

SPECIFICATIONS:

1. Specification for excavation of cable trench and method of laying of UG cable.

1. Laying of LT Underground Cables: Excavation of cable trench in all kinds of soils and laying of power cables as per cable route plan, and termination of the cables on poles / MDB / building etc as required. Other specifications are:

2. The work shall be carried out according to the drawings approved by the Railways and the provision of IE Rules and IE Act. The contractor shall be solely responsible for the proper execution of the work as per specification. The cable laying work shall strictly conform to the provision of IS Specification No: 1255, 1983 the "Code of practice for installation and maintenance of power cables up to and including 33 kV".

3. Normally trenches shall be cut to a width of 300 mm and depth of 1000 mm from the ground level reckoned below the parent soil. Otherwise it should be approved by supervisor in charge of Railways according to site condition. General arrangements of cable trench is as detailed in the drawing number: DRM/EL/TPJ/40-2016. Depth of trenches should be as shown in the drawing in all locations and the same should not be changed due to condition of soil. If extreme difficulties are encountered due to prevailing site conditions, approval of the Engineer-in-Charge should be taken before any deviation is proposed.

4. The cables shall be laid at site generally following the cable layout plan. The route by which the cable trench is to be taken shall be surveyed in advance and may be got approved by the Engineer at site before commencement of the work. Any specific difficulties in following route indicated or obstructions met with shall be brought to the notice of the Engineer-in-Charge. The trenches should be excavated as far as practicable in a straight line.

5. Adequate care shall be taken while cutting the trenches in the platform area so that passengers may not fall inadvertently into the trenches dug, either during the day or night. Such portions of the trenches which may affect movement of travelling public / movement of trolleys etc. should be closed on the same day of cutting duly laying of cables / pipes as the case may be. Adequate care shall be taken to ensure that the Platform coping is not damaged due to the cutting of the trenches. It should also be ensured that paver blocks, concrete slabs etc removed for providing of trench should be refit including pointing immediately. Cable trench across tar road includes dismantling of tar road including bituminous top layer of road. When tar road is cut for provision of cable trench the same shall be covered with cement concrete of mix specified in the schedule and consolidated to form smooth surface as that of the existing tar road as per instruction of site Engineer in charge

6. The contractor has to take a "Works Permit" to work in the station area for the movement and working of men. The contractors shall take all precaution to ensure that the life and safety of the men working under them is taken care of. They are solely responsible for accidents if any occurs to the staff working under them. Railway will in no way stand responsible for such accidents.

7. No cable trench shall be cut within 2 metres from the centre line of any main line track. No cutting of trenches near the main line shall be carried out without the presence of the Railways representative. Where long lengths of trenches have to be cut parallel and close proximity to the track the laying of cables should be completed at one stretch at the quickest time possible to avoid any sinkage of track and consequent train accidents. No trenching work shall be carried out in the night hours (18.00 Hours to 6.00 Hrs.) The cut trenches will be inspected by a Railways representative after which only subsequently laying of pipes, laying of cables etc shall be commenced.

8. At intermediate or termination points, spare length of cables shall be coiled and buried in the soil sand cushion shall be laid over which the cables shall be laid and again covered with a sand cushion also at the specified depth. The location where such coils shall have to be laid will be indicated by the Railways representative. The sand cushion should be 150 mm on the bottom and top of the cable coil.

9. Cables and other materials which are proposed to be supplied by Railway will be supplied in the office of the Senior Section Engineer, Electrical, Works, Tiruchchirappalli. Tenderer / Contractor has to collect these materials and take to the site of work with their own transport. The contractor may make his own arrangements for proper storage of the Railway materials, safeguarding and subsequent transportation to site for laying / use etc. Care shall be taken to avoid damage to the Railway materials during transportation, spreading out and subsequent laying operations and fixing / erection. Adequate man power shall be employed by the contractor for this purpose. The UG cable is likely to be damaged due to rough handling, too sharp bending, hanging over pivots etc. The cable should not be allowed to be twisted while spreading and laying.

10. The cable should be inspected before and at the time of spreading out for the insulation strength and look for any mechanical injury to the insulation of the cable etc. so that appropriate caution can be taken before laying of the cable and closing of the trenches No cable which does not pass the acceptance levels of insulation strength shall be laid in the trench.

11. The contractor is solely responsible for damage if anything happens in the process of spreading out the cables and laying cables within the station area. Particular attention would be required in this respect in view of the continuous rail traffic that may take place in the close vicinity. The contractor has to take adequate precaution to ensure that the staff working near the running tracks are adequately warned for the approach of trains. They shall be removed from such areas well before the arrival of the train. They shall not cause any type of detention to the trains or in any way dislocate the train operation. No materials, tools, accessories, cables shall be left over in between, under or in the close vicinity of the track. No open fire or other inflammable materials shall be kept on the track or nearby.

12. If trenching operations are affected by rain, the trenches should not be left open to rain water which may prove to be hazardous for the train movement nearby. Such trenches if further work is likely to be delayed shall be closed. The back filling of the earth should be made fully packed and rammed well so that the filled soil is well consolidated. Cut soils should not be wasted away. They shall be used for back filling only.

13 .In case the LTUG cables drawn through pipes, sand filling and bricks protections are not required. In such locations where pipes are used in trenches for laying of cables, adequate slope shall be maintained for quick draining of water.

14. The station yard, Platform area is likely to have signal and other power cables. Therefore, care shall be exercised to avoid damage to the cables already available below the ground level. Generally cables are laid 900 mm to 1000 mm below the ground level.

15. Where the cable raise above the ground to be fixed against a wall or rail post or other structures, the vertical portion of the cable shall be protected by means of GI pipe of appropriate dia meter. The length of GI pipe shall be such that it shall be 600 mm below the ground level and at least 2000 mm above the ground level. The approximate length of cable leading pipe for such purpose is 3000 mm. The portion of the GI pipe below the ground level shall be covered by a cement concrete of 1:3:6 ratio and finished in an approved manner and yet with provision to avoid stagnation of rain water inside the pipe. The GI pipe encasing the cables shall be secured by suitable clamps fixed at 1000 mm intervals and one at the top. The open end of the pipe shall be covered with bituminous cable compound to prevent entry of rain water.

16. Necessary clamps and cable leading pipes for cable laying etc are generally covered under separate schedule items. If not included in the schedule as separate items, supply and fixing of cable leading pipes are inclusive of clamps of specification mentioned.

17. The cables above 2000 mm from ground level can be taken in open state either over the building walls / trusses of roof columns etc. They shall be clamped at 1000 mm intervals and secured to the structures walls / posts etc. as the case may be by clamps made out of MS flats of sizes for securing the UG cables to avoid damage to the cables.

18. The cable leads brought out at the cable end boxes should be provided with aluminium lugs / sockets and brass cable glands adopting crimping methods and finished as suitable for termination on to the switches cut out etc. as the case may be.

19. The route of the trenches excavated will be taken as the linearly at the centre line of the trench. In the case of trenches excavated for the purpose of laying spare length of cables, the same method shall be adopted for the purpose of measurements.

20. Cable route indicators shall be embedded in the trench before refilling at intervals of 15 metres in straight run and at every turning and as per the instructions of the Engineer-in-Charge. The cable route indicator shall be as per drawing number CEE/CN/MS/11-2004.

2.0. Specification for wiring – General.

The following additional specifications are applicable for this contract. These are in the nature of additional requirements over and above the specifications for electric wiring.

a). Wiring shall be carried out with single core, PVC insulated copper conductor through PVC pipes already provided. The cables proposed to be used are of flexible type of appropriate voltage class and other specifications as indicated in the specifications. Approved makes of cables only should be used. Cables proposed to be used shall be tendered for inspection and only on acceptance the same may be used.

b). The attention of the tenderer is invited with regard to spurious makes of cables sold in the market. If at any time the cables used were found to be spurious the work has to be redone by the contractor at his own cost duly removing the wiring carried out with spurious materials.

c). All materials, fittings, appliances shall conform to relevant IS Specification wherever available. In case of materials for which no IS Specification exists the material shall be got approved by the Divisional Electrical Engineering / General / Tiruchchirappalli prior to their use.

d). SYSTEM OF WIRING

d.1 The system of wiring shall be that separate phase, neutral and earth wires shall be taken for each circuit from the main control board / distribution fuse board, similarly from the control board to each and every light point / fan point, separate phase, neutral and earth wires shall be taken.

d.2 Where more than one control board is to be connected in any one circuit the supply can be taken from one control board to the other by taking separate phase and neutral wires (one earth continuity connections if required) or from the main control board / distribution fuse board through separate phase and neutral wires for each control boards.

d.3 Suitable PVC connectors shall be used for such purpose in the main control boards for termination of phase and neutral wires controlling to light points / fan points and other control boards. No jointing or twisting of wires is permitted either inside the control boards or anywhere also outside.

d.4 The stipulation regarding the minimum size of wires, the number of point, total connected wattage on each circuit should be as per relevant code of practice.

d.5. LAYOUT OF WIRING: Power circuits if any shall be kept separate and distinct from the light and fan circuits. The wiring shall be done in such a way to facilitate easy inspection. The wiring shall be carried out in an approved manner satisfying the relevant IS specification, code of practice available and the additional specifications, applicable for conduit wiring system included.

d.6. No joints shall be permitted in the wiring. If any jointing of cables is found to have been carried out in the PVC pipe wiring subsequently a penalty of Rs.500/- per joint detected will be levied. In addition the contractor has to redo the portion of the wiring found to have been carried out with jointing at his own cost to an acceptable standard.

d.7. No power will be supplied by the Railway for the contractor to carry out his work. The contractor if he desires to have temporary supply for his works, he may apply for the same to the Divisional Electrical Engineer, Tiruchchirappalli. If feasible supply may be made available on terms applicable as for outsiders. The contractor has to bear all the costs.

d.8. Necessary earth continuity connections shall be provided keeping in mind the maintenance requirements, safety etc. In addition to the above earth connection, the contractor is required to have a separate earth pit and earth connection as detailed in the schedule of work.

d.9. On completion of the wiring work, necessary tests will be conducted to certify the correctness of the work carried out by the contractor which shall cover broadly the following:

- i) Insulation strength from conductor to earth.
- ii) Earth resistance of earth pits and effectiveness of the earthing provided.

d.10. The tenderer should furnish makes / manufacturer's names for materials proposed to be supplied by him and get the same approved by Engineer-in-Charge before the same are employed for the physical execution of work. All other materials for which no specific brands are available in the market and fabricated items should be got prior approval by the competent authority before execution.

SPEC/ELEC/TPJ - Specification for FR PVC wiring cables.

Description : Single core flexible FR PVC insulated, unsheathed multi stranded copper wiring cables for working voltage up to & including 1100V AC conforming to IS:694, 2010.

Conductor: Bright annealed bare electrolytic copper multi stranded (not more than 0.30 mm dia) Conductor as per IS: 8130, 2003 / IEC 228.

Insulation : Dielectric grade PVC compound conforming to IS 5831, 1984 with additional fire retardant properties (FR) for working voltage up to 1100V with ISI mark.

3.0. Specification for earthing arrangement.

This includes excavation of earth pit of 0.40 m X 0.40 m size and of 3.0 m depth including supply and erection of 'C' class GI pipe of 50 mm nominal bore dia. of 3.0 m long, provided with one number of MS flat of 50 mm wide and 10 mm thick and 60 mm long, welded to the earth pipe for earth connection. This includes necessary fabrication including drilling of holes of sizes on the earth pipe. Use 10 kgs of salt and 20 kgs of charcoal for every earthing arrangement. On the top of the earth pit shall be provided with RCC earth box with RCC top cover of sizes shown in the drawing. Use MS rods of 6 mm dia, both longitudinally & laterally, interspaced not more than 100 mm apart for earth box and top cover. The top cover shall also be provided with one lifting hook made out of MS rod of 6 mm dia. for inspection purpose. The earth pit shall be painted with two coats of black anti corrosive paints and details of earth values, both individual & combined, including date of measurement should be written on the earth top cover of earth box. The earthing arrangement shall conform to IS. 3043, 2018. Refer drawing No: EL/P/Type/1022 for further details.

SPECIFICATION – General:

NOTE-1. Test & Guarantee Certificates: Tenderer / contractor shall submit Manufacturer's Test and Guarantee Certificates along with materials asked for by the Engineer-in-Charge.

NOTE:-2. All switches should conform to AC 23A duty cycle, unless stated otherwise, and conform to ISS. No: 13947, 2004 and the breaking capacity of HRC fuse links should be 80 kA. All MCBs should be of 10 kA short circuit breaking capacity type and of "C" series, unless stated otherwise, conforming to IS / IEC. 60898-1 2015.

NOTE:-3. All switches / control boxes shall be fixed by concealed / open wiring method to suit the site requirement with required accessories including plastering etc as detailed in the schedule description. For mounting by open method, an angle iron frame work made out of MS angle of suitable size made out of 25mmX25mmX3mm size shall be used, if not specifically mentioned in the specification, painted with two coats in each of primer zinc chromate and aluminium or grey enamel paints shall be used. Use only GI bolts and nuts for fixing, even if not mentioned in the schedule.

NOTE:-4. GI and MS pipes shall conform to IS.1239:part 1(2004) and shall be either one of HFW or ERW or HFIW types.

NOTE:-5: Any removal / dismantlement of existing installation should be done with the consent of the Engineer-in-Charge. All such released materials should be immediately handed to the stores depot of the Engineer-in-Charge or as instructed by him.

NOTE:-6: "Danger – 440 V" or "Danger – 230V" stickers shall be affixed on Panel boards, MCB type SDBs, switches, looping boxes, metering bunks and in all important locations as instructed by the Engineer-in-Charge.

NOTE:-7. All materials to be used for the work should conform to relevant IS specification.

JE/DRG/TPJ

SSE/E/W/HQ/TPJ

ADEE/G/TPJ

DEE/G/TPJ