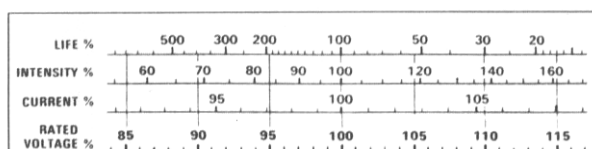


MARINE SIGNAL LAMPS

FILAMENT LIFE

The life of a filament is always a compromise between long life and high light intensity. A voltage higher than the designed voltage for the filament gives increased light intensity but short filament life.

For example (see nomogram below), a 5% increase in voltage means a 20% higher light intensity but a 50% short filament life. This would only produce a marginally greater luminous range, but the service period would, of course, be much shorter.



TUNGSTEN HALOGEN LAMPS

The inclusion of halogen gas into lamps with tungsten filaments permits the filaments to be operated at higher temperatures producing greater luminous flux. The efficiency of tungsten halogen lamps in lumens per watt is higher than with conventional tungsten filament lamps filled with insert gases. Lamp life is generally higher also.

The halogen gas supports a transport cycle which keeps the bulb wall free from deposited tungsten. That cycle will only occur at higher temperatures which can only be achieved with continuous burn or very low flash ratios.

COLOUR OF LIGHTSOURCE

The ultimate colour of a lightsource is determined not only by the colour of the lens or filter, but also by the colour of the lightsource. With tungsten filament lamps the colour of the luminous filament is a function of its temperature: the hotter the filament, the whiter the light. When tungsten lamps are under-run to achieve greater lamp longevity they run less hot and therefore tend towards the red.

Pharos Marine/Automatic Power lanterns are designed to give correct colour rendering when the lamps are run at the recommended voltages. Care should therefore be exercised when de-rating lamps for longer life since a colour shift will likely be experienced.

TWIN FILAMENT LAMP

Each filament of a twin filament lamp has a service life of 1500 hours flashing time (the total sum of all flash lengths) at 13.0 volts. The matching flasher ELCO-12, which operates on direct current, incorporates a voltage regulating circuit that maintains an accurately stabilised 10.3 volts rms to the filament even if the input power supply varies between 11 and 23 volts.

CALCULATING FILAMENT SERVICE PERIOD

The service period of one filament can be calculated according to the following formula:

$$F = \frac{1500 \times T}{t \times D}$$

F = service period in days

T = total period of light character in seconds

t = sum, in seconds, of all flash lengths in that period

D = means annual operating time per day in hours (14 hours is a common value)

EXAMPLES

Character 0.3 + 2.7 = 3 seconds

$$F = \frac{1500 \times 3}{0.3 \times 14}$$

Character 1 + 1 + 1 + 5 = 8 seconds

$$F = \frac{1500 \times 8}{2 \times 14} = 428 \text{ days, or more than 13 months}$$

FLASH LIGHTS

Short flashes are ineffective because the filament cannot reach full incandescence. Also, due to the Blondel-Rey effect, the quick flash will be inconspicuous. Long flashes are uneconomical because they consume unnecessary electric power and reduce the filament life.

Shown in the table (on page 8) are the optimum flash lengths for different wattage filaments: they give the maximum light intensity per unit of electrical energy expended. We like to recommend that short flash lengths than these optimum ones should not be used.