

Radium



7/60

High Pressure Mercury Lamps

HRL · HRL de Luxe
HRL yellow · HR · HRLV



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More light for less money

Efficiency of lighting is of decisive importance in the economical running of your business.

Up to only a few years ago filament lamps were practically the only available source of artificial lighting. To-day the lighting engineer has the choice not only of fluorescent lamps but also of powerful High Pressure Discharge Lamps with or without fluorescent powder.

Where a particularly high level of illumination is required or where lamps have to be suspended very high, these lamps have proved particularly economical in use.

The present catalogue in addition to technical data also contains hints on the most important applications of **Radium** High Pressure Lamps. The lighting engineer will find in it the necessary information for planning lighting systems. The factory owner and business man can examine whether it might not be more economical to change over from his present lighting system to **Radium** High Pressure Lamps.

Our engineers are at your disposal. They will provide you free of charge and without engagement with comparative charts and advise you on all questions pertaining to lighting problems.

Do your planning together with our lighting engineers.

Applications

Radium High Pressure Mercury Lamps with and without fluorescent powder can frequently be used for identical illumination purposes, the choice of lamp being dictated by the individual needs and economic considerations. We shall merely give you a survey of the most important fields of application.

HRL and HRLV Roads, bridges, squares, tunnels, traffic depots, factory halls, stockyards, foundries, mines, dockyards, quays, locks, canals, sports stadiums, playing fields and airports.

HRL de Luxe Offices, ticket offices, staircases, business premises, large rooms, car parks.

HRL yellow To indicate danger points in road traffic.

HR To floodlight car parks, gardens, houses, ruins, castles, monuments, etc.



Maximum performance for minimum expenditure

is the characteristic feature of **Radium High Pressure Mercury Lamps:**

they provide three times the light of filament lamps of equal wattage;

they provide the same light at about one third of the power cost;

their service life is many times longer than that of filament lamps, thus reducing operating and maintenance costs;

by concentrating a large amount of light in a small lamp, light-weight and low-cost fittings can be used;

their shape affords a safe, convenient grip;

they are designed for maximum protection against shocks and vibration and are therefore suitable for use under robust operating conditions;

they are highly resistant to sharp temperature changes;

they are dependable in any position;

their life is not shortened by occasional overloading.



**TECHNICAL
DATA**

SUPPLY VOLTAGE

The supply voltage for the 50–1000 watt lamps is normally 220 volts. The 2000 watt lamp is designed for 380 volts. Deviations of $\pm 10\%$ are permissible. Other supply voltages require special adaptor units.

DISCHARGE LAMP APPARATUS:

High Pressure Lamps require a control gear, normally a choke and in special cases a leak reactance transformer or a capacitive control unit.

VOLTAGE FLUCTUATIONS:

When using inductor type control units there is a risk of the lamp extinguishing in the case of voltage fluctuations in excess of 10 per cent. In the case of very great supply voltage fluctuations, for example in crane and excavator operation, it is recommended to use capacitive control units. Voltage drops by up to 130 volts can then be safely taken up.

SWITCHING-ON PROCESS:


The full luminous flux of the lamp is reached in about 3 minutes after the lamp has been switched on. 1.5 times more current is used for starting than for ordinary operation.



TECHNICAL DATA


POWER FACTOR:

When using an inductive control unit the power factor is about 0.5. For practically non-inductive operation the compensating capacitors designated in detail on pp. 12-20 should be used.




DUO CIRCUIT:

In the case of lamps using audio-frequency control just as with fluorescent lamps duo circuits can be used to advantage. The power factor will then be almost 1.




RE-LIGHTING:

After switching off, all High Pressure Lamps require a certain cooling period before they can light up again. This varies from 3 to 10 minutes according to individual conditions.



IMPACT RESISTANCE:

In respect of impact resistance the lamps are comparable with rough service filament lamps.



BURNING POSITION:

With all types the burning position is optional.



**TECHNICAL
DATA**

MERCURY VAPOUR BURNER:

The basic material of all Mercury Vapour Lamps is pure Brazilian quartz. This guarantees maximum strength.

ISOTHERMAL ENVELOPES:

The 80–2000 watt lamps have an external bulb made of hard “Jena” glass in isothermal form. They can therefore stand up to considerable temperature fluctuations. Due to the isothermal shape of the bulb it has also been possible to achieve maximum efficiency of the fluorescent powder.

BASE:

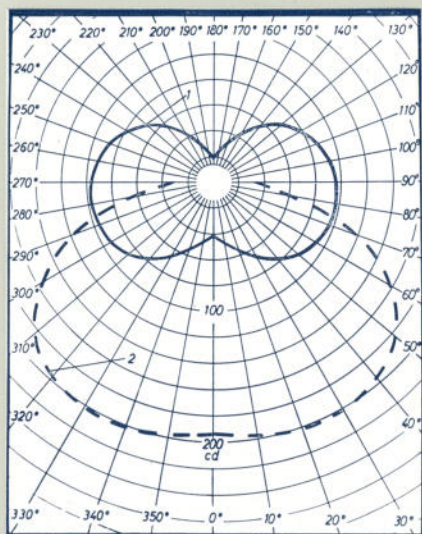
50 to 125 watt lamps have E 27 bases. Higher capacity lamps of 250–2000 watts are provided with a cementless base E 40. On special request the 125 watt lamp can also be supplied with base E 40 or B 22 and the 80 watt lamp with base B 22.

LUMEN OUTPUT:

The luminous flux values of Radium High Pressure Mercury Lamps have been established with the aid of calibrating lamps by the Federal German Institute of Physics and Technology in Brunswick.

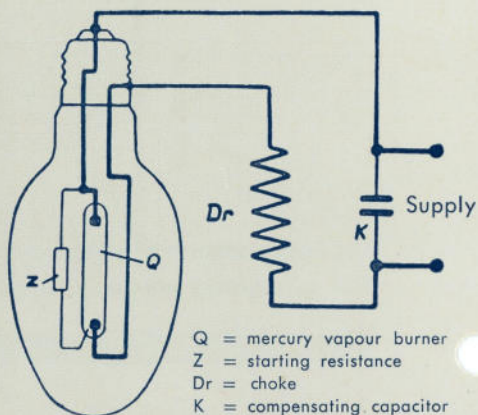
DAMAGE TO EXTERNAL BULB:

Because of ultraviolet radiation operation of High Pressure Lamps with damaged external bulbs is dangerous to health and not permissible.



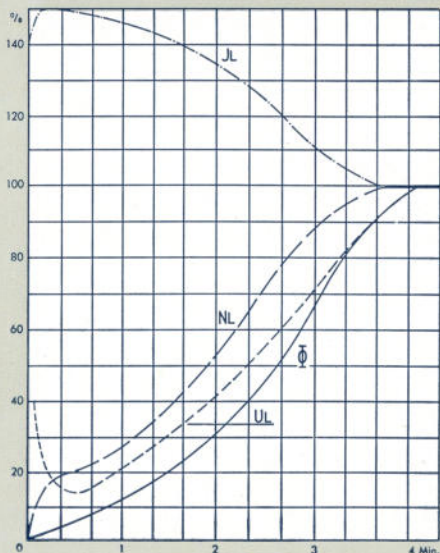
Curve of intensity distribution* HRL (1) and HRLV (2) related to 1000 lm.

* Curve of intensity distribution 1 also applies to the lamps type HRL - yellow and HRL de Luxe

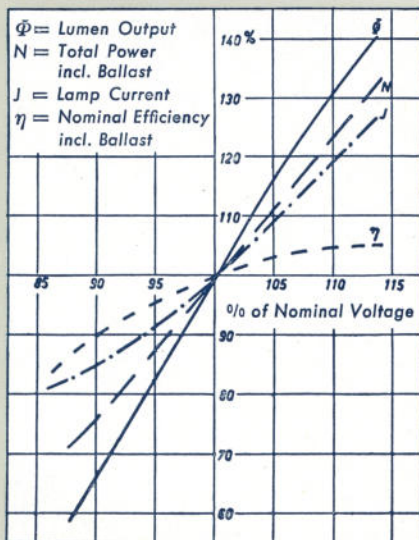


Circuit diagram: Lamp with inductive control unit and compensating capacitor.

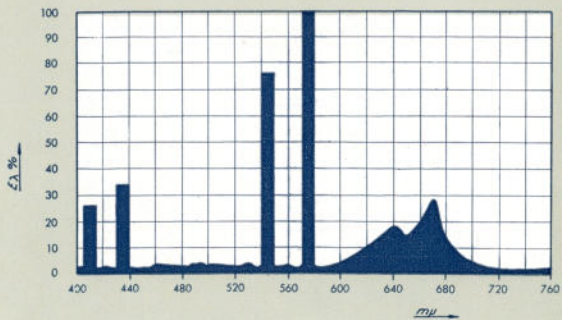
TECHNICAL DATA



Operation characteristic - starting process

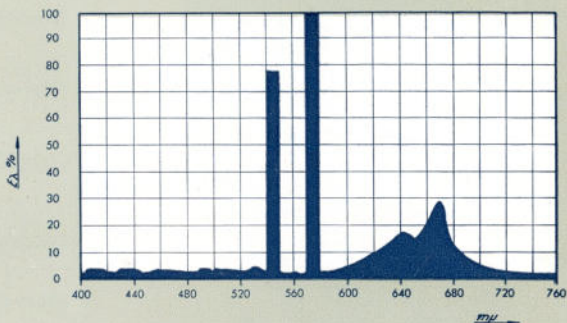


Operation characteristic - voltage fluctuation

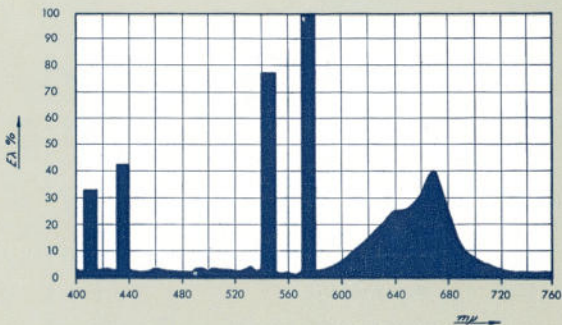
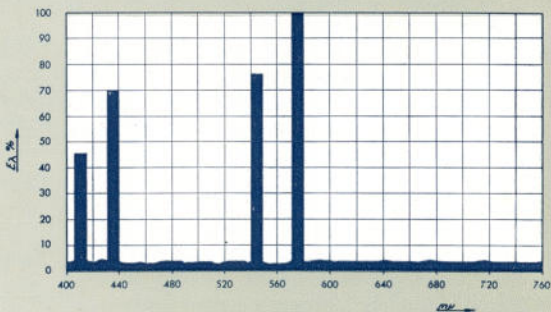


Relative spectral energy distribution of HRL lamps and HRLV lamps

Relative spectral energy distribution of HRL-yellow lamps



Relative spectral energy distribution of HR lamps



Relative spectral energy distribution of HRL de Luxe lamps



Radium HRL Lamps

Radium HRL Lamps are High Pressure Lamps of maximum luminous efficiency and good colour rendition. They are available in a wide range covering lamps from 50 to 2,000 watts capacity. Where so far a large number of lamps have been necessary to obtain a high lighting level such demands can now be met by using a small number of HRL Lamps. Their pleasant golden white colour is easy on the eyes and provides excellent visual conditions.

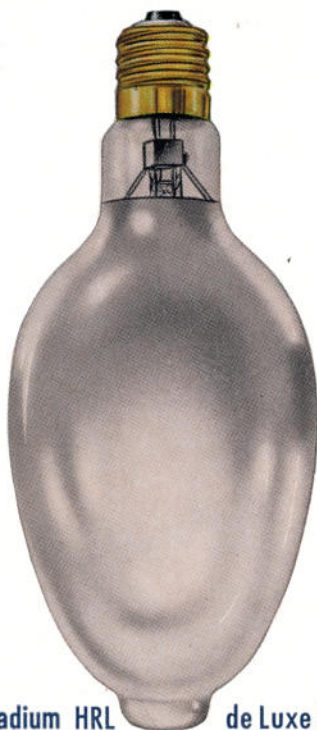
Radium HRL Lamps are provided with special fluorescent powder on the inside of the bulb, which changes the invisible ultraviolet radiation of the mercury vapour high pressure burner into largely red light. This red light in conjunction with the bluish white light portion of the mercury vapour discharge provides the golden white light characteristic of **Radium** HRL Lamps.

Radium	
Lamp Type	Watt
Lumen output	lm
Overall Length	mm
Diameter	mm
Lamp Rating	Watt
Total Power including Ballast	Watt
Operating Voltage	Volt
Lamp Current	Amp.
Nominal Efficiency including Ballast	lm/W
Power Factor	cos φ
Compensating Capacitor	μ F
Brightness	sb
Standard Package	Numbers
Lamp Cap	

Radium

HRL

HRL							
50	80	125	250	400	700	1000	2000
1600	3000	5250	11500	20500	37000	52000	125000
130	160	170	225	295	355	380	420
55	70	75	90	130	150	165	180
50	80	125	250	400	700	1000	2000
59	89	137	266	425	730	1050	2100
220	220	220	220	220	220	220	380
0,63	0,8	1,15	2,2	3,3	5,6	7,5	8,8
27	34	38	43	48	50	50	60
0,42	0,5	0,54	0,55	0,58	0,59	0,63	0,63
7	8	10	18	25	45	65	37
4	4	6	9	10	12	14	22
20	20	20	9	4	4	4	4
E 27				E 40			



Radium HRL de Luxe Lamps

Radium HRL de Luxe High Pressure Lamps are a further development of the well-tried HRL Lamp. This lamp type was developed to meet every demand in respect of good colour rendition.

The light of the HRL de Luxe is „doubly colour corrected“

The most important characteristic of this type of lamp is a fused-on special filter layer on the outside of the "Jena" hard glass bulb.

Certain precious metal salts in combination with "Jena" hard glass provide a filter having a maximum absorption factor of about 560 microns. When using a filter of this type it is possible so to attenuate the characteristic spectrum lines of the high pressure discharge of 546 and 578 microns that while maintaining the red and blue light portions a colour is produced which is pleasant to the eye. Since the special process used for manufacturing the filter layer causes the metallic salts to enter into an intimate combination with the "Jena" glass, any damage to this layer is impossible.

In addition to the advantage of particularly good colour rendition the HRL de Luxe Lamps embody all the advantages of standard High Pressure Lamps.

Radium	
Lamp Type	Watt
Lumen output	lm
Overall Length	mm
Diameter	mm
Lamp Rating	Watt
Total Power including Ballast	Watt
Operating Voltage	Volt
Lamp Current	Amp.
Nominal Efficiency including Ballast	lm/W
Power Factor	$\cos \varphi$
Compensating Capacitor	μF
Brightness	sb
Standard Package	Numbers
Lamp Cap	

Radium

HRL *de Luxe*

HRL de Luxe						
80	125	250	400	700	1000	2000
2400	4200	9200	16400	29500	41500	100000
160	170	225	295	355	380	420
70	75	90	130	150	165	180
80	125	250	400	700	1000	2000
89	137	266	425	730	1050	2100
220	220	220	220	220	220	380
0,8	1,15	2,2	3,3	5,6	7,5	8,8
27	31	35	39	40	40	48
0,5	0,54	0,55	0,58	0,59	0,63	0,63
8	10	18	25	45	65	37
3	5	7	8	10	11	18
20	20	9	4	4	4	4
E 27		E 40				



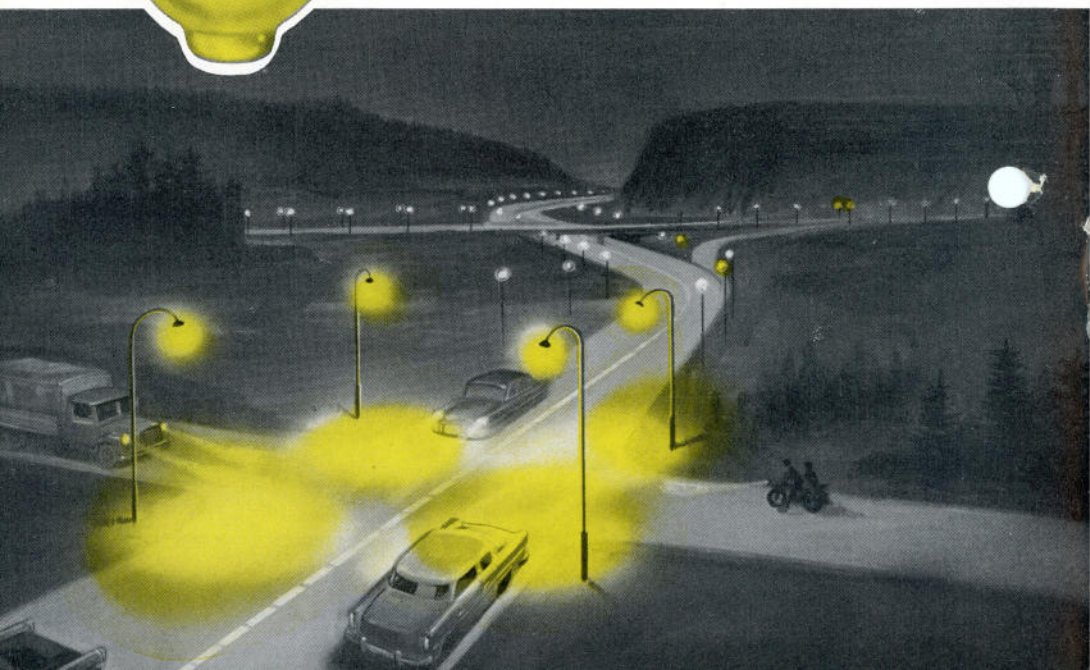
Radium HRL Yellow Lamps

For safety at night.

Yellow lamps interrupt the chain of white lights and make the driver pay greater attention.

With an intensity of 15200 lumens HRL Yellow Lamps can be used as traffic warning lights which can be seen from a great distance. High Pressure Lamps HRL Yellow have a layer of luminescent material in the same way as HRL Lamps. The yellow filter glass of the external bulb absorbs the entire short-wave radiation below 500 microns and gives the light its characteristic yellow colour.

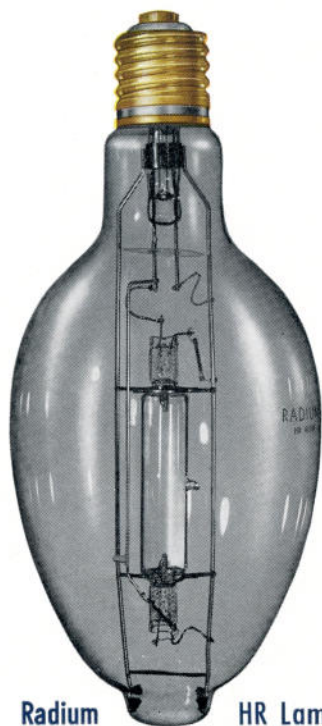
It is important that the red light portion of the lamps is maintained unchanged, so that red colours can be rendered as faithfully as possible. This is particularly important in traffic lighting.



Radium

HRL 

Radium		HRL- yellow			
Lamp Type	Watt	80	125	250	400
Lumen output	lm	2250	3950	8600	15200
Overall Length	mm	160	170	225	295
Diameter	mm	70	75	90	130
Lamp Rating	Watt	80	125	250	400
Total Power including Ballast	Watt	89	137	266	425
Operating Voltage	Volt	220	220	220	220
Lamp Current	Amp.	0,8	1,15	2,2	3,3
Nominal Efficiency including Ballast	lm/W	25	29	32	36
Power Factor	$\cos \varphi$	0,5	0,54	0,55	0,58
Compensating Capacitor	μ F	8	10	18	25
Brightness	sb	3	4	7	8
Standard Package	Numbers	20	20	9	4
Lamp Cap		E 27		E 40	



Radium HR Lamps

Radium HR Lamps are High Pressure Lamps having a clear external bulb. Wherever faithful colour rendition is of subordinate importance this lamp can be used to advantage. The high green portion of the mercury vapour light gives lawns and trees a full green colour, enabling excellent light effects to be obtained.

The light of the **Radium** HR Lamps, due to the missing layer of fluorescent powder, has a bluish white colour. The line spectrum of the pure mercury vapour discharge increases visual acuity and contrast. Because of the smaller burner the arc has a particularly high brightness. The lamp is therefore suitable for use in searchlights.

Radium	
Lamp Type	Watt
Lumen output	lm
Overall Length	mm
Diameter	mm
Lamp Rating	Watt
Total Power including Ballast	Watt
Operating Voltage	Volt
Lamp Current	Amp.
Nominal Efficiency including Ballast	lm/W
Power Factor	$\cos \varphi$
Compensating Capacitor	μF
Ligth Centre	mm
Length of Arc	mm
Standard Package	Numbers
Lamp Cap	

Radium

HR

HR							
50	80	125	250	400	700	1000	2000*
1600	3000	5250	11500	20500	37000	52000	125000
130	160	170	225	295	355	380	420
55	70	75	90	130	150	165	180
50	80	125	250	400	700	1000	2000
59	89	137	266	425	730	1050	2100
220	220	220	220	220	220	220	380
0,63	0,8	1,15	2,2	3,3	5,6	7,5	8,8
27	34	38	43	48	50	50	60
0,42	0,5	0,54	0,55	0,58	0,59	0,63	0,63
7	8	10	18	25	45	65	37
85	100	105	140	185	220	230	250
20	25	30	45	60	90	120	145
20	20	20	9	4	4	4	4
E 27				E 40			

* Type HR 2000 is also available in cylindrical bulb without extra cost.

Radium

HRLV



Radium HRLV Lamps

For special purposes we recommend **Radium** High Pressure Reflector Lamps with fluorescent powder. Their paraboloid external bulb is coated on the inside with a reflecting and fluorescent layer. The reflecting layer is fully protected against external influences (smoke, dirt, dust) and therefore retains its reflective power to an undiminished degree.

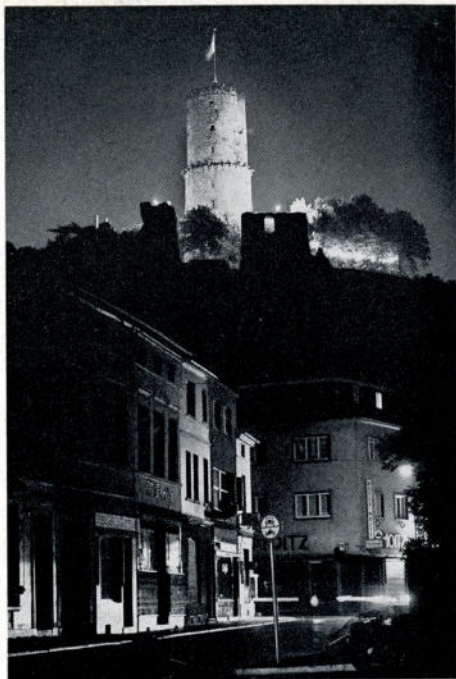
Radium		HRLV	
Lamp Type	Watt	250	400
Lumen output	lm	10500	18000
Overall Length	mm	305	305
Diameter	mm	180	180
Lamp Rating	Watt	250	400
Total Power including Ballast	Watt	266	425
Operating Voltage	Volt	220	220
Lamp Current	Amp.	2,2	3,3
Nominal Efficiency including Ballast	lm/W	39	42
Power Factor	cos φ	0,55	0,58
Compensating Capacitor	μF	18	25
Brightness	sb	—	—
Standard Package Numbers		4	4
Lamp Cap		E 40	











MANUFACTURING RANGE

All-Purpose Lamps
Shockproof (S) Lamps
Railway Lamps
Daylight Lamps
Silopal Lamps
Drop and Pear Shaped Lamps
Brilliant Lamps
Tubular Lamps
Candle Lamps
Candle Shaft Lamps
Strip Light Lamps
Photoflood Lamps
Miniature Film Lamps
Projector Lamps
Reflector Lamps
Infra-Red Lamps
NON-Insekta Lamps
Sodium Vapour Lamps (RNA)

Operating figures and dimensions are subject to the customary minor deviations. We reserve the right to modify designs without notice. Information regarding delivery is without engagement.

All control gear, auxiliary equipment, inductors and capacitors are supplied by the electronics industries.

Sale and delivery are subject to the **Radium** Conditions of Delivery and Payment in force on the date of dispatch.

Please write for our detailed leaflets which will give you an outline of our entire manufacturing range.

