

**HIGH
PRESSURE
DISCHARGE
LAMPS**

TUNGSRAM

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One or other lamp in our High Pressure Discharge Range will meet the requirements of most indoor and outdoor lighting applications.

The versatility of these light sources depends on special features.

A rare gas is filled in the discharge tube at low pressure in which the arc is initiated and mercury, mercury and sodium or mercury and halogen compounds of sodium, indium, thallium, dysprosium and, in some lamps, of other metals are used in convenient ways to provide light emission. These metals are efficient in light production, as they are vaporized by the heat from the discharge in the rare gas. For some minutes after starting, both light output and colour will vary until lamp stability is achieved. The filament in Blended Light Lamps gives light immediately the mains supply is connected to the lamp and, in addition, it is a current-limiting device integrated in the lamp.

Advantages

- long life,
- high light output,
- high luminous efficacy,
- moderate depreciation of the luminous flux,
- small dimensions allowing easy optical control,
- outstanding colour rendering properties, for Daylight Metal Halide Lamps.

Mains Voltages and Ballasts

The High Pressure Discharge Lamps listed are suitable for operation from A.C. mains only. With the exception of Blended Light Lamps, operation of Discharge Lamps must be in conjunction with separate ballasts. For certain lamps, an ignition device may also be required for starting the lamp. For Blended Light Lamps, no separate ballast is needed, they can be connected to the supply mains as though they were standard incandescent lamps, provided that the operating voltage tolerances, indicated in the appropriate tables, are taken into account.

High Pressure Sodium and Mercury Vapour Lamps and Metal Halide Lamp ratings under 2000 W and lamp HgMI 2000 W/220 V are operated with reactive ballasts provided the supply voltage is higher than 198 V. Below this voltage a leak transformer should be applied. Other Metal Halide Lamps 2000 W and 3500 W require reactive ballasts for mains voltages above 340 V. Certain lamps are designed for operation from 120 V supply and, for these circuits, the minimum acceptable voltage is 110 V.

The ballast must always be connected to the phase conductor from the mains supply. The wiring connection from ballast to lamp should be provided at the centre contact of the cap as indicated in the circuit diagrams. Care be taken to ensure that the ballast used is just the proper one for the specific lamp and for operation at the nominal mains voltage available. Incorrect ballast or significant fluctuations of the mains voltage, can be detrimental to the lamp. In particular, high power values can reduce lamp life and cause Metal Halide Lamps to operate at lower values than those rated, reduce lamp efficacy and, in Metal Halide Lamps, increase colour temperatures and are to the prejudice of colour rendering properties. Sudden fluctuations of the supply voltage beyond specified limits can result in arc extinction.

Hence variations in the mains supply should not exceed:

- ± 5 per cents for High Pressure Sodium and Metal Halide Lamps,
- ± 10 per cents for High Pressure Mercury Vapour and Blended Light Lamps.

Starting

High Pressure Mercury Vapour and Blended Light Lamps do not need any external starting device. Starters providing pulse voltages up to 1.5...5 kV are required for most Metal Halide and High Pressure Sodium Lamps, the actual pulse voltage depending upon the lamp type and the ignition system involved.

In this range of lamps, once the arc has been initiated, the starting device will no longer provide voltage pulses. The related tabular detail gives the maximum cable capacitance admissible to supply the correct starting pulse and be sure that, for the cable being used, the capacitance of the cable length does not exceed these values. To restart hot lamps with suffix /D2, a voltage pulse higher than 60 kV is required.

Starters connected in series between lamp and choke, can only accept insignificant load capacitances and must be installed close to the luminaire. The ballast can be arranged remotely from the starter combined with the lamp, taking into account the voltage drop in the cable. Starting devices connected in parallel, e.g. type S410, admit higher wire capacitances but, in this case, the distance between starter, ballast and lamp depends on the actual capacitance of the cable (it may be max. 10 m).

Run up

The starting current of the lamps is some one and a half times to twice the value of the rated current of the discharge lamp: the current capacity of the circuit wiring and fuses should be chosen up to this requirement. Immediately after switching on, even higher transient currents can flow for a short time and the use of inert fuses is recommended. The circuit wiring may permit no higher voltage drops than 5 V.

Restarting

After extinction, discharge lamps normally need 5 to 15 minutes for cooling down before reignition is possible. This period can be influenced by factors as open or closed luminaire. The reignition time of High Pressure Sodium Lamps is approximately one minute and, using an appropriate starter, Metal Halide Lamps with suffix /D2 and Warm White Metal Halide Lamps with contacts at both ends can be restarted immediately.

GENERAL

Power Factor

In case of discharge lamps with inductive ballast, the uncorrected power factor is between 0.5 and 0.7, it can be improved by the use of appropriate power factor correction capacitors indicated in the relevant tables. The power factor of Blended Light Lamps is approx. 1 and there is no need of power factor correction capacitors.

Radio Interference

Except for ignition, discharge lamps do not interfere with radio or television, nevertheless, the use of a non-inductive suppression capacitor of $0.1 \mu\text{F}$ is recommended for connection in parallel with High Pressure Mercury Vapour Lamps. In circuits with High Pressure Sodium or Metal Halide Lamps the use of this capacitor is not permitted.

Frequency of Switching

The life of discharge lamps depends largely on the frequency of switching. Avoid unnecessary actuation of the switch.

It is undesirable to energize hot lamps after extinction, types with suffix /D2 and Warm White Metal Halide Lamps with contacts at both ends excepted if starters designed for immediate restarting are used in conjunction with these lamps.

Luminous Flux

When controlled by a choke, the lamp attains 90 per cents of its total luminous flux 3 to 7 minutes after being switched on. The values of luminous flux given in the tables are measured at rated power consumption and, in case of

- High Pressure Sodium Lamps in horizontal position,
- Metal Halide Lamps in horizontal position, unless otherwise specified,
- High Pressure Mercury Vapour and Blended Light Lamps in vertical position, cap up.

Units and Symbols

Units and symbols used in this Catalogue are in conformity with Système International approved by ISO in 1960.

In the type designation of lamps, the figures following letters denote the rated power and, in some cases, figures in suffix indicate the mains voltage. However, in compliance with international conventions, for several Metal Halide Lamps, the first group of figures may provide information concerning power ratings that differ slightly from the actual consumption indicated in the relevant Tabular detail.

The light center length is the rated distance between the centre of the arc and the central outlet of the cap.

When Ordering

When ordering, please specify

- denomination and type designation,
- nominal lamp wattage,
- cap,
- mains voltage or voltage tolerances,
- ordering number.

TABLE OF EQUIVALENTS

High Pressure Sodium

Tungsram Lamp Ref.	European Lamp Ref.	Osram-GEC Lamp Ref.	Philips Lamp Ref.	Sylvania Lamp Ref.	Thorn Lamp Ref.	Wotan Lamp Ref.	G.E. Lamp Ref.
SON-C 70	TCE 70	SON-C 70	70 W SON-T	SHP70/CL/E	70 W SON-T	NAV-T 70S	LU 70/90/D/27
SON-T 100S	TCF 100S	—	100 W SON-T	—	—	NAV-T 100S	LU 100/40
SON-T 150	TCF 150	SON-T 150	150 W SON-T	SHP-T/150	150 SON-T	NAV-T 150	LU 150/100/40
SPN-T 250	TCF 250	SON-T 250	250 W SON-T	SHP-T/250	250 SON-T	NAV-T 250	LU 250/40
SON-T 250S	TCF 250S	—	—	—	—	NAV-ST 250S	LU 250/S/40
SON-T 250 DL	TCF 250 DL	SON DL-T 250	250 W SON-T COMFORT	SHP-T/250 COLOUR DE LUXE	250 SON DL-T	NAV-T 250 DL	LU 250/DX/40
SON-T 400	TCF 400	SON-T 400	400 W SON-T	SHP-T/400	400 SON-T	NAV-T 400	LU 400/40
SON-T 1000	TC 1000	SON-T 1000	1000 W SON-T	—	1000 SON-T	NAV-T 1000	LU 1000/T 18/40
SON-E 70	TCL 70	SON-E 70	70 W SON-E	SHP70/50/E	70 W SON-E	NAV-E 70/E	LU 70/90/D/27
SON-E 100S	TCL 100S	—	100 W SON	SHP100/40	—	NAV-E 100S	LU 100/D/40
SON-E 150	TCL 150	SON-E 150	150 W SON	SHP150	150 W SON-E	NAV-E 150	LU 150/100/D/40
SON-E 250	TCL 250	SON-E 250	250 W SON	SHP250	250 W SON-E	NAV-E 250	—
SON-E 250S	TCL 250S	—	—	—	—	NAV-E 250S	—
SON-E 250 DL	TCL 250 DL	SON DL-E 250	250 W SON COMFORT	SHP 250 W	250 W SON DL-E	NAV-E 250DL	—
SON-E 400	TCL 400	SON-E 400	400 W SON	SHP400	400 W SON-E	NAV-E 400	LU 400/D/40
SON-E 1000	TCL 1000	—	1000 W SON	—	1000 W SON-E	NAV-E 1000	—

Metal Halide

Tungsram Lamp Ref.	European Lamp Ref.	Osram-GEC Lamp Ref.	Philips Lamp Ref.	Sylvania Lamp Ref.	Thorn Lamp Ref.	Wotan Lamp Ref.
70 HQI-TS/WDL	HQI-TS 70WDL	HQ 70WL	70 MHW-TD	HSI-TD/70 W/3K	—	HQI-TS 70/WDL
150 HQI-TS/WDL	HGMIS 150WDL	HQ 150L	150 MHN-TD	HSI-TD/150 W/4K	—	HQI-TS 150/WDL
250 HQI-TS/WDL	HGMIS 250WDL	HQ 250L	250 MHN-TD	—	—	HQI-TS 250/WDL
250 HQI-T/D	HGMIF 250/D	HQ 250	250 W HPI/T	—	—	HQI-T 250 D
400 HQI-T/DH	HGMIF 400/DH	HQ 400H	—	—	—	HQI-T 400 DH
400 HQI-T/DV	HGMIF 400/DV	HQ 400 V	—	—	—	HQI-T 400 DV
1000 HQI-T/D	HGMI 1000/D1	HQ 1 KW	1000 W HPI/T	—	—	HQI-T 1000 D
250 HQI-E/D	HGMIL 250/D	—	—	—	250 W MBIF	HQI-E 250 D
400 HQI-E/DH	HGMIL 400/DH	—	—	—	400 W MBIF/U	HQI-E 400 DH
400 HQI-E/DV	HGMIL 400/DV	—	—	—	400 W MBIF/BU	HQI-E 400 DV
1000 HQI-E D	HGMIL 1000/D	—	—	—	—	HQI-E 1000 D
2000 HQI-T/D1	HGMI 2000/D1	—	—	—	—	—
2000 HQI-T/DG	HGMIG 2000/D	—	—	—	—	HQI-T 2000 D/I
2000 HQI-T/D2	HGMI 2000/D2	—	—	—	—	HQI-TS 2000 D
3500 HQI-T/D1	HGMI 3500/D1	—	—	—	—	HQI-T 3500 D
3500 HQI-T/D2	HGMI 3500/D2	—	—	—	—	HQI-TS 3500 D
400 HQI-T/N	HGMIF 400	—	—	—	—	—
400 HQI-E/N	HGMIF 400	—	—	—	400 W MBIF/H	—
2000/220 HQI-T/N	HGMI 2000/220	—	2000 W HPI/T (240 V)	HSI-T/2000/U	—	—
2000/380 HQI-T/N	HGMI 2000/380	—	2000 W HPI/T (415 V)	HSI-T/2000/4K	—	—
2000 HQI-T/SGN	HGMIG 2000/S	—	—	HSI-T/2000S/4K	—	HQI-T 2000 N

High Pressure Mercury

Tungsram Lamp Ref.	European Lamp Ref.	Osram-GEC Lamp Ref.	Philips Lamp Ref.	Sylvania Lamp Ref.	Thorn Lamp Ref.	Wotan Lamp Ref.
50 W MBF/U	HGLI 50	50 W MBF/U	50 W HPL-N	HSL-BW/50	50 W MBF/U	HQL 50
80 W MBF/U	HGLI 80	80 W MBF/U	80 W HPL-N	HSL-BW/80	80 W MBF/U	HQL 80
125 W MBF/U	HGLI 125	125 W MBF/U	125 W HPL-N	HSL-BW/125	125 W MBF/U	HQL 125
250 W MBF/U	HGLI 250	250 W MBF/U	250 W HPL-N	HSL-BW/250	250 W MBF/U	HQL 250
400 W MBF/U	HGLI 400	400 W MBF/U	400 W HPL-N	HSL-BW/400	400 W MBF/U	HQL 400
50 W MBF/U/DL	HGLI 50/DL	—	—	—	—	HQL 50DL
80 W MBF/U/DL	HGLI 80/DL	—	—	—	—	HQL 80DL
125 W MBF/U/DL	HGLI 125/DL	—	—	—	—	HQL 125DL
250 W MBF/U/DL	HGLI 250/DL	—	—	—	—	HQL 250DL
400 W MBF/U/DL	HGLI 400/DL	—	—	—	—	HQL 400DL
50 W MBF/U/KOM	HGLI 50/KOM	—	50 W HPL COM	—	—	HQL 50SDL
80 W MBF/U/KOM	HGLI 80/KOM	—	80 W HPL COM	—	80 W MBFSD/U	HQL 80SDL
125 W MBF/U/KOM	HGLI 125/KOM	—	125 W HPL COM	—	125 W MBFSD/U	HQL 125SDL
250 W MBF/U/KOM	HGLI 250/KOM	—	250 W HPL COM	—	250 W MBFSD/U	—
400 W MBF/U/KOM	HGLI 400/KOM	—	400 W HPL COM	—	400 W MBFSD/U	—
160 W MBTF	HMLI 160	160 W MBFT/V	160 W ML	HSB-BW/160	160 W MBTF	HWL 160
250 W MBTF	HMLI 250	250 W MBFT/V	250 W ML	HSB-BW/250	250 W MBTF	—
500 W MBTF	HMLI 500	500 W MBFT/V	500 ML	HSB-BW/500	500 W MBTF	—

HIGH PRESSURE SODIUM LAMPS

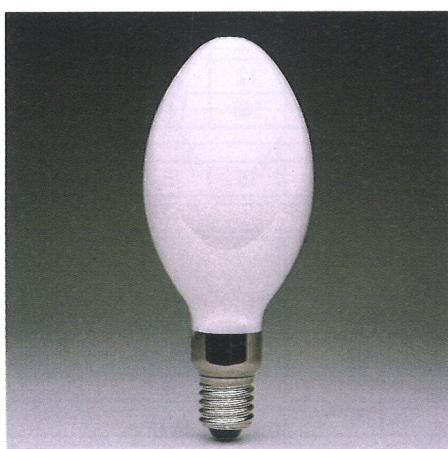
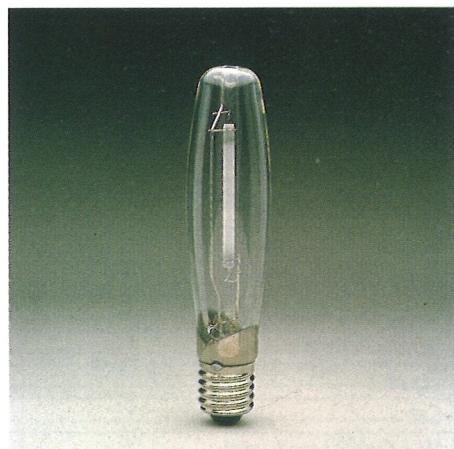
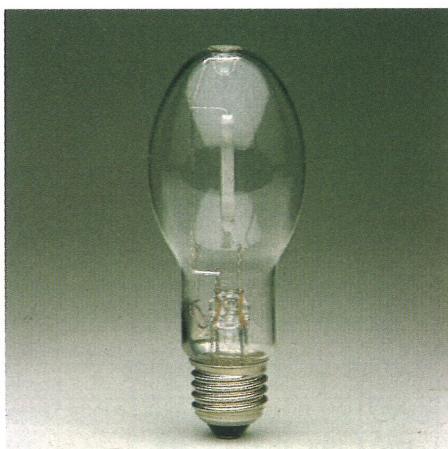
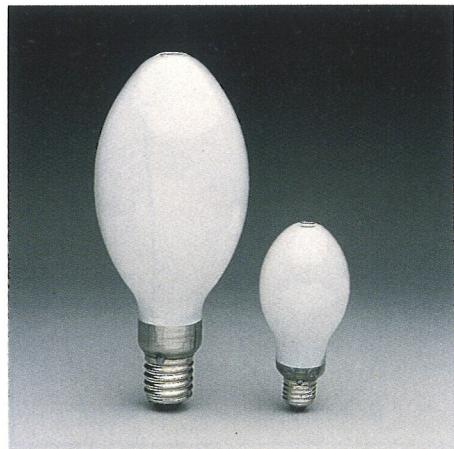
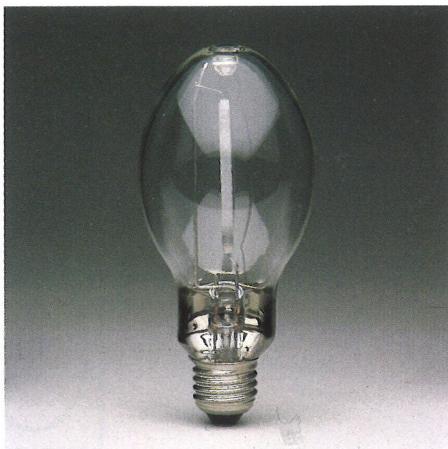
HIGH PRESSURE SODIUM LAMPS

High Pressure Sodium Lamps, with their very high luminous efficacy are the most economic high pressure discharge lamps. They can be applied for lighting any area where visual comfort and economy is a major consideration without the need for better than moderate colour rendition.

Low power ratings 35 and 50 W, can replace incandescent lamps in a variety of outdoor applications, as in gateways/entrances, garages and garden walkways etc., and they can be used for conversion existing systems equipped with 80 and 125 W Mercury Lamps in street lighting.

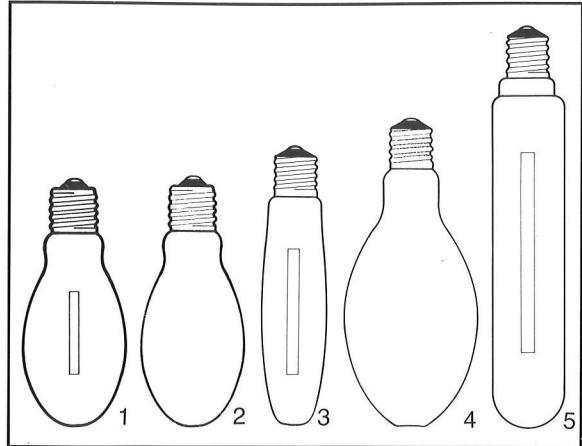
Higher ratings are advantageous in lighting streets, squares, tunnels, bridges, roads and, for example, in making pedestrian crossings very conspicuous.

Controlled light beams can be obtained using clear bulb variants and by lamps with diffuse bulb a high level of glare free illumination is provided. TCL lamps can be operated in fixtures normally used for High Pressure Mercury Vapour Lamps of the same power consumption, but with increased luminous efficacy, the gain being some 80 to 110 per cent.



HIGH PRESSURE SODIUM LAMPS

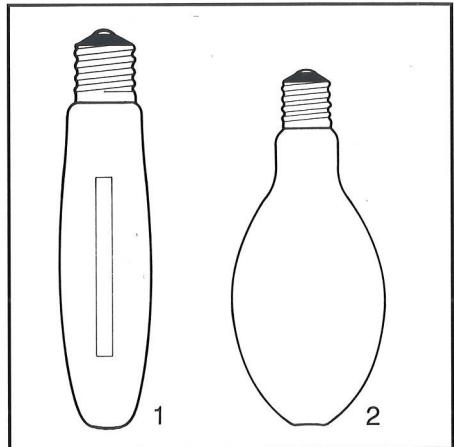
STANDARD HIGH PRESSURE SODIUM LAMPS



Type	TCE 70 W/E	TCL 70 W/E	TCF 100 W	TCL 100 W	TCF 150 W	TCL 150 W	TCF 250 W	TCL 250 W	TCF 400 W	TCL 400 W	TC 1000 W	TCL 1000 W
Ordering Number	85110	85120	85930	85940	85230	85220	85330	85320	85430	85420	85450	85460
Nom. Lamp Watts	70	.70	100	100	150	150	250	250	400	400	1000	1000
Nom. Lamp Volts	90	90	100	100	100	100	100	100	100	100	110	110
Nom. Lamp Current (A)	1.0	1.0	1.2	1.2	1.8	1.8	3.0	3.0	4.6	4.6	10.3	10.3
Luminous Flux (klm)	6.0	5.8	9.0	8.5	14.5	14.0	27.0	25.0	48.0	47.0	130.0	120.0
Luminous Efficacy (lm/W)	86	83	90	85	97	93	104	100	120	117	130	120
Colour Temperature (K)	1900	1900	1900	1900	2000	2000	2000	2000	2100	2100	2100	2100
Burning Position									any			
Figure	1	2	3	4	3	4	3	4	3	4	5	4
Cap	E27/27	E27/27	E40/45									
Max. Overall Length (mm)	156	156	211	182	211	227	257	227	257	292	390	380
Nom. Diameter (mm)	70,5	70,5	52	75,5	52	90	59	90	59	120	65	160
Light Center Length (mm)	105	—	132	—	132	—	160	—	160	—	240	—
Packing (pcs)	25	25	12	25	12	12	12	12	12	4	6	4
Impedance of Ballast at 200 V (V/A)	189	189	148	148	99	99	60	60	39	39	17	17
Recommended Ballast									see page 22			
Capacitance of Power Factor Correction Capacitor (μ F)	12	12	15	15	20	20	40	40	45	45	100	100
Recommended Starter									see page 26			
Electronic Starter Requirements:												
Pulse Peak Voltage (V)												
minimum	1800						3000				3500	
maximum	2300						4500				5000	
Pulse width at 90% (μ s)	2,5						1				1	
Repetition Rate (Hz)	50						50				50	

HIGH PRESSURE SODIUM LAMPS

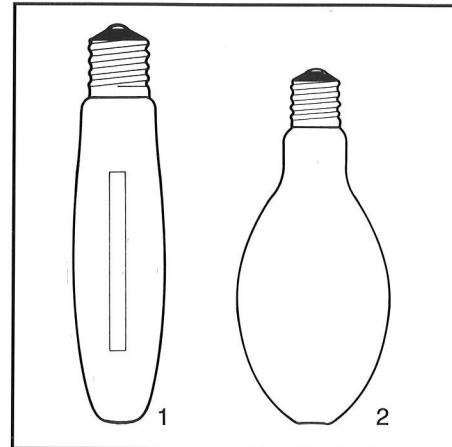
HIGH PRESSURE SODIUM LAMPS WITH ENHANCED LUMINOUS EFFICACY



Type	TCF 100 W/S	TCL 100 W/S	TCF 250 W/S	TCL 250 W/S
Ordering Number	85170	85200	85340	85350
Nom. Lamp Watts	100	100	250	250
Nom. Lamp Volts	100	100	100	100
Nom. Lamp Current (A)	1.2	1.2	3.0	3.0
Luminous Flux (klm)	10.0	9.5	30.0	27.5
Luminous Efficacy (lm/W)	100	95	120	110
Colour Temperature (K)	1900	1900	2000	2000
Burning Position	any			
Figure	1	2	1	2
Cap	E40/45	E40/45	E40/45	E40/45
Max. Overall Length (mm)	211	182	257	227
Nom. Diameter (mm)	52	75	59	90
Light Center Length (mm)	132	—	160	—
Packing (pcs)	12	25	12	12
Impedance of Ballast at 220 V (V/A)	148	148	60	60
Recommended Ballast	see page 22			
Capacitance of Power Factor Correction Capacitor (μ F)	15	15	40	40
Recommended Starter	see page 26			
Electronic Starter Requirements:				
Pulse Peak Voltage (V)				
minimum	3000	3000	3000	3000
maximum	4500	4500	4500	4500
Pulse Width at 90% (μ s)	2	2	1	1
Repetition Rate (Hz)	100	100	50	50

HIGH PRESSURE SODIUM LAMPS

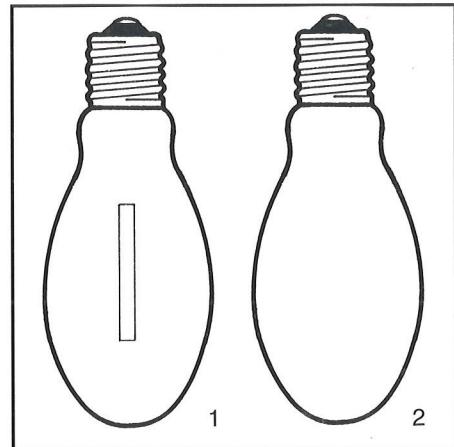
HIGH PRESSURE SODIUM LAMPS WITH ENHANCED COLOUR RENDITION



Type	TCF 250 W de Luxe	TCL 250 W de Luxe
Ordering Number	85360	85370
Nom. Lamp Watts	250	250
Nom. Lamp Volts	100	100
Nom. Lamp Current (A)	3.0	3.0
Luminous Flux (klm)	21	20
Luminous Efficacy (lm/W)	84	80
Colour Temperature (K)	2200	2200
Colour Rendering Index (R_a)	70	70
Burning Position	any	
Figure	1	2
Cap	E40/45	E40/45
Max. Overall Length (mm)	257	227
Nom. Diameter (mm)	59	90
Light Center Length (mm)	160	—
Packing (pcs)	12	12
Impedance of Ballast at 220 V (V/A)	60	60
Recommended Ballast	see page 22	
Capacitance of Power Factor Correction Capacitor (μ F)	40	40
Recommended Starter	see page 26	
Electronic Starter Requirements:		
Pulse Peak Voltage (V)		
minimum	3000	3000
maximum	4500	4500
Pulse Width at 90% (μ s)	2	2
Repetition Rate (Hz)	100	100

HIGH PRESSURE SODIUM LAMPS

120 V-HIGH PRESSURE SODIUM LAMPS



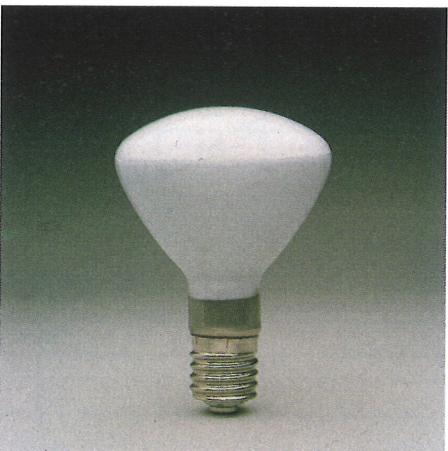
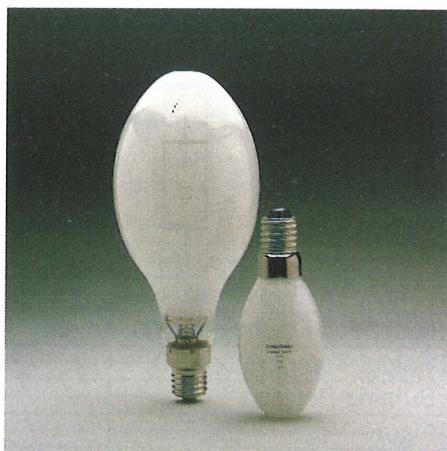
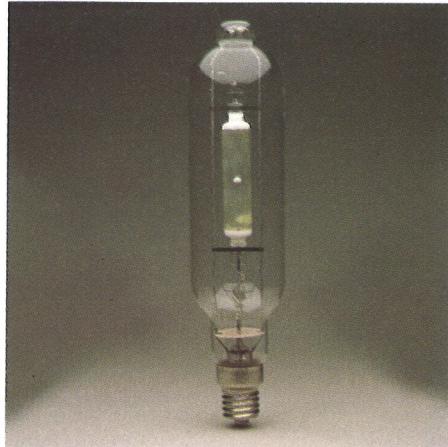
Type	TCE 35 W/120 V	TCED 35 W/120 V	TCE 50 W/120 V	TCED 50 W/120 V	TCE 70 W/120 V	TCED 70 W/120 V	TCE 100 W/120 V	TCED 100 W/120 V	TCE 150 W/120 V	TCED 150 W/120 V
Ordering Number	85040	85050	85095	85105	85155	85165	85185	85195	85255	85265
Nom. Lamp Watts	35	35	50	50	70	70	100	100	150	150
Nom. Lamp Volts	52	52	52	52	52	52	55	55	55	55
Nom. Lamp Current (A)	0.83	0.83	1.18	1.18	1.6	1.6	2.1	2.1	3.2	3.2
Luminous Flux (klm)	2.25	2.15	4.0	3.8	6.3	6.0	9.5	8.8	16.0	15.0
Luminous Efficacy (lm/W)	64	61	80	76	90	86	95	88	107	100
Colour Temperature (K)	1900					2000				
Burning Position	any									
Figure	1	2	1	2	1	2	1	2	1	2
Cap	E27/27	E27/27	E27/27	E27/27	E27/27	E27/27	E27/27	E27/27	E27/27	E27/27
Max. Overall Length (mm)	141	141	141	141	141	141	141	141	141	141
Nom. Diameter (mm)	55	55	55	55	55	55	55	55	55	55
Light Center Length (mm)	92	—	92	—	92	—	92	—	92	—
Packing (pcs)	24	24	24	24	24	24	24	24	24	24
Starting Pulse Requirements:										
Pulse Peak Voltage (V) minimum	1800									
maximum	2300									
Pulse Width at 90% (μ s)	2.5									
Repetition Rate (Hz)	100									

On 220 V-mains, the use of a electronic ballast is indispensable.

METAL HALIDE LAMPS

METAL HALIDE LAMPS

Metal halide lamps excel by their high luminous efficacy, good colour rendition and long life. They are used in both indoor and outdoor lighting, e.g. in sports grounds, plants, exhibition halls, business centres, shop-windows, floodlighting and in gardens.

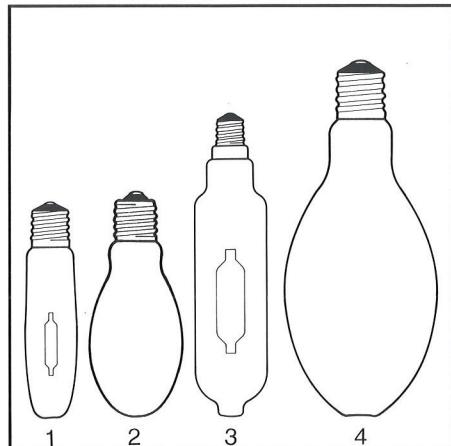


METAL HALIDE LAMPS

STANDARD DAYLIGHT METAL HALIDE LAMPS

This range of lamps with suffix /D in their type designation, provide superior colour rendering— R_a index above 90, i.e. in category one, with excellent colour stability at colour temperature approx. 6000 K, owing to the presence of rare metal (e.g., dysprosium) halides among the additives in the discharge tube. The light emitted by these lamps can be mixed with natural light say in film studios or in colour television broadcasting of sport programmes out-of-doors in the evening, when the transition from full daylight to artificial light is imperceptible in the colour quality of the televised picture. Daylight Metal Halide Lamps can be recommended, consequently, for economic lighting of sports grounds, film and TV studios, dye works, textile factories, printing presses or any other area, where both high luminous intensity and colour rendering are strict necessities.

HgMIL lamp ratings 250 W to 1000 W are supplied alternatively in elliptical diffuse bulb, that can be operated in fixtures designed for High Pressure Mercury Vapour Lamps of equivalent power, without change in light distribution but with increased luminous efficacy, that is higher by about 20 to 30 per cent.



Type	HgMIF 250 W/D	HgMIL 250 W/D	HgMIF 400 W/DH	HgMIL 400 W/DH	HgMIF 400 W/DV	HgMIL 400 W/DV	HgMI 1000 W/D1	HgMIL 1000 W/D
Ordering Number	83270	83320	83510	83440	83520	83480	83610	83630
Nom. Lamp Watts	250	250	370	370	370	370	1000	1000
Nom. Lamp Volts	100	100	118	118	118	118	120	120
Nom. Lamp Current (A)	3.0	3.0	3.5	3.5	3.5	3.5	9.5	9.5
Luminous Flux (klm)	19.0	17.0	25.0	24.0	28.0	26.0	80.0	68.0
Luminous Efficacy (lm/W)	76	68	68	67	76	72	80	68
Colour Temperature (K)					6000			
Colour Rendering Index (R_a)					above 90			
Burning Position			horizontal $\pm 45^\circ$		vertical cap up $\pm 45^\circ$		horizontal $\pm 60^\circ$	
Figure	1	2	1	2	1	2	3	4
Cap			E40/45				E40/65×50	
Max. Overall Length (mm)	220	227	270	292	270	292	340	380
Nom. Diameter (mm)	52	90	59	120	59	120	80	160
Light Center Length (mm)	150	—	175	—	175	—	205	—
Packing (pcs)	12	12	12	4	12	4	6	4
Impedance of Ballast at 220 V (V/A)	60	60	45	45	45	45	17	17
Recommended Ballast					see page 22			
Capacitance of Power Factor Correction Capacitor (μF)	32	32	35	35	35	35	80	80
Recommended Starter					see page 26			
Electronic Starter Requirements:								
Pulse Peak Voltage (V) minimum				3000			4000	
maximum				4500			5000	
Pulse Width at 90% (μs)				1			1	
Repetition Rate (Hz)				50			50	

METAL HALIDE LAMPS

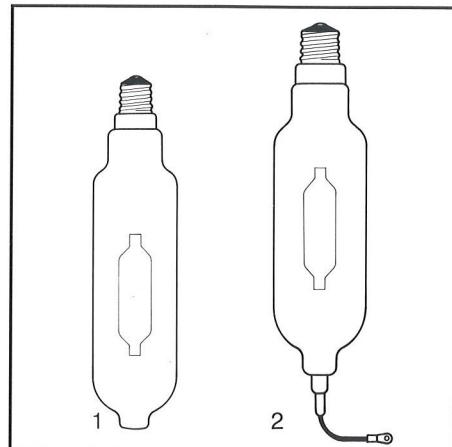
HIGH POWER DAYLIGHT METAL HALIDE LAMPS for 380 V-MAINS

These lamps are supplied in clear bulb only and need to be operated from supply voltage 380 V.

Alternative types available in each rating are denoted, as shown below, by a suffix to the type designation:

- lamps /D1 can be restarted following a cool-off period,
- lamps /D2 are designed for immediate reignition,
- Lamps /G are strictly for use without starting device.

Lamps that must be operated only without starter, are provided with integrated auxiliary electrodes for starting. Their use is recommended to reduce the capital costs of new installations and to save expenses in the conversion of existing systems.



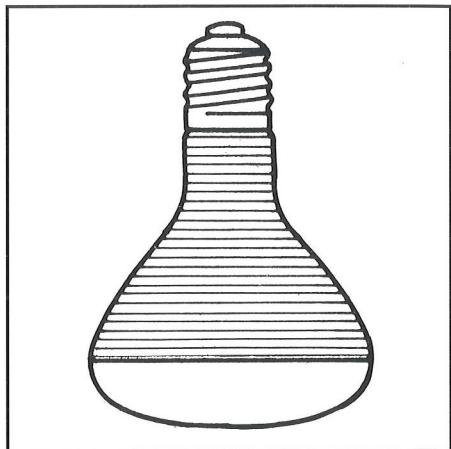
Type	HgMI 2000 W/D1	HgMIG 2000 W/D	HgMI 2000 W/D2	HgMI 3500 W/D1	HgMI 3500 W/D2
Ordering Number	83720	83750	83730	83820	83830
Nom. Lamp Watts	2000	2000	2000	3500	3500
Nom. Lamp Volts	225	225	225	220	220
Nom. Lamp Current (A)	10.3	10.3	10.3	18.0	18.0
Luminous Flux (klm)	170.0	170.0	170.0	300.0	300.0
Luminous Efficacy (lm/W)	85	85	85	86	86
Colour Temperature (K)			6000		
Colour Rendering Index (R_a)			above 90		
Burning Position			horizontal $\pm 60^\circ$		
Figure	1	1	2	1	2
Cap			E40/65×50		
Max. Overall Length (mm)	430	430	490	430	490
Nom. Diameter (mm)	101	101	101	101	101
Light Center Length (mm)	260	260	260	260	260
Packing (pcs)	4	4	4	4	4
Recommended Ballast			see page 22		
Impedance of Ballast at 380 V (V/A)		25.5			15
Capacitance of Power Factor Correction Capacitor (μF)		60			100
Recommended Starter			see page 26		
Electronic Starter Requirements:					
Pulse Peak Voltage (V)			¹⁾		¹⁾
minimum	4000	—	—	4000	—
maximum	5000	—	—	5000	—
Pulse Width at 90% (μs)	1	—	—	1	—
Repetition Rate (Hz)	50	—	—	50	—

¹ Hot lamps can be restarted immediately.

DAYLIGHT METAL HALIDE LAMPS IN REFLECTOR BULB

For particular indoor and shop-window illumination, these are Daylight Metal Halide Lamps featuring superior colour rendering properties. This reflector bulb is available with alternative beam angles 40° and 100° and it eliminates the use of complex luminaires. The wide angle beam lamp can be installed at relatively low mounting heights whilst still giving uniform illumination of extended surfaces.

Not recommended for the lighting of materials that are sensitive to UV rays, e.g. textiles, organic substances etc.



Type	HgMIR 250 W/D FL	HgMIR 250 W/D WFL
Ordering Number	83340	83330
Nom. Lamp Watts	250	250
Nom. Lamp Volts	100	100
Nom. Lamp Current (A)	3.0	3.0
Luminous Flux (klm)	15.0	13.0
Luminous Efficacy (lm/W)	60	52
Colour Temperature (K)	6000	
Colour Rendering Index (R_a)	above 90	
Radiation Angle (grade)	40	100
Burning Position	vertical, cap up $\pm 150^\circ$	
Cap	E40/45	E40/45
Max. Overall Length (mm)	180	180
Nom. Diameter (mm)	125	125
Packing (pcs)	9	9
Impedance of Ballast at 220 V (V/A)	60	
Recommended Ballast	see page 22	
Capacitance of Power Factor Correction Capacitor (μF)	32	
Recommended Starter	see page 26	
Electronic Starter Requirements:		
Pulse Peak Voltage (V)		
minimum	3000	
maximum	4500	
Pulse Width at 90% (μs)	1	
Repetition Rate (Hz)	50	

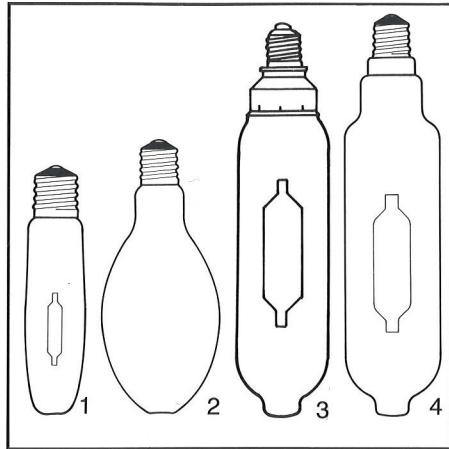
METAL HALIDE LAMPS

NEUTRAL WHITE METAL HALIDE LAMPS

The discharge tube in these lamps contains, in addition to mercury, the halides of metals to fill up the gaps in the high pressure mercury vapour discharge spectrum. These spectral lines improve the colour rendering properties of the lamp and result in increased luminous efficacy.

The colour temperature of these lamps is approximately 4000 K. Their use is suggested for lighting any area where moderate colour rendering is required, e.g. large assembly halls, open plan offices, railway stations, ports and public street lighting.

HgMI and HgMIF lamps have clear hard glass bulb. The diffuse version, type HgMIL can be operated in fixtures normally used for High Pressure Mercury Vapour Lamps of the same power without changing the light distribution, but with luminous efficacies higher by about 30 per cent.



Type	HgMIF 400 W	HgMIL 400 W	HgMI 2000 W/220 V	HgMI 2000 W/380 V	HgMIG 2000 WS
Ordering Number	83490	83420	83710	83740	83760
Nom. Lamp Watts	390	390	1900	2000	2000
Nom. Lamp Volts	120	120	125	235	235
Nom. Lamp Current (A)	3.5	3.5	16.5	8.8	8.8
Luminous Flux (klm)	30.0	27.0	180.0	190.0	210.0
Luminous Efficacy (lm/W)	77	69	95	95	105
Colour Temperature (K)	4000	4000	4000	4000	3500
Colour Rendering Index (R_a)			65		
Burning Position	horizontal $\pm 45^\circ$		horizontal $\pm 75^\circ$	horizontal $\pm 75^\circ$	horizontal $\pm 20^\circ$
Figure	1	2	3	4	3
Cap	E40/45		E40/88×70	E40/65×50	E40/88×70
Max. Overall Length (mm)	270	292	430	430	430
Nom. Diameter (mm)	59	120	101	101	101
Light Center Length (mm)	175	—	287	260	260
Packing (pcs)	12	4	4	4	4
Impedance of Ballast at 220 V (V/A)	45	45	9.25		28
Recommended Ballast			see page 22		
Capacitance of Power Factor Correction Capacitor (μF)	30	30	120		37
Recommended Starter			see page 26		
Electronic Starter Requirements:					¹⁾
Pulse Peak Voltage (V) minimum		3000	4000		—
maximum		4500	5000		—
Pulse Width at 90% (μs)		1			—
Repetition Rate (Hz)		50			—

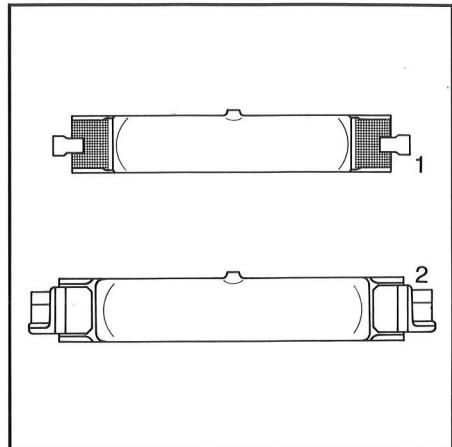
¹ For operation without starter.

NEUTRAL WHITE AND WARM WHITE METAL HALIDE LAMPS WITH CONTACTS AT BOTH ENDS

Use these lamps in fittings with silicate glass cover. For materials sensitive to light, UV-filters should be provided.

Advantages

- small dimensions = good directivity of the light
- using convenient starter, immediate restarting
- good colour rendition
- agreeable warm white hint of colour



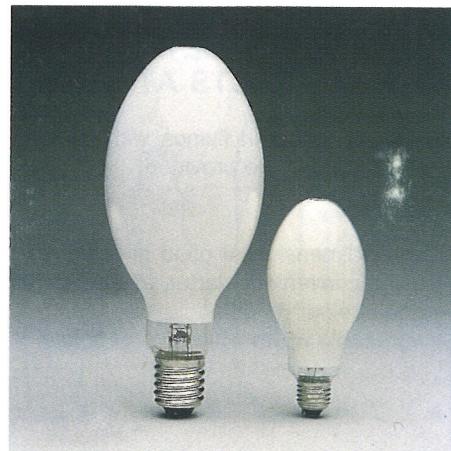
Typ	HgMIS 150 W/WDL	HgMIS 150 W/NDL	HgMIS 250 W/WDL	HgMIS 250 W/NDL
Ordering Number	83210	83220	83250	83240
Nom. Lamp Watts	150	150	250	250
Nom. Lamp Volts	95	95	100	100
Nom. Lamp Current (A)	1.8	1.8	3.0	3.0
Luminous Flux (klm)	11	11	20	20
Luminous Efficacy (lm/W)	73	73	80	80
Colour Temperature (K)	3200	4000	3200	4000
Colour Rendering Index (R_a)	75	80	75	80
Burning Position	horizontal +45°			
Figure	1	1	2	2
Cap	R7s	R7s	Fc2	Fc2
Max. Overall Length (mm)	132 ¹	132 ¹	163	163
Nom. Diameter (mm)	24	24	25	25
Light Center Length (mm)	66	66	81.5	81.5
Packing (pcs)	12	12	12	12
Impedance of Ballast at 220 V (V/A)	99	99	60	60
Recommended Ballast	see page 22			
Capacitance of Power Factor Correction Capacitor (μ F)	20	20	32	32
Recommended Starter	see page 26			
Electronic Starter Requirements:				
Pulse Peak Voltage (V)				
minimum	4000	4000	4000	4000
maximum	—	—	—	—
Pulse Width at 90% (μ s)	1	1	1	1
Repetition Rate (Hz)	6	6	6	6

¹ Contact distance.

HIGH PRESSURE MERCURY VAPOUR LAMPS

HIGH PRESSURE MERCURY VAPOUR LAMPS

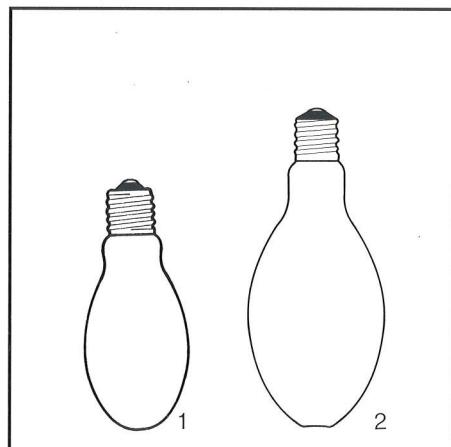
High Pressure Mercury Vapour Lamps are ideal sources for indoor and outdoor lighting. They can be operated in any burning position. They feature long life and high reliability in all conditions of operation. They excel by low sensitivity to fluctuations in the mains supply.



STANDARD HIGH PRESSURE MERCURY VAPOUR LAMPS

These lamps are available either in soft or in hard glass bulb, both coated with an yttrium-vanadate-phosphate phosphor.

Outdoor applications are the lighting of roads, bridges, car parks, railway stations, factory yards, construction sites, loading ramps, etc.; indoor applications are restricted to industrial lighting or similar locations where no special consideration is paid to the colour rendition.



Type	HgLI 50 W ¹	HgLI 80 W ¹	HgLI 125 W ¹	HgLI 175 W ³	HgLI 250 W ³	HgLI 400 W ³
Ordering Number	404	391	392	397	393	394
Nom. Lamp Watts	50	80	125	175	250	400
Nom. Lamp Volts	95	115	125	130	130	135
Nom. Lamp Current (A)	0.6	0.8	1.15	1.5	2.15	3.25
Luminous Flux (klm)	1.8	3.7	6.3	8.1	13.0	22.0
Luminous Efficacy (lm/W)	38	46	50	46	52	55
Colour Temperature (K)				4000		
Colour Rendering Index (R _a)				40		
Burning Position				any		
Figure			1		2	
Cap	E27/27 ²	E27/27 ²	E27/27 ²	E40/45	E40/45	E40/45
Max. Overall Length (mm)	130	156	170	214	227	292
Nom. Diameter (mm)	55	70	75	90	90	120
Packing (pcs)	24	16	25	12	12	4
Impedance of Ballast at 220 V (V/A)	297	206	134	99.5	71	45
Recommended Ballast				see page 22		
Capacitance of Power Factor Correction Capacitor (μ F)	7	8	10	13	18	25

¹ In soft glass bulb. Variant HgLI/H 80 W and and HgLI/H 125 W with hard glass bulb.

² Upon special agreement with cap B22d-3.

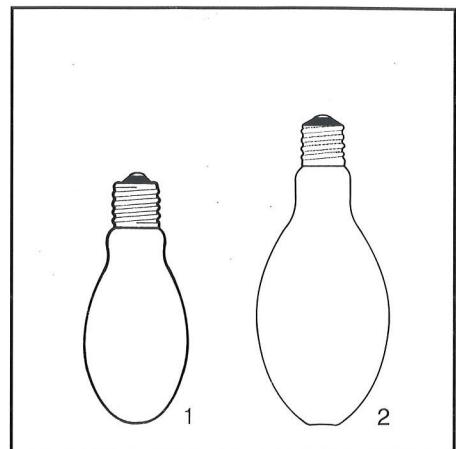
³ In hard glass bulb.

HIGH PRESSURE MERCURY VAPOUR LAMPS

HIGH PRESSURE MERCURY VAPOUR LAMPS WITH ENHANCED COLOUR RENDITION

De Luxe Lamps

These lamps, feature a warmer colour hint and more light, resulting in versatile applications in indoor and outdoor lighting.



Type	HgLI 50 W de luxe ¹	HgLI 80 W de luxe ¹	HgLI 125 W de luxe ¹	HgLI 175 W de luxe ³	HgLI 250 W de luxe ³	HgLI 400 W de luxe ³
Ordering Number	408	410	411	412	413	414
Nom. Lamp Watts	50	80	125	175	250	400
Nom. Lamp Volts	95	115	125	130	130	135
Nom. Lamp Current (A)	0.6	0.8	1.15	1.5	2.15	3.25
Luminous Flux (klm)	1.8	3.7	6.3	8.1	13.0	22.0
Luminous Efficacy (lm/W)	36	46	50	46	52	55
Colour Temperature (K)				3500		
Colour Rendering Index (R_a)				52		
Burning Position				any		
Figure		1			2	
Cap	E27/27 ²	E27/27 ²	E27/27 ²	E40/45	E40/45	E40/45
Max. Overall Length (mm)	130	156	170	214	227	292
Nom. Diameter (mm)	55	70	75	90	90	120
Packing (pcs)	24	16	25	12	12	4
Impedance of Ballast at 220 V (V/A)	297	206	134	99.5	71	45
Recommended Ballast				see page 22		
Capacitance of Power Factor Correction Capacitor (μF)	7	8	10	13	18	25

¹ In soft glass bulb. Variant HgLI/H 80 W de luxe and HgLI/H 125 W de luxe with hard glass bulb.

² Upon special agreement with cap B22d-3.

³ In hard glass bulb.

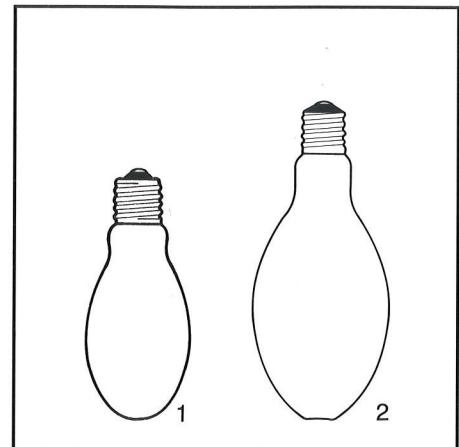
HIGH PRESSURE MERCURY VAPOUR LAMPS

HIGH PRESSURE MERCURY VAPOUR LAMPS WITH ENHANCED COLOUR RENDITION

Comfort Lamps

Advantages

- enhanced colour rendition
- low colour temperature
- long life
- interchangeability with any high pressure mercury vapour lamps of the same rating



Type	HgLI 50 W Comfort ¹	HgLI 80 W Comfort ¹	HgLI 125 W Comfort ¹	HgLI 250 W Comfort ³	HgLI 400 W Comfort ³
Ordering Number	360	361	448	363	364
Nom. Lamp Watts	50	80	125	250	400
Nom. Lamp Volts	95	115	125	130	135
Nom. Lamp Current (A)	0.6	0.8	1.15	2.15	3.25
Luminous Flux (klm)	2.0	4.0	6.5	14.0	24.0
Luminous Efficacy (lm/W)	40	50	52	56	60
Colour Temperature (K)	3500	3400		3350	3400
Colour Rendering Index (R _a)		57		55	50
Burning Position			any		
Figure	1	1	1	2	2
Cap		E27/27 ²			E40/45
Max. Overall Length (mm)	130	156	170	227	292
Diameter (mm)	55	70	75	90	120
Packing Quantity	24	16	25	12	4
Ballast Impedance 220 V (V/A)	297	206	134	71	45
Recommended Ballast			see page 22		
Capacitance of Power Factor Correction Capacitor (μ F)	7	8	10	18	25

¹ In soft glass bulb.

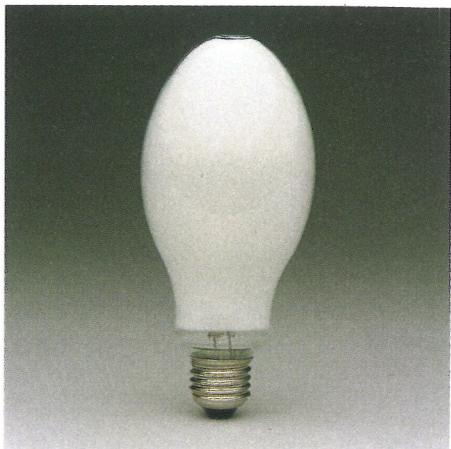
With type designations HgLI/H 125 Comfort available also in hard glass bulb.

² Upon special request, available also with cap B22d-3.

³ In hard glass bulb.

BLENDED LIGHT LAMPS

They feature hard glass bulb with yttrium-vanadate-phosphate phosphor coating. A tungsten filament connected in series with the discharge tube provides current limitation and no control gear is required: these lamps can be operated directly on the A.C. mains, provided the voltage is correct. The reddish light radiated by the tungsten filament improves the colour rendering properties of the source. In addition, light is emitted immediately they are switched on and their life is many times longer than that of the incandescent lamp which they replace with luminous efficacies higher by some 35 to 66 per cent. They are advantageous and economic in retrofitting existing lighting systems equipped originally with incandescent lamps, investment costs are reduced to minimum. In indoor lighting they are used for the illumination of industrial areas, garages, waiting rooms, etc., and outdoor for the lighting of roads, side-roads, parks, gardens, factory yards and work and storage spaces.



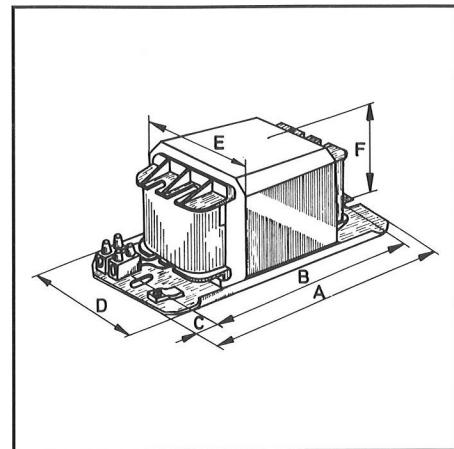
Type	HMLI 160 W	HMLI 250 W	HMLI 500 W
Ordering Number	382 355 367	380 356 368	381 357 369
Nom. Lamp Watts	160	250	500
Mains Voltage	220—230 230—240 240—250	220—230 230—240 240—250	220—230 230—240 240—250
Nom. Lamp Current (A)	0.8 ¹	1.20 ¹	2.35 ¹
Luminous Flux (klm)	3.1	5.6	14.0
Luminous Efficacy (lm/W)	18	21	27
Colour Temperature (K)		3500	
Colour Rendering Index (R _a)		52	
Burning Position	vertical ±30°	any	
Cap	E27/27 ²	E40/45	E40/45
Max. Overall Length (mm)	170	227	292
Nom. Diameter (mm)	75	90	120
Packing (pcs)	25	12	4

¹ 220—230 V mains voltage, measured at 220 V.

² Upon special agreement with cap B22d-3.

HIGH PRESSURE DISCHARGE LAMPS

BALLASTS

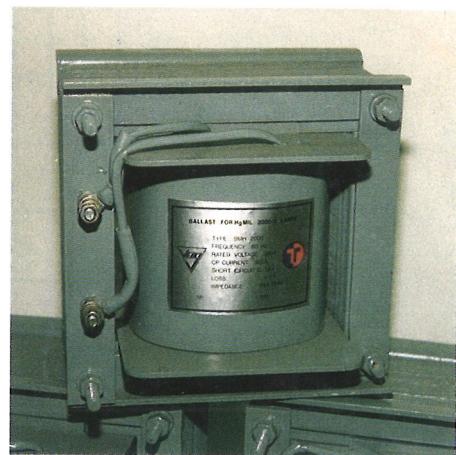


70—1000 W

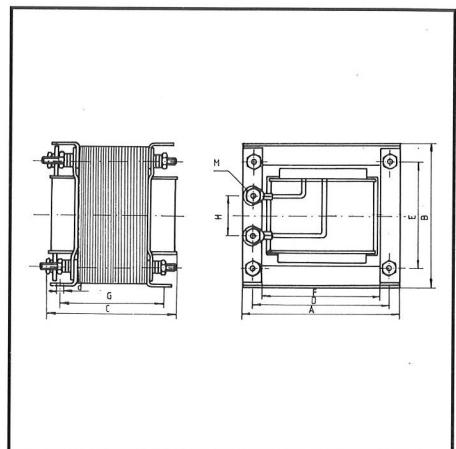
Type	Dimensions (mm)						Mass (kg)
	A	B	C	D	E	F	
AN 70	118	99.5	10.5	65	65	56	1.45
AN 100	133	114.5	10.5	65	65	56	1.9
AN 150	169	150.5	10.5	65	65	56	2.75
ANF 250	163	145.0	9.0	92	92	94	4.0
ANF 400	187	169.0	9.0	92	92	94	5.3
AMF 250	163	145.0	9.0	92	92	94	4.0
AMF 400	163	145.0	9.0	92	92	94	4.0
AH 50	104	85.5	10.5	65	65	56	1.18
AH 80	104	85.5	10.5	65	65	56	1.18
AH 125	118	99.5	10.5	65	65	56	1.45
AH 175	169	150.5	10.5	65	65	56	2.75
AH 250	169	150.5	10.5	65	65	56	2.75
AHF 400	163	145.0	9.0	92	92	94	4.0
HGFA 1000 A	263	242.0	10.5	110	110	114	10.5

HIGH PRESSURE DISCHARGE LAMPS

BALLASTS¹



1000—3500 W



Type	Mains voltage (V)	Operating current (A)	Short current (A)	Impedance (V/A)	Loss (W)	Mains frequency (Hz)
BTC 1000	220, 240	10.3	15	16.8	50	50, 60
BMH 1000	220, 240	9.5	14.5	17	40	50, 60
BMH 2000/D	380, 400	10.3	16	25.5	80	50, 60
BMH 2000/380	380, 400	8.8	15	28	80	50, 60
BMH 2000/220	220, 240	16.5	25	9.25	85	50, 60
BMH 3500/D	380, 400	18	28	15	110	50, 60

Type	A	B	C	D	E	F	G	H	d	Mass (kg)
BMH 3500/D	231	212	194	201	179	140	124	60	Ø 10	36.5
BMH 2000/D	195	186	188	170	155	110	102	60	Ø 10	22.5
BMH 2000/380	195	186	188	170	155	110	102	60	Ø 10	22.5
BMH 2000/220	195	186	206	170	155	110	120	60	Ø 10	25.5
BMH 1000	170	145	173	150	120	110	87	60	Ø 10	13
BTC 1000	170	145	173	150	120	110	87	60	Ø 10	14

¹ When ordering, please specify nominal mains voltage and frequency.

WHICH BALLAST FOR WHICH LAMP?

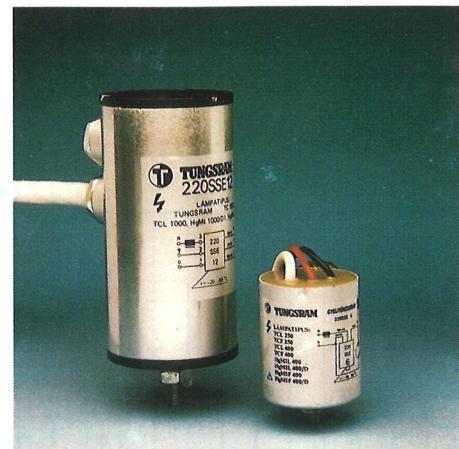
Ballast	Lamp type	High Pressure Sodium Lamps																														
		TCE 70 W	TCL 70 W	TCF 100 W	TCL 100 W	TCF 150 W	TCL 150 W	TCF 250 W	TCL 250 W	TCF 400 W	TCL 400 W	TC 1000 W	TCL 1000 W	TCF 100 W/S	TCL 100 W/S	TCF 250 W/S	TCL 250 W/S	TCF 250 W de luxe	TCL 250 Wide luxe	TCE 35 W/120 V	TCED 35 W/120 V	TCE 50 W/120 V	TCED 50 W/120 V	TCE 70 W/120 V	TCED 70 W/120 V	TCE 100 W/120 V	TCED 100 W/120 V	TCE 150 W/120 V	TCED 150 W/120 V	HgMIF 250 W/D	HgMIL 250 W/D	HgMIF 400 W/DH
	AN 70	●																														
	AN 100		●	●																												
	AN 150		●	●																												
	ANF 250			●	●																											
	ANF 400					●	●																									
	AHF 50																															
	AHF 80																															
	AHF 125																															
	AHF 175																															
	AHF 250																															
	AHF 400																															
	HGFA 1000A																															
	BTC 1000									●	●																					
	BMH 1000																															
	BMH 2000/D																															
	BMH 2000/380																															
	BMH 2000/220																															
	BMH 3500/D																															

Operation using electronic ballast

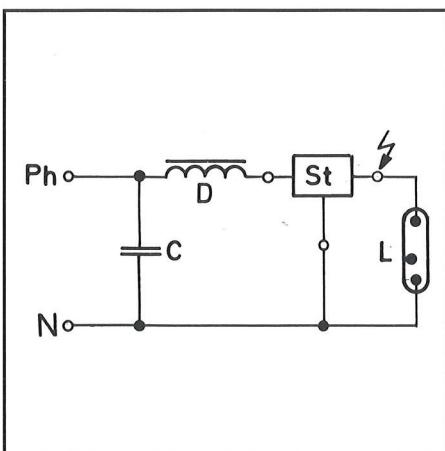
Blended Lamps	High Pressure Mercury Vapour Lamps	Metal Halide Lamps	High Pressure Mercury Vapour Lamps	Metal Halide Lamps
HMLI 160 W	HgMIL 400 W/DV	HgMI 1000 W/D1	HgMIL 1000 W/D	HgMIL 1000 W/D1
HMLI 250 W	HgMIL 1000 W/D	HgMI 1000 W/D	HgMIG 2000 W/D	HgMI 2000 W/D1
HMLI 500 W	HgMIL 2000 W/D	HgMI 2000 W/D	HgMI 2000 W/D1	HgMI 2000 W/D2
	HgMIR 250 W/DFL	HgMIR 250 W/DFL	HgMIF 400 W	HgMIL 3500 W/D1
	HgMIR 250 W/DFL	HgMIR 250 W/DFL	HgMIL 400 W	HgMI 3500 W/D1
	HgMIS 150 W/WDL	HgMIS 150 W/WDL	HgMIL 2000 W/220 V	HgMI 3500 W/D2
	HgMIS 250 W/WDL	HgMIS 250 W/WDL	HgMI 2000 W/380 V	HgMIG 2000 W/S
	HgLI 50 W	HgLI 50 W	HgMI 2000 W/220 V	HgMIR 250 W/DFL
	HgLI 80 W	HgLI 80 W	HgMI 2000 W/380 V	HgMIS 150 W/WDL
	HgLI 125 W	HgLI 125 W	HgMIS 250 W/WDL	HgMIS 250 W/WDL
	HgLI 175 W	HgLI 175 W	HgMIS 250 W/WDL	HgMIS 250 W/WDL
	HgLI 250 W	HgLI 250 W	HgLI 400 W	HgMIS 250 W/WDL
			HgLI 50 W de luxe	HgMIS 250 W/WDL
			HgLI 80 W de luxe	HgMIS 250 W/WDL
			HgLI 125 W de luxe	HgMIS 250 W/WDL
			HgLI 175 W de luxe	HgMIS 250 W/WDL
			HgLI 250 W de luxe	HgMIS 250 W/WDL
			HgLI 400 W de luxe	HgMIS 250 W/WDL
			HgLI 50 W Comfort	HgMIS 250 W/WDL
			HgLI 80 W Comfort	HgMIS 250 W/WDL
			HgLI 125 W Comfort	HgMIS 250 W/WDL
			HgLI 250 W Comfort	HgMIS 250 W/WDL
			HgLI 400 W Comfort	HgMIS 250 W/WDL
				Operation without ballast

HIGH PRESSURE DISCHARGE LAMPS

IGNITORS

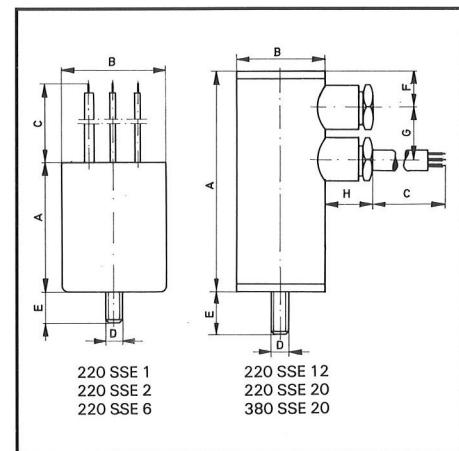


SERIAL IGNITORS



CIRCUIT DIAGRAM

Ph — phase wire
N — neutral wire
L — lamp
C — condenser
D — ballast
St — starter

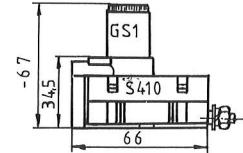
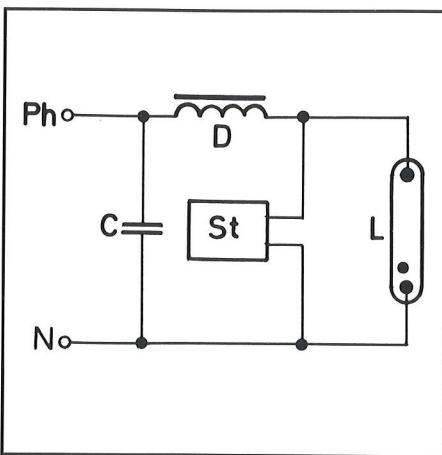


Type	220 SSE1	220 SSE2	220 SSE6	220 SSE12	220 SSE20	380 SSE20
Max. Passing Current (A)	1,3	2,5	6	12	20	20
Pulse Peak Voltage (V)	1,8—2,3	4—5	4—5	4—5	4—5	4—5
Phase (° shift)	60—90	60—90	60—90	60—90	60—90	60—90 240—270
Pulses/Period	3	3	3	3	3	2
Max. Loading Capacity (pF)	200	100	200	200	200	200
Response Voltage (V)	198	198	198	198	198	342
Cut-off Voltage (V)	160	160	160	160	160	320
Internal loss (W)	2	4	4	6	8	
Temperature Rise (°C)	40	40	40	40	40	40
Mains Voltage (V)	220	220	220	220	220	380
Frequency (Hz)	50—60	50—60	50—60	50—60	50—60	50—60
Figure	1	1	1	2	2	2
Dimensions (mm)						
A	41	41	61	140	130	130
B	51	51	51	70	90	90
C	800	800	800	800	800	800
D	M8	M8	M8	M10	M10	M10
E	10	10	10	28	28	28
F	—	—	—	24	24	24
G		—	—	32	32	32
H	—	—	—	32	32	32

Special order: — starter with rated voltage 240 V
— other cable lengths
— 220 SSE1, 220 SSE2, 220 SSE6 with terminals

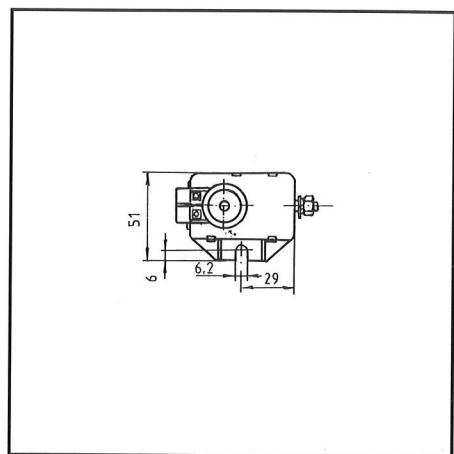
HIGH PRESSURE DISCHARGE LAMPS

IGNITORS PARALLEL IGNITORS

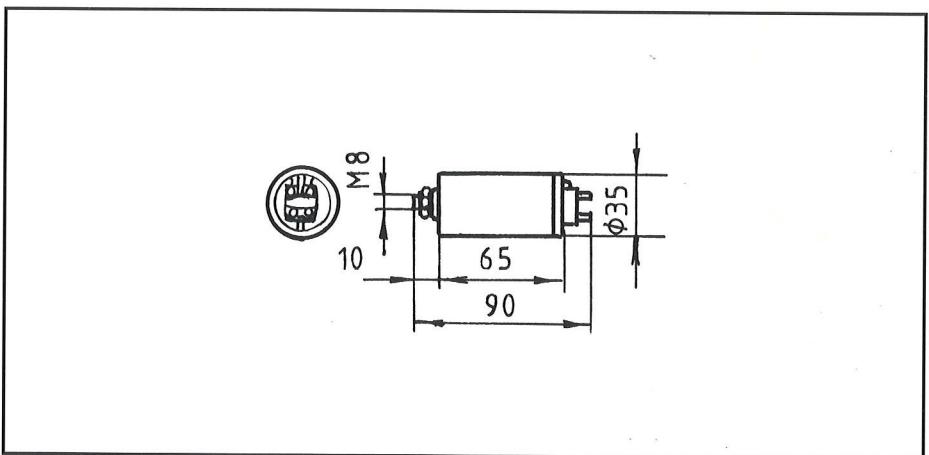


CIRCUIT DIAGRAM

Ph — phase wire
 N — neutral wire
 L — lamp
 C — condenser
 D — ballast
 St — starter



S 410



S 400

Type	S 400	S 410
Mains Voltage (V)	$220 \pm 10\%$	
Frequency (Hz)	50	
Response Voltage (V)	180	
Cut-off Voltage (V)	160	
Pulse Peak Voltage (kV)	1.5	
Apparition of the Starting Pulse	in 30 s after switching ON	
Max. Loading Capacity (pF)	1000	

WHICH IGNITOR FOR WHICH LAMP?

Ignitor	Lamp type	High Pressure Sodium Lamps																														
		TCE 70 W	TCL 70 W	TCF 100 W	TCL 100 W	TCF 150 W	TCL 150 W	TCF 250 W	TCL 250 W	TCF 400 W	TCL 400 W	TC 1000 W	TCL 1000 W	TCF 100 W/S	TCL 100 W/S	TCF 250 W/S	TCL 250 W/S	TCF 250 W de luxe	TCL 250 W de luxe	TCE 35 W/120 V	TCED 35 W/120 V	TCE 50 W/120 V	TCED 50 W/120 V	TCE 70 W/120 V	TCED 70 W/120 V	TCE 100 W/120 V	TCED 100 W/120 V	TCE 150 W/120 V	TCED 150 W/120 V	HgMIF 250 W/D	HgMIL 250 W/D	HgMIF 400 W/DH
BAG-TURGI 380 ZB/D2	TUNGSRAM S410	●	●	●	●	●	●	●	●	●	●																					
BAG-TURGI MZN250SE	TUNGSRAM S400	●	●	●	●	●	●	●	●	●	●			●	●																	
BAG-TURGI MZN 150S	TUNGSRAM S400																															
BAG-TURGI MZN250SE	TUNGSRAM S400	●	●	●	●	●	●	●	●	●	●																					
BAG-TURGI MZN250SE20	TUNGSRAM S400	●	●	●	●	●	●	●	●	●	●																					
BAG-TURGI 220SSSE20	TUNGSRAM S400																															
BAG-TURGI 220SSSE12	TUNGSRAM S400																●	●														
BAG-TURGI 220SSSE6	TUNGSRAM S400																															
BAG-TURGI 220SSSE2	TUNGSRAM S400																															
BAG-TURGI 220SSSE1	TUNGSRAM S400	●	●																													

Operation with electronic starter

Blended Light Lamps	High Pressure Mercury Vapour Lamps	Metal Halide Lamps
HgML 400 W/DV		
HgML 1000 W/D1		•
HgML 1000 W/D		•
HgMIG 2000 W/D		
HgMI 2000 W/D1		
HgMI 2000 W/D2	•	
HgMI 3500 W/D1	•	
HgMI 3500 W/D2		
HgMIR 250 W/DFL		
HgMIR 250 W/DWFL	•	
HgMIF 400 W		
HgMIL 400 W	•	
HgMI 2000 W/220 V		
HgMI 2000 W/380 V		•
HgMIG 2000 W/S		
HgMIS 150 W/WDL		
HgMIS 250 W/WDL		
HgLI 50 W		
HgLI 80 W		
HgLI 125 W		
HgLI 175 W		
HgLI 250 W		
HgLI 400 W		
HgLI 50 W de luxe		
HgLI 80 W de luxe		
HgLI 125 W de luxe		
HgLI 175 W de luxe		
HgLI 250 W de luxe		
HgLI 400 W de luxe		
HgLI 50 W Comfort		
HgLI 80 W Comfort		
HgLI 125 W Comfort		
HgLI 250 W Comfort		
HgLI 400 W Comfort		
HMLI 160 W		
HMLI 250 W		
HMLI 500 W		

Operation without starter

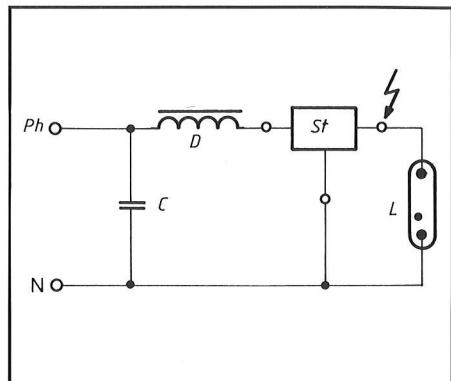
Operation without starter

Operation without starter

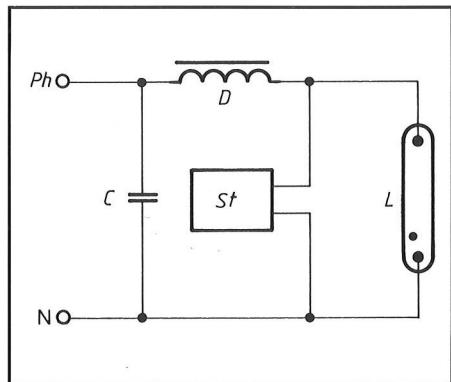
HIGH PRESSURE DISCHARGE LAMPS

CIRCUITS

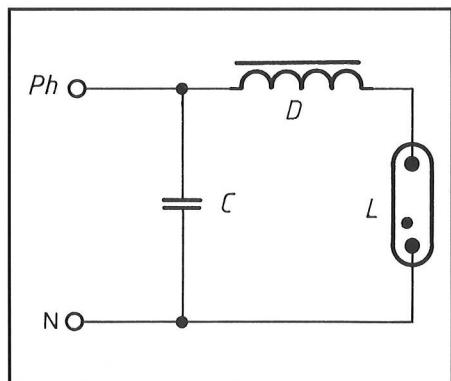
In series



In parallel



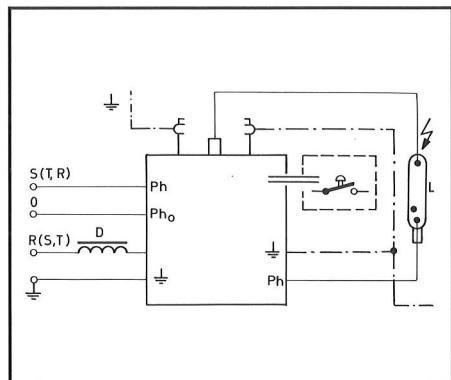
Operation without starter



Operation with starter BAG-TURGI 380 ZB/D2

Symbols:

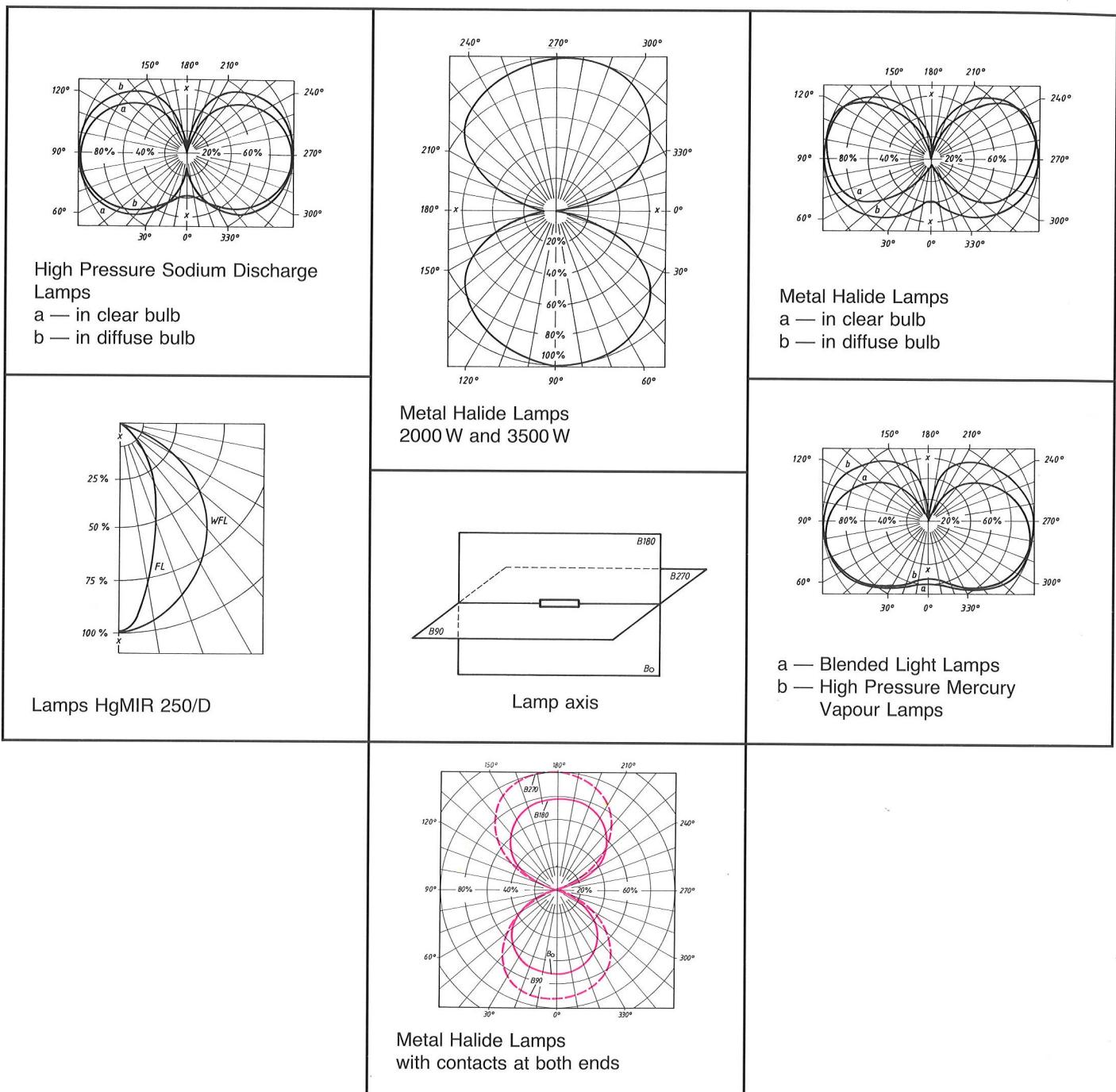
- C — condenser
- D — ballast
- St — starter
- 0 — neutral wire
- R — phase wire in tri-phase mains
- S — phase wire in tri-phase mains
- T — phase wire in tri-phase mains
- Ph — phase wire



When operating Metal Halide Lamps on 380 V-mains, points Ph and 0 correspond to two phase points (e.g. R and S).

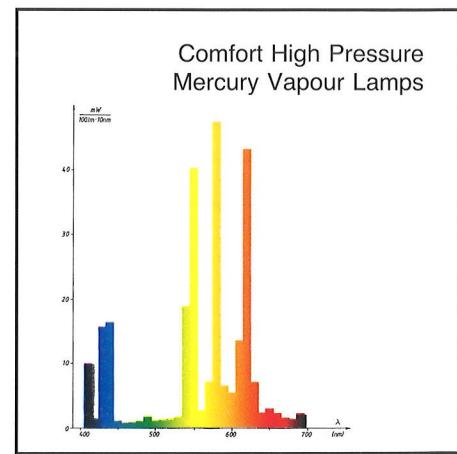
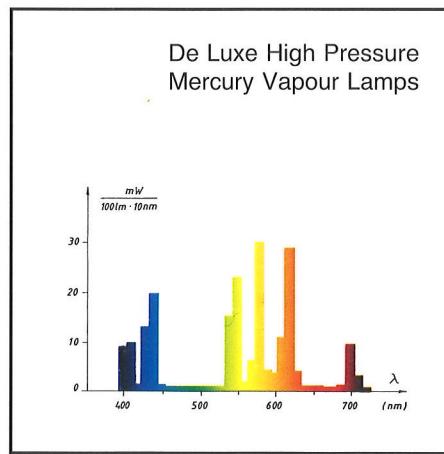
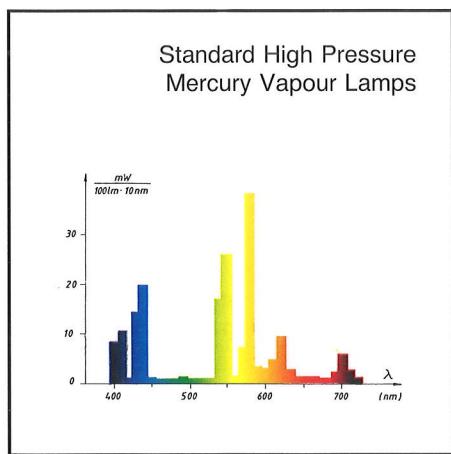
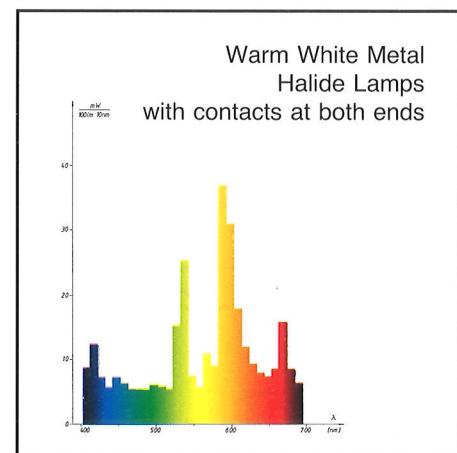
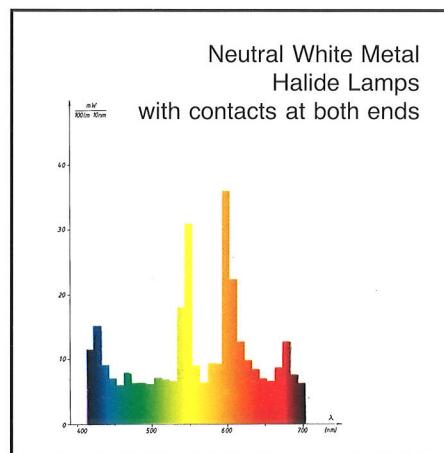
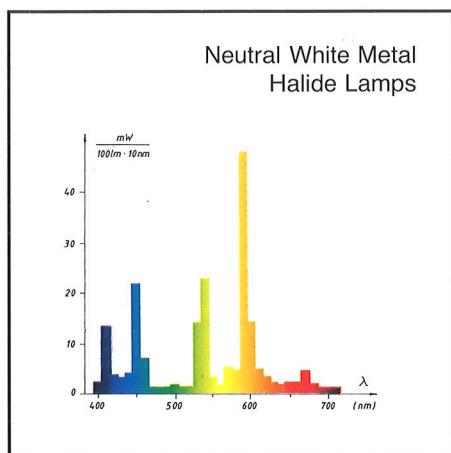
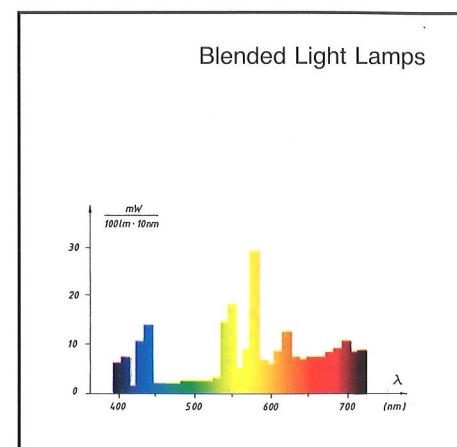
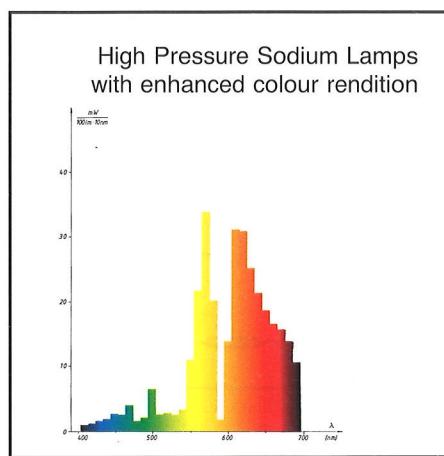
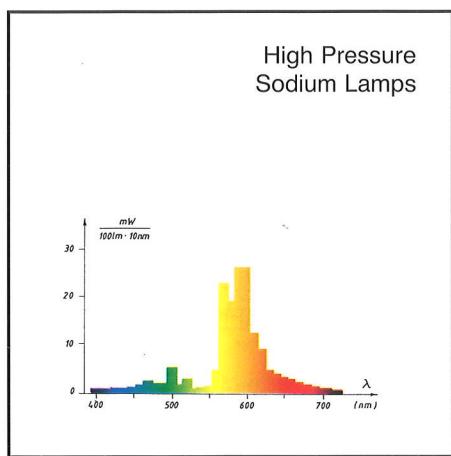
HIGH PRESSURE DISCHARGE LAMPS

LIGHT DISTRIBUTION CURVES



HIGH PRESSURE DISCHARGE LAMPS

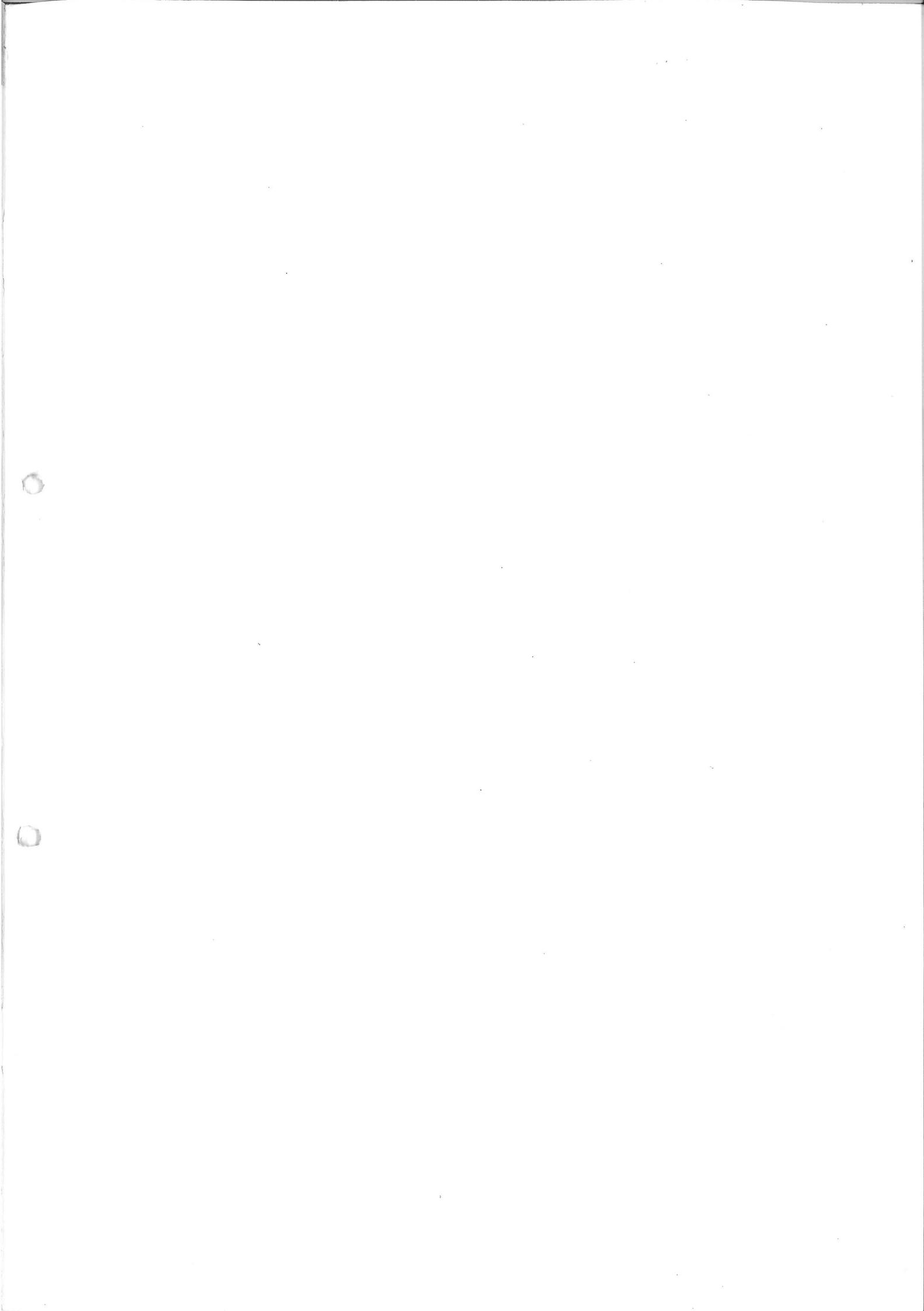
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NOTES



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