

		<p>3. Short circuit withstand capability This will depend on the feeder type. For a fuse protected circuit, cable should be sized to withstand the letout energy of the fuse. For breaker controlled feeder, cable shall be capable of withstanding the system fault current level for total breaker tripping time inclusive of relay pickup time.</p> <p>4. Derating factors for various conditions of installations including the “Variation in ambient temperature for cables laid in air, Grouping of cables, Variation in ground temperature and soil resistivity for buried cables”.</p> <p>5. Power cable size for motors should be minimized and if required double run cable can be used for motors of higher rating.</p> <p>6. Above ground cable joints shall not be installed in hazardous area.</p> <p>7. Selection and sizing of cables for hazardous area as per relevant IS/IEC standards.</p>																						
15	Earthing & Lightning Protection	<table border="1"> <thead> <tr> <th>Equipment</th><th>Earth conductor above ground level and in-built trenches</th></tr> </thead> <tbody> <tr> <td>Main earth grid</td><td>40 mm dia MS rod</td></tr> <tr> <td>415V MCC/Distribution Boards / Transformer/LT Motors above 125kW</td><td>50x6mm GS flat</td></tr> <tr> <td>LT Motors 25 kW to 125 kW</td><td>25 x 6mm GS flat</td></tr> <tr> <td>LT Motors 1KW to 25 kW</td><td>25 x 3mm GS flat</td></tr> <tr> <td>Fractional horsepower motor</td><td>8 SWG GS wire</td></tr> <tr> <td>Control panel & control desk</td><td>25 x 3 mm GS flat</td></tr> <tr> <td>Push button station / JB</td><td>8 SWG GI wire</td></tr> <tr> <td>Columns, structures, cable trays</td><td>50 x 6mm GS flat</td></tr> <tr> <td>33kV/11kV/6.6kV/3.3 kV/ switchgear equipment and 415V switchgear</td><td>65 x 8mm GS flat</td></tr> <tr> <td></td><td> <p>1. Earthing design shall be carried out in accordance with the requirements of CEA regulation 2010 and code of practice for earthing IS: 3043.</p> <p>2. The earthing system for plant shall be designed for a life expectancy of at least forty (40) years, for a system fault current of 50 kA for 1.0 sec. The minimum rate of corrosion of steel for selection of earthing conductor shall be 0.12mm per year.</p> <p>3. Earthing system network/earthmat shall be interconnected mesh of mild steel rods buried in ground in the plant.</p> <p>4. The material of the earthing conductors shall be Galvanized steel for Conductors above ground level and in built up trenches.</p> </td></tr> </tbody> </table>	Equipment	Earth conductor above ground level and in-built trenches	Main earth grid	40 mm dia MS rod	415V MCC/Distribution Boards / Transformer/LT Motors above 125kW	50x6mm GS flat	LT Motors 25 kW to 125 kW	25 x 6mm GS flat	LT Motors 1KW to 25 kW	25 x 3mm GS flat	Fractional horsepower motor	8 SWG GS wire	Control panel & control desk	25 x 3 mm GS flat	Push button station / JB	8 SWG GI wire	Columns, structures, cable trays	50 x 6mm GS flat	33kV/11kV/6.6kV/3.3 kV/ switchgear equipment and 415V switchgear	65 x 8mm GS flat		<p>1. Earthing design shall be carried out in accordance with the requirements of CEA regulation 2010 and code of practice for earthing IS: 3043.</p> <p>2. The earthing system for plant shall be designed for a life expectancy of at least forty (40) years, for a system fault current of 50 kA for 1.0 sec. The minimum rate of corrosion of steel for selection of earthing conductor shall be 0.12mm per year.</p> <p>3. Earthing system network/earthmat shall be interconnected mesh of mild steel rods buried in ground in the plant.</p> <p>4. The material of the earthing conductors shall be Galvanized steel for Conductors above ground level and in built up trenches.</p>
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	<p>5. The material of the earthing conductors shall be Mild steel for Conductors buried in earth.</p> <p>6. The material of the earthing conductors shall be Mild steel rod (40mm Dia) for earth electrodes.</p> <p>7. Grounding and lightning protection for the entire plant areas and buildings covered in the specification shall be provided in accordance with IS 3043, IS 2309, IEEE 80, IEEE 665, and IEC: 62305.</p> <p>8. All electrical equipment and HT and LT switchgear panel shall be earthed to suitable size GI strip through suitably sized finned copper braiding/copper flexible cable suitably lugged on either end.</p> <p>9. Neutral points of HT transformer shall be earthed through NG resistors. The Contractor shall connect the NGR earthing point to earth electrodes by suitable earth conductors.</p> <p>10. The metallic enclosure of all equipment shall be bonded and earthed to the common earthing grid.</p> <p>11. In hazardous area or where the equipment contains hazardous liquid, the metallic enclosure of non-electrical equipment vessels, tanks, structures, pipelines etc., shall be bonded and earthed to common plant earthing grid.</p> <p>12. Earthing system network / earthmat shall be interconnected mesh of mild steel rods buried in ground in the plant and it should be interconnected by min. 40dia ms rod with existing NTPC below ground earthmat at min. two location.</p> <p>13. Connections between earth leads and equipment shall normally be of bolted type. Contact surfaces shall be thoroughly cleaned before connections. Equipment bolted connections after being tested and checked shall be painted with anti-corrosive paint/compound.</p> <p>14. Lightning design shall be carried out in accordance with the requirements of CEA regulation 2010 and code of practice for lightning IEC 62305.</p> <p>15. Lightning system shall comprise of air terminations, down conductors, test links, earth electrode etc. as per approved drawings.</p> <p>16. All joints in the down conductors shall be welded type.</p> <p>17. Lightning protection system down conductors shall not be connected to other earthing conductors above the ground level.</p> <p>18. Down conductors shall be cleated on outer side of building wall, at 750 mm interval or welded to outside building columns at 1000 mm interval.</p> <p>19. Lightning conductor on roof shall not be directly cleated on surface of roof. Supporting blocks of PCC/insulating compound shall be used for conductor fixing at an interval of 1500 mm.</p>
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