SPECTRAL LAMPS

Strong monochromatic sources, or sources which emit a number of monochromatic lines of known wavelength, are an important aid in physical and chemical research where visible or ultra-violet radiation plays a part.

For most experiments, the different sources used must be interchangeable as regards electrical and geometrical characteristics. To meet these demands, Philips have developed spectral lamps, which consist of a small discharge tube surrounded by a cylindrical outer bulb. The discharge tube contains a gas, a metallic vapour or a mixture of both in a very pure state, and the electrodes permit a very high current density. In this way, a light source is obtained capable of emitting considerable energy in one single spectral line or in a few lines. All lamps have identical outer dimensions and light centre lengths, ensuring complete interchangeability. For those applications where ultra-violet radiation plays a part, lamps are available consisting of a quartz discharge tube mounted in a quartz outer bulb, which emits UV radiation extending to the short UV.

Mercury lamps are made for low as well as for high pressure. In the latter case the amount of mercury is such that the metal is entirely vaporized at the operating temperature. In addition to the lines, the spectrum of a high-pressure mercury lamp shows a relatively weak continuum covering the UV and visible regions of the spectrum. The low-pressure mercury lamp shows no addition of a continuum.

If it is desired to separate a part of the spectrum, filters can be used. In favourable cases these can be so arranged that only light of one wavelength is emitted. If conditions are such that this cannot be achieved with filters, a monochromator will have to be placed in front of the lamps.

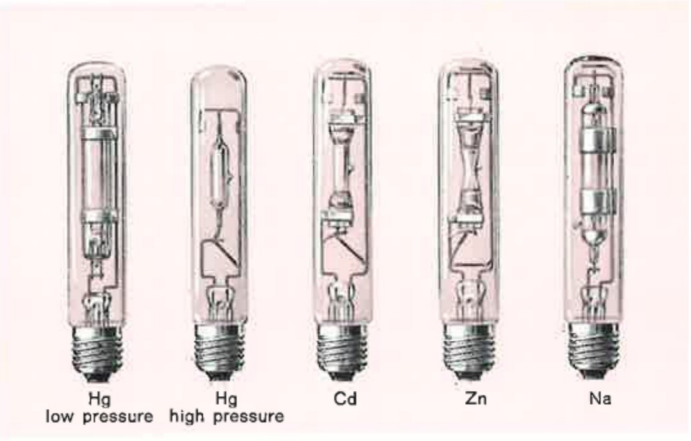
Applications

All kinds of biological, chemical and physical experiments, such as interferometry, polarimetry, refractometry and spectroscopy.

AUTO-LEAK TRANSFORMER

Although some of the lamps may be connected to a 220 V A.C. supply – employing, of course, a suitable current-limiting device – it is better to use a higher voltage for the sake of easy ignition.

An auto-leak transformer with a primary voltage of 110/125 or 220 V can be supplied together with the lamp.



	Gas or vapour	Wattage W	Lamp current A	Material of bulb	Arc length	Catalogue number [1]
For visible spectra	Hg (low pressure)	12	0.9	glass	38	9281 950 000 ..
	Hg (high pressure)	90	0.9	glass	25	9281 951 092 ..
	Cd	16	0.9	glass	24	9281 960 092 ..
	Zn	16	0.9	glass	24	9281 940 092 ..
	Hg, Cd, Zn	75	0.9	glass	24	9281 975 092 ..
	He	60	0.9	glass	32	9281 900 000 ..
	Ne	20	0.9	glass	27	9281 905 000 ..
	A	15	0.9	glass	27	9281 910 000 ..
	Kr	15	0.9	glass	27	9281 915 000 ..
	Xe	10	0.9	glass	27	9281 920 000 ..
	Na	14	0.9	glass	19	9281 945 000 ..
	Rb	15	0.9	glass	33	9281 930 000 ..
	Cs	10	0.9	glass	33	9281 935 000 ..
	K	10	0.9	glass	33	9281 925 000 ..
For ultra-violet spectra	Hg (low pressure)	12	0.9	quartz	40	9281 952 051 ..
	Hg (high pressure)	90	0.9	quartz	25	9281 953 051 ..
	Cd	16	0.9	quartz	24	9281 961 051 ..
	Zn	16	0.9	quartz	24	9281 941 051 ..
	Hg, Cd, Zn	75	0.9	quartz	24	9281 976 051 ..
For visible and ultra-violet spectra	In	25	0.9	quartz	25	9281 965 051 ..
	Tl	20	0.9	quartz	30	9281 970 051 ..
	Ga	20	0.9	quartz	30	9281 985 051 ..

[1]) Dimensions of the lamps: diam. 30; max. length 177; lcl. 110. Base E 27

DEUTERIUM SPECTRAL LAMP

The deuterium lamp produces a continuous spectrum, with the Balmer-lines and the strongest lines of the multiline-spectrum of deuterium above 400 nm.

Type number	Lamp voltage V	Lamp current A	Bulb material	Average life [1] h	Diam.	Max. length	Ordering number
126138	60-90 D.C.	0.3	quartz	200	30	71	9281 980 051 ..

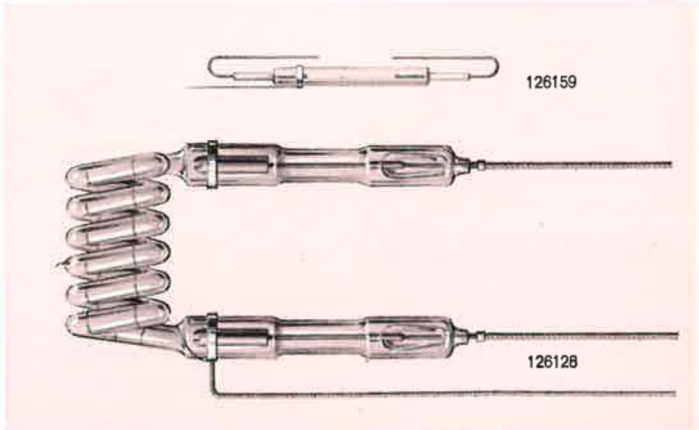
[1]) Life after which the energy output is 65 % of the 0-hour value

LASER PUMPING FLASHLAMPS

For solid-state lasers Philips have developed two special xenon flashlamps with which the rubies can be pumped above their threshold level.

The most efficient way in which the straight flashlamp, type 126159, can be used is to mount the lamp in one focus of an elliptical reflector and the laser rod (ruby) in the second focus of the same reflector. All the energy dissipated by the lamp is consequently concentrated in the ruby.

The helix flashlamp, type 126128, is a very high-power flashlamp which operates on a high voltage. By means of this flashlamp a very simple laser can be built, as the laser rod can be set up along the axis of the helix of the flashlamp. Hence, without the aid of adequate reflectors, the laser rod can be brought above its threshold level.



Type number	Energy per flash Ws nom.	Energy per flash Ws max.	Anode voltage V min.	Anode voltage V max.	Max. flash frequency flashes/min	Main capacitor µF at nom. load	Main capacitor µF at max. load	Inductance to be connected in series µH	Life (number of flashes with inductance)	Flash duration µsec	Max. length	Ordering number
126159	250	500	750	3000	2	125	250	40	1000	200	120	9283 815 000 ..
126128	1500	10000	1500	5000	1	250	1600	0.5	1000	< 2000	210	9283 812 000 ..