12 EMERGENCY LIGHTING

12.1 GENERAL

12.1.1 Scope

1 This Part specifies the general requirements for emergency lighting and accessories both maintained and non-maintained. It shall be read in conjunction with other parts of the Specifications and the Project Drawings.

2 Related Parts and Sections are as follows:

This Section

Part 1..... General Provisions for Electrical Installations
Part 10..... Wiring Accessories and General Power
Part 11..... Light Fittings
Part 24..... Testing

12.1.2 Reference Standards

1 The following standards and documents of other organisations are referred to in this Part, and shall be complied with:

BS 4533 .....General requirements and tests (IEC 60598-1 Luminaires - General requirements and tests)

BS 4533.....Luminaires for emergency lighting (IEC 60598-2 Luminaires - Particular requirements. Luminaires for emergency lighting)

BS 5225.....Method of photometric measurement of battery operated emergency lighting luminaires (EN 13032-3 Light and lighting. Measurement and presentation of photometric data of lamps and luminaires - Presentation of data for emergency lighting of workplaces)

BS 5266.....Emergency lighting

BS 7671 .....Requirements for Electrical Installations. IET Wiring Regulations

EN 60073 .....Basic and safety principles for man-machine interface, marking and identification - Coding principles for indicators and actuators

EN 60529 .....Degrees of protection provided by enclosures (IP code)

ISO 9000 .....Quality management and assurance standards

QGEWC .....Qatar General Electricity & Water Corporation Regulations.

KAHRAMAA .....In accordance with KAHRAMAA all internal & external light & Emergency light fittings should be considered as LED Luminaire in order to comply with Qatar National Program for Conservation & Energy Efficiency (Tarsheed)

12.1.3 Quality Assurance

1 The supplier’s manufacturing facility shall be certified to ISO 9000 or equivalent.

12.1.4 Warranty

1 Battery units, luminaires and accessories shall be warranted for a minimum of 5 years by the manufacturer. The battery shall have minimum 10 years useful life.

12.2 PRODUCTS

12.2.1 General

1 Emergency lighting installations shall be complete with emergency batteries, chargers, luminaires and wiring, all as described in Specifications and as indicated on the Project Drawings, complying with BS 5266 Part 1.All emergency lighting shall be Non-maintained type except for the EXIT lights where it shall be maintained unless otherwise explicitly specified in the project documentation.

2 Non-maintained luminaires shall be supplied directly from the battery system. Maintained exit luminaires etc., shall be supplied from a separate supply via an independent transformer and shall only operate from batteries during mains failure.

3 The operation of the system shall be such that on loss of one or all phases of the main electricity supply, a set of central batteries or individual battery packs shall provide power for 3 hours to illuminate emergency luminaires throughout the building. On restoration of the mains supply the batteries shall be charged by an integral charger such that the system supplies not less than 85 % of its rated voltage after a period of 12 hours.

12.2.2 Central Battery Units

1 Battery chargers:

(a) battery chargers shall be installed in purpose-made metallic enclosures with an index of protection IP 31 in accordance with EN 60529 suitable for wall or floor mounting, depending on size

(b) battery charger enclosures may house the system batteries providing the design of the enclosure ensures safe operation with the batteries specified. This arrangement should normally be restricted to smaller systems e.g. for circuit breaker tripping supplies for power supply to emergency lighting system, central battery units shall be wall or floor mounted as required, conforming to BS 4533 Section 102.22, and be of robust, high quality construction. Enclosures shall be metal, with hinged lockable doors and with suitable ventilation provided

(c) battery charger shall operate from a 415 V, three phase or 240 V, 50 Hz single phase supply, unless otherwise specified

(d) battery charger shall be rated to supply trickle charge and any standing loading plus any additional recharging load that may be imposed

(e) battery charger shall use an uncontrolled bridge as the input stage to minimise harmonic generation on the supply system. The characteristics of each charger shall match the requirements of the specific batteries selected and the duty cycle

(f) battery charger shall be suitable for fully automatic charging of the appropriate battery and shall be provided with:

(i) Mains ‘ON’ lamp

(ii) Main ON/OFF switch

(iii) Charge Ammeter Discharge Ammeter

(iv) Battery voltmeter

(v) Test switch facilities

(vi) Contactor/relays to BS 5266 Part 3

(vii) fault protection

(viii) output current limitation

(ix) lamp indication for appropriate faults e.g. charger fail, low volts etc., with lamp colours in accordance with EN 60073

(x) common fault contact for use with a central alarm system or BMS.

(g) units shall be provided with composite output distribution boards of the sizes and types indicated on the Project Drawings

(h) units shall be installed complete with all necessary fixings, maintenance equipment and instructions.

2 Batteries:

(a) batteries shall be suitable for the discharge duty they will be required to perform. Batteries shall be of the lead acid, sealed re-combination type or Nickel Cadmium depending on the duty requirements and as indicated on the Project Drawings. The contractor shall submit calculation to justify the Ampere-Hour capacity of the batteries for approval to the Engineer.

(b) battery system shall be provided with a suitably rated switch disconnector

(c) Batteries shall be mounted on suitable tiered galvanized steel shelving with moulded plastic trays to contain any leakage from the battery cells and, to allow safe easy access for maintenance

(d) battery terminals shall be coated with the battery manufacturer's approved grease, and shrouded if not enclosed.

12.2.3 Self Contained Emergency Battery Packs

1 Where a central emergency battery unit is not installed, individual emergency luminaries shall consist of individual power packs installed within or remote to the luminaries.

2 Battery pack units shall consist of converter/inverter devices, with nickel-cadmium batteries to provide 3 hours operation under mains failure, unless the main supply is restored prior to this.

3 Luminaries with self contained battery packs shall be connected to the 'live side' of the local lighting circuit and lamps shall operate automatically under mains failure conditions.

4 Units shall have the capability of sustaining high temperature so that they can be accommodated in fittings with high internal temperatures. However, if the internal temperature of the fittings exceeds 50 °C, the battery unit shall be mounted remote to the luminaries. In the case of remote mounting, a purpose made remote mounting box shall be provided.

5 Key operated switches shall be provided, at the locations indicated on the Project Drawings, for all self contained emergency pack unit luminaries, to control the operation of the luminaries manually for testing purposes. Test key switches shall be clearly labelled “Emergency Lighting”.

12.2.4 Luminaries and Lamps

1 Clauses of Part II relating to luminaries and lamps shall also apply to emergency luminaries and lamps.

2 Slave luminaries shall comply with BS 4533 Section 102.22 and BS5225 Part 3 and be as specified.

3 Exit sign luminaries lettering shall be both in Arabic and English. The Arabic text shall be above the English text.

Maximum viewing distance for minimum legend height shall be guided as follows:

H > L/200
H = Height of Legend
L = Distance of viewer from the sign

4 Self contained emergency luminaries shall have a red light emitting diode installed on the luminaries so that the red light is visible.

5 With the central battery unit system, emergency luminaries shall be installed with an engraved label fixed to the outer case of the luminaries, so that it is readily identified. The label shall detail the lamp wattage and rated voltage.

6 Generally, marking of emergency luminaries shall comply with BS5266 Part 1.

7 The following illumination level shall be considered for designing the number of luminaries for emergency lighting: (refer to BS 5266, Part 1)

Space to Height Ratio for luminaries shall be 4:1

5 lux for vital positions:	first aid and safety equipment exit doors fire alarm call points fire fighting equipment exit and safety signs changes of direction corridor intersection adjacent areas of final exit points
1 lux for normal working spaces:	on the centreline of escape route toilets lift cars and moving ways plant rooms covered car parks

8 Fluorescent lamps shall be provided for both slave and self contained type luminaire installations. The lamp wattage ratings shall be chosen from the following table:

Slave : 4 watts or 8 watts
Self contained : 8 watts, 18 watts, 36 watts or 58 watts

Total quantity of luminaries shall be calculated based on the illumination level requirement as per item 7 above, the type of luminaries and lamp lumens.

12.2.5 Obstruction / Beacon lights

1 This regulation is mandatory by International Civil Aviation Organization (ICAO).

2 Where a building height is 45m or more, then the contractor shall install permanent obstruction lights as required by ICAO.

3 The contractor shall obtain local navigation authorities requirements and approval for this type of installation..

12.3 INSTALLATION

12.3.1 Wiring

1 Where the emergency lighting system installation is via a central battery unit, the wiring to emergency luminaries shall be carried out in MICC, PVC sheathed cables, unless specified otherwise.

2 Where the emergency lighting scheme is self-contained emergency packs, the wiring system shall either be in MICC Cables as above or in PVC insulated single core wires in conduits.

3 Generally, cables shall be 2.5 mm^2 cross-sectional area unless specified otherwise.

4 The Contractor shall pay careful attention to cable routings so as to keep cable runs to the shortest possible length and ensure the overall volt drop on any circuit is within the tolerances of the luminaries connected and within the limits specified in the QGEWC regulations.

12.3.2 Installation of Batteries

1 The manufacturer's recommendation/instructions shall always be followed.

2 Insulated tools shall be used.

3 Personnel erecting battery banks shall remove metallic objects from their person i.e. watches, rings etc.

4 Eye and hand protection shall be provided.

5 Batteries shall not be left on site for prolonged periods without being trickle charged to maintain their condition i.e. if delivery is some weeks before commissioning of the charger.

6 Due care shall be observed when handling acidic substances.

12.3.3 Luminaries and Lamps

1 Luminaries and lamp installation shall comply with the requirements stipulated in Part 11 for general light fittings.

END OF PART