

## **SOUTHERN RAILWAY**

### **SPECIFICATION/SPECIAL CONDITIONS FOR WIRING/REWIRING**

1.0 Wiring shall be carried out with single core, PVC insulated cables with Copper conductors. The cables proposed to be used are of the flexible type unless otherwise as specifically indicated in the Schedule of Work of appropriate voltage grade and other specifications as indicated in this specification.

2.0 The attention of the tenderer is invited with regard to spurious makes of cable sold in the market. If at any time the cable used were found to be spurious, the work has to be redone by the contractor at his own cost duly removing the spurious materials.

3.0 All materials, fittings, appliances shall conform to ISS wherever available. In case of materials for which no ISS exists the materials shall be got approved by the Sr. Divisional Electrical Engineer/General/Chennai Division, Southern Railway, Park Town, Chennai - 600 003 prior to use. The makes of those materials proposed to be used shall be indicated in the tender and samples shall be submitted for proper appreciation of the quality of the materials proposed to be used.

#### **4.0. SYSTEM OF WIRING: -**

4.1 The system of wiring shall be that separate phase and neutral wire 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/plug point, separate phase and neutral wires shall be taken.

4.2 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 (and earth continuity connections) or from the main control board/distribution fuse board through separate phase and neutral wires for each control board. Looping of neutral and earth wires are not permitted.

4.3 Suitable porcelain/Bakelite connector shall be used for this purpose in the main control board for termination of phase and neutral wires controlling the light points, fan points and other control boards. No jointing or twisting of wires is permitted either inside the control boards or anywhere else outside.

5.0 **LAYOUT OF THE 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 specifications, code of practice available and the additional specifications, applicable for conduit wiring system included.

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6.0 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 will be levied and deducted. 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.

7.0 No power will be supplied by the Railways for the contractor to carry out his work. If he desires to have temporary supply for his works, he may apply for the same to the Sr. Divisional Electrical Engineer/Chennai Division, Southern Railway, Park Town, Chennai - 600 003 and if feasible, supply may be made available on terms applicable as for outsiders. The contractor has to bear all the costs.

8.0 Necessary earth continuity connection 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. Power supply and the suppliers earth connections on the MDB will be terminated by the Railways as per site feasibility.

9.0 Specification applicable to PVC conduit wiring system: - NOTE: - **WHENEVER THE SCHEDULE SPECIFICALLY CALLS FOR USING PVC CAPPING AND CASING, THE WORD "PVC PIPES" SHALL BE SUBSTITUTED WITH "PVC CAPPING AND CASING" WHEN AND WHERE EVER RELEVANT AND APPLICABLE IN THIS SPECIFICATION. HOWEVER THE SIZES AND SPECIFICATIONS OF SUCH PVC CAPPING AND CASING SHALL BE AS PER THE SCHEDULE. THE PVC CASING AND CAPPING SHALL CONFORM TO THE LATEST REVISION OF THE GOVERNING BIS.**

9.1 Type and size of PVC pipes, all PVC pipes shall be in conformity to IS: 9537 Part 3. No PVC pipes not less than 20 mm dia shall be used in wiring PVC pipes, heavy duty with wall thickness not less than 2.0 mm, suitable for taking electrical cables, electrical wiring smooth inside and outside shall only be used. PVC pipe of appropriate sizes should be used for wiring. Provision should be available for taking additional cables of similar type for future use. The route of the piping should be properly planned to have minimum number of bends, change of direction etc. in addition to achieving neatness of wiring. The number of insulated cables that can be drawn into PVC pipe should be as per Table III of ISS: 732-1963 amended suitably for the size and type of cable proposed to be used. The main consideration is the easiness in putting the cables through at the time of rewiring. PVC pipe shall be joined by means of PVC coupling. In long distance straight runs, inspection type couplers shall be provided at reasonable intervals. **IVORY** coloured conduit shall only be used. The paint/distemper of the wall shall also be applied to the conduit and clamps so that they do not appear conspicuous. All the conduit accessories such as bends, couplings, inspection boxes etc., shall be of the same colour as that of the conduit.

#### 10.0 FIXING CONDUITS FOR CONCEALED WIRING: -

10.1 As far as practicable, the PVC pipes shall be laid on the ceiling direct from the control point to the actual location of point so that minimum number of bends, tees, junction boxes etc. only are provided since junction boxes/Tee bends causes problem at a later date for rewiring.

10.2 The PVC pipes shall be laid over the reinforced and tied on to them by means of GI binding wire. This shall be carried out in such a way to avoid disturbance to the reinforcement work.

10.3 Suitable concealing type PVC junction boxes shall be used for junction boxes etc. so that the exposed surface of the deep boxes is in alignment with the surface of the ceiling.

10.4 Please note that as per the specification mentioned vide para no. 4.1 the wiring shall be with a pair of cable for each point taken from the switch board to the point for phase and neutral. Then the size of PVC conduits shall be appropriately designed for this purpose. **(Please note that "Looping in" system shall not be adopted for this).**

11.0 Recessed PVC conduits wiring system shall comply with all the requirements for surface PVC wiring system specified above. The chase made in the wall shall be neatly made and be amply dimensioned to permit the PVC pipe to be fixed in the manner desired.

In the case of buildings under construction, chase shall be provided in the wall-ceiling etc. at the time of the construction and shall be fitted up neatly after erection of conduits and brought to the original finish of the wall. The pipe shall be fixed by means of saddle not more than 60 cm apart. Fixing of standard bends of elbows shall be avoided as far as practicable and all curves maintained by bending the pipe itself with a long radius, which will permit easy drawing of conductors. Suitable inspection boxes shall be provided to permit periodical inspection and to facilitate removal of wires, if necessary. These shall be mounted flush with the wall suitable ventilating holes shall be provided in the inspection box covers.

11.1 All the outlets such as switches and wall sockets shall be of surface mounting type only. Heat may be used to soften the pipe for bending and forming joints in case of plain conduits. The PVC pipe is to be bent to shape by the heating projects for leading in and out from the sheet steel and TW boards and shall be fixed rigidly by a saddle clamp inside the boxes.

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12.0 The cost of wiring of light points/fan points include the provision of ceiling rose, connections etc, wherever applicable but not the cost of switch boards controlling the points as these have been itemised separately. However, under different item of the schedule the supply and fixing of the wooden boards has been shown. It shall be understood that the switches supplied under item for wiring shall be fixed on the wooden boards but the cost included only against the item for "wiring".

13.0 Fixing of ceiling rose for fans: - At the fan point, ceiling rose shall be provided as near to the fan hook as practicable. Wiring to the fan terminals from the ceiling rose shall be done by three-core flexible pendant chord of size 23/0.0076 (Minimum).

14.0 Fixing of Exhaust fan: - The exhaust fan shall be fixed on the walls with sufficiently long MS bolts of 3/8" / 1/2" as required embedded inside the wall for 3" with gripping MS flats welded with bolt head.

15.0 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.

**The reading should be recorded jointly and submitted to this office.**

16.0 Fans shall be installed such that the bottom of the fan body is generally at a height of 9' (maximum) from floor level. The length of down rods required should be assessed.

17.0 The tenderer should indicate the makers/manufacturers name etc. in respect of the materials proposed to be supplied and used by him, and for all fabricated items to be supplied by the contractor, he may take prior approval before erection of the same.

18.0 Layout of Electrical installations showing the control boards, distribution boards, light, fan and plugs to be provided are to be decided at site by Section in charge to suit site conditions.

19.0 The quantities of work indicated against various items of work under the schedule of work is likely to be increased or decreased according to site conditions and as decided by the Railway administration subject to variation of quantities to maximum of 25%.

20.0 The wiring to be done under this contract will be in close proximity to the wiring already existing. Hence, special case shall be exercised while rewiring is done not only to avoid damage to the existing wiring but also to ensure continuity of power supply. The old wiring shall be dismantled only after completion of the new wiring and energising. The tenderer shall ensure shutting down the supply before commencing the work at site.

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21.0 The walls/ceilings opened or damaged in the course of this work shall be plastered neatly. This shall include the wall surface from where wooden plugs are removed consequent to the removal of the wiring to the satisfaction of the Engineer-in-charge. The portions of wall replastered shall also be white or colour washed to bring these portions in good condition as had been before rewiring.

22.0 The released materials, if any, shall be properly accounted and handed over to local Supervisors on a day-to-day basis and acknowledgement obtained for the receipt of the same. The materials shall be removed from the site to the Office of the local Supervisor only on obtaining the approval from the Supervisors at site.

23.0 Normally the wiring shall be carried out only during daytime on all days. Necessary permission, in advance, shall be sought for and obtained from Engineer-in-charge to carry out works during night hours.

24.0 Prior intimation shall have to be given to the occupants of the Qrs. so as to ensure the co-operation of the occupants of the quarters. The intention is to minimise the inconvenience caused to the occupants of the house at any time. The Railways shall be on no way responsible for the non-availability of the occupants in Qrs. where the work has not been started or partly done. Railways will however, take all possible steps to request the occupants to make the Qrs. available to enable the contractor to carry out his work.

25.0 Necessary openings required on the wooden board shall be made suitably to terminate the existing PVC pipe inside the wooden boards and properly rewired by clamps/saddles indicated in the specification. The PVC cable and earth continuity wire for the fan point wiring shall be terminated inside the new seasoned wooden board and properly connected up.

26.0 Please note the system of supply arrangement for the common lights in Veranda and staircase of multistoried type of quarters connected on to a separate service main connected to street light control.

27.0 In the case of Type - II Qrs. the wiring shall include provision for future wiring for a second fan point for which necessary space in the Wooden Board space inside the PVC pipes for accommodating a part of cables and earth continuity connections and provision of 'T' at the appropriate plan for wiring to branch off to the fan point (open end of 'T' shall be dismantled) shall be made in consultation with the Railway Engineer.

28.0 The existing wiring is likely to be in perished condition. Therefore, the tenderer are advised to be careful in handling the existing wiring to avoid any damage to them till new wiring is completed and energised. Care is also required to ensure that the workman of the contractors and the occupants are not exposed to danger due to damage caused to the wiring.

29.0 Wiring shall be carried out after completion of the service mains, preliminary works in connection with the fixing of wooden boards/PVC pipes, fittings etc., so as to ensure shift transfer of the supply through the new wiring. The transfer should be done at a stretch in one block complete at a time so that there is no inconvenience caused to the occupants. No quarters should be left without power in the night time. The contractor may make necessary temporary supply arrangements if need to avoid interruption to supply for the Quarters during night time. The method of the execution of the work shall be chalked out, discussed in advance with the Railways site Supervisor and then work commenced.

30.0 Separate PVC pipe shall be used for carrying the "Inside main" from the MDB/SDB/DFB to the service buildings. This should be distinct and separate from the wiring without the quarter itself.

31.0 In the course of execution of the work, if the Wooden Gutties already fixed on the walls, for the old wiring is in good condition that the gutties are firmly fixed on the walls. The route of wiring shall not be deviated for the sole purpose of using the old work.

32.0 The tenderer shall guarantee the quality of materials used by him for this work for a period of 12 months from the date of completion of work and handing over to the Railways successfully for usage. During the course of the guarantee period in case if any defects are noticed due to faulty workmanship or defective materials, necessary replacement/repairs may be arranged to be carried out by the tenderer at his own cost.

33.0 The main and sub-main lengths will be measured from the starting point to the terminating point from outside the switchboards only. The extra loose length of wiring to be provided inside the switchboards will not be counted for measurement of length of wiring mains.

34.0 **IN THE CASE OF REWIRING THE COST SHOULD INCLUDE REMOVING THE EXISTING WIRING AND OTHER ELECTRICAL FITTINGS HANDING OVER TO THE SECTION ENGINEER IN CHARGE AT HIS DEPOT STORE.** The disturbed portion of walls or elsewhere done to removal of existing wiring and on account of new wiring should be made good to the satisfaction of the Engineer-in-charge.

35.0 The materials proposed in this tender should be procured as per the clause 49 of Special Condition of Contract enclosed to the tender. The successful tenderer has to submit samples in duplicate and get it approved before bulk purchases are made.

36.0 The open ends of GI pipe should be filled with bituminous sealing compound to prevent ingress of water.

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37.0 All fabricated sheet steel enclosures shall be of not less than 14 gauge, duly coated with 2 coats of primer and one set of admiralty grey. The enclosure shall be of weather and waterproof construction and doors should be provided with sealing rubber gasket and all cable entries shall be suitable glands/grommets.

38.0 The enclosures shall be mounted at a sufficient height but not less than 6'-0" from ground level so as to deny access user/other unqualified staff/unauthorised persons.

**Note:-** 1. All MCB DBs, Switch fuse units shall be sheet steel enclosed duly painted or phosphated or powder coated.

2. This specification is general in nature. The applicability of the various Para will depend on the nature & scope of work. However the decision on the applicability shall rest with Railway.

3. Important: - The tenderer shall note that all the conduits/capping and casing shall be given adequate number of coats of white/colour wash after completion of all the works so as to blend the same with the colour of interiors of the respective rooms.

**4. All switches / Switch boards / Metering boards shall be paint marked / stencilled with controlled circuits / loads. Alternatively, aesthetically designed stickers shall also be used.**

**5. All the terminations in the switches / MCBs including the internal wiring in the MCB DBs shall only be with suitable type and size of crimping sockets. The material of the shoe namely copper or aluminium shall be based on the material of wire / cable. A rough sketch indicating the method of cable termination at MCB is enclosed for general guidelines. In addition proper connection must be made using good quality spring and flat washers of appropriate size. The sockets / shoes for termination into MCBs shall be of insulated / sleeve type.**

**6. Wherever metallic enclosures / boards have been called for in the schedule as a part of scope of contractors supply, the same shall be of CRCA sheet. These enclosures / boards shall be finished with powder coating. The colour shall be as advised by the Section Engineer in charge.**



