

Remote Units

Remote heads in a few words...

EMERGENCY LIGHTING HEADS: PERFORMANCE & TECHNOLOGY

Emergency Lighting Heads represent a key element of an emergency lighting system performance. During a power failure, these lamp heads must provide adequate lighting levels for the safe evacuation of humans from buildings.

Which level of illumination is necessary to ensure a safe evacuation? Minimum levels are established by the National Building Code of Canada:

“3.2.7.3. Emergency Lighting 1 - Emergency lighting shall be provided to an average level of illumination not less than 10 lx at floor or tread level. . .

2-Emergency lighting to provide an average level of illumination of not less than 10 lx at floor or catwalk level shall be included in a service space referred to in Sentence 3.2.1.1.7).

3- The minimum value of the illumination required by Sentences (1) and (2) shall not be less than 1 lx.”

During a power failure, the emergency power supply is provided to the heads from batteries. Equipment manufacturers and customers should use high intensity light sources, with efficient light levels and distributions.

Let's examine which light sources are used for emergency lighting and which are the best ones?

MINIATURE LAMPS: TUNGSTEN AND QUARTZ HALOGEN

Most commonly used emergency heads are fabricated of an injection-molded thermoplastic housing containing a miniature lamp, a metallic reflector and a polycarbonate lens. Lamps use a tungsten filament enclosed in a filling gas mixture of argon and nitrogen and are generally referred to as incandescent lamps.

A better performance is obtained with quartz halogen lamps, which are still incandescent lamps, but the filling gas (iodide/chloride) allows the tungsten filament to operate at higher temperatures. This results in higher luminous intensity, 20 to 30% superior to standard incandescent lamps of same wattage and lamp life.

Table 1 shows a comparison between miniature incandescent lamps and quartz halogen lamps. The luminous intensity is measured in MSCP (mean spherical candle power).

TABLE 1

Lamp Type	Application	Voltage (V)	Wattage (W)	Average Life (hrs)	Luminous Intensity (MSCP)	Relative Luminous Intensity
INCANDESCENT	Emergency Lighting	6	12	50	15	100%
HALOGEN	Emergency Lighting	6	12	50	19	127%

You have probably already noticed the short lamp life of these light sources. Who would be interested in using a bulb which only lasts 50 hours? The answer is simple: such a lamp produces 25% to 30% more light than a lamp of the same wattage but longer lamp life (i.e. 1,000 hours).

By design, the filament is used at higher temperatures, increasing light output.

However, using high temperatures also increases vaporization of the filament, which in turns shortens its life. As power failures are relatively scarce (let's say 4 to 6 per year) and duration of emergency lighting between 30 minutes to 2 hours, lamp heads are only used between 3 to 12 hours per year. A lamp with an average life of 50 hours should therefore be functional during over four years.

Lamp manufacturers offer two types of miniature lamps : long life and high light output.

Table 2 shows a few examples.

Remote Units

TABLE 2


Lamp Type	Application	Voltage (V)	Wattage (W)	Average Life (hrs)	Luminous Intensity (MSCP)	Relative Luminous Intensity
INCANDESCENT	Specialty	12	8	1,000	10	100%
	Emergency	12	8	50	13	130%
	Lighting	6	8	50	13	130%
	Emergency Lighting					
HALOGEN	Automobile, Rough	12.8 6	12.8 12	1,000 50	12 15	100% 120%
	Service, Emergency Lighting					

PAR36 SEALED BEAM LAMPS

Emergency head performance also depends on lamp optics: the reflector and the lens. This is especially critical in damp areas where vapors and water condensation can deteriorate the electrical contacts and the reflector performance.

Sealed beam lamps are recommended for such applications.

Sealed beam lamp construction includes a metal coated glass reflector and a lens, designed to provide a light beam of a certain opening: narrow, medium, large, etc. The most common lamps used are those with a 4.5" diameter (PAR36), available in both incandescent and halogen versions. As for miniature lamps, there are sealed beam lamps dedicated for long life applications (4,000 hours, 7-8 lumens/Watt) and for emergency lighting (50 to 300 hours, 12-20 lumens/Watt).



Originally, lamp life wasn't an issue. However, this has become increasingly important in recent years, with the introduction of sophisticated emergency lighting fixtures with periodic self-test and self-diagnostic features.

Such a system includes a micro-controller board which automatically simulates a power failure and forces the fixture in emergency lighting mode every 30 days for at least 30 seconds and tests both the batteries and the lamps. Even if the duration of the self-test is minimal compared to the lamp life, the repetitive connection and disconnection cycle of the lamps increases the risk of a premature failure caused by the initial high current applied.

MR16 GENERATION

Fortunately, the lamp life issue was resolved with a new generation of lamps, the MR16 technology (MR16 stands for Multi-faceted Reflector, 16/8" diameter). Increasingly popular, the MR16 contains everything in one: miniature halogen lamp, metal coated glass reflector and, for the most part, a glass lens cemented to the reflector. Easy to install, MR16 lamps are popular in both residential and commercial applications, and increasingly specified for emergency lighting. Why?

In addition to their bright directional beam, these lamps offer a good efficacy (11 to 18 lumens/Watt), as well as long life (2,000 to 6,000 hrs). How is this possible?

First, the use of a glass lens which is clear and thin, absorbing much less light than standard diffuser lens, and second an efficient light distribution, accomplished by the multi-faceted reflector.