

**THORN  
LIGHTING  
LTD.**

**COMPREHENSIVE  
LIGHTING  
CATALOGUE  
1971/72**



## Introduction

Thorn Lighting Limited has the widest range of discharge lamp sources available in this country. Exclusive use of the °Kolorlux phosphor and a wider range of °Kolorarc and High Pressure Sodium lamps have made this a high quality, high efficiency range.

Highlights include the linear sodium lamps now renowned for reliability, metal halide °Kolorarc lamps giving excellent colour rendering and the increasingly important High Pressure Sodium SON lamp with its extremely high luminous efficacy.

Additionally mercury tungsten and mercury reflector lamps have benefitted from an extension of the °Kolorlux phosphor to improve colour and give high light output. All Atlas discharge lamps are illustrated in the following pages, in the Hytek section that follows will also be found the Atlas CSI sealed beam and MBIL/H floodlighting lamps which have recently been used effectively for lighting football stadiums for colour television.

## Index

<b>7:2</b>	Mercury iodide lamps, Types MBI & MBIF °Kolorarc
<b>7:3</b>	Mercury fluorescent lamps Type MBF °Kolorlux
<b>7:4</b>	Mercury reflector lamps Type MBFR °Kolorlux
<b>7:5</b>	Mercury Tungsten lamps Type MBTF °Kolorlux
<b>7:6</b>	Mercury lamps Type MB
<b>7:7</b>	Mercury lamp information
<b>7:8</b>	High Pressure Sodium lamps Type SON
<b>7:9</b>	Linear Sodium lamps type SLI/H
<b>7:10</b>	Sodium Lamps Type SOX
<b>7:11</b>	Sodium Lamps Type SOI/H integral
<b>7:12</b>	Sodium Lamp information

# atlas Discharge lamps

## Metal Halide lamps Types MBI and MBIF °Kolorarc

### 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 to 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

The excellent colour rendering of °Kolorarc makes it suitable for interior commercial applications such as shops, stores, offices, exhibitions etc. It is also suitable for industrial applications where colour plays an important part in the process.

It is ideal for high bay lighting, area floodlighting and streetlighting where an added attraction is its 25% increase in light output over MBF lamps.

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.

### Supply Voltage 200/250V

**Rated Life 7,500 hrs**

### 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.

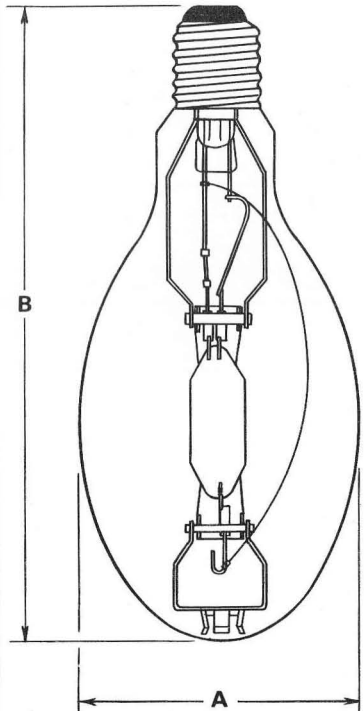
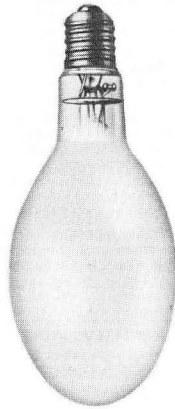
Type	Burning Position	Std. Pack	Cap	Lighting Design Lumens*
400w °Kolorarc MBIF	BU	9	G.E.S.	27,000
400w MBI	BU or BD	9	G.E.S.	24,000
1000w °Kolorarc MBIF	BU or BD	1	G.E.S.	85,000
1000w MBI	BU	1	G.E.S.	78,000

\*Note: The lighting design lumens quoted apply to vertical operation. There will be a slight reduction in output when operated horizontally.

For further information see page 7:7.

### DIMENSIONS

	A (mm)	B (mm)
400w	122 max.	292 max.
1000w	178 max.	410 max.



# atlas Discharge lamps

## Mercury fluorescent lamps Type MBF °Kolorlux

### 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 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 and streetlighting. The improved colour of °Kolorlux has extended the applications to commercial and display lighting, shopping centre and concourse lighting, and area floodlighting.

### Burning Position

Universal – lamps may be operated in any position.

### Supply Voltage 200/250V

Rated Life 7,500 hrs

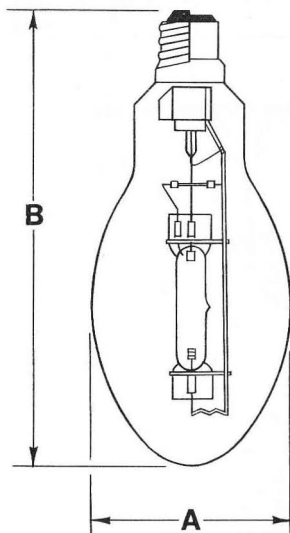
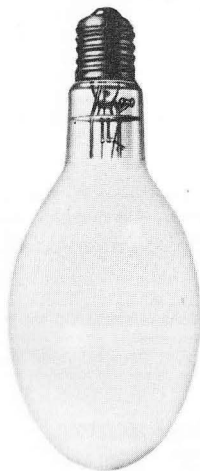
Watts	Std. Pack	Cap	Lighting Design Lumens
50	50	E.S.	1,800
80	24	E.S.*	3,350
125	24	E.S.*	5,550
250	9	G.E.S.	12,000
400	9	G.E.S.	21,500
700	1	G.E.S.	38,000
1,000	4	G.E.S.	54,000

\*3 pin B.C. cap also available.

For further information see page 7:7.

### DIMENSIONS

	A (mm)	B (mm)
50w.	55±1	125±4
80w.	70±1	150±4
125w.	75±1	170±5
250w.	90±1	220±7
400w.	120±2	280±6
700w.	141±2	320±8
1000w.	165±2	400±10



# atlas Discharge lamps

## Mercury reflector lamps Type MBFR °Kolorlux

### 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

Reflector lamps can be operated in any position.

### Supply Voltage 200/250V

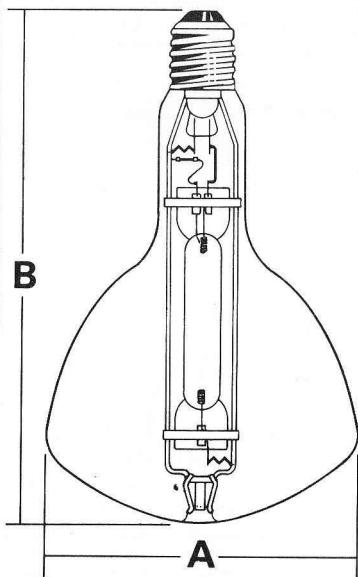
Rated Life 7,500 hrs

Watts	Std. Pack	Cap	Lighting Design Lumens
250	1	G.E.S.	10,500
400	1	G.E.S.	18,000
700	1	G.E.S.	32,500
1,000	1	G.E.S.	48,000

For further information see page 7:7.

### DIMENSIONS

	A (mm)	B (mm)
250w	165±1	253±7
400w	180±1	293±7
700w	200±2	320±8
1000w	220±2	370±10



# atlas Discharge lamps

## Mercury tungsten lamps Types MBTF °Kolorlux,

### 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.

°Kolorlux MBTF lamps have an outer bulb coated with a new phosphor giving higher light output and improved colour in comparison with the previous MBTL and MBTF types.

### Application

Mercury tungsten lamps can be used as direct replacements for tungsten filament lamps giving higher light output and six times the life. They are particularly suitable where labour costs are high and access is difficult. Applications include shop windows, garages, warehouses, streetlighting and in wellglass, bulk head and flameproof fittings.

### Burning Position

Mercury tungsten lamps are designed for operation in the cap up position. 250 and 500w ratings will only operate in other positions providing there is negligible fluctuation in the supply voltage.

### Rated life 6,000 hrs

### Supply Voltage

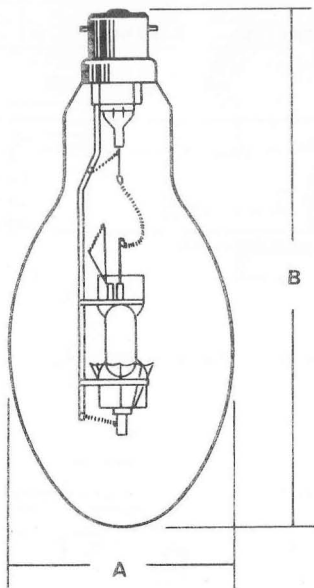
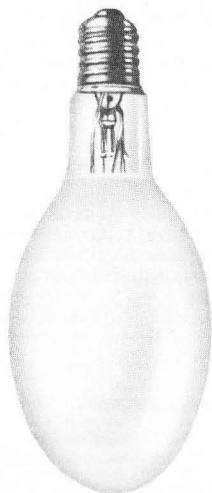
Two voltage ratings of lamps are available 220/230v and 240/250v and lamps must be operated on the correct supply. Sudden reductions in voltage will cause lamps to extinguish.

Watts	Std. Pack	Cap	Lamps Current 220/230v	(amps) 240/250v	Lighting Design Lumens
160	12	BC or ES	0.70	0.65	2,700
250	12	GES	1.10	1.05	4,840
500	6	GES	2.20	2.10	11,500

### DIMENSIONS

	A (mm) max	B (mm) max
160w	76	175
250w	91	227
500w	122	286

\*For E.S. Cap add 5mm.



# atlas Discharge lamps

## Mercury lamps Type MB

### Description

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

### Application

MB lamps have been largely superseded for industrial and streetlighting by MBF <sup>®</sup>Kolorlux because of the higher light output and improved colour. MB lamps are still used for general illumination where colour is not important but are also used where the typical characteristics of mercury spectral power distribution are advantageous, e.g. for graphic arts, laboratory and scientific purposes, plant growth, floodlighting.

**Supply Voltage 200/250V**

### Burning Position

Universal – lamps may be operated in any position.

**Rated Life 7,500 hrs**

Watts	Std. Pack	Cap	Lighting Design Lumens
80	24	E.S.*	3,200
125	24	E.S.*	5,200
250	12	G.E.S.	11,500
400	12	G.E.S.	19,600

\*3 pin B.C. cap also available.

For further information see page 7:7.

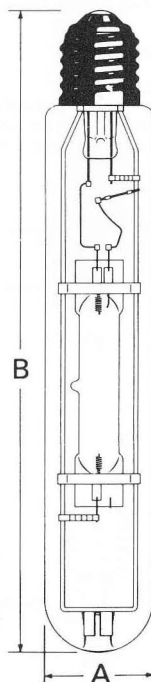
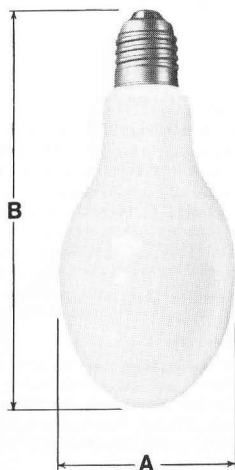
### DIMENSIONS

#### Elliptical

	A (mm)	B (mm)
80w.	70±1	150±4
125w.	75±1	170±5

#### Tubular

	A (mm)	B (mm)
250w.	51±1	290±8
400w.	51±1	330±8



# atlas Discharge lamps

## Mercury lamp information

### Lighting Design Lumens

The "Lighting Design Lumens" quoted are the lamp outputs at 2,000 hours and are recommended as a guide to lighting engineers planning scheme lay-outs. Lumen output beyond 2,000 hours decreases by 2-4% per 1,000 hours use according to type.

### Striking Voltage

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

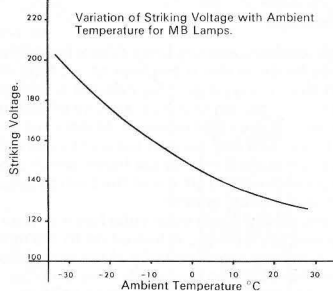
### Mains Voltage Variation

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

### Run-up Characteristics

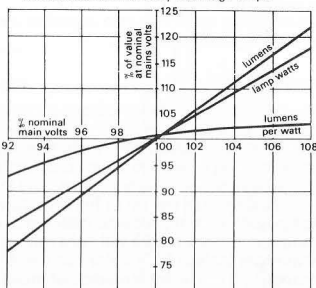
These are shown in diagram 3. The time taken will vary slightly depending upon the location and the type of fitting housing the lamp. Curves for metal halide lamps are shown in diagram 4.

1



2

Effect of variation of mains voltage on the Lamp Characteristics of Mercury Discharge Lamps



### Nominal Electrical Characteristics for MB, MBF and MBFR lamps.

Watts	Rating	Volts	Lamp Operating Volts	Lamp Operating Current (amps)
50		200/250	85/105	0.61
80		200/250	105/130	0.8
125		200/250	110/140	1.15
250		200/250	115/145	2.15
400		200/250	120/150	3.2
700		200/250	125/155	5.6
1000		200/250	130/160	7.5

### Nominal Electrical Characteristics for °Kolorarc and MBI lamps

Watts	Rating	Volts	Lamp Operating Volts	Lamp Operating Current (amps)
400		200/250	120/150	3.3
1000		200/250	235/265	4.2

### British Standards

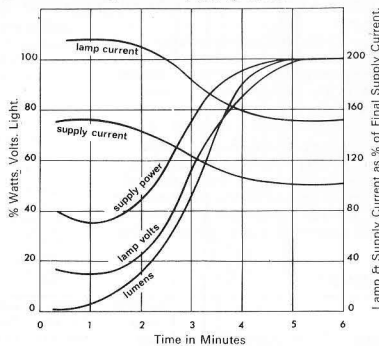
Lamps described in this catalogue conform to the following Standards where applicable.

BS 3677:- 1963 Schedule for Electric Discharge Lamps for General Purposes.

BS 98:- 1962 Screw Caps and Holders.

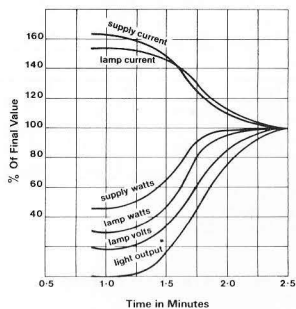
3

Typical Mercury Run-up Curves.



4

Typical Metal Halide Run-up Curves.





# atlas Discharge lamps

## High pressure sodium lamps type SON

### 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).

A tubular 400w version is 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 44 ft. from the 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. Atlas SON 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.

### BURNING POSITION

Universal Lamps may be operated in any position

#### Colour

The colour appearance of the lamp resembles that of a black-body at 2,300°K – 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.

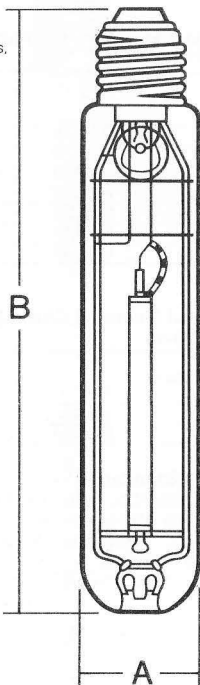
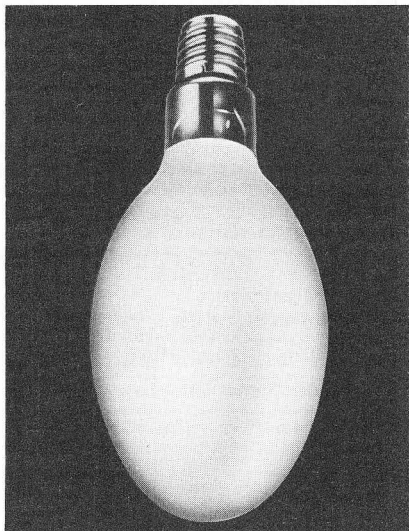
#### Applications

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.



### DIMENSIONS

Watts	Type	Std. Pack	Nominal Lamp Volts	Lamp Current (amps)	Lighting Design Lumens
250	Clear	12	100	3.0	21000
250	Coated	9	100	3.0	19500
400	Clear	12	105	4.4	38000
400	Coated	9	105	4.4	36000

Watts	Type	A	B
250	Elliptical Coated	90±1	220±7
250	Tubular Clear	51±2	250±6
400	Elliptical Coated	120±2	280±6
400	Tubular Clear	51±2	280±6

Supply Volts – 200/250

Rated Life – 6000 hours

Guaranteed life – 4000 hours

For further information see page 7:13 and TLL leaflet 0053

# atlas Discharge lamps

## Sodium lamps Type SLI/H linear

### 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 6,000 hours.

Thorn now offer an improved 200W linear sodium lamp with higher lumen output and characteristics suitable for instant start circuits. The new 200W lamp is dimensionally and electrically interchangeable with the previous lamp. The 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 reflective coating based on indium.

Braided cathodes, as used in the 140W linear sodium lamp, are embodied to give reliable life and freedom from early failures.

### RESEARCH AND DEVELOPMENT

Intense study of the fundamental principles of sodium lamps has resulted in exceptionally high efficacy and reliability.

The shape of the inner tube, in particular, shows considerable ingenuity and contributes materially to the success of this lamp. In order to minimise energy losses due to atomic collisions, etc., and absorption of light by the sodium atoms themselves the cross-section 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 a 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 considerable portion of the power in the tube is used to achieve this.

An important design feature is the use of an infra-red reflecting film on the inside of the outer bulb. This film, which is composed of the oxides of metals such as tin and indium, conserves the thermal energy of the arc, thus increasing the proportion of energy 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.

### SPECIAL ADVANTAGES

Due to its electrical characteristics and low starting voltage, the 140W lamp is ideally matched to the standard control gear for the 140W and 90W "U" shaped lamps, giving completely reliable operation under normal and adverse conditions.

The small source size and uniform distribution conform to the design requirements of modern street lighting lanterns. Light is emitted uniformly from an arc 78 cm long and only 2.9 cm wide.

The compact and lightweight construction make it easy to handle during relamping.

The lamp is 3ft 0in long and 1½ in diameter and weighs less than 1 lb. Transport and installation are further simplified by a 25-way pack which can easily be stored in service truck or tower wagon.

### GENERAL DESCRIPTION

A low pressure sodium lamp incorporating the following essential factors:

- 1 A discharge tube of unique cross section containing metallic sodium in an inert gas.
- 2 An electrode sealed into each end terminating in bi-pin caps.
- 3 An outer envelope containing the discharge tube, with the intervening space evacuated to maintain thermal insulation, thus keeping the sodium in a fully vapourised condition.
- 4 A heat reflecting coating on the inside surface of the outer envelope to provide further thermal insulation.

### APPLICATION

The primary application for linear sodium lamps is street lighting where the construction of the lamp materially assists the design of lanterns and the light outputs are eminently suitable to meet M.O.T. requirements for major road lighting schemes.

### BURNING POSITION

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

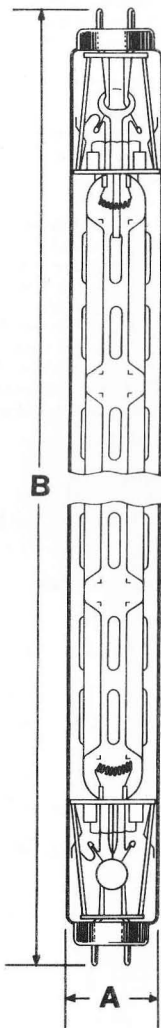
Stand-ard Watts	Nominal volts	Lamp current (amps)	Lighting design lumens
140	25	1.75	20,000
200	25	1.35	25,000
200	25 (H.O.)	1.45	27,500

Supply voltage 200/250v.

Rated life 6,000 hours.

Guaranteed life 4,000 hours.

Further information see page 7:13.



B (mm)	A (mm)
max	max
39.5	908.8

# atlas Discharge lamps

## Sodium lamps Type SOX

### Description

Low pressure sodium discharge operating in a U-shaped arc tube. The U-tube is enclosed in a tubular outer bulb whose inside surface has a reflector coating to provide thermal insulation. This construction provides a lamp of considerably higher efficacy than the integral type. A BC cap is fitted.

### Application

The primary application for SOX lamps is for streetlighting where their higher efficacy has superseded earlier types as follows :-

### Sodium Lamp Equivalents

- 1 The 90w SOX lamp replaces the 140w SOI/H integral lamp and the 140w SO/H lamp and jacket. All three lamps have the same dimensions and can be operated from the same control gear.
- 2 The 55w SOX lamp replaces the 85w SOI/H integral lamp and 85w SO/H lamp and jacket. All three 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 and the 60w SO/H lamp and jacket. All three lamps have the same dimensions and can be operated from the same control gear.

### Burning Position

Horizontal  $\pm 20^\circ$ .

35w and 55w ratings may also be operated in the vertical cap up position.

### Supply Voltage 200/250

### Rated Life 6,000 hrs

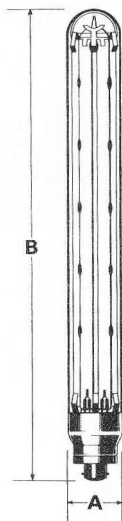
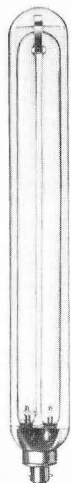
### Guaranteed Life 4,000 hrs

Watts	Std. Pack	Nominal Lamp Volts	Lamp Current (amps)	Lighting Design Lumens
35	9	70	0.6	4,300
55	9	104	0.59	7,150
90	9	112	0.94	12,250
135	9	164	0.95	21,200

Further information: See page 7:13.

### DIMENSIONS

	A max (mm)	B max (mm)
35w	53	311
55w	53	425
90w	67	528
135w	67	775



# atlas Discharge lamps

## Sodium lamps Type SOI/H integral

### Description

Low pressure discharge operating in a U-shaped arc tube. The U-tube is enclosed in a tubular outer bulb having a BC cap. Integral lamps have been superseded by SOX lamps with higher efficacies, but are still available for replacement purposes.

### Application

The primary application of Integral sodium lamps is for streetlighting. Full details of interchangeability with SOX lamps are given on Page 7:10

### Burning Position

Horizontal  $\pm 20^\circ$ .

45w and 60w ratings may also be operated in the vertical cap up position.

**Supply Voltage 200/250V**

**Rated Life 6,000 hrs**

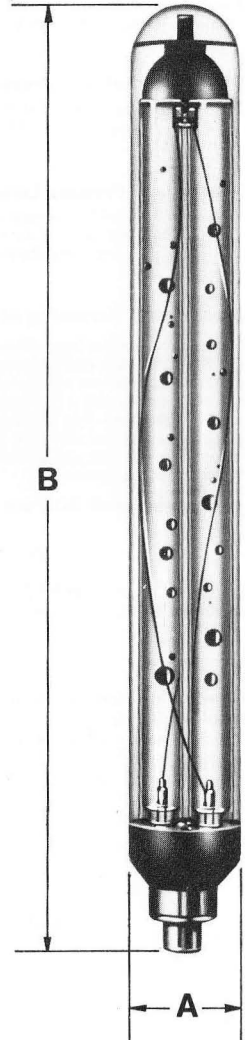
**Guaranteed Life 4,000 hrs**

Watts	Std. Pack	Nominal Volts	Lamp Current (amps)	Lighting Design Lumens
45	12	80	0.6	2,800
60	12	105	0.6	3,900
85	12	144	0.68	6,400
140	6	160	0.9	10,600

For further information see page 7:7.

### DIMENSIONS

	A mm	B mm
45w	52	257
60w	52	310
85w	52	425
140w	67	528



# atlas Discharge lamps

## Sodium lamp information

### Lighting Design Lumens

The "Lighting Design Lumens" quoted are the lamp outputs at 3,000 hours\*, and represent an average over the first 6,000 hours\* life.

\* SON lamps are quoted at 2000 hours representing an average over the first 5000 hours.

### Mains Voltage Variation

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

### Spectral Distribution of Low Pressure Lamps

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

### Run-up time for Low Pressure Lamps

This varies 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 4.

### Colour Appearance & Rendering of SON

The colour appearance of the lamp resembles that of a black-body at 2300°K—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.

### Run-up Characteristics of SON are

shown in diagram 3.

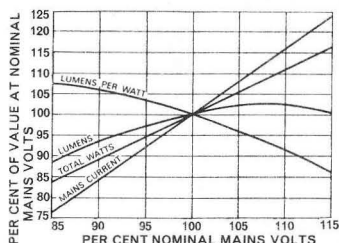
**CONTROL GEAR** Control gear for Discharge Lamps is described on pages 10:40 and 10:41.

### British Standards

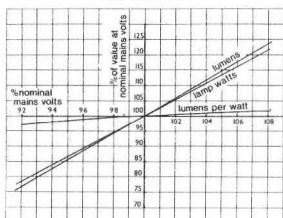
Lamps described in this catalogue conform to the following Standard where applicable.

BS 3767 : 1964 Schedule of Sodium Discharge Lamps.

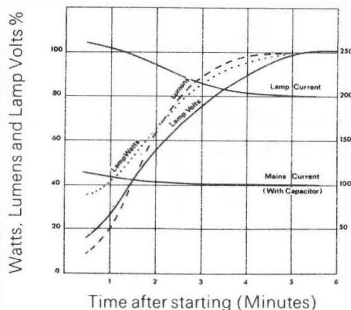
Effect of variation of mains voltage on sodium lamp characteristics.



High Pressure.



Run-up characteristics of SON Lamps.



Typical Run-up Curves for SLI/H Lamp

