1. **SCOPE:**
   1.1 This specification covers manufacture, testing before dispatch, supply and delivery F.O.R. Destination of Insulation Piercing Connector suitable for LT Aerial Bunched XLPE Insulated Aluminium Conductor Cables with XLPE insulated/bare Messenger Wire for LT Overhead lines suitable for working voltage up to & including 1100 Volts as per relevant NFC Standard.

   1.2 Insulation Piercing Connector will be supplied with Nuts, Bolts, and Washers. The requirement of Insulation Piercing Connector shall be as per schedule of requirement annexed with this section at Annexure-I. It may be noted that the quantity in the schedule is tentative and may vary at the time of placement of order.

2. **APPLICABLE STANDARDS:**
   Unless otherwise stipulated in this specification the following standards with latest amendments shall be applicable:
   i) NFC - 33-020 : Insulation Piercing Connectors
   ii) NFC - 33-209 : LV Aerial Bunched Cable
   iii) NFC - 33-004 : Electrical Ageing Test.
   iv) NFC - 33-041 : Environment testing for outdoor.
   v) IS 14255 : LV Aerial Bunched Cable

3. **CLIMATIC CONDITIONS:**
   i) Peak ambient temperature in shade  50 deg. C
   ii) Maximum average ambient temperature in a 24 hours period in shade  50 deg. C
   iii) Minm. ambient air temperature in shade  5 deg. C
   iv). Maximum temperature attainable by an object exposed to sun  60 deg. C
   v) Maximum relative humidity  95%
   vi). Average number of thunder storm days per annum  40
   vii) Average number of rainy days per annum  100

...
viii) Average annual rainfall 10 to 100 cm
ix) Number of months of tropical monsoon conditions.
x) Maximum wind pressure. 150kg /mm²
xi) Altitude not exceeding 1000 M

4. GENERAL REQUIREMENTS:
The Insulation Piercing Connector should be suitable for AB Cable required as under

The phase conductor should be 50 mm² and 35 mm² XLPE Insulated (1.5 mm thickness) and neutral conductor should be 25 mm² and 16 mm² XLPE Insulated both with PVC covering (1.00 mm thick) over XLPE Insulation, whereas messenger conductor should be bare heat treated, aluminium silicon containing 0.5% magnesium and approximately 0.5% silicon confirming to IS398 (Part -IV)-1979 and its latest amendment if any.

4.1 L.T. INSULATION PIERCING CONNECTORS:
a) The L.T. Insulating Piercing Connectors are used for making Tee or Tap off connections to an Aerial Bunched Cables suitable up to 1.1 KV, service voltage 0.6 KV.
b) The L.T. Insulation Piercing Connectors shall conform to NFC-33-020
c) The L.T. Insulation Piercing Connectors shall be following type:

<table>
<thead>
<tr>
<th>Type</th>
<th>Main Cable</th>
<th>Tap Off Cable</th>
<th>End Cap suitable for Sealing Branch</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>16 -95mm²</td>
<td>4- 50mm²</td>
<td>4-- 50mm² XLPE Or PVC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Aluminum Alloy or Tinned Copper</th>
</tr>
</thead>
<tbody>
<tr>
<td>d) The L.T. Insulation Piercing Connectors are designed to make a connection between the uncut main conductor &amp; a branch cable conductor without removing the insulation and with single tightening. The IPC will first pierce the insulation, then make good electrical contact between the main &amp; the branch conductor while simultaneously insulating &amp; sealing the connection. The piercing teeth shall be made of <strong>Aluminum Alloy or Tinned Copper</strong>.</td>
<td></td>
</tr>
<tr>
<td>e) The Insulation Piercing Connectors must be suitable for application by one worker working alone with a 17mm/ 13mm/ 10mm wrench.</td>
<td></td>
</tr>
</tbody>
</table>
f) The Insulation Piercing Connectors must be equipped with shear heads having minimum & maximum torque as indicated by the manufacturer and within the range specified in NFC 33-020.

g) The Insulation Piercing Connectors shall be water proof & the water tightness shall be ensured by appropriate elastomeric material.

h) The Connector shall have removable end cap for sealing cut end of the branch cable enabling tapping on either side of the connector with the connector being in its vertical position with bolt head upward. The End cap shall be rigid of slide type enabling easy positioning and unloadable after the tap cable is positioned. The End cap shall be equipped with a water tightness seal.

i) Rubber seal around piercing teeth shall be compatible with grease used. Rubber seal shall be designed in a manner to provide proper sealing around the piercing & to avoid the damage to conductor insulation beyond piercing point. Rubber parts shall comprised of material that exhibit resistance to aging caused by heating or other weather conditions.

j) All the insulating material used shall be UV resistant & fire retardant. Metallic parts shall be non-corrosive surface treatment. Exposed metallic parts to be potential free during & after connector mounting.

k) The Insulation Piercing Connectors shall have good finish and shall be free from all flaws, sharp radii of curvature and suitably rounded off.

l) The performance/ test requirements of insulation piercing connectors shall be as per NFC Standards 33-020.

4.2 The above Piercing Clamp shall be suitable for use with LT Aerial Bunched, XLPE Insulated Cable conforming to IS:14255/1995 of following sizes:

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Designation of finished cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>i)</td>
<td>3C X 50+1C X 25+35mm²</td>
</tr>
<tr>
<td>ii)</td>
<td>3C X 35+1C X 16+25mm²</td>
</tr>
<tr>
<td>iii)</td>
<td>1C X 35mm² + 25mm²</td>
</tr>
</tbody>
</table>

Note:- The first part of the designation refers to the number and size of the phase conductor and the last to the size of messenger wire. The sizes shown are the nominal cross sectional area of the conductors.
5.0 **DRAWINGS:**

The successful bidder shall within two weeks of placement of order shall furnish three sets of final versions of all drawings of Piercing clamp for purchaser’s approval.

6.0 **TESTS & TESTS CERTIFICATES:**

6.1 The Piercing clamp should meet the requirement of all tests as specified in respective NFC standard NFC-33-020 along with other relevant standards and their latest amendments.

6.2 The tenderer shall furnish latest complete type test certificates (should not be older than 5 years) prescribed in respective NFC standard from any NABL/ILAC/APLAC/ Accredited laboratory / CPRI, Bangalore / CPRI, Bhopal / CPRI, Muradnagar testing laboratory or ERDA Baroda. **The supplier who have not submitted the type test reports along with the offer shall not be entertained & their offer are likely to be ignored/rejected.**

The tenderer must also clearly indicate various testing facilities available at their works for testing the material as per relevant standard. In case of otherwise particulars of the place their such testing is proposed to be conducted during the course of inspection shall be indicated with the offer.

7.0 **INSPECTION:**

7.1 The inspection may be carried out by the purchaser at any stage of manufacture. The successful tenderer shall grant free access to the purchasers representative at reasonable time when the work is in progress. Inspection and acceptance of any equipment / material under this specification by the purchaser shall not relieve the supplier of his obligation of furnishing equipment in accordance with the specification and shall not prevent subsequent rejection if the equipment / material is found to be defective.

7.2 The acceptance tests shall be carried out as per relevant NFC standards.

7.3 **TYPE TEST:** The first lot offered shall not be less than 10% of ordered quantity.
One sample from the 1st Lot of Piercing Clamp as received in purchaser’s store shall be sealed for getting it type tested as per NFC Standard at any CPRI, Bangalore/CPRI, Bhopal/CPRI, Muradnagar/ERDA, Vadodara/NABL accredited testing laboratory.

In case sample from first lot fails then:
1) Supplier shall have to replace the full quantity of the respective inspected lot supplied to various stores and lying unused at stores.

2) Sample from next lot shall be selected again for type test. All test charges incurred towards type test of the material for second time shall be borne by the Supplier. In case sample again fails in the type test then further supplies shall not be accepted.

7.4 The supplier shall keep the purchaser informed in advance about the manufacturing programme so that arrangement can be made for inspection.

7.5 The purchaser reserves the right to insist for witnessing the acceptance /routine tests of the brought out items.

7.6 Sampling shall be in accordance with Annexure-B of relevant NFC standards for insulation piercing connectors. Samples shall be taken at random and tested from each lot for ascertaining the conformity of the lot to the requirement of the specifications.

7.7 The supplier shall present the latest calibration certificates of testing instruments / equipments to be used for the testing of the material covered in the purchaser order to the authorized inspection officer/inspecting agency of the purchaser. The testing instruments/meters/apparatus etc. should be got calibrated by the supplier from time to time from manufacturer of the instrument. The calibration certificate should not be in any case be older than 01 year at the time of presenting the same to the inspecting officer/inspecting agency of the purchaser. The testing instruments / equipments should be duly sealed by the calibrating agency and mention thereof shall be indicated in the calibration certificates.

8.0 **EMBOSSING & IDENTIFICATION:**
It should be provided in each piece as per Clause No.3 of the relevant NFC standards.
9.0 **PACKING, MARKING & FORWARDING:**
9.1. All Hardware shall be packed in suitably sized Gunny Bags. The gross weight of the packing shall not normally exceed 50 Kgs. to avoid handling problems.

9.2 Suitable cushioning, protective padding or spacer shall be provided to prevent damage to or deformation of the Piercing Clamp during transit and handling.

9.3 All identical items shall be dispatched to destination duly assembled and packed. Bolts, Nuts, Washers etc shall be packed duly installed and assembled with the respective parts and suitable measures shall be taken to prevent their transit loss.

9.4 All packing cases shall be marked legibly and correctly so as to ensure their safe arrival at their destination and to avoid the possibility of goods being lost or wrongly dispatched on account of faulty or illegible marking. Each case / crate shall have all the markings stenciled on it in indelible ink.

10. **PAST SUPPLIES:**
The tenderer must furnish the documentary proof for the orders executed in past.

11. **GUARANTEED TECHNICAL PARTICULARS:**
The tenderer shall furnish guaranteed technical particulars in the Annexure-II.

12. **PRICES:**
The tenderer must quote the prices FIRM.

13. **DELIVERY:**
The delivery of the material shall commence within one month from the date of receipt of Purchase order and shall be completed at monthly rate thereafter (Refer Schedule-A). The tenderer who have not quoted monthly rate of delivery shall not be entertained and tenders are likely to be ignored.

14. **SAMPLES:**
The tenderer must submit eight samples of offered Insulation Piercing Connector along with tender (Please refer schedule-A of tender)
ANNEXURE-I

SCHEDULE OF REQUIREMENT

PIERCING CLAMP SUITABLE FOR LT AERIAL BUNCHED XLPE INSULATED ALUMINIUM CONDUCTOR CABLES FOR LT OVER HEAD LINES SUITABLE FOR WORKING VOLTAGE UPTO & INCLUDING 1100 VOLTS

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Size</th>
<th>Quantity (Approx)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Insulation Piercing Connectors:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Type - (Main 16-95mm² &amp; Tap off 4-50 mm²)</td>
<td>89,835 Nos.</td>
</tr>
</tbody>
</table>

NOTE: The quantities as mentioned in the schedule of requirements tentative and may increase/decrease as per the requirement of the MGVCL at the time of finalization of tender.
ANNEXURE-II

GUARANTEED TECHNICAL PARTICULARS OF INSULATION PIERCING CONNECTOR OF AERIAL BUNCHEC CABLES CONFORMING TO NFC STANDARED

<table>
<thead>
<tr>
<th>Sr No.</th>
<th>Particulars</th>
<th>Requirement</th>
<th>to quote by Bidders</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Name &amp; Address of the Manufacturer:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) Office:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ii) Works:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Standard to which material shall conform.</td>
<td>NFC 33-020</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Material used in manufacture and reference of NFC to which material shall confirm</td>
<td>To be furnished by the bidder</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Rated current in Amp</td>
<td>To meet with Max.50 mm2 Cable Maximum</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Tensile load (KN)</td>
<td>NFC 33-020</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Voltage Test</td>
<td>NFC 33-020</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Length, width &amp; thickness of complete connector //assembly</td>
<td>To be furnished by the bidder</td>
<td></td>
</tr>
</tbody>
</table>

(Technical Specification & G.T.P. of Insulation Piercing Connector--Page 8 of 8)