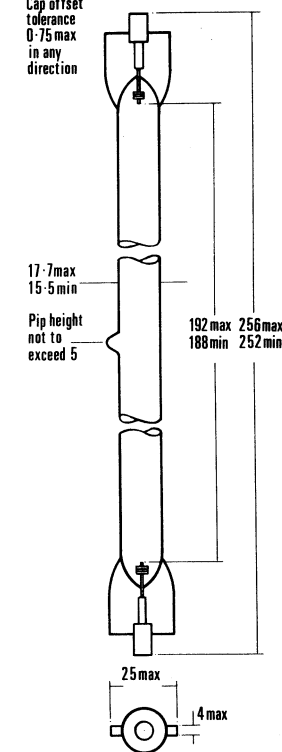
SPECTRAL DISTRIBUTION



WARNING

The light emitted by the bare lamp should not be observed with the naked eye as it emits short wave uv radiation. This radiation is filtered out by the cover glass of the projector ON1600.

Cap offset tolerance
0.75 max
in any direction



All dimensions in mm

Metal halide lamp—Type MBIL/H 1600W

DESCRIPTION

A mercury iodide lamp with quartz arc tube loaded below 100W/cm at a pressure of 8/10 atmospheres. The lamp is for use in ON 1600 floodlighting fitting. See page 2:20

APPLICATIONS

The fitting was originally designed and used for the floodlighting of football stadia, in which it has proved unusually successful. It can also be used for general floodlighting. Its colour-rendering properties are good and allow its use in Colour television.

CONTROL GEAR

See Section 10.

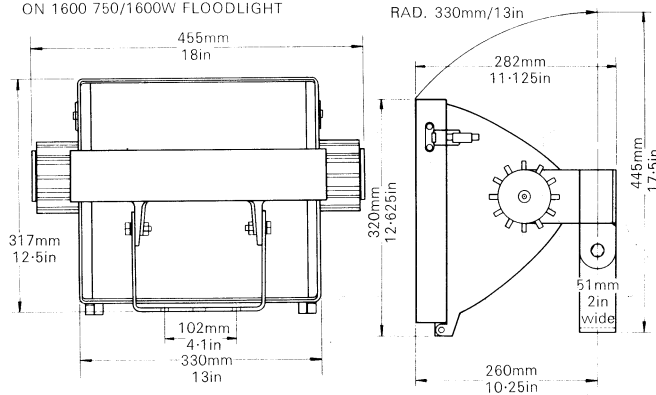
LAMP CHARACTERISTICS

Rating	1600W
Caps	Ceramic
Bulb finish	Frosted
Operating volts	450
Operating amps	3.75
Nominal lumens (initial)	135000
Nominal lumens (throughout life)	115000
Life	3000 hours
Run-up time	2½ mins
Operating position	Horizontal

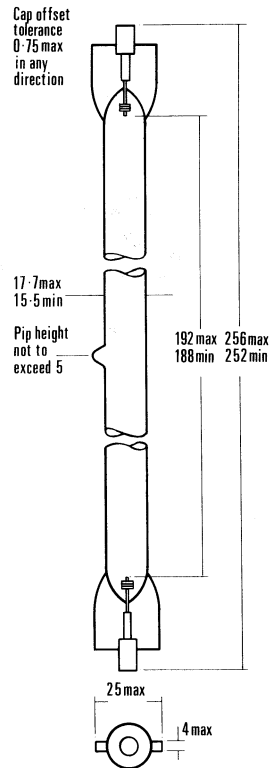
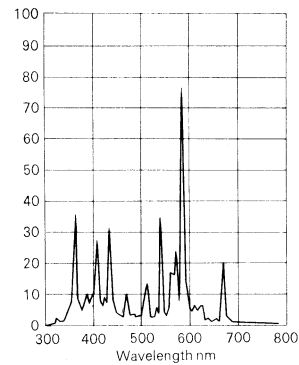
SAFETY PRECAUTIONS

The light emitted by the lamp should not be observed with the naked eye for it has a u-v content normally filtered out by the projector. The lamp (arc tube) should not be touched with the bare hand but, if this is unavoidable, it should be cleaned with a methylated spirit damped cloth before operation.

LAMP REFERENCE NUMBER 91-7475
ON 1600 750/1600W FLOODLIGHT



TYPICAL SPECTRAL DISTRIBUTION CURVE



All dimensions in mm

Metal halide lamp—Type MBIL/H 1200W

GENERAL DESCRIPTION

This 1200W MBIL lamp consists essentially of an arc burning between tungsten electrodes in an atmosphere of mercury vapour and additional metallic halides enclosed in a tubular quartz bulb. The halides are chosen to ensure maximum radiation in the 360 to 450 nanometre region. It is designed to operate in an enclosure in still air. The lamp will only remain stable in operation providing the quartz wall temperature operates between 600 °C and 750 °C.

GENERAL APPLICATION

For photoprinting purposes in the graphic arts industry: this encompasses diazo printing, photo-resists, etc. The u-v output enables faster printing speeds than those obtained from conventional carbon arc lamps. It is particularly recommended by Agfa-Gevaert as an exposure source for use with their colour proofing system "Gevaproof".

CONTROL GEAR

See Section 10

Supply volts	240V 50Hz
Rating	1200W
Chokes	2 × G 53254.4
Capacitors	8 × G C2236

LAMP CHARACTERISTICS

Rating	1200W
Cap	Ceramic
Operating volts	350 ± 30
Operating amps	4

LIFE

500 hours

BURNING POSITION

Horizontal

SAFETY PRECAUTIONS

The light emitted from the lamp or the reflector should not be observed with the naked eye.

If the tube has been handled, it must be cleaned with methylated spirits before operation.

Owing to the high open-circuit voltage of the reactance transformer, the lamp enclosure must be provided with a lock which automatically switches off the supply when the enclosure is opened.

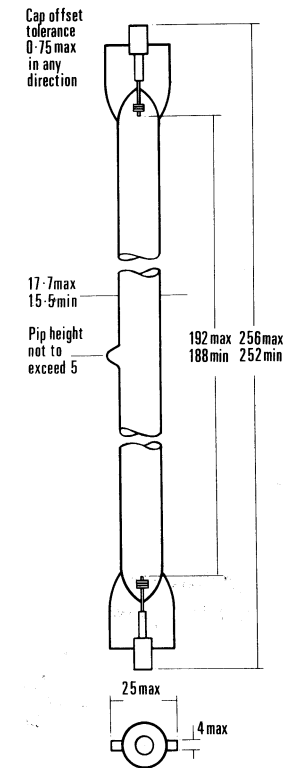
LAMPHOLDER ASSEMBLY

A lampholder assembly GL 1153 has been designed for use with these lamps.

SIMMERING CONDITIONS

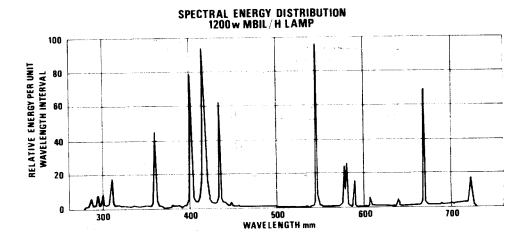
The lamp may be operated under simmering conditions at approx. half power. Current details on application.

LAMP REFERENCE NUMBER 91-7470

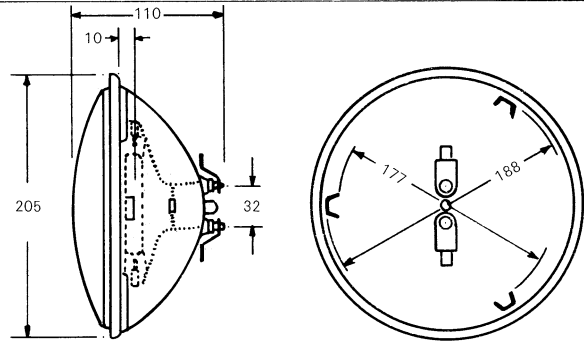


All dimensions in mm

TYPICAL SPECTRAL DISTRIBUTION CURVE



400W metal halide sealed beam photoprinting lamp MBI PAR 64



All dimensions in mm

Description

A 400W high pressure metal halide quartz arc lamp enclosed in a sealed beam envelope with internal reflector, providing radiation primarily in the 360–450 nanometer wave bands. The unit is fitted with a spreader lens to give an elliptical light distribution capable of giving reasonably uniform radiation over a 36in x 24in area at a distance of 2 – 3ft.

Application

In the photoprinting field, especially for diazo and photo resist printing as replacement for carbon arcs. By using this unit printing times can be reduced by factors of 4 to 1 or more with a reduction in electrical power.

Electrical characteristics

Arc Watts	400
Arc Volts	105 ± 15
Arc Current	4.4 amps
Run-Up time	2 minutes
Restrike time	7/10 minutes

Dimensions

Overall width	205mm
Caps	Two lug flat

Life

1000 hours nominal.

Operating Position

Universal
Lamp reference no. 91-9826

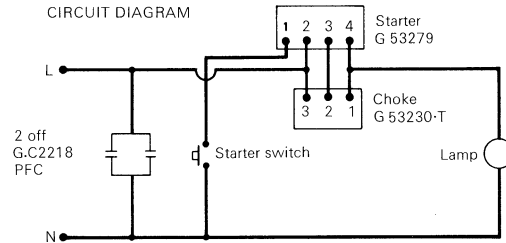
Control Gear (See also section 10)

Choke G.53230T. with starter unit G.53279, and two capacitors G.C2218. See circuit diagram.

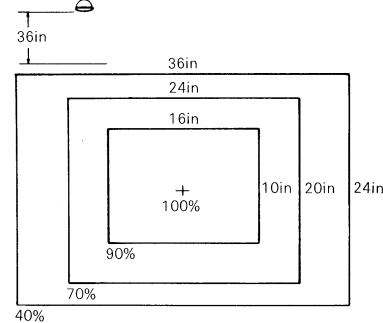
Lamp Fitting

A special fitting has been designed for use with this lamp. Full details on application.

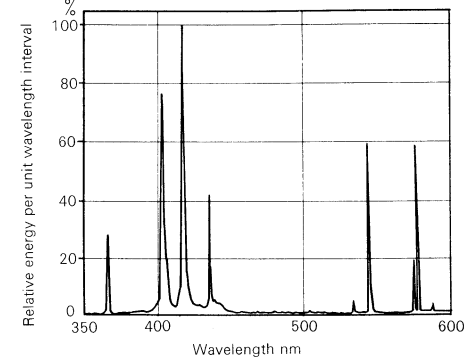
CIRCUIT DIAGRAM



TYPICAL LIGHT DISTRIBUTION AT 36in FROM UNIT FACE



SPECTRAL ENERGY DISTRIBUTION CURVE



Pulsed xenon arc lamps—linear types

DESCRIPTION

These pulsed xenon arc lamps consist of an arc between tungsten electrodes operating in an atmosphere of pure xenon contained in a tubular quartz bulb.

The spectrum of the radiation is virtually continuous extending from the ultra-violet through the visible into the infra-red. The colour of the visible radiation is very similar to noon sunlight having a colour temperature of 5600°K. Light output is controlled by the gear which pulses the lamp for a specific period.

APPLICATION

Photo reproduction
Until recently the standard light source for copy board illumination has been the open carbon arc. Over the last two or three years special discharge lamps have been used, particularly pulsed xenon lamps.

CONTROL GEAR

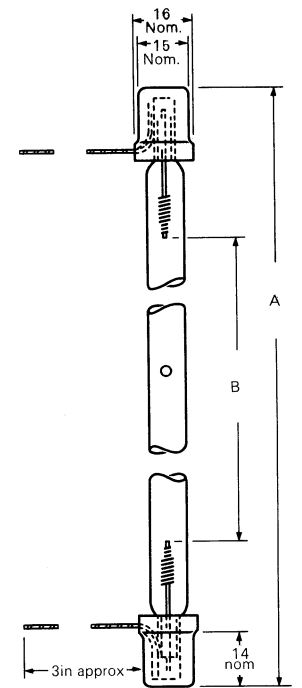
Light output is controlled by the gear which pulses the lamp for a specific period. The lamps are designed to operate at a 100 cycle per second pulse rate for pulse width of 1 millisecond at half peak. Suitable gear for operating the lamp is manufactured by Theimer Ascorlux and Littlejohn. Other companies have gear under development.

LAMP SPECIFICATION

Type	Pulsed Xenon Arc
Cap	Ceramic with flexible leads.
Operating Position	Universal. Forced cooling essential
Arc Voltage	110 ± 5
Supply Voltage	200/250V 50Hz
Pulsed Frequency	100Hz
Design Wattage	1500 and 3000
Efficacy	25 lumens per watt
Life	500 hours

LAMPS

Rating	Lamp Reference no.
1500W	98-2015
3000W	98-2030



Rating	A	B
1500W	392 ± 3	310 approx.
3000W	695 ± 3	615 approx.

All dimensions in mm unless otherwise stated

Pulsed xenon arc lamps—helical

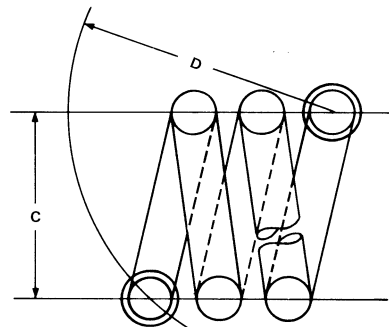
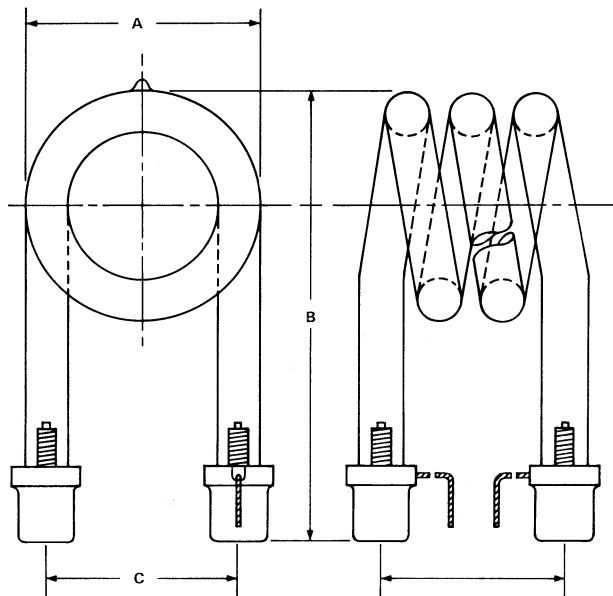
LAMP SPECIFICATION

Caps	Ceramic with flexible leads
Supply volts	200/250V 50Hz
Pulse frequency	100Hz
Design wattage	4kW, 8kW
Efficacy	30 lumens/watt
Life	200 hours
Lamp references	98-2050; 98-2070

DESCRIPTION

These pulsed xenon lamps are higher wattage versions of the linear type (shown on the previous page). They are designed to operate on control gear providing 100 cps pulses. In order to provide a more concentrated source the quartz tube is formed into a helix.

For some equipment it is necessary to include a striker starting device on the 4kW lamp. Lamps can be supplied with this addition as lamp ref. no. 98-2049.



	4kW	8kW
A	60 max	60 max
B	118 max	118 max
C	48	48
D	64.5	102

All dimensions in mm

Linear source xenon lamps—Type XB

DESCRIPTION

Linear source xenon lamps consist of an arc burning between tungsten electrodes contained in a tubular quartz bulb. The spectrum of the radiation is virtually continuous extending from the ultra-violet through the visible into the infra-red. The colour of the visible radiation is very similar to noon sunlight with a colour temperature of approximately 5600°K. Light output may be modified over a wide range, without appreciably altering the colour of the light, by adjusting the power input.

On starting these lamps full output is given almost immediately. The lamps require a starter unit to initiate the arc, and a series inductance and power factor connection capacitor are also required. For further details see Section 10.

APPLICATION

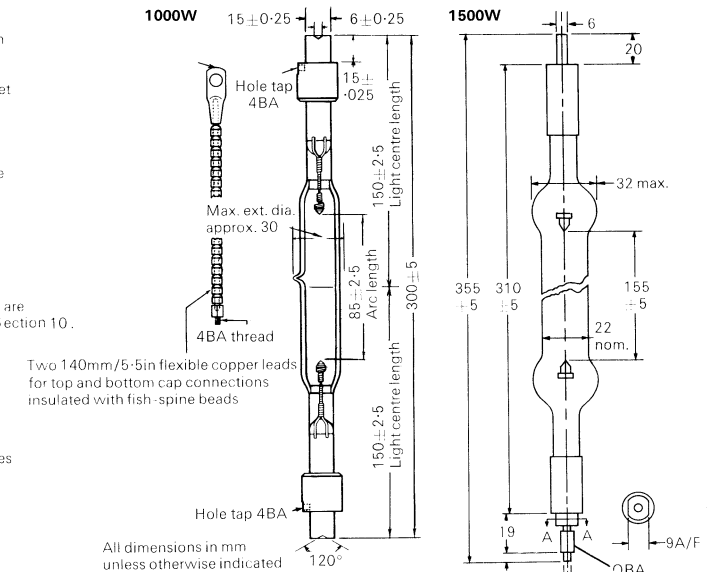
High speed photography and cinematography
Colour matching
Fadeometer testing
Graphic arts
Optical instruments
Laboratory and general scientific purposes

BURNING POSITION

Vertical ±15°

CAPS

Special cylindrical



Two 140mm/5.5in flexible copper leads for top and bottom cap connections insulated with fish-spine beads

All dimensions in mm unless otherwise indicated

TYPICAL SPECTRAL POWER DATA FOR 1kW AND 1.5kW AC XENON DISCHARGE LAMP

Spectral band	Spectral Power (Watts)		Spectral Power (Watts)		
	1 kW	1.5 kW	1 kW	1.5 kW	
250-280	2.20	3.3	9.10	13.6	
280-310	2.20	3.3	10.0	15.0	
310-340	3.08	4.6	9.8	14.8	
340-370	4.50	6.6	10.62	16.2	
370-400	7.0	10.5	9.83	14.8	
400-430	7.7	11.6	12.75	19.1	
430-460	8.55	12.8	21.5	32.5	
460-490	11.0	16.5	13.2	19.8	
490-520	8.75	13.1	26.4	39.5	
520-550	8.75	13.1	17.6	26.5	
550-580	8.97	13.33	14.9	22.3	
580-610	9.10	13.6	16.3	24.5	
610-640	9.30	13.9			
			640-670	9.10	13.6
			670-700	10.0	15.0
			700-730	9.8	14.8
			730-760	10.62	16.2
			760-790	9.83	14.8
			790-820	12.75	19.1
			820-850	21.5	32.5
			850-880	13.2	19.8
			880-910	26.4	39.5
			910-940	17.6	26.5
			940-970	14.9	22.3
			970-1000	16.3	24.5

LAMPS

Rating	Reference no.	Supply Volts	Arc Length (mm)	Lamp operating Volts	Amps	Lumens	Life Hours
1000W	98-0125	200/250V 50Hz	85 ± 2.5	42	25	22000	500
1500W	98-0150	200/250V 50Hz	155	65/80	20/25	33000	1500

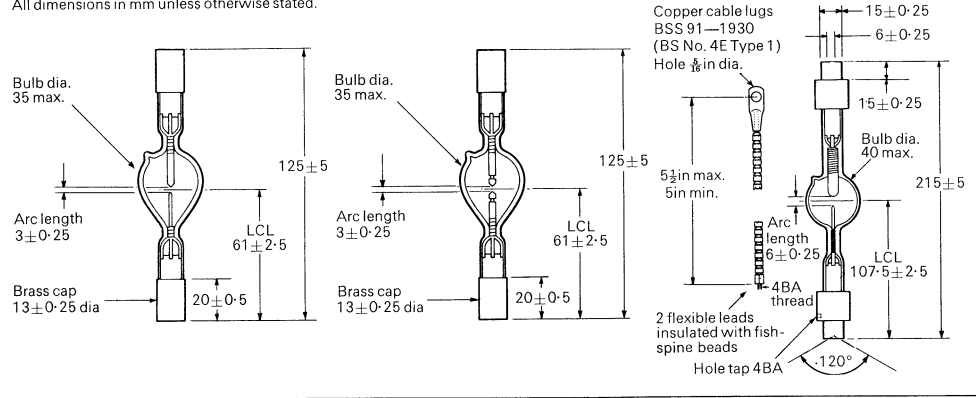
CONTROL GEAR

Rating	Starter Reference no.	Chokes Reference no.	Capacitors MFD	Reference no.	Mains Current Amps
1000W	G:53239	6 × G.53235	240 or	3 × G. C2276	7.5
			300	3 × G. C2276	5
				+ G. C2275	
1500W	G. 53239	3 × G.53230 T + 2 G.53251 T	200	2 × G. C2275	9.3
				+ G. C2276	

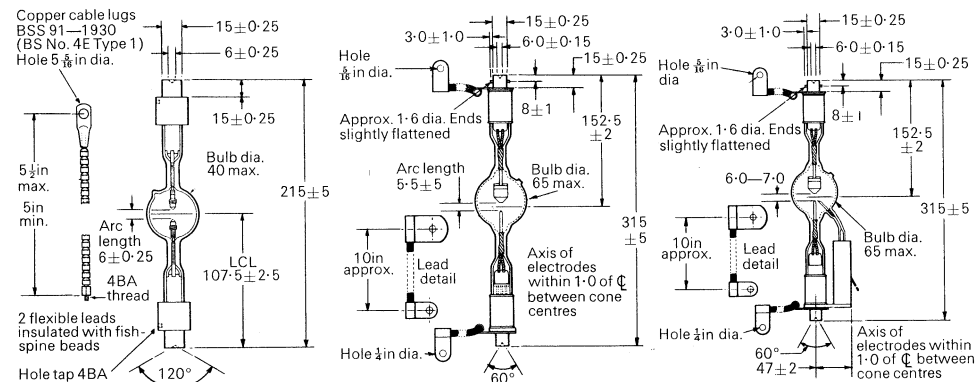
Compact source xenon lamps—Type XE/D

250W/DC 250W/AC 500W/DC

All dimensions in mm unless otherwise stated.



500W/AC 2kW 2 Electrode 2kW DC 3 electrodes



Description
The quartz bulb of a xenon compact-source discharge lamp encloses two electrodes between which the arc is struck in a high pressure atmosphere of pure xenon. Two types of lamps are available, operating from an AC or a DC supply respectively. The very compact high-brightness light-source emits radiation in a virtually continuous spectrum extending from the ultra violet region through the visible into the infrared. There is a pronounced peak in the latter at about 900nm. The lamp is thus a powerful U.V. and I.R. radiator as well as a light-source. The colour temperature of the source is approximately 5600K, similar to noon sunlight. Colour rendering is excellent; dimming can be effected

without appreciable change in the colour of the light. The lamp has almost entirely superseded the carbon arc in cinema projectors, having a much longer life and being cleaner to run. The arc of the AC form of the xenon discharge lamp has a more uniform brightness distribution than the DC forms. The power supply is also simpler, but in general these advantages are outweighed by the more stable arc and longer life of the DC lamp, and it is recommended that the latter be used wherever possible. On starting, the lamp gives full light output almost immediately.

Application
High speed photography and cinematography. Colour matching. Fadeometer testing. Graphic arts. Optical instruments. Laboratory and general scientific purposes.

Position of Burning
Vertical ±15° except for 2KW 3 electrode lamp which burns vertically or horizontally +15°.

Caps
All lamps require a starter unit to strike the arc. In addition AC lamps require control gear in the form of a series inductance and a power factor correction capacitor, while

Compact source xenon lamps—Type XE/D

LAMPS

Rating Watts	Reference no.	Supply Volts	Arc size mm	Lamp operating Volts	Amps	Lumens	Luminance*	Life Hours
250	98-0352	65 min. d.c.	3×2	16.5	15	5000	11000	1500
250	98-0351	200/250 a.c.	3×2	16	17	5000	10000	500
500	98-1002	65 min. d.c.	5×3	22	23	12000	20000	1000
500	98-1001	200/250 a.c.	5.5×3	20	27	11000	11000	500
2kW	98-1506	65 min. d.c.	4.5×4	25	80	70000	120000	1000
2 Electrodes								
2kW	98-1503	35 min. d.c.	6×4	23	87	64000	80000	1000
3 Electrodes								

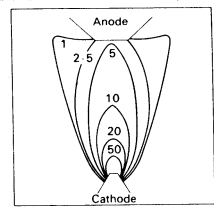
*Luminance=Average luminance of brightest circle of 2mm dia. in candelas/cm²

TYPICAL POWER DISTRIBUTION DATA FOR XENON LAMPS SPECTRAL POWER

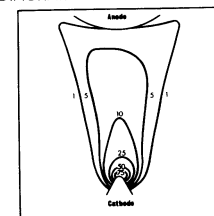
Spectral Band nm	250W AC & DC	500W DC	500W AC	2kW 2 Electrode	2kW DC 3 Electrode Watts
250-280	0.50	1.52	1.40	8.4	7.7
280-310	0.80	2.04	1.87	9.3	8.5
310-340	1.10	2.76	2.53	12.5	11.4
340-370	1.38	3.24	2.97	17.8	16.3
370-400	1.65	4.07	3.74	22.5	20.6
400-430	1.75	4.45	4.07	26.0	23.7
430-460	1.95	4.67	4.29	28.1	25.7
460-490	2.30	5.75	5.28	33.9	31.0
490-520	2.00	4.95	4.55	28.5	26.0
520-550	2.00	4.80	4.40	27.4	25.2
550-580	2.05	4.90	4.50	29.2	26.7
580-610	2.10	4.90	4.50	29.0	26.5
610-640	2.15	4.80	4.40	28.7	26.2
640-670	2.10	4.55	4.18	26.3	24.0
670-700	2.30	5.00	4.60	27.6	25.0
700-730	2.20	4.95	4.55	27.9	25.5
730-760	2.40	5.40	4.95	30.8	28.2
760-790	2.25	5.15	4.73	27.9	25.5
790-820	2.90	6.37	5.85	35.0	32.0
820-850	4.90	11.20	10.30	68.3	62.5
850-880	3.05	7.20	6.60	35.5	32.5
880-910	6.00	13.10	12.00	77.0	70.5
910-940	4.00	9.70	8.90	56.9	52.0
940-970	3.40	7.70	7.05	47.0	42.9
970-1000	3.70	9.10	8.36	52.5	48.0

These figures are accurate to 10% in the visible and IR regions but may be up to 25% in error in the ultra violet

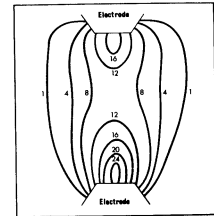
BRIGHTNESS DISTRIBUTION DIAGRAM OF 250W D.C. XE/D LAMP



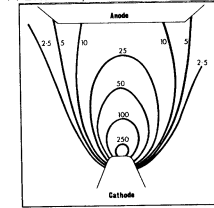
BRIGHTNESS DISTRIBUTION DIAGRAM OF 500W D.C. XE/D LAMP



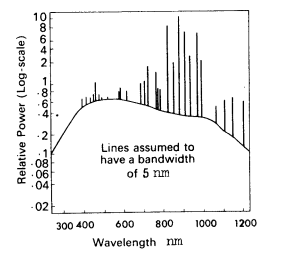
BRIGHTNESS DISTRIBUTION DIAGRAM OF 250W A.C. XE/D LAMP



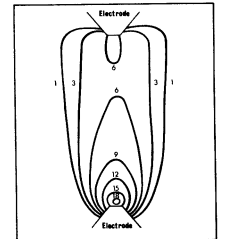
TYPICAL ARC BRIGHTNESS DISTRIBUTION DIAGRAM OF A 2kW XE/D LAMP (2 ELECTRODE)



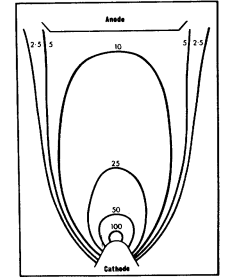
TYPICAL SPECTRAL POWER DISTRIBUTION OF COMPACT SOURCE XENON LAMP



BRIGHTNESS DISTRIBUTION DIAGRAM OF 500W A.C. XE/D LAMP



ARC BRIGHTNESS DISTRIBUTION OF A 2kW XE/D LAMP. (2 ELECTRODE)



Figures are in 10³ Candela/sq. cm.

Compact source xenon flash-tube type FA5

DESCRIPTION

The arc of the 230W type FA5 flash-tube operates between tungsten electrodes in an atmosphere of pure Xenon contained in a tubular glass envelope. It is designed to be operated continuously from mains with an inductive ballast, or as a powerful electronic flash-tube on a 1000-2000V supply.

Under continuous operating conditions its spectral characteristics are those of a normal Xenon arc but under high-intensity flash conditions there is a slight shift towards the blue end of the spectrum, so that the colour approximates to that of North-sky daylight. Colour-rendering is excellent.

Full light output is reached almost immediately and dimming can be affected with negligible variation in the colour of the light.

APPLICATIONS

1. FLASH TUBE

The unusually small size and high power of the light-source make it especially suitable for use with optical systems. Setting-up and focussing can be facilitated by continuous operation of the tube. It is used in high-speed photography and for stroboscopy.

2. CONTINUOUS BURNING

Is mainly useful where low initial cost of lamp and circuitry are of prime importance. Where the highest arc brightness or efficacy are needed one of the range of compact source Quartz Xenon lamps should be used.

Lamps are used in optical instruments, for the graphic arts, for colour-matching and laboratory and general scientific work.

SINGLE FLASH OPERATION

Electrical characteristics

Operating voltage: 1000-2000V

Maximum loading: 150 Joules

Maximum repetition frequency: 1 every 10 seconds.

Trigger voltage: 12kV.

Approximate luminous characteristics

Total light-output: 1500 lm/s.

Peak lumen output: 2.0×10^9 lm.

Approx. flash duration to $\frac{1}{3}$ peak: 1-0 millisecond.

Average objective life: 5000 flashes.

NOTES

The trigger ring round the tube consists of a single turn of wire at a point approximately half-way up to the top electrode.

The spark-gap is an air-gap with approximately 5kV breakdown (4mm gap; needle points).

The basic circuit has been found satisfactory under single flash conditions, and data given above only applies to it. The tube may be operated at other loading and repetition rates if the maximum mean power (230W) is not exceeded. At higher frequencies and mean powers special pulse forming circuits will be needed.

WARNING

The design and construction of these high tension circuits should only be attempted by persons familiar with the problems involved as they can be dangerous and even lethal.

CONTINUOUS OPERATION

Electrical Characteristics

Lamp rating 230W

Minimum supply voltage 200V

Lamp operating voltage 13-5V

Lamp operating current 18-5A

Approximate luminous characteristics

Light output 2750 lm

Efficacy 12 lm/watt

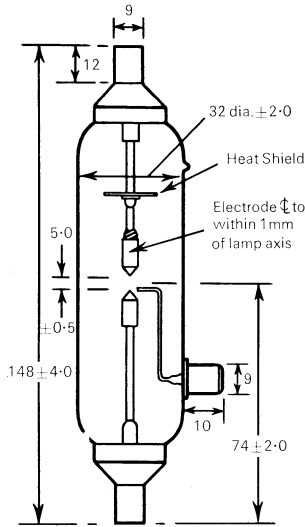
Mean horizontal c.p. 300 cds

Centre arc luminance 2000 stilbs

Average objective life 500 hours

NOTE

Four or five type G53235 chokes each passing approximately 4 amps may be wired in parallel to form the inductance. Tappings must be adjusted to give 18-5 amps. Other constant current (or power) circuits and alternative starting circuits may be used if more convenient.



All dimensions in mm.

FIG. 1 BASIC CIRCUIT FOR SINGLE FLASH OPERATION

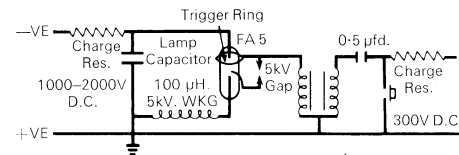
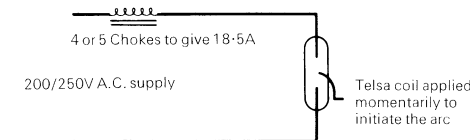


FIG. 2 BASIC CIRCUIT FOR CONTINUOUS OPERATION



Standard xenon lamp '4 in 1' housings

GENERAL SPECIFICATION

The '4 in 1' system Four optical systems each 90° apart, can be illuminated by a single xenon lamp. The '4 in 1' range of two standard lamp-housings has been designed to accommodate 250W or 500W-2KW xenon lamps.

Construction and finish Both lamp-housings are in 16 SWG mild steel welded construction and finished in grey synthetic stoving enamel.

Lamp mounts and shields The mount is a unit assembly, is fully adjustable and retains the xenon lamp between spring loaded retention cups. The lamp is surrounded by a metal box type heat shield which also provides mechanical protection. The lamp-housings are supplied with four plastic feet for free standing operation.

Mechanical adjustments All mechanical adjustments are carried out by varying the position of the lamp mount assembly.

Electrical connections Provision for three cable inlets has been made, in addition to an earth connection.

250W HOUSING

CATALOGUE No. AME 6078

Dimensions

Base	6in x 6in
Overall height	10½in
Optical centre line height from table surface	5in
Weight	10lb

Optical features Provision is made for mounting a standard 2in x 2in heat filter to the lamp shield.

Cooling Under normal operating conditions, convection cooling only is necessary. For continuous operation or for operation in confined spaces, forced air cooling may be necessary.

Safety The front panel is retained by four screws and cannot be accidentally opened. The housing must be effectively earthed before switching on. Unauthorised persons should not have access to the housing interior once electrical connection has been made.

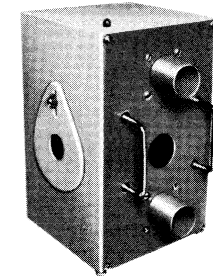
500W/2KW HOUSING

CATALOGUE No. AME 6077

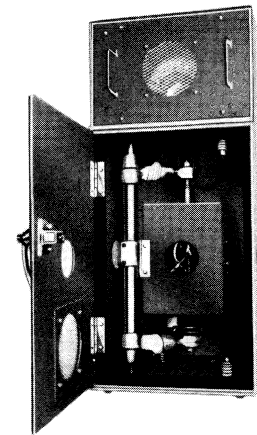
Dimensions

Base	12in x 12in
Overall height	26in
Optical centre line height from table surface	9.5 in
Weight	50lb

Optical features Provision is made for the attachment of a rear aluminised spherical mirror by means of an adjustable mount



AME 6078



AME 6077

attached to the lamp shield. On the opposite face provision is made for mounting a standard 2in x 2in heat filter. The aluminised reflector is supplied as part of the standard unit, but heat filters are not included.

SAFETY REQUIREMENTS

Ventilation Xenon lamps when in operation, generate ozone. Adequate room ventilation or the use of a ducted system where necessary, must be provided.

U.V radiation The radiation from a xenon lamp is rich in ultra-violet, and when the eyes and skin are exposed directly to the radiation, harmful effects such as conjunctivitis and skin irritation may be experienced. A completely sealed lamp-housing system will ensure maximum safety.

ADDITIONAL FACILITIES

The standard housings are designed for free standing use. However, to ensure precise registration of the housing in one or more

optical systems, provision has been made for Kinematic mounting. A special Kinematic base plate suitable for either housing, providing location for P.T.I. standard optical benches is available.

Other available accessories include - Heat filters. Special lens mounts to accept a range of standard lenses, condensers and other proprietary optical systems. Fan cooling units for 250W housing ducts.

Enquiries for these additional features should be made to - Goulding & Partners (Consultant Engineers) Ltd, 1a Essex Road, Acton, London W.3. Telephone 01-992 6022.

Linear neon high intensity obstruction lights

DESCRIPTION

The 160W linear neon high intensity obstruction light is designed to give red light at high efficiency, with long life and low power consumption. The main spectral energy line is at 640 nanometres, and the lamp is designed to operate either as a static burning source or, by means of an electronic switching unit, to operate as an occulting beacon which flashes up to 180 per minute.

APPLICATIONS

For use on masts, chimneys or buildings which constitute a hazard or obstruction to military and civil aviation.

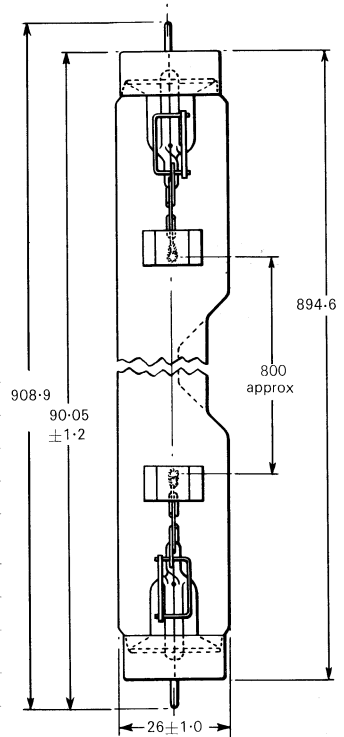
FITTINGS AND CONTROL GEAR

Details of a specially designed fitting unit including control gear, are available on request. Details of a separate flashing control unit are also available.

LAMP DATA

Watts 160
Nominal arc current 1.33 amps
Nominal arc voltage 157
Initial light output 2000 lumens
Minimum light output at 4000 hours 1850 lumens
Rated life continuous burning 4000 hours
Rated life flashing 30 million flashes
DIMENSIONS
Diameter 26mm ± 1 mm
Overall length 909 mm maximum
Caps G 13/10 \times 24 – bi-pin

LAMP REFERENCE NUMBER 98-4501



dimensions in mm

160W LINEAR NEON LAMP Spectral energy diagram

