SPECIFICATION NO: 17B0214

SPECIFICATION OF 11kV TAPEX STRAIGHT / TRANSITION JOINTING KITS AND PUSH ON TYPE TERMINATION KITS FOR 11kV CABLES

Notice for Revision of Specification (Summery sheet)

Attention of tenderers for - the tender is invited with following additions / amendments made in the specification.

Sr. No.	Existing Specification No	Revised Specification No.	Date of Revision
1	17B0114	17B0214	14/10/2014

Sr. No.	Existing Section/ Clause No.	Description of Existing Clause	Revised Section/ Clause No.	Description of Additions / Amendments
3	SECTION 5 Clause No. 5.1.11	STANDARDS	SECTION 5 Clause No. 5.1.11	Corrected Indian standard specified

SECTION 1 - GENERAL

1.1 Tender document

1.1.1 This tender document shall be read and understood as a whole inclusive of all annexures, drawings, etc. and every section or sub-section of this document shall be interpreted in proper context with other sections contained herein.

1.1.2 This specification covers design, manufacture, testing before dispatch and Supply of complete Tapex jointing and Push On type termination kits suitable for 11kV power cables.

1.1.3 All work covered by this specification shall be carried out in accordance with the "General Conditions of Contract".

1.1.4 Wherever the directions to the tenderers embodied herein conflict with those specified in the General Conditions of Contract, the former shall be binding in preference to the latter.

1.2 STANDARDS

1.2.1. Except as specified herein, 11kV jointing and termination kits shall comply with the requirements of the latest relevant INDIAN Standards Specifications (as amended to date).

1.2.2. Where Indian Standard Specification does not exist, the relevant IEC or British Standard or relevant International Standards Specification shall be taken as standard.

1.2.3. If offered 11kV jointing and termination kits are manufactured according to some other standard, it shall be clearly stated and a copy of the latest publication of the standard in English shall be forwarded with the offer.

1.3 Legislation

1.3.1 The whole of 11kV jointing and termination kits shall comply in every respect with the provisions of relevant Government Legislations and/or Rules and Regulations governing manufacture, installation, operation and maintenance of the equipment.

1.3.2 Tenderers shall ensure that all safety measures are extensively provided in 11kV jointing and termination kits against hazards to life and property and that the proper installation and use of the equipment under no circumstances shall contravene any enactments rules, laws and by-laws of the Government and the Local Authority.

1.4 Departure from Specification

1.4.1 If due to any reason, tenderers find it necessary to depart from the provisions of section of the specification, such departures shall be clearly stated and underlined giving full reasons.

1.4.2 If departures from the provisions of any section of this specification are not notified in writing, it will be presumed that tenderers will abide by this specification.

1.4.3 Any suggestion, comment, or advice to include in this document, additional provisions in respect of any special device or attachment necessary but not already specified herein, may be put forward by the tenderers giving full details of the special/additional features of the equipment together with the justification for its inclusion.

1.5 Technical Data

1.5.1 Tenderers shall give full specifications of offered 11kV jointing and termination kits and shall supply technical literature and descriptive particulars together with drawings and illustrations to indicate the type and design of 11kV jointing and termination kits offered, manufacturing features and details pertaining to installation, testing and commissioning.

1.5.2 Tenderers shall supply such technical data, characteristics and statistical information as required to supply comparative merits and performances of different types and designs of 11kV jointing and termination kits and experience of other users of the equipment.

1.6 Materials and Workmanship

1.6.1 11kV jointing and termination kits shall conform to the best engineering practice in design, materials and construction so as to ensure reliability, economy and safe and convenient operation.

1.6.2 Tenderers shall supply all incidental items necessary or usual for such 11kV jointing and termination kits for erection/installation purpose and correct working.

1.6.3 Manufacturers shall give details of the experience in the supply of similar 11kV jointing and termination kits. A list of important customers who have been supplied with similar equipment with details of order executed shall be furnished. Details shall include rating of the equipment, quantity, purchase order reference etc.

1.7 GUARANTEE

1.7.1 11kV Tapex straight, transition Joints / Push on type Terminations installed shall be guaranteed atleast for a period of 5 years against the defective design and materials from the date of installation of joint/termination. In case if the tenderer is authorized distributor/dealer, he/she shall submit the undertaking letter from the manufacturer stating that guarantee of 5 years remains valid even if, the authorized agent / dealer is changed during the guaranteed period.

1.7.2 Also Tenderer shall submit the undertaking letter stating that "In the event of failure of a joint within guarantee period, he/she shall replace it with two joints, free of cost and in case of failure of termination within guarantee period, he/she shall replace it with one termination and one joint, free of cost.

1.7.3 In case of failure of 11kV joint / termination within guarantee period, the successful tenderer shall depute a technical representative on priority basis for failure analysis of failed joint / termination upon receipt of intimation from the Undertaking and submit the report of failure analysis.

SECTION 2 : DESCRIPTION OF THE POWER SYSTEM

2.1 Grid

2.1.1 The Tata Power Company Ltd. (TPCL) and the Maharashtra State Electricity Board have their generating stations located in different parts of Maharashtra State and form an interconnected transmission system in the Mumbai-Pune Region.

2.1.2 Power from this system is transmitted at 220 / 110kV through overhead conductors and underground cables amongst others to TPCL's five main receiving stations at Backbay, Carnac, Parel, Dharavi and Mahalaxmi situated in the island of Mumbai, where they have installed either delta/star or star/zigzag step down transformers with star point effectively earthed for making power available to their consumers at 110 / 33 / 22kV.

2.2 Existing B.E.S.T. System

2.2.1 The B.E.S. & T. Undertaking on behalf of Brihan Mumbai Mahanagarpalika (who are the licensees for the distribution of electric power within the City limits of Mumbai) receives power in bulk from the Tata Power Company Ltd. at 110 / 33 / 22kV, 3 Phase, 50 Hz.

2.2.2 Bulk power at 110 / 33 / 22kV is transmitted from TPCL's five main receiving stations through effectively earthed underground cables to B.E.S.T.'s receiving substations situated at different localities in Mumbai where the B.E.S.&T. Undertaking has installed installed 110 / 33kV, 110 / 11kV, 33 / 11kV or 22 / 11kV, Star-z, star/star, delta/star power transformers of Vector group YNzn11, Ynyn0, 31 Dyn1 with neutral earthed with/without a resistance. Where the transformation is 110 / 11kV or 110 / 33kV, 22 / 11kV or 33 / 11kV, the star point of the transformers has been effectively earthed. The power transformers are provided with OLTC gear to regulate and maintain the 11kV voltage fairly constant.

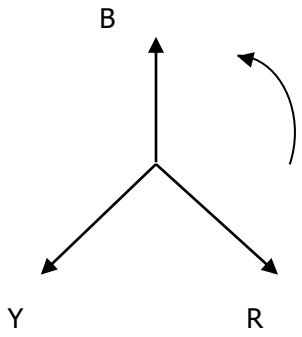
2.2.3 Underground 11kV (effectively earthed) feeder cables radiate from the B.E.S.T. receiving substations to supply power to a large number of distribution substations and to certain consumer's substations. These feeders form a radial network under which each feeder supplies on an average 5 to 7 substations in series.

2.2.4 Power at 11kV is stepped down to 415/240V at the distribution substations where the various sizes of 11kV/415-240Volt delta/star transformers of vector group Dyn11 are installed. The star point of these transformers is solidly earthed and is

also brought out to an insulated terminal for the 3 phase, 4 wire distribution system.

2.2.5 The 415/240V secondary distribution system comprises of a vast network of underground four core cables, suitably sectionalized by means of distribution pillars, to which service lines are teed off to supply power to low voltage consumers.

2.2.6 The phase sequence of the 3 phases at the existing receiving substations is in accordance with the International Standards as indicated below :-



SECTION 3 - PREVAILING SERVICE CONDITIONS

3.1 Climatological Data

3.1.1 The information given hereunder is based on data supplied by the Regional Meteorological Centre, Colaba, Mumbai - 400 001.

3.1.2 The information is based on the data collected over the years 1881 to 2007.

3.1.3 The table below gives the climatological data for the City of Mumbai.-

a) Air Temperature in Shade

Highest temperature recorded : 40.6 ^{0}C
Lowest temperature recorded : 11.7 ^{0}C
24 hours' daily average : 26.0 ^{0}C

b) Mean highest temperature in sun : 62.2 ^{0}C
Highest temperature in sun : 64.0 ^{0}C

c) Relative Humidity

Lowest mean RH : 62%
Highest mean RH : 85%

d) Rainfall

Mean no. of rainy days in a year : 75.9 days
Mean rainfall in a year : 2146.5 mm
Maximum rainfall recorded in a year : 3,481.6 mm
Heaviest rainfall in a day recorded : 575.6 mm

e) Wind

Mean daily wind speed -

Minimum in a year - 9.8 km/hr

Mean daily wind speed -

Maximum in a year - 18.7 km/hr.

Highest wind speed in gust - 103.0 km/hr. on 17.06.2004

3.2 Geographical Data

Mumbai city is situated on the western coast of India and is the second biggest city in the country. It has an excellent sea port and is on the world's main routes by sea and air. It is well connected with the hinterland by road and railways.

Area	61 sq. km.
Population	38,00,000
Longitude	72 40' E
Latitude	18 54' N
Height above MSL	11 Meters

3.3 Local conditions

3.3.1 Mumbai is a densely populated city with large industries such as cotton mills, chemical factories, engineering workshops and several varieties of large and small industries occupied in the manufacture of consumer goods and other commodities.

3.3.2 Although certain areas are still undeveloped, the city is divided into several zones such as residential, commercial, industrial etc. With a view to minimise nuisance and localise several mixed localities where such zoning has not been done, two or more types of activities are allowed to continue. By and large, the heavy industries are gradually shifting from the city.

3.3.3 The city originally comprised of five islands separated by small creeks which were, in later years filled in and reclaimed. The city now stands as one large island separated from the mainland by creek, the shores of which more or less demarcate the boundaries of the city and suburban limits.

3.3.4 Because of large areas of reclaimed land, the soil conditions and the sub-soil water levels in the different parts of the city vary widely.

3.3.5 The sub-soil water level varies with the time and height of the tides and lies between 1 meter to 4 meters below ground level in the densely populated areas. The water has considerable salt content.

3.3.6 During rains, flooding of the roads takes place and water level in certain low laying areas may go up to about 1 meter above ground level.

3.3.7 The chemical composition of soil obtained from typical samples is given below :

Appearance	Sample No.1 A mixture of clay, Stones, some clinker & coal bits & other organic matter.	Sample No.2 Mainly clay with a few small stones & a few bits of organic matter.
Moisture	2.00%	7.20%
Analysis on dry soil		
Organic matter	14.20%	3.00%
Combined Water	4.00%	3.60%
Carbon dioxide	NiL	3.70%
Total Water Solubles (100 gms. in 500 cc Water).	0.1075%	0.1855%
Reaction of water	pH Value	pH Value
Extract	7.5%	7.6%
Analysis of water solubles		
Silicon SiO2	0.0100	0.0065
Lime CaO ^{2}	0.0060	0.0104
Magnesia MgO	0.0101	0.0109
Sulphur Trioxide SO3	0.0065	0.0143
Sodium Oxide Na_2O	0.0149	0.0138
Chlorine Cl_2	0.0340	0.0221
Nitrogen Na_2O_5	0.0040	0.0078
Pentoxide		

The above radicals are probably combined as follows :

Calcium Sulphate	$Caso_4$	0.0146	0.0253
Magnesium Chloride	$Mgcl_2$	0.0428	0.0257
Sodium Chloride	NACL	0.0035	0.0049
Sodium Silicate	Na2Si03	0.0203	0.0132
Sodium Nitrate	$NANo_3$	0.0063	0.1040
Total Inorganic Salts	----	0.0875	0.0815
Water Soluble Organic matter	----	0.0200	0.1040

Total Water soluble Matter	----	0.1075	0.1855

The mean ground temperature may be taken as 30^0 C and the thermal resistivity of soil g = 120^0 C watt per cm^3.

3.4 Existing Practice

3.4.1 All the cables are laid direct in the ground except for small length laid in ducts, earthenware or PVC/ DWC pipes inside the receiving stations, sub-stations and carriage ways.

3.4.2 The cables are normally laid along footpaths according to standard alignments decided upon by the local authority to bring about uniformity and proper co-ordination between the underground services of different utilities such as gas mains, water mains, electric mains, telephone, etc. The minimum clearance between electric cables and the mains of other utilities when they run parallel to each other is generally 45 cms. But in certain cases electric cables have been laid almost touching the water mains or sewer due to congestion.

3.4.3 The city has suburban and main line electric rail traction system operating partly on 25000 volts AC/1500 volts D.C. which are subject to problem involving electrolytic corrosion and vibration.

3.4.4 The underground utility services are laid in soil prone to chemical corrosion and microbiological action at these places.

3.4.5 The standard depths below the surface of ground at which the cables are generally laid are as follows :-

Type of Cables	Depth below Ground Level
33,000 / 22,000 Volt Cable	1,070 mm
11,000 Volt Cable	910 mm
1,100 Volt Cable	760 mm
Communication Cable	910 mm

3.4.6 Where the cables cross railway tracks, they are laid through R.C.C./PVC/DWC pipes, the depth being such that clear minimum distance of 1,220 mm is left from the bottom of the sleepers to the top of pipes.

3.4.7 The number of cables in any one section of the trench does not normally exceed four but in certain short sections where cables enter receiving stations, sub-stations or distribution pillars, any number upto 20 may be side by side or in special configuration. The spacing between cables may be 23 Cms., 17 Cms., or 11 Cms., depending upon the number of cables and availability of spaces.

SECTION 4 : REQUIREMENTS

4.1 Type and Quantities

4.1.1 The following sizes and quantities of 11kV Tapex straight , transition jointing and push on type termination kits are required:-

Sr. No.	L.F. No.	Description	Qty. in Nos.
1.	29139	Push on type or Equivalent Indoor Termination Kit required for terminating 11kV, 3C x 240 sq.mm. Alu. Conductor, wire armoured XLPE cable.	
2.	29150	Tapex Straight Jointing Kit required for jointing of 11kV, 3C x 240 sq.mm. Alu. Conductor, wire armoured XLPE cables	
3.	29151	Tapex transition straight jointing kit required for jointing of 11kV, 3C x 240 sq.mm. Alu. Conductor, wire armoured XLPE cable with 11kV, 3C X 300 sq.mm. Alu. Conductor, PILC Cable.	

4.2 Quantity variation

The General Manager at his discretion may alter the above quantity by –25% or +25% after the contract is awarded and before delivery of material is completed.

SECTION : 5 TECHNICAL SPECIFICATION

5.1 GENERAL

5.1.1 The word kit referred hereunder shall mean straight through joint, transition straight joint or Push-on or equivalent termination as the case may be.

5.1.2 The maximum symmetrical short circuit level will be 250MVA in 11kV system. The cable jointing /termination kits installed in our electricity distribution system shall perform its function without distress under normal loading, cyclic loading, mechanical impact and electrical stresses developed during fault conditions.

5.1.3 The cable jointing / termination kits should have good electrical and thermal characteristic and shall provide proper mechanical protection, impervious to water/moisture.

5.1.4 It is expected that material to be used shall be capable of resisting degradation during the service life of the cable system.

5.1.5 Tapex kits / Push-on termination shall have proven performance for atleast 5 years in prevailing conditions. Documentary evidence shall be made available.

5.1.6 Tenderer shall furnish information as regards the facility available for testing for various components of the kit at their works or laboratory, which can be witnessed by the representatives of the Undertaking.

5.1.7 The tenderer shall give list of kit contents (Packing List), Instruction sheet/Installation Manual along with each kit and shall give demonstration of at least one joint / termination on free of cost basis at site. Also, the tenderer shall submit the undertaking letter for rendering technical and supervisory assistance for making joints and terminations at site for at least 10% of the ordered quantity for item/s (for which P.O. is placed) on free of cost basis, at a short notice.

5.1.8 The tenderer shall submit the list of power utilities / public undertaking / private organisation to whom they have supplied the said kits.

5.1.9 Only manufacturers and authorized distributors/Dealers shall quote.

5.1.10 11kV Push on type or Equivalent cable termination shall be of Class-1 type termination as defined in IEEE standard-48 –1996, amended to-date. Termination shall be indoor type.

5.1.11 Following Indian & International standards shall be followed for 11kV straight/transition jointing and termination kits.

(A) Indian standards	
IS 13573: (Part 2):2011	***Specification for cable accessories for extruded power cables Part 2 - For working voltages from 3.3kV (UE) up to and including 33kV (E) - Test requirements (Amended up to date)***
IS 13573: (Part 3):2011	***Specification for cable accessories for extruded power cables Part 3 - For working voltages from 3.3kV (UE) up to and including 33 kV (E) - Test Methods (Amended up to date)***
IS 13705:1993	Performance requirements and type test for transition joint of cables for working voltages from 11 kV up to and including 33 kV (Amended upto date)
IS 7098: Part 2: 1985	Cross linked polyethylene insulated thermoplastic sheathed cables - Specification : Part 2 For working voltages from 3.3 kV upto and including 33kV (Amended upto date)
IS 692: 1994	Paper Insulated Lead Sheathed cables (PILC) for rated voltages upto and including 33kV (Amended upto date)
IS 10810: 1984	Method of Test for cables (Amended upto date)
(B) International standards	
IEEE standard-48 –1996	Standards Test Procedures and requirements for high voltage alternating current cable termination (Amended upto date)

5.2 KIT CONTENTS

5.2.1 The Tapex straight jointing kit required for jointing of 11kV, 3C x 240 sq.mm. Alu. Conductor, wire armoured XLPE cables.

The contents of each kit shall include the following components :

Sr. No.	Material	Quantity
1.	Cable Jointing Compound (Resin) (Minimum Weight : -2.6 kg. Each)	4 Tins
2.	Cable Jointing Compound (Hardener) (Sufficient quantity proportionate to resin part)	4 Bottles
3.	Stress Grading Pad (120 mm x 120 mm +/- 5 mm)	3 Nos.
4.	High Impact Polystyrene Mould	1 No.
5.	Mould Adhesive	1 Bottle
6.	Cleaning Solvent (Minimum - 40ml.)	2 Bottles
7.	Core Spacers	2 Nos.
8.	Self Amalgamating Insulating Tape	35 Meters
9.	Self Amalgamating Semi-conducting Tape	15 Meters
10.	Foam Tape / Sponge Sheet Packet (Tape / Sponge Minimum Length : - 1.5 Meters)	1 No.
11.	Tinned Copper Flat Braid for earth continuity connection (Minimum Cross Sectional Area: 25 mm^2 & Minimum Length - 920 mm)	2 Nos.
12.	Bare Copper Braid (Short) for copper tape screen (Minimum Cross Sectional Area: 06 mm^2)	6 Nos.
13.	Copper Binding Wire - 16 /18 swg (Minimum Length - 3 Meters)	2 Rolls.
14.	Tinned Copper Wire Mesh - 50mm Width (Minimum Length - 03 Meters Each)	3 Rolls.
15.	PVC (N.A.) Tape	15 Meters
16.	Mastic Sealing Tape	4 Meters
17.	PVC Adhesive Tape (R, Y, B)	1 Meter of each colour

18.	Nylon String for cutting the XLPE insulation	2 Meters
Sr. No.	**Material**	**Quantity**
19.	Aloxite tape for polishing the XLPE insulation (120,150, 220 grit) Minimum Length - 1Meter.	01 Piece Each
20.	Spatula / Stirrer for mixing compound	1 No.
21.	Epoxy Putty	500 gms.
22.	Cleaning Tissues (6ml.)	06 Packets.
23.	Cleaning Cloth	2 Nos.
24.	Aluminium Supporting Ring / Backup Ring (split type) (Minimum Width – 60 mm)	2 Nos.
25.	S.S. Hose Clips / Jubilee Clamps	4 Nos.
26.	Aluminium Inline ferrules (Compression Type)	3 Nos.
27.	Mould Holding Clips	6 Nos.
28.	Instruction sheet/ Installation Manual	1 No.
29.	List of kit contents / Packing list	1 No.
30.	Any other item as prescribed by supplier	Adequate

5.2.2 The Tapex, transition straight jointing kit required for jointing of 11kV, 3C x 240 sq.mm. Alu. Conductor wire armoured XLPE cable with 11kV, 3C X 300 sq.mm. Alu. Conductor, PILC Cable.

The contents of each kit shall include the following components :

Sr. No.	**Material**	**Quantity**
1.	Cable Jointing Compound (Resin) (Minimum Weight: -2.8 kg. Each)	4 Tins
2.	Cable Jointing Compound (Hardener) (Sufficient quantity proportionate to resin part)	4 Bottles
3.	Stress Grading Pad (120 mm x 120 mm +/- 5 mm)	3 Nos.
4.	High Impact Polystyrene Mould	1 No.
5.	Mould Adhesive	1 Bottle
6.	Cleaning Solvent (Minimum - 40ml.)	2 Bottles
7.	Core Spacers	2 Nos.

8.	Self Amalgamating Insulating Tape	20 Meters
9.	Self Amalgamating Semi-conducting Tape	15 Meters
Sr. No.	**Material**	**Quantity**
10.	Foam Tape / Sponge Sheet Packet (Tape / Sponge Minimum Length : - 1.5 Meters)	1 No.
11.	Tinned Copper Flat Braid for earth continuity connection (Minimum Cross Sectional Area: 25 mm^2 & Minimum Length- 920 mm)	2 Nos.
12.	Bare Copper Braid (Short) for copper tape screen (Minimum Cross Sectional Area: 06 mm^2)	3 Nos.
13.	Copper Binding Wire 16 /18 swg (Minimum Length - 3 Meters)	2 Rolls.
14.	G.I. Binding Wire (Minimum Length - 3 Meters)	2 Rolls.
15.	Tinned Copper Wire Mesh - 50mm Width (Minimum Length - 03 Meters Each)	3 Rolls.
16.	PVC (N.A.) Tape	10 Meters
17.	Oil Barrier Tape	10 Meters
18.	Mastic Sealing Tape	4 Meters
19.	PVC Adhesive Tape (R, Y, B)	1 Meter of each colour
20.	Nylon String for cutting the XLPE insulation	2 Meters
21.	Aloxite tape for polishing the XLPE insulation (120,150, 220 grit) Minimum Length - 1Meter.	01 Piece Each
22.	Spatula / Stirrer for mixing compound	1 No.
23.	Epoxy Putty	500 gms.
24.	Cleaning Tissues (6ml.)	06 Packets.
25.	Cleaning Cloth	2 Nos.
26.	Aluminium Supporting Ring / Backup Ring (split type) (Minimum Width – 60 mm)	1 No.
27.	S.S. Hose Clips / Jubilee Clamps	4 Nos.
28.	Barrier type, Aluminium Ferrule (For 3C X 240 sq.mm. XLPE Cable to 3C X 300 sq.mm. PILC Cable)	3 Nos.
29.	Mould Holding Clips	6 Nos.
30.	Instruction sheet/ Installation Manual	1 No.

31.	List of kit contents / Packing list	1 No.
32.	Any other item as prescribed by supplier	Adequate

5.2.3 The Push on type or Equivalent Indoor Termination Kit required for terminating 11kV, 3C x 240 sq.mm. Alu. Conductor XLPE cable in the 11kV switchgear cable compartment (VCBs & RMUs). For details of 11kV VCB's cable compartment, pl. refer Drawing No. E/PL-103 B (5) Rev. 'A' and Drawing No.SK/PL-(2013)311 for details of 11kV RMUs cable compartment with & without LV CT.

The contents of each kit shall include the following components :

Sr. No.	Material	Quantity
1.	Push On Stress Cone	03 Nos.
2.	Sliding Cone	01 No.
3.	Semi - Conducting Pad	03 Nos.
4.	Self-bonding Insulating tape	03 Meters
5.	PVC (N.A.) Tape	30 Meters
6.	Lug Sealing Tape	01 Roll.
7.	Lug Sealing Mastic	03 Nos.
8.	Tinned Copper Flat Braid of sufficient length (Long) with lug at one end for earthing (Minimum Cross Sectional Area: 50 mm^2)	01 No.
9.	Bare Copper Braid (Short) for copper tape screen	03 Nos.
10.	Discharge Control Compound / Silicon Grease	03 Packets.
11.	Cleaning Solvent (Minimum - 40ml.)	02 Bottles
12.	Trifurcating Boot	01 No.
13.	Aluminium Lugs (Compression Type)	03 Nos.
14.	Aloxite tape for polishing the XLPE insulation (120,150, 220 grit) (Minimum Length – 0.5 Meter)	01 Piece Each
15.	Nylon String for cutting the XLPE insulation	02 Meters
16.	Copper Binding Wire 16 /18 swg (Minimum Length - 3 Meters)	01 Roll.

17.	Cleaning Tissues (6ml.)	04 Packets.
18.	Cleaning Cloth	2 Nos.
Sr. No.	**Material**	**Quantity**
19.	PVC Adhesive Tape (R-Y-B)	1 Meter of each colour
20.	Aluminium Supporting Ring / Backup Ring (split type)	01 No.
21.	S.S. Hose clips / Jubilee Clamps	02 Nos.
22.	Instruction sheet/ Installation Manual	01 No.
23.	List of kit contents / Packing list	01 No.
24.	Any other item as prescribed by supplier	Adequate

5.2.4 The above mentioned kit contents of 11kV Tapex jointing & Push on type terminations are specified for general guidance. However tenderer / supplier shall include necessary components in the jointing/termination kit for improving performance and thorough jointing/termination of HV cables thereby restoring continuity of the cable parts giving same performance as that of cable. The tenderer shall give full justification for inclusion of necessary components in the jointing kit in the SECTION 9: SCHEDULE OF DEPARTURES FROM SPECIFICATION.

5.2.5 The tenderer shall furnish complete list of components describing functioning of each component along with the offer. Various tapes, wires etc. listed above shall be supplied in standard lengths, sizes etc.

5.2.6 All these components shall have adequate dimensions and also electrical, chemical, mechanical and physical properties, generally as per prevailing/applicable standards amended to-date, to ensure reliability of joints and terminations to be installed.

5.2.7 The tenderer shall mention shelf life for the Tapex type kits. However, it should be minimum of 18 months for Tapex type Straight/ Transition Joints & unlimited shelf life for Push on Type Terminations from the date of delivery of each lot under normal storage conditions at ambient temperature prevalent in Mumbai as described in section 3 of this specification. The certificate of shelf life shall be submitted alongwith the offer. The jointing procedure should be quick, simple and absolutely reliable.

5.2.8 The aluminium ferrules/lugs supplied in the kit shall be as per IS:8308/93 and IS: 8309/93 respectively. Hardness index of aluminium ferrules/lugs used shall

be between 18 – 21 Vickers Hardness Number (VHN). The inner diameter ΦA for aluminium lug of size CAA300 shall be 25mm and for ferrule of size CIA300 shall be 25mm. Refer drawing no.ES/PL-A388 Rev.'E'.

5.2.9 The successful tenderer shall have to supply additional ferrules / lugs (1% of the total quantity of ferrules/lugs supplied per item, per lot of jointing/termination kits or minimum 5 nos. of ferrules / lugs per item, per lot whichever is higher) for testing purpose.

5.2.10 The components of resin cast system shall be packed in Tins/plastic bottles of suitable Sizes. There should be sufficient space in the tin/container containing resin to facilitate mixing of resin with the hardener. For 11kV Tapex straight / transition joints, the minimum weight of resin (in kgs.) to be supplied has been specified in the kit contents. However if additional quantity of resin/hardner is required for filling the mould completely, then same shall be supplied in each jointing kit.

5.2.11 For identification purpose, a suitable name plate made of acrylic sheet (Thickness : 04 to 05 mm , Size:- Width: 50 mm, Length: 70 mm) shall be provided at either end of the completed joint and in case of termination, same shall be provided below the crutch region. Nameplate shall be suitably packed in polyethylene bag/aluminium foil pouch (with sealing arrangement at one end) and shall be provided for each jointing kit/termination kit on which following information shall be engraved. Also holes shall be provided at four corners of identification tag for fixing the tag.

Make --------, Brand--------
P.O.no./date ----------, Lot no.---------- Supply month/year ---------.

SECTION 6: PERFORMANCE TESTS CERTIFICATES AND ACCEPTANCE CRITERIA

6.1 Type Tests

6.1.1 Type Tests for 11Kv Tapex joints / Push on Type Termination kits

6.1.1.1 The Tenderer who had supplied specified material in the past to the Undertaking and carried out any changes in design

AND

The tenderer who has not supplied specified material in the past to the Undertaking i.e. New suppliers of Tapex jointing kits / Push on Type Termination kits of different voltages which are offered by the tenderer, shall submit type test certificates from NABL accredited laboratory along with the offer in respect of offered of 11kV Tapex jointing kits / Push on Type Termination kits for the records of purchaser. Information shall be summarized as per Annexure I-A.

6.1.1.2 For 11kV Tapex straight joints and Push on Type Terminations of 11kV XLPE Cables, these Type tests shall be carried out in accordance with IS 13573:1992 amended upto date or relevant International Standards amended upto date, whichever is applicable.

6.1.1.3 For 11kV XLPE Cable to PILC Cable Tapex transition straight joints, Type tests shall be carried out in accordance with IS 13705:1993 amended upto date or relevant International Standards amended upto date, whichever is applicable.

6.1.1.4 These type test certificates of 11kV Tapex straight, transition joints & Push on terminations shall be preferably in respect of testing carried during last 5 years period from the date of opening of the tender.

6.1.2 Type Test Certificates for Vital jointing /Termination kit components:

6.1.2.1 The Tenderer who had supplied specified material in the past to the Undertaking and carried out any changes in design

AND

The tenderer who has not supplied specified material in the past to the Undertaking i.e. New suppliers of Tapex jointing kits / Push on Type Terminations kits of different voltages which are offered by the tenderer, shall submit type test certificates for Self Amalgamating Insulating Tape, Self Amalgamating Semi-conducting Tape and other vital components particularly the one used for stress grading function , vital components of Push on Type Terminations, to confirm their important properties as per requirement of this

specification along with the offer for the records of purchaser. Information shall be summarized as per Annexure I-B.

6.1.2.2 Testing shall be carried out at CPRI Bangalore or at other government recognized laboratories/internationally accredited laboratories in line with Indian Standard or relevant International Standards, whichever is applicable.

6.2 The undertaking reserves the right to ask for any other certificates which is deemed fit for technical evaluation of Tapex jointing and push on termination kits , during the process of the tender.

6.3 Tenderer shall submit test certificates for Vickers Hardness Number (VHN) along with tender documents for aluminium ferrule and lug.

6.4 ACCEPTANCE CRITERIA

6.4.1 Initially, tenderer shall deliver 1 no. of 11kV Tapex straight ,transition jointing and/or Push On termination kit (1 no. each of every item for which the successful tenderer has received Acceptance letter /Purchase Order) to our Kussara Stores, Mazgaon, Mumbai 400 010 as a proto-type for approval of Undertaking's accepting authority within 3 weeks from date of receipt of acceptance letter/Purchase Order.

6.4.2 PROTO INSPECTION / TESTING OF JOINTING & TERMINATION KITS / KIT COMPONENTS:

6.4.2.1 Over and above the various requirements specified in this specification, physical inspection of proto-type of 11kV Tapex straight ,transition jointing and/or Push On termination kit delivered by successful tenderer/s shall be carried out by the Undertaking's accepting authority to ascertain component's quality, quantity, and dimensions supplied as per Undertaking's specification, proper marking/labeling for component identification and ensuring adequate packing.

6.4.2.2 The aluminium inline ferrules/lugs supplied alongwith 11kV Tapex jointing and termination kits shall be tested in the Undertaking's laboratory in accordance with IS 8308: 1993 and IS 8309:1993 amended to date respectively. Also VHN test shall be carried out on aluminium ferrules/lugs to confirm hardness.

6.4.2.3 Also compound (resin) and hardener supplied along with proto-type of 11kV Tapex straight and transition jointing kits shall be tested at our laboratory as per relevant Indian Standards / International Standards at the discretion of the Undertaking.

6.4.2.4 In case of rejection of prototype at our end, the manufacturer shall attend/rectify defects/shortfalls within 10 days from the date of receipt of rejection memo, failing which the delayed period will be reckoned for counting L.D. charges.

6.4.3 After the approval of proto-type of Tapex straight ,transition jointing and Push On type termination kits, the successful tenderer shall deliver the 1st Lot within 4 weeks from date of approval of proto type and remaining kits as per our schedule. However the Undertaking reserves the right of revising the delivery schedule & also intimating the required quantity to be delivered.

6.4.4 For acceptance of lot/s of 11kV Tapex straight ,transition jointing and Push On type termination kits, supplied by vender/s, physical inspection / testing of random samples selected from lot/s shall be carried out to ascertain material properties, component's quality, quantity, and dimensions supplied as per Undertaking's specification and as per prototype accepted earlier. Any lot is liable for rejection during lot inspection by the Undertaking, if test results are not satisfactory and there are deviations from our specification or jointing and termination kits, offered are found to be incomplete. In such cases, the manufacturer has to offer fresh lot for re inspection.

6.4.5 Additional Tests/Inspection:

6.4.5.1 Purchaser reserves the right of carrying out any inspection and testing at the manufacturer's works/laboratory during all the stages of manufacture.

6.4.5.2 Purchaser also reserves the right to select complete jointing/termination kit and/or some of the components from the kits, at random from the supply made and subject them for testing at government recognized laboratories as per relevant standards applicable, for confirmation of material properties and ensuring reliability of jointing/termination kits. If the same fails in the testing, whole lot would be rejected.

SECTION 7 : DISPATCH INSTRUCTIONS

7.1 : Marking on Tin/ Container.

Marking on Compound : Each container of compound (resin / hardener) shall be marked with the following information :

The information regarding Date of Manufacturing & Date of expiry shall be embossed on cast resin metal tin/container or shall be printed on plastic tin/container with indelible ink instead of providing a printed sticker. Remaining details shall be printed on container with indelible ink or printed on a sticker provided on container.

1.0 Type of cast resin system

2.0 Content of bottle - Resin / Hardener

3.0 Quantity of Resin / Hardener in tin/container in Kilograms

4.0 Quantity of Resin / Hardener in tin/container in liters

5.0 Procedure for mixing of compound

6.0 Batch No.

7.0 Type HV or LV

8.0 Date of Manufacturing

9.0 Date of expiry

7.2 Marking on Mould :

Each half of the mould shall be marked with following information by embossing :

1. Manufacturer's name
2. Brand name
3. Year of manufacture

7.3 Routine Test Certificates:

Certificates regarding routine tests carried out in India, by the supplier on randomly selected vital components such as Self Amalgamating Insulating Tape, Self Amalgamating Semi-conducting Tape and other vital components generally

representing the lot/supply; shall be furnished along with the lot offered for the records of the purchaser.

7.4. Additional set of Resin & Hardner

7.4.1 While delivery of each lot, the successful tenderers shall supply additional set of compound (resin) and hardener having same weight as that of compound (resin) & hardener supplied along with jointing kits. This is for selecting randomly the above items in the specific lot for carrying out acceptance test at our laboratory as per relevant Indian Standards / International Standards to accept the lot as per the discretion of the Undertaking.

7.5 Packing of the kit and marking of kit components:

7.5.1 Each component shall be supplied in separately sealed package. All components together shall form complete jointing/ termination kit and packed in cartons bearing legible kit description. Packing cartons shall be sufficiently strong to withstand damage during transport, storage and handling.

7.5.2 For the purpose of identification, each component shall bear legible description such as name of the component, supplier's name, component serial number, batch reference, Electrically conducting components shall be marked as "conducting" clearly and permanently.

7.5.3 Instruction manual and bill of materials strictly as per kit contents indicating component dimensions and quantity supplied shall be furnished with the kit.

7.5.4 Instruction manual shall clearly bring out detailed procedure in steps for cable preparation and joint/termination installation with the help of necessary drawings.

SECTION 08: <u>SCHEDULE OF GUARANTEED PERFORMANCE AND OTHER PARTICULARS OF 11kV TAPEX STRAIGHT / TRANSITION JOINTING KITS AND PUSH ON TYPE TERMINATION KITS FOR 11kV CABLES</u>

(Must be filled in by the Tenderers)

Sr. No.	Guaranteed Performance & Other Particulars	Remarks
1.	To supply all the components enlisted in clause no. 5.2.1, 5.2.2 and 5.2.3 for the respective items. List of kit contents shall be submitted along with the offer (In case of any alternation of any component, which the tenderer intends to supply, proper justification should be submitted. If, the justification is not submitted or it is felt unsatisfactory by the Undertaking, the offer shall be overlooked)	Yes / No
2.	To submit details of testing facilities available at the manufacturing place which can be witnessed by the Undertaking's representative.	Yes / No
3.	To give demonstration of atleast one joint / termination at site On free of cost basis as per clause no. 5.1.7 of specification.	Yes / No
4.	Letter of acceptance for rendering technical and supervisory assistance for making joints terminations for at least 10% of the ordered quantity for item/s (for which P.O. is placed) on free of cost basis, at a short notice.as per clause no. 5.1.7 of specification..	Yes / No
5.	Letter for shelf life mentioning shelf life of minimum 18 months for Tapex type Straight/ Transition Joints & unlimited shelf life for Push on Type Terminations as per clause No. 5.2.7 of specification.	Yes / No
6.	Type test certificates of tests conducted at a NABL accredited Laboratory for 11kV Tapex jointing & Push On type termination kits are submitted alongwith the offer as per clause no. 6.1.1 of specification.	Yes / No
7.	Type test certificates of vital components of jointing & termination kits are submitted alongwith the offer as per clause no. 6.1.2 of specification.	Yes / No

8.	Test certificate for Vickers Hardness Number (VHN) as per clause no. 6.3 of specification.	Yes / No
Sr. No.	**Guaranteed Performance & Other Particulars**	**Remarks**
9.	Letter of acceptance of 5 years guarantee for the kits from the date of installation against defective design and material as per clause no. 1.7.1 of specification.	Yes / No
10.	To submit undertaking letter of the manufacturer regarding acceptance of guarantee clause no. 1.7.1 of specification., even if the, authorized agent / dealer is changed during the guarantee period.	Yes / No
11.	To submit undertaking letter of the Tenderer regarding failure of any Joint / Termination, as per clause No. 1.7.2 of specification.	Yes / No
12.	To submit list of electricity utilities / boards to whom 11kV Tapex kits of equivalent or higher rating than the item quoted for. (The list must contain P.O. details, rating and quantity supplied)	Yes / No
13.	Stress control distribution, attach literature.	Yes / No
14.	Provision of catalogues for offered 11kV joints & terminations.	Yes / No

Date : _____

Signature & Seal of Tenderer : _____

SECTION 09: SCHEDULE OF DEPARTURES FROM SPECIFICATION

SPECIFICATION NO. 17B0214

Tenderers shall mention in this schedule all the departures from the various clauses/sections of this specification If any. In absence of any mention in this schedule, compliance with this specification is taken for granted and shall be binding on tenderer.

Sr No	Ref. to Clause/Section No of Specification	Departures & remarks on departures

SEAL & SIGNATURE
OF THE TENDERER _____

DATE : _____

ANNEXURE - I

LISTS OF TYPE TESTS OF COMPLETE KITS AND VITAL KIT COMPONENTS

ANNEXURE – I (A) Lists Of Type Test Certificates regarding Testing of Complete 11kV Tapex jointing & Push On Termination Kits

Sr No	Testing Month / Year	Type of Tapex Straight/ Transition Push On Termination Kit	Voltage Grade	Size / Type of cable	Testing Lab/ Organisation	Tested as per Ref. Std.	Specific remarks if any.

Signature & Seal of Tenderer

_____

ANNEXURE – I

ANNEXURE – I (B) Lists Of Type Test Certificates regarding Testing of vital Kit components of 11kV Tapex jointing & Push On Termination Kits.

Sr No	Testing Month / Year	Description of the Tapex Straight/ Transition Push On Termination Kit components tested	Voltage Grade	Testing Lab/ Organisation	Tested as per Ref. Std.	Specific remarks if any.

Signature & Seal of Tenderer

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