



Specification No: - CSC- 86/R-I/DH/UH/P&D/2015-16

TECHNICAL SPECIFICATIONS

FOR

Heat Shrinkable / Push on Type Terminations

For

11 KV XLPE Cables

**CSC Approval Date - 22.03.2016 Common Specifications Committee
DHBVN & UHBVN**



TECHNICAL SPECIFICATIONS FOR Heat Shrinkable / Push on Type Terminations for 11 KV XLPE Cables

1. SCOPE:-

This specification covers the design, manufacture/assembly and testing of heat shrinkable/push on type terminations suitable for 11 KV 3-core XLPE insulated, screened, armoured, with aluminium conductor cables suitable for earthed system and conforming to IS:7098(Part-II)-1985 with latest amendment, if any

2. STANDARD

The performance as well as type test requirements of all type of kits referred under scope shall conform to stipulations of IS : 13573/2011 or VDE-0278 with latest amendments, if any.

All the electrical & physical parameters of terminations should also conform to the corresponding parameters of XLPE cables referred under 'SCOPE' of this specification, as per IS: 7098 (Part-II)-1985 (with latest amendments, if any) or equivalent international standards

2) CLIMATIC CONDITIONS

I.	Maximum ambient temperature (°C)	60
II.	Minimum ambient air temperature (°C)	-5
III.	Maximum average daily ambient temperature(°C)	40
IV.	Maximum yearly weighed average ambient temperature	32
V.	Maximum altitude above mean sea level (m)	1000
VI.	Minimum Relative Humidity.(%)	28
VII.	Maximum Relative Humidity (%)	95
VIII.	Average no of Rainy days/year	120
IX.	Average annual rainfall	900mm
X.	Maximum wind pressure .	195 kg/m sq.

The material shall be for use in moderately hot and humid tropical climate, conducive to rust and fungus growth

3) REQUIREMENT

The heat shrinkable/push on type terminations offered shall be of proven design and make, which have already been extensively used ; and fully type tested.

4) GENERAL REQUIREMENT

The Purpose of this specification to specify the performance of termination kits for the use on 50 C/S 3 phase system with earthed neutral for working voltage of 11 KV. Earthing arrangement shall be as per relevant standard and details of earthing arrangement offered shall be submitted alongwith the tender

5.1 The material to be used should be inert and capable of resisting degradation during the service of cable system. The kit shall be provided with protection against rodents and termite attack.

5.2 Heat Shrinkable Type (Terminations):

5.2.1 The term heat shrinkable refers to extruded or moulded polymeric materials which are cross-linked to develop elastic memory and supplied in expanded or otherwise deformed size/shape, subsequently heating in a non-constrained state to a



temperature above the shrink temperature resulting in the material recovering or shrinking to its original-shape.

- 5.2.2 Since the sealant or adhesives (to be used for environment sealing) between the heat shrinkable materials and XLPE cables shall be exposed to high electrical stresses, they must be track resistant.
- 5.2.3 The heat shrinkable polymer materials being used for external leakage insulation between the high voltage of conductors and grounds should be weather resistant.
- 5.2.4 All cuts/nicks inadvertently occurred to XLPE insulation must be rendered discharge free by using suitable discharge suppression compound.
- 5.2.5 The heat shrinkable tubing may be either extruded or moulded type.
- 5.2.6 Higher thickness of heat shrinkable sleeves shall be preferable to counter erosion due to pollution.
- 5.3 Push on type (Terminations only):
- 5.3.1 Rubber components should be made from proven quality of rubber with tested curing properties.
- 5.3.2 The semi conducting portion of the stress cone should be vulcanized with insulation so that both semi conducting and insulation portion becomes an integrated part.
- 5.3.3 The stress cone must be of proven design of stress control.
- 5.3.4 The moulding of rubber components should be aimed to achieve a smooth finish on interior and exterior of the components.
- 5.3.5 The stress cone should probably be reusable type.
- 5.3.6 In case of outdoor terminations, the suitable provision for covering the cable cores with re-useable protective system from the crotch seal to the bottom of stress cone should be made
- 5.4 "Other Requirements
- 5.4.1 Proper stress control, stress grading and non tracking arrangement in the terminations shall be offered by means of proven methods, details of which shall be elaborated in the offer. Detailed sectional view of assemblies shall be submitted alongwith the offer.
- 5.4.2 The kits shall provide the total environment sealing, the details of which shall be offered alongwith the offer.
- 5.4.3 Provision for effective screening over each core be made and bidders shall categorically conform this aspect in their offer.
- 5.4.4 The material and components not specifically stated in the specification, but which are essential for satisfactory operation of the equipments shall be included without any extra cost.
- 5.4.5 The terminations shall be of better tracking resistant properties and fully reliable earthing system to maintain continuous contact with screening/armouring as the case may be.
- 5.4.6 The armour earthing arrangement shall form part of the termination.



- 5.4.7. Terminations shall have provision for shield connections and earthing.
- 5.4.8 The kits shall be suitable for storage without deterioration at a temperature upto 50 C for more than 5 years.
- 5.4.9 The fault level (as well as duration) withstand capability of terminations should be strictly matching with these parameters of cables for which the kits are intended to be used.
- 5.4.10 The words DHBVN/UHBVN alongwith trade name of manufacturer, month/year of manufacturer, size etc. shall be embossed/engraved or suitably marked with indelible ink/paint for the purpose of identification.
- 5.4.11 Suitable creepage extension/rain protection shield for outdoor termination shall be provided.
- 5.4.12 The adequate provisions for eliminating the chances of entrapment of air at the steps formed by semicon screen shall be made.
- 5.4.13 The gripping tubing (termination boot) for the cable where trifurcation takes place shall also be part of kit and covered under scope of this supply of this specification.
- 5.4.14 Name of sub-supplier for the raw material and standard according to which their raw material are tested, must be furnished alongwith the offer
- 5.4.15 Detailed kit contents, whether manufactured by the bidder or bought from outside (with name of sub vendor) for each component must be indicated in the offer.
- 5.4.16 The terminations shall be supplied, in kit forms. All insulating and sealing materials, consumable items, conductor fittings, earthing arrangements and lugs etc. shall be included in the individual kit.
- 5.4.17 An instruction manual in English, indicating the complete method/procedure to be adopted for installation of kits, preferably with more and more diagrams/pictorial presentation shall be supplied with each kit. Various items quantity thereof against each kit must be indicated in the instruction manual.

6- GUARANTEED TECHNICAL PARTICULARS

The terminations shall have same electrical and thermal characteristics as those of cables with which these are intended to be used. The tenderers must furnish the guaranteed technical particulars for each type/size of kit in Annexure-'A'

7- CONSUMABLES OR RE-USABLE PUSH ON TYPE KITS:

The details of consumable viz-a-viz reusable parts for each size of push on type (indoor/outdoor separately) termination must be supplied on a separate sheet. The %age of consumables for reusing these kits must be indicated for each size.

8- DRAWINGS

Complete detailed dimensional drawings showing all details of kit contents/bill of material for each size type.

Note: Any tender without complete guaranteed technical particulars and



dimensional drawings shall be liable for rejection

9- TRAINING :-

In case of placement of an order against this tender enquiry, the tenderer shall have to impart free of cost demonstration to selected number of Nigam personnel by installing few kits anywhere in Haryana, places of Purchaser's discretion. If required, supplier may have to give free of cost practical training regarding installation of their product in Nigam training institutes also

10- TESTS :-
10.1 Type tests :

The termination kits of offered design should have been got tested from NABL accredited laboratory as per relevant standards with latest " version. "

10.2 Acceptance Tests:

Initially the following tests shall constitute as acceptance tests

- i) Dimensional checking as per approved drawings.
- ii) Volume resistivity test; for various components.
- iii) AC High voltage test after installation of terminations (as per IS : 13573/1992 or VDE-0278) on appropriate cable.
- iv) Dielectric strength of major components.
- v) D.C. High voltage test.
- vi) Tracking resistance.
- i) Ultimate Elongation.
- ii) Tensile Strength.

The scope to include more type tests as acceptance tests shall be decided after processing the offers of various bidders/after knowing the details of testing facilities for type tests available with various tenderers.

IMPORTANT : The tenderers must specifically mention in their offer about the details of testing facilities for various type test as per IS : 13573/1992 and or VDE-0278, available at their works, failing to do so, the offer is liable to be rejected on the presumption that adequate testing facilities are not available with them.

ROUTINE TESTS :- The following test's shall constitute routine test:

- i) Dielectric strength.
- ii) Density.
- iii) Heat shock.
- i) Shrinkage ratio.

The tenderer must specify the details of routine tests (being conducted at their works) alongwith the standard applicable, in their offer.

The routine test certificates shall be furnished alongwith the inspection call for each offered lot.

11 PACKING AND TRANSPORT :

The supplier shall be responsible for suitable packing of all the kits of material and marking on the consignment, so as to avoid any damage during transport and storage and to ensure correct dispatch to the destination.



उत्तर दक्षिण हरियाणा बिजली वितरण निगम
UTTAR DAKSHIN HARYANA BILJI VITRAN NIGAM


DHBVN

Superintending Engineer/P&D
Cum-Member Secretary DHBVN