The charger must be capable of recharging the battery to 80% of capacity within 12 hours. The battery must be designed for 10 years design life (lower life batteries exhibit a sudden failure mode, which will not be picked up by the emergency lighting testing procedures). The output must be capable in the emergency condition of clearing all distribution protection devices and fuses (normally a UPS unit drops down to zero voltage when sensing a distribution short circuit). It is important to clear the protection device and re-supply those parts of the building that do not have a fault. The inverter must be capable of starting the load from the battery in an emergency. The system monitors, as defined in BS EN 50171, should be supplied.

Generators

The main components of a generator system are a prime mover driving an alternator, fuel tanks, operating controls and starter batteries. The generator has to be able to start automatically and to provide the power for the load within 5 s (or in some cases within 15 s) as detailed in BS 5266-1. As with all central systems, the distribution wiring must be fire protected and also the last normal lighting circuits must be monitored and the emergency luminaires automatically activated if the local circuit fails. As compliance with the safety requirements for the whole generator system may be arduous, it may be preferable to provide one-hour duration battery-powered luminaires in addition to the generator set. Testing of generators should be in accordance with the manufacturer's instructions and Home Office guidance.

8.4.2 Circuits

Cabling

For self contained systems, all the wiring is internal to the luminaire. The luminaire should conform to BS EN 60598 and be CE-marked.

For central systems, the integrity of the system is the paramount design consideration as the failure of a single part could render the entire emergency lighting installation ineffective. Where possible, the power supply should incorporate some redundancy, for example more than one battery room and multiple distribution circuits can be provided. To enhance integrity further, the distribution circuits should be divided and segregated such that the risk of a total loss of emergency lighting in any one area is minimised. Precautions should include the use of fire survival cables such as mineral-insulated copper conductor (MICC) cables, armoured power cables to BS 7846 or low-smoke-and-fume (LSF) cables in protected routes. Examples of methods of protection include metal trunking and conduit. Cables run in ceiling voids that do not form part of a fire-rated zone should not be run in open trays unless they are of the MICC type, armoured cable to BS 7846 or conform to cable performance standards BS 6387 or IEC 60364-5-52. Particular attention should be paid to the most vulnerable parts of the distribution system, for example where cabling enters and leaves enclosures and luminaires. Suitable glands should be provided which maintain the same level of integrity as the cabling being used. Where slave luminaires are spurred off a main circuit, the final cabling should be to the same standard as the rest of the system. Cabling provided solely for emergency lighting purposes should be clearly identified as such and labelled accordingly. It is desirable to include some form of sensing to prove the integrity of the emergency lighting circuits.

Electromagnetic compatibility (EMC)

It is also important that the overall design of a centrally supplied emergency lighting system is EMC compliant, as many of the components used in these systems, although individually suitable, may interact in such a way as to generate electrical interference. Verification should be sought from the equipment manufacturers and systems integrators that EMC issues have been considered properly This is particularly important when attempting to convert conventional luminaires to emergency lighting luminaires with an 'emergency pack.'