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6.1 Workmanship & Material

- 6.1.1 Good workmanship and proper materials of internationally acceptable standards shall be used in all electrical installation.
- 6.1.2 All material/equipment shall be so constructed, installed, protected and shall be capable of being maintained, inspected and tested, so as to prevent danger so far as reasonably practicable.
- 6.1.3 All installations shall be suitable for the maximum power demanded by the current-using equipment when it is functioning in its intended manner.
- 6.1.4 The Power Factor of electrical loads shall be controlled such that the Power Factor, when the load is in operation, shall remain between 0.9 and 1.0 (lagging).

6.2 Electrical Conductors

- 6.2.1 All conductors shall be of sufficient size and current carrying capacity for the purposes for which they are intended.
- 6.2.2 All conductors shall either-



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- 6.2.2.1 Be so insulated, and where necessary, further effectively protected, or,
- 6.2.2.2 Be so placed and safeguarded as to prevent danger so far as reasonably practicable.
- 6.2.3 Every electrical joint and connection shall be of proper construction as regards conductance, insulation, mechanical strength and protection.

6.3 Overcurrent Protective Devices

- 6.3.1 Where necessary to prevent danger, every installation and every circuit thereof shall be protected against over current.
- 6.3.2 The above protection shall be effected by devices which:
 - 6.3.2.1 Will operate automatically at values of current which are suitably related to the safe current ratings of the circuit.
 - 6.3.2.2 Are of adequate current breaking/making capacity, and,
 - 6.3.2.3 Are suitably located and are constructed so as to prevent danger from overheating, arcing or the scattering of hot particles when they come into operation and to permit ready restoration of the supply without danger.

6.4 Precautions against Earth Leakage and Earthfault Currents

- 6.4.1 Where metal works of electrical equipment, other than current carrying conductors, may become charged with electricity in such a manner as to cause danger if the installation of a conductor should become defective or if a fault should occur in any equipment:
 - 6.4.1.1 The metal work shall be earthed in such a manner as will cause discharge of electrical energy without danger, or
 - 6.4.1.2 Other equally effective precautions shall be taken to prevent danger.
- 6.4.2 Every circuit shall be arranged so as to prevent the persistence of dangerous earth leakage currents by:
 - 6.4.2.1 The over current protective devices mentioned at Sec.6.3 above, and,
 - 6.4.2.2 A residual current device or equally effective device.
- 6.4.3 Where necessary to prevent danger, where metal work of electrical equipment is earthed for compliance with section 4.4.1 above, and is simultaneously accessible with exposed metal parts of other services, the latter parts shall be effectively connected to the main earthing terminal of the installation.

6.5 Position of Protective Devices, Switches and Electrical Equipments



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- 6.5.1 No fuse or circuit breaker other than a linked circuit breaker, shall be inserted in an earthed neutral conductor and any linked circuit breaker so inserted shall be arranged to break also all the related phase conductors.
- 6.5.2 Every single-pole switch shall be inserted in the phase conductor only and any switch connected in an earthed neutral conductor shall be a linked switch which shall also break the related phase conductors.
- 6.5.3 Effective means of isolation and switching, suitably placed for ready operation, shall be provided so that all voltage may be cut off from the installation, circuit or equipment served by such devices, as may be necessary to prevent or remove danger.
- 6.5.4 For every electric motor an efficient means of disconnection shall be provided which shall be readily accessible, easily operated and so placed as to prevent danger.
- 6.5.5 Every piece of equipment which requires operation or attention by a person in normal use shall be so installed that adequate and safe means of access and working space are afforded for such operation or attention.

6.6 Precautions in Adverse Conditions

- 6.6.1 All equipment likely to be exposed to weather, corrosive atmosphere, or other adverse conditions, shall be so constructed or otherwise protected that danger arising from such exposure is prevented.
- 6.6.2 All equipment situated in surroundings susceptible to risk of fire or explosion precautionary measures shall be taken, as may be necessary to prevent danger.

6.7 Nature of Supply

- 6.7.1 Following aspects of electrical power supply source shall be considered while designing electrical systems:
 - 6.7.1.1 Nominal voltage
 - 6.7.1.2 Nature of current and frequency
 - 6.7.1.3 Prospective short circuit current at the origin of the installation
 - 6.7.1.4 Type and rating of over current protective device acting at origin of the installation
 - 6.7.1.5 Suitability of the source to meet requirements of installation including the maximum demand
 - 6.7.1.6 The earth loop impedance of that part of the system external to the installation



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6.7.2. Supplies for Safety and Standby Purposes: Where a supply for safety purposes or standby purposes is specified, such supplies shall have adequate capacity, reliability and rating and appropriate changeover time for the operation specified.

6.8 Installation Circuit Arrangements

6.8.1. Every installation shall be divided into circuits as necessary to

6.8.1.1 Avoid danger and minimize inconvenience in the event of a fault

6.8.1.2 Facilitate safe operation, inspection, testing and maintenance

6.8.2 Separate circuits shall be provided for parts of installation, which need to be controlled, in such a way that these circuits are not affected by failure of other circuits.

6.8.3 The number of final circuits required and the number of points served by each circuit shall be such as to comply with the requirements for suitable over current protection, isolation, switching and the current carrying capacities of the conductors.

6.9 Additions and Alterations to an Installation

No additions or alterations, temporary or permanent, shall be made to an existing installation, unless it has been ascertained that the ratings and the condition of any existing equipment which shall have to carry an additional load is adequate for the altered circumstances and that the earthing arrangements are also adequate.

6.10 Filtration Device

Adequate Filtering/Smothering devices shall be introduced between incoming main supply and such electrical devices like Arc Furnaces etc, which are likely to transmit harmful harmonic radiations, voltage spikes, or such other disturbances, back to the transmission/ distribution network.

6.11 P.F Correction

All capacitive devices like P.F. correction equipments etc. shall have arrangement for safe conducting the charges to the earth upon disconnection of incoming power supply. Enclosures containing such devices shall have a caution notice displayed prominently on the front panel stating that the inner circuits could be alive even when the main incoming supply is switched off.



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6.12 Inspection and Testing

On completion of an installation or an extension or alteration of an installation, appropriate tests and inspection shall be made to verify, so far as reasonably practicable, that the requirements of Regulations 6.1 to 6.11 have been met.

6.13 Electrical Equipment/Installations

- 4.13.1 All Equipment/machinery and installations in industrial premises shall be approved by Trakhees prior to operations. It remains the responsibility of the lessee/licensee to ensure that all such installations are safe with all relevant approvals/certifications from DEWA prior to Trakhees approvals.
- 4.13.2 Defective electric cables, apparatus, motors, fans, welding gears etc. must be rectified before work commences.
- 4.13.3 It is forbidden to replace burnt-out fuses with fuses which have a higher rating than the specified rating.
- 4.13.4 Electric inspection lamps are to be fitted with protective glass and a protective mesh. More powerful bulbs than those for which the inspection lamps are designed may not be used.
- 4.13.5 Electric inspection lamps, floodlights, etc. are to be hung up.
- 4.13.6 Electric heaters, motors, fans, transformers, welding apparatus etc. must not be covered, but are to be protected so that they are not subjected to moisture, water, oil or steam.
- 4.13.7 During break in the work and also when work is finished for the day, lighting, electric motors, inspection lamps and welding apparatus are to be switched off.
- 4.13.8 Isolation and, where necessary, earthing at appropriate place to be done before undertaking any repair/maintenance work on electrical installations.
- 4.13.9 Use of Generators in FZ Pre-built Unit Areas is not advised. Use of Generators in other areas shall need to be approved on a case-to-case basis by Trakhees.