- Adequate quantity of the BFC should be filled at the time of earthing which should remain moist for the rest of life & maintains the good ohmic values of earth resistance.
- Any additional quantity of BFC required beyond the quantity mentioned in the SOQ, it shall have to be supplied in the quoted rates. Back filling Compound: one Bag of 25 Kg.
- Ground improving material (BFC) shall have constant ohmic value having resistivity of **0.12 ohms** per meter , sulphur content less than 2 percent and corrosion test with pH of not less than 8 as per requirements of **IEC 62561 part 7**.
- Suitable brick/cement concrete enclosure along with M.S./C.I. cover shall be provided for each earth electrode with proper dressing of surrounding area.
- All the grounding connections shall be in accordance with the relevant IS codes.

**Additional Precautions to be followed during the installation of earth electrode :-**

- Handle carefully and do not plunge an electrode.
- Do not apply any extraordinary force/pressure during installation.
- Do not try to disassemble, repair or otherwise tamper with an Earthing Electrode.
- Do not strike it with hammer or other object and never step on it.

**TESTING OF CHEMICAL/ADVANCED TYPE EARTH ELECTRODE**

- The earth electrode should be tested at **CPRI/ERDA** or NABL APPROVED TEST LABORATORY with prior permission of E.I.C.
- The corrosion test (in accordance with pH value) of the BFC shall be as per IS 2720 (P-26) 1987 Re.2002.
- The first testing of ohmic values for preliminary result will be carried out on the day of installation and the final results are taken after the seven days of installation.
- The final test period of one week is necessary to allow curing time for the chemical to mix with soil conditions.
- The results shall be obtained by Earth résistance measuring meters which are basically version of **Wheatstone bridge method used for measuring the Unknown values of resistances.**
- The earth resistance may also be directly measured an crosschecked with latest clip on type Earth Resistance Meter (MECO/other reputed make duly calibrated as on date).
- The Values obtained should be well within the limit given as per **IS: 3043-1987.** In practical sense the values obtained shall be between 0.5 to 1.5 ohms depending upon the soil conditions (Resistivity of Soil) of the location.
- The test certificate shall be provided by the manufactures certifying the values obtained. The fault current test report from CPRI/ERDA or NABL approved test laboratory with prior approval of E.I.C shall have to be submitted for the lot of earth electrodes used at site.

b. The earthing electrode can be connected after satisfactory preliminary test report and safety of the equipment can be ensured.

| LIST OF APPROVED MAKE | | |
|---|---|---|
| **SR. NO.** | **ITEMS** | **APPROVED MAKE** |
| 1 | Advanced type/Chemical Earthing/Gel earthing Electrode | CPRI/ERDA approved<br>(Make shall be decided by the Engineer-In-Charge) |
| 2 | Back Fill Compound | As per the recommendations of the OEM of Earth Electrode. |
| 3 | OTHER ITEMS | TO BE GOT APPROVED BY E-I-C. |

Note: If the approved makes are mentioned in B.O.Q, same has to be supplied.

## SPECIFICATIONS FOR LED LIGHT FIXTURE

| Sr. No. | Description | Remarks | |
|---|---|---|---|
| 1 | Efficiency of LED light fitting (efficacy) | Minimum 95 Lumens / Watt | |
| 2 | Losses of LED Light fitting | 10% LOR (Light Output Ratio) | |
| 3 | Total power consumption of fitting | Not more than 110% of rated capacity | |

| | | | |
|---|---|---|---|
| 4 | Life of control driver of LED light fitting | Min. 2/3rd of LED Life | |
| 5 | Approved make of LED | Nichia/Cree/Osram/Phillips (Lumilade)/Sharp/CITIZEN. | Note – LED should be from two bin, (5 MacAdams), however LED from single bin, (3 MacAdams) shall be preferred |
| 6 | Operating Temp | -10 deg to +50 deg C | |
| 7 | Operating humidity | 10 to 90 % | |
| 8 | CRI (Colour Rendering index) | Minimum 80 for indoor application and minimum 70 for outdoor application. | |
| 9 | CCT (Colour Temperature) | 5000 to 7000 K. | |
| 10 | THD (Total Harmonic Distortion) | <10% | |
| 11 | Beam angle | 120º | |
| 12 | Lumen Depreciation | Depreciates 30% after life (50000 hrs) | |
| 13 | Power Factor | >0.95 | |
| 14 | Type of Housing | Extruded aluminium / Standard alloy housing for indoor applications.<br>High pressure die cast aluminium / Standard alloy for outdoor applications. | |
| 15 | IP Protection | IP 20 or higher for indoor applications and IP 65 or more for outdoor applications. | |
| 16 | Surge Protection | As per IEC 61643-II Class – 2 or EN 61643 – II Type – 2 | |
| 17 | Output over voltage/ Under voltage | Suitable protection shall be provided. | |
| 18 | Output over current and short current | Auto Recovery | |
| 19 | Input high voltage cut off | Auto Recovery | |
| **20** | **Testing Certificates** | | |
| | IES LM-79-08 | AbsoluteLight output, efficacy, color for LED products | Report to be submitted. |
| | IEM LM-80-08 | Relative Light output over time, temperature for LED packages | Report to be submitted. |
| | IES L70 | Life of LED light fitting minimum 50000 hours | Report to be submitted. |

## TECHNICAL SPECIFICATIONS & MAKES OF SYNTHETIC INSULATING MAT

1 **Composition:**

The insulating mat shall be made from – Vulcanized Rubber /Synthetic Polymer / Elastomer, free from any insertions leading to deterioration of insulating properties.

Upper surface of insulating materials mat shall have small aberration (rough surface without edges to avoid slippery effects). The lower surface should be plain. The mat should be pastable on floor / iron plate wherever required as per site condition.

2 **Dimensions**

Thickness- unless otherwise specified the thickness of the mat shall be of 2.00mm/2.5mm ± 10%
For HT 2.5mm ± 10%
For LT 2.0mm ± 10%

3 **Length and Width-**

Length-Length of the mat should be as per site requirement

Note - Width of the mat should be 1000 mm ± 20 mm but measurement shall be done on the basis of actual requirement as per site condition.

4 **Color**

Color of the mat is Black, Blue or as per direction of E.I.C.

5 **Workmanship and finish**