



# CHAPTER 5

## 5.1 INSTALLATION

<b>5.1.1</b>	
<p>The installation, control and distribution of wiring of electrical equipment in buildings shall be in accordance with BS 7671, Requirements for Electrical Installation.</p>	
<b>EXPLANATIONS &amp; ILLUSTRATIONS</b>	
<p><i>No illustration.</i></p> <p><i>Electrical Power Supplies</i></p> <p><i>Buildings under Purpose Group 1 are not required to provide primary and secondary source of power supplies, except in the case of electrical passenger lift installed within the dwelling building.</i></p>	



# CHAPTER 5

## 5.2 PRIMARY AND SECONDARY SUPPLIES

### 5.2.1 Primary and secondary supplies

Where any of the following installations is required by this Code or other Codes/Regulations, its primary and secondary source of power supplies shall comply with the corresponding Code of Practice stated therein:

- (a) Where electrical passenger or goods lift is required, its electrical installations, inclusive of battery and other form of secondary power supply, shall comply with BS EN 81-20 Safety rules for the construction and installation of lifts. Lifts for the transport of persons and goods. Passenger and goods passenger lifts. Where the provision of fire lift is required by this Code, installation of the primary and secondary supplies shall also comply with the above mentioned Code of Practice.

### EXPLANATIONS & ILLUSTRATIONS

*No illustration.*

#### *Electrical passenger lifts*

*Electrical installations, inclusive of battery and other forms of secondary power supply shall comply with BS EN 81-20 Code of Practice for Installation, Operation & Maintenance of Electric Passenger and Goods Lift. However, for building under Purpose Group I, emergency supply is not required. The power supply to the lift shall be from a sub-main circuit so that whenever there is power failure to the house, the electrical supply to the lift is still available.*

*For lifts which are not powered by emergency generator, an Automatic Rescue Device (ARD) should be incorporated in the lift system to bring the lifts to the nearest lift landing and open its door upon power failure from the sub-main circuit. Installation of hydraulic lifts is acceptable, provided there is safety feature to bring the lift to the lowest floor, except basement upon power failure.*

*BS EN 81-20 does not specifically require the installation of generator set to provide secondary power supply to the above lifts. If emergency generator is not available, power supply to passenger lift and fire lift shall be provided via a sub-main circuit to enhance reliability.*

*For buildings exceeding the 60m habitable height and mixed developments under Cl. 6.6.2(b) and the provision of private lifts under Cl. 3.8.8(h), emergency power supply from a generating plant shall be provided to home the lift to the designated floor when there is a power failure in the building.*

*Where electrical fire alarm system is required, its primary power supply as well as type and capacity of battery shall comply with BS 5839-1 Code of Practice for the Installation and Servicing of Electrical Fire Alarm Systems.*

**EXPLANATIONS & ILLUSTRATIONS****5.2.1**

*Atrium smoke control system is required if any building under Purpose Group VI and VIII is designed to incorporate an atrium under cl.7.5 of Chapter 7. Large basement occupancy other than car park usage shall be provided with engineered smoke control system, if the gross floor area exceeds 2000m<sup>2</sup> under Cl.7.4 of Chapter 7. All smoke control systems shall be connected to secondary power supply.*

*Lifts that are commonly found in buildings under Purpose Group VI and VIII are electrical passenger lifts, fire lifts and good lifts.*

*Although the current BS EN 81-20 does not specifically require the installation of generator set to provide secondary power supply to the above lifts, however in the case of multi-storey industrial buildings under Cl. 6.6.2(b), generator set is required to be provided to operate the lifts during emergency.*

*Where emergency generator is provided, the lifts would be designed to home to the designated floor under generator power upon loss of normal power supply.*



(b) Where electrical fire alarm system is required, its primary power supply as well as type and capacity of battery shall comply with BS 5839, fire detection and fire alarm system for buildings.

**EXPLANATIONS & ILLUSTRATIONS**

**5.2.1**

- (i) *Fire alarm panel - For buildings which are provided with automatic fire alarm system, the fire alarm panel should be located near the main entrance of the building.*
- (ii) *Alarm Sounding - The fire alarm sounder shall have a sound that is readily distinguishable from any other alarm system. However, permission may be obtained for having a common sounding for fire alarm and burglar alarm in residential houses only.*
- (iii) *Connection to monitoring station - It is not a requirement to connect the automatic fire alarm system to monitoring station for residential houses.*

*Provision of electrical fire alarm system is not required in buildings under purpose group II, except those located over commercial development or car park. The electrical fire alarm system shall be provided with emergency battery supply to the requirement of BS 5839.*



(c) Where exit or emergency lighting system is required, its electrical wiring, type and capacity of battery or other form of secondary power supply shall comply with BS 5266, Code of Practice for Emergency Lighting of premises.

**EXPLANATIONS & ILLUSTRATIONS**

**5.2.1**

*No illustration.*

*The provision of exit or emergency lighting system would be required for non-residential areas, such as basement car park in cluster housing development.*

*Emergency lighting in exit staircases and escape routes outside the residential units would need to be provided with either self-contained battery or connected to secondary power supply.*



(d) Where an emergency voice communication system is required, its electrical wiring shall be fire rated or otherwise fire protected in accordance with BS 5839, Code of Practice for the design, installation, commissioning and maintaining of emergency voice communication system. Appropriate type and capacity of secondary source of supply shall also be provided accordingly.

**EXPLANATIONS & ILLUSTRATIONS**

**5.2.1**

*No illustration.*

*The current Fire Code requires emergency voice communication system to be provided in buildings under Cl. 8.2.1(a) (i) Purpose group III to VIII*

*The type and extent of the emergency voice communication shall be in accordance with cl.8.2 of current Fire Code. Technical requirements such as fire rated cables, routing and emergency power supply shall comply with BS 5839.*



(e) Where a wet rising main system is required, the relevant electrical supply shall be installed in accordance with BS 9990 and BS 5306. A secondary source of power supply with capacity stipulated in BS 9990 shall be provided for the wet rising main pumps.

**EXPLANATIONS & ILLUSTRATIONS**

**5.2.1**

*No illustration.*

*Where a building under purpose group II exceeds 30m in habitable height, wet rising main system shall be provided. The wet riser pumps including any transfer pumps shall require connection to secondary power supply. If emergency generator is available, the electrical pumps shall be connected to emergency generator supply. In the absence of emergency generator set, the duplicate wet riser pump or transfer pump shall be diesel engine driven and shall start automatically upon demand of water supply. This is to ensure that the wet riser main system would remain operational during failure of normal power supply.*



(f) Installation of electrical supply for sprinkler system shall comply with BS EN 12845 Fixed Fighting system for Automatic Sprinkler Systems. Capacity of secondary source of supply, where required, shall satisfy the operation requirements under the respective hazard category.

**EXPLANATIONS & ILLUSTRATIONS**

**5.2.1**

*No illustration.*

*Buildings under purpose group II are usually not provided with sprinkler system, except those with basement car parking facilities. See Cl.6.4.1 (d)*

*Buildings under purpose group III to VIII exceeding 24m in habitable height, larger than the permitted compartmentation size and containing the respective hazard category (high risk) shall be provided with automatic fire sprinkler system complying with BS EN 12845.*

*The sprinkler pump including any transfer pumps shall be connected to secondary power supply. If electrical generator set is available, the electrical pumps shall be connected to this source of supply. In the absence of electrical generator set, the duplicate sprinkler pump or transfer pump shall be diesel engine -driven and shall start automatically when there is demand on the sprinkler system to supply water. This is to ensure that the sprinkler system would remain operational during failure of normal power supply.*





(g) Secondary source of supply

Mechanical ventilation where required for the following rooms or spaces shall be provided with secondary source of supply:

- (i) exit staircases and exit passageways;
- (ii) smoke-stop and fire fighting lobbies;
- (iii) areas of refuge within the same building
- (iv) basement carparks;
- (v) fire command centres;
- (vi) flammable liquid/gas storage rooms;
- (vii) emergency power generator room, and engine driven fire pump room
- (viii) carpark smoke purging system;
- (ix) powered smoke control systems;
- (x) any other fire precautionary measure

**EXPLANATIONS & ILLUSTRATIONS**

**5.2.1**

*Standby source of power supply may be in the form of emergency generator or uninterruptable power supply. This is to ensure that the mechanical ventilation system provided to these rooms or spaces would not be affected during power failure.*



- (h) Where mechanical ventilation is installed to provide air for the operation of the following equipment, secondary source of supply shall be provided:
  - (i) emergency generator;
  - (ii) Engine driven fire pump.

**EXPLANATIONS & ILLUSTRATIONS**

**5.2.1**

*No illustration.*

*If the emergency generator or engine driven fire pump rooms are provided with mechanical ventilation, the mechanical ventilation system should continue to function under secondary source of power supply.*



(i) Cable installation

Power supply cables for equipment that is required to operate during a fire emergency shall be of fire resistant type. The fire resistant cables shall comply with BS 6387.

**EXPLANATIONS & ILLUSTRATIONS**

**5.2.1**

*No illustration.*



- (j) All motors and their control equipment as well as the associated wiring and accessories shall be suitable for their particular application and for the environment they are exposed to:
- (i) High Rupturing Capacity Fuses (HRC) or Moulded Case Circuit Breakers (MCCB) with magnetic release shall be installed and capable of protecting the cable connections to the motor, and carrying the stalled current of the motor for a period of not less than 75% of the period which such a current would cause the motor windings to fail;
- (ii) Any no-volt release mechanism shall be of the automatic resetting type such that on restoration of supply the motor can start automatically;
- (iii) Thermal overload trips shall not be permitted;
- (iv) Magnetic (short circuit) trips are permitted for use in motor circuits of mechanical ventilation systems serving essential services.

**EXPLANATIONS & ILLUSTRATIONS**

**5.2.1**

*No illustration.*



# CHAPTER 5

## 5.2 PRIMARY AND SECONDARY SUPPLIES

<b>5.2.2</b>	
<p>The following systems shall be provided with secondary source of supply:</p> <ul style="list-style-type: none"><li>(a) Atrium smoke control system, including associated AHUs forming part of the system;</li><li>(b) All smoke control systems where required by this Code.</li></ul>	
<b>EXPLANATIONS &amp; ILLUSTRATIONS</b>	
<p><i>No illustration.</i></p> <p><i>Buildings under purpose group II are usually not provided with atrium. Basement occupancy other than car park usage shall be provided with engineered smoke control system, if the gross floor area exceeds 2000m<sup>2</sup>. All smoke control system shall be connected to secondary power supply.</i></p>	



# CHAPTER 5

## 5.2 PRIMARY AND SECONDARY SUPPLIES

<b>5.2.3 Emergency generator</b>	
<p>Where emergency generators are provided as a secondary source of supply, they shall comply with BS ISO 8528 Reciprocating internal combustion engine driven alternating current generating sets.</p>	
<b>EXPLANATIONS &amp; ILLUSTRATIONS</b>	
<p><i>No illustration.</i></p> <p><i>Emergency generator shall start automatically upon power supply failure and shall be sufficiently sized to supply power to fire safety systems such as essential fans, fire pumps &amp; lift system for a required period of time.</i></p>	