Mazda LAMP DATA SHEET

Mercury Discharge and Tungsten Filament

Type MAT/V

General Description

300W and 500W MAT/V lamps

Lamps incorporating two separate light sources, viz.

(a) A hard glass arc tube having an electrode at each end and containing a small amount of mercury and filled with inert gas. An auxiliary electrode is sealed into one end of the arc tube in close proximity to one of the main electrodes to initiate the discharge. This auxiliary electrode is connected to the supply through a resistor of high ohmic value, as shown in the circuit diagram. The arc tube is loaded above 10 watts/cm of arc length and operates at about atmospheric pressure.

and (b) A coiled Tungsten filament connected in series with the Mercury discharge. Both the light sources are enclosed within a clear soft outer bulb, containing a filling of inert gas.

The outer bulb also incorporates a thermally operated bi-metal switch. When the lamp is initially switched on the bi-metal switch contacts are open, and current flows through the discharge path and the whole of the filament in series with it. The filament dimensions are such that the lamp current is limited to an appropriate value during the early stage of the run-up.

As the mercury discharge builds up, the heat of the discharge plus the hot gas rising from the filament raise the temperature of the bi-metal strip sufficiently to cause it to bend towards its contact, and thus short circuit part of the filament coil, the portion remaining in circuit being such that the requirements of the discharge in its fully run-up condition are satisfied (see circuit diagram).

Composition of the light of MAT/V lamps

The Mercury discharge emits violet, blue, green and yellow light strongly, but is lacking in red. The Tungsten filament supplies to some extent this deficiency.

In comparison with the conventional Mercury Discharge lamp, the advantages and disadvantages are as follows -

Advantages

(1) Since current limitation is controlled by the filament within the lamp, no external choke or capacitor is required.

(2) The colour rendering properties of the lamp are considerably better, the red content of the light having been raised from about 1% to approximately 8%.

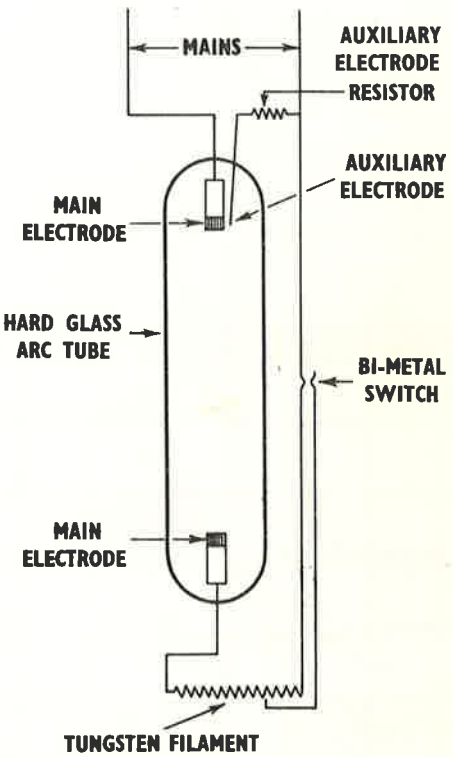
(3) A fair amount of light (chiefly from the filament) is available immediately the lamp is switched on.

Disadvantage

The luminous efficiency of the lamp is lower than that of the conventional Mercury Discharge lamp of comparable wattage, though still higher than that of comparable gas filled Tungsten lamps.

General Applications

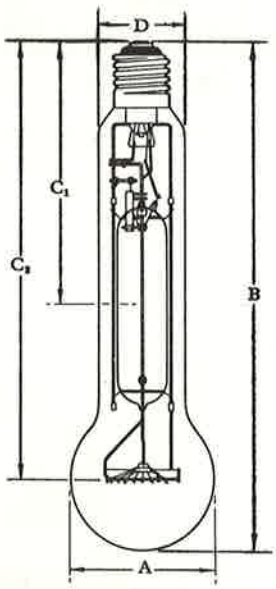
Industrial, Streetlighting, and other applications where it is desired to dispense with the use of external control equipment.

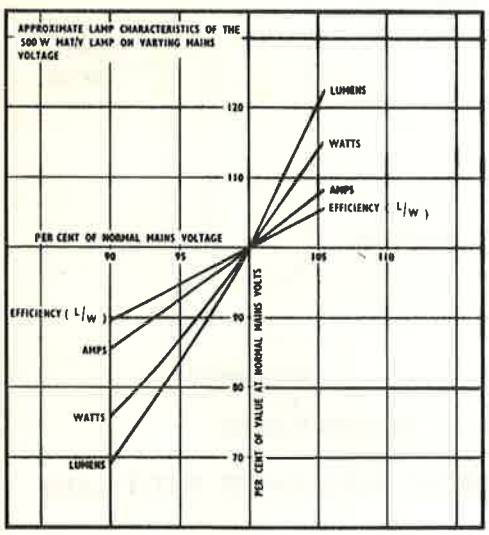


CIRCUIT DIAGRAM OF MAT/V LAMP

A.E.I. Lamp and Lighting Co. Ltd.
Melton Road, Leicester

90-200
July, 1962





Standard Ratings and Type

Watts	Volts	Cap	Designation	Type	Bulb
300 500	200, 210 220, 230 240, 250	GES	E40/45	MAT/V	Tubular with Round Bulb at end

Physical Characteristics

Watts	Cap	Dimensions (mm)				
		Diam. A	Overall length B	Light centre length		Neck Diam. D
				Discharge C_1	Filament C_2	
300	GES	85 ± 1	285 ± 15	150 ± 5	245 ± 10	50 ± 1
500	"	100 ± 1	355 ± 20	182 ± 10	305 ± 20	60 ± 1

Light Source Characteristics

Rated Watts	Lumens per watt		Lumens		Average life (hours)	Run-up time (minutes)	Colour correction factor
	Initial	Average through life	Initial	Average through life			
300	21	18	6,300	5,400	3000	20 MAX.	8.5% red
500	25	21	12,500	10,500	3000	20 MAX.	7.5% red

Electrical Characteristics

Rating		Lamp operating volts		Lamp current (amps)		Apparent Power Factor
Watts	Volts	Discharge	Filament	Operating	Starting	
300	200	105-114	86-95	1.61	1.71	0.95
"	210	110-120	90-100	1.52	1.62	"
"	220	116-126	94-104	1.45	1.55	"
"	230	121-131	99-109	1.39	1.49	"
"	240	127-137	103-113	1.33	1.43	"
"	250	133-143	107-117	1.28	1.38	"
500	200	110-120	80-90	2.66	2.80	"
"	210	115-126	84-95	2.53	2.67	"
"	220	121-132	88-99	2.42	2.56	"
"	230	126-137	93-104	2.31	2.45	"
"	240	132-144	96-108	2.22	2.36	"
"	250	138-150	100-112	2.13	2.27	"

Operating Position

Vertical with cap uppermost.

Operating Conditions

No special precautions need be observed other than the position of operation, and the provision of some form of protection to prevent rain or condensed moisture falling on the bulb during operation.

Note : In the event of the lamp being extinguished by an interruption in the supply, a short delay will occur while the lamp cools down, re-strikes and runs up again.