

Chapter 4: Luminaires

4.1 Basic requirements

A luminaire is the apparatus containing the light source. A luminaire is designed to:

- connect the light source to the electricity supply
- protect the light source from mechanical damage
- control the distribution of light
- be efficient
- withstand the expected conditions of use
- be safe when used in the recommended manner.

To meet these design objectives it is necessary to consider the electrical, mechanical, optical, thermal and acoustic aspects of luminaires.

4.1.1 Electrical

Electrical wiring

The internal wiring of a luminaire has to be capable of handling the electrical current and the thermal conditions in the luminaire. The cross sectional area of the wire will determine the maximum allowable current. IEC 598 specifies a minimum cross section of 0.5 mm² although this may be reduced to 0.4 mm² where space is severely restricted.

The wire itself can be solid or stranded. Solid wire is easier to hold in position and to strip, making it simpler to install in a luminaire. However, solid wire is not suitable for luminaires that are subject to vibration or for luminaires that may be frequently adjusted. For such luminaires, stranded wire is better.

Both types of wire are covered with insulating material. The choice of insulation material is largely determined by its heat resistance. The wiring of a luminaire has to be capable of withstanding not only the air temperatures inside the luminaire but also the surface temperatures of components that the wiring may contact, such as lamps, control gear and lamp holders. PVC insulation that is heat resistant up to 90 °C, 105 °C and 115 °C is available. Where higher temperatures may be experienced, silicon rubber (170 to 200 °C) and PTFE (250 °C) insulation may be used. Additional thermal insulation can be achieved by covering the electrical insulation with a glass fibre sleeve.

Connection to the electricity supply

There are three approaches commonly used to connect a luminaire to the electricity supply; the connection block, automatic connection and through wiring.

The most common method is via a connection block within the luminaire. To prevent the connection being accidentally broken, the supply wire should pass through a cable clamp before reaching the connection block.

Luminaires mounted on trunking systems are often designed so that connection to the electricity supply occurs when the luminaire is mounted on the trunking. For this to occur the electrical socket carrying the electricity supply is part of the trunking and the plug is contained within the luminaire.