Erection Specification of LT Cabling Works

Scope :

This is defining the requirements for supply, wherever applicable the installation, testing and commissioning of the cabling system.

Standards:

The work shall be carried out in the best workmen like manner in conformity with this specification, the relevant specification and codes of practice of Indian standards institution, approved drawing and instruction of Engineer-in- charge or his authorized representative issued from time to time. In case of any conflict between the standards, the instructions of Engineer-in-charge shall be binding.

CABLE LAYING:

1.1 Cables as far as possible shall be laid in complete, uncut lengths from one termination to the other.

1.2 Cables shall be neatly arranged in the trenches in such a manner so that crossing is avoided and final takes off to the switchgear is facilitated. Arrangement of cables within the trenches shall be responsibility of the contractor. Cable routing between lined cable trench and equipment shall be taken through appropriate support arrangement.

1.3 All temporary ends of cables must be protected against dust and moisture to prevent damage to the insulation. For this purpose, ends of all XLPE insulated cables shall be taped with an approved XLPE or rubber insulation tape. Use of friction type or other fabric type tape is not permitted. Lead sheathed cables shall be plumbed with lead alloy.

1.4. Cables shall be handled carefully during installation to prevent mechanical injury to the cables. Ends of cables leaving trenches shall be coiled and provided with a protective pipe or cover, until such times the final termination to the equipment's is completed.

1.5. Directly buried cables, if required shall be laid underground in excavated cable trenches where specified. Trenches shall be of sufficient depth and width for accommodating of all cables correctly spaced and arranged with a view of heat dissipation and economy of design.

Minimum depth of buried cable trench shall be **750mm** for low voltage cables, the depth and the width of the trench shall vary depending upon the number of layers of cables as per Indian standard.

1.6. As each row of cables is laid in place and before covering every cable shall be given an insulation test in the presence of Engineer-in-charge / MGVCL. Any cable, which proves defective, shall be replaced before the next groups of cables are laid.

All wall openings / pipe sleeves shall be effectively sealed after Installation of cables to avoid seepage of water inside building / lines trench.

1.7 Where cables rise from trenches to D.P. / S.S., MSP etc. they shall be taken in G.I. pipes / HDPE PVC pipe for mechanical protection up to a minimum permissible height. Cables ends shall be carefully pulled through the conduit, to prevent damaged to the cable. Where required, approved cable lubricant shall be used for this purpose. Where cable enters conduit the cable should be bent in large radius. Radius shall not be less than the recommended bending radius of the cables specified by the manufacture.

Following guide of the pipe fill shall be used for sizing the pipe Size:

1 cable in pipe - 53% full
2 cable in pipe - 31% full
3 or more cables - 43% full
4 Multiple cables - 40% full

After the cables are installed and all testing is complete, conduit Ends above grade shall be plugged with a suitable weatherproof Plastic compound / "PUTTI" for sealing purpose. Alternatively, G.I. Lids or XLPE bushes shall be deemed to have been included in the Cost for the same shall be deemed to have been included in the Installation of G.I. pipe and no separate payment shall be allowed.

1.8. Where cables pass through foundation walls or other underground structure, the necessary ducts or opening will be provided in advance for the same. However, should it become necessary to cut holes in existing foundations or structures. The electrical contractor shall determine their location and obtain approval of the Engineer-in-charge before cutting is done.

1.9. At road crossing / railway crossing and other places where cables enter pipe sleeves adequate bed of sand shall be given so that the cables do not slack and damaged by pipe ends.

1.10. Drum number of each cable from which it is taken shall be recorded against the cable number in cable schedule. Cables shall be so routed that they will not be subjected to heat from adjacent hot piping or vessels.

1.11. Cables installed above grade shall be run in trays, exposed on walls, ceilings or structures and shall be parallel or at right angles to beams, walls or columns.

1.12. In case of individual cables or small groups which run along structure / walls etc. will be clamped by means of 16 SWG GI saddles on 25*6 mm saddle bars. The cost of the saddle and saddle bars shall be deemed to have been included in the installation of cables and no separate payment shall be made on this account. Alternative small group of cables can be taken through 100 mm slotted channel / ISMC 100 / angle support. They shall be rightly supported on structural steel and masonry individual or in groups as required, if drilling of Steel must be resorted to, approval must be secured and steel must be drilled where the minimum weaking of the structure will result. Cables shall be supported so as to prevent unsightly sagging.

1.13. If required, Cable laid on supporting angle in cable trenches, structures, columns and vertical run of cable trays shall be suitably clamped by means of G.I. Saddle / clamps, whereas cable in horizontal run of cable trays shall be tied by mean of nylon cords.

1.14 The identification cable tag, having adequate size from 3 mm thick, 25 mm wide PVC strip, shall be placed on each cable at every 10 Mtrs intervals and at every cable joint locations. The Cable tag shall be tied by nylon string with cable. The tag shall be embossed by letter as stated below as applicable. In LT Cable- PSS Name/MSP Name

1.15 The XLPE Cable terminal ferrules for identification of phase sequence and feeder/PSS/MSP name of LT cables shall be provided at every termination of all cables stating detail as under. In LT Cable- PSS/MSP name/Phase(R/Y/B/N)

Testing:

2.1 Before energizing, the insulation resistance of every circuit shall be measured from phase to phase and from phase to ground.

2.2 Where splices or termination are required in circuit rates above 600volts, measure insulation resistance of each length of cable before splicing and or / terminating. Repeat measurements after splices and / or terminations are complete.

2.3 Measure the insulation resistance of directly buried cable circuits, before cable trenches are back-filled. Repeat measurement after back-filling.

For cables up to 1.1 KV grade 1000KV Megger and for H.V. Cables 2.5KV Megger shall be used.

2.4 D.C. High Voltage Test shall be conducted after installation on the following and test results are recorded as MGVCL format.

a (All 1000 volts grade cables in which straight through joints have been made.

b (All cables above 1.100 V grade.

For record purposes test date shall include the measure values of leakage current verses time. The D.C. High Voltage test shall be performed as detailed below in the presence of the Engineer-in-charge or his authorized representative only.

Cable shall be installed in final position with the entire straight through joints complete. Termination shall be kept unfinished so that (if any) switchgears, transformers etc. are not subjected to test voltage.

The test voltage shall be 18KV DC for 1.1KV grade cables.