

VOLUME – II

**RATE CONTRACT
TECHNICAL SPECIFICATION
FOR
CABLE TERMINATION
& JOINTING KITS
(NON-NTPC Projects)**

SPECIFICATION NO: PE-RC-999-507-E014A

REVISION: 0



**BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA, UP (INDIA) – 201301**



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SECTION

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DATE: 28.05.2025

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COMPLIANCE CERTIFICATE

The bidder shall confirm compliance to the following by signing/ stamping this compliance certificate and furnishing same with the offer.

1. The scope of supply, technical details, construction features, design parameters etc. shall be as per technical specification & there are no exclusion/ deviation with regard to same.
2. There are no deviation with respect to specification.
3. Only those technical submittals which are specifically asked for in NIT to be submitted at tender stage shall be considered as part of offer. Any other submission, even if made, shall not be considered as part of offer.
4. Any comments/ clarifications on technical/ inspection requirements furnished as part of bidder's covering letter shall not be considered by BHEL, and bidder's offer shall be construed to be in conformance with the specification.
5. Any changes made by the bidder in the price schedule with respect to the description/ quantities from those given in 'BOQ-Cum-Price schedule' shall not be considered (i.e. technical description and quantities as per specification shall prevail).

BIDDER'S STAMP & SIGNATURE



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SECTION – I

SPECIFIC TECHNICAL REQUIREMENTS

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SPECIFIC TECHNICAL REQUIREMENTS

1.0 SCOPE OF ENQUIRY


- 1.1 Design, manufacture, inspection and testing at manufacturer's works, proper packing and delivery to site of Cable Termination & Jointing Kits conforming to this specification.
- 1.2 It is not the intent to specify herein all the details of design & manufacture of material. However, the material shall conform in all respects to high standard of design, engineering and workmanship and shall be capable of performing in continuous commercial operation at site conditions.
- 1.3 Technical requirements of Cable Termination & Jointing Kits are indicated in Data Sheet-A & Section-II.

2.0 BILL OF QUANTITIES

The bidder to quote for items as per 'BOQ-cum-Price Schedule' attached with NIT.

3.0 DRAWINGS & DOCUMENTS TO BE SUBMITTED

- 3.1 Documents required to be submitted by the bidder along with the Technical offer: -
 - (a) Type test reports for 3.3kV (UE), 6.6kV (UE) & 11kV (UE).
 - (b) PQR Credentials
 - (c) Compliance sheet
- 3.2 After rate contract; against specific project requirement following information shall be furnished by BHEL: -
 - a) BOQ (Bill of Quantities)

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3.3 Following documents shall be submitted for specific project requirement after placement of order for BHEL & customer's approval: -

Sl N o.	Drawings / Document Description	Document Number	Document Type	Vendor Sub (Days)*	BHEL Comment (Days)	Vendor Sub (Days)#	Bhel & customer comment/ Approval (Days)
1	Quality Plan for Cable Termination & Jointing Kit	PE-V0- XXX - 507-E904	Primary	5	5	5	15
2	Technical datasheet & GA drawings of Cable Termination & Jointing kits	PE-V0- XXX - 507-E032	Primary	5	5	5	15
3	Type Test Report/ Certificates of Cable Termination & Jointing kits	PE-V0- XXX - 507-E033	Primary	5/60 days (**)	5	5	15

- a) * 1st submission within indicated days from date of purchase order.
b) # Submission (within indicated days) after incorporating all BHEL comments.
c) Primary documents shall be considered for Delay analysis.

(**)

1. If Type Test Report is available and Type test conduction is not required as per technical Specification, days specified before '/' shall be followed from date of purchase order.
2. If Type Test Report is not available as per technical Specification, days specified after '/' shall be followed after approval of all other primary documents.

3.4 Drawings/ documents shall be submitted through Document Management System (DMS).

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DATASHEET-A

1.0 REFERENCE CODES & STANDARDS

- 1.1 IS: 13573 (Latest Revision): Cable accessories for extruded power cables.
- 1.2 IS: 8309: Compression type tubular terminal ends for aluminium conductors of insulated cables.
- 1.3 Heat shrink material shall comply with requirements of ESI 09-13 (external tests).
- 1.4 Cable joints and terminations should be with FRLS properties as per IEC 60754

2.0 TERMINATION KITS

- 2.1 Voltage grade: 3.3 kV (U/E) /6.6kV (UE)/ 11kV (U/E)
- 2.2 Application: Indoor
- 2.3 Type: Heat Shrinkable Type
- 2.4 Sizes: As per BOQ
- 2.5 Type testing conforming to: As per IS 13573 and IEC60502
- 2.6 Total Shrouding of all live parts: Yes

3.0 STRAIGHT THROUGH JOINTING KITS

- 3.1 Voltage grade: 3.3 kV (U/E) /6.6kV (UE)/ 11kV (U/E)
- 3.2 Type: Heat Shrinkable Type
- 3.3 Sizes: As per BOQ.
- 3.4 Testing requirement conforming to As per IS 13573 and IEC60502

4.0 BRIEF CABLE SPECIFICATION

- 4.1 Voltage grade: 3.3 kV (U/E) /6.6kV (UE)/ 11kV (U/E)
- 4.2 Conductor material: Stranded aluminium
- 4.3 Conductor screening material: Extruded cross-linked Semi conducting compound
- 4.4 Insulation material: Cross-linked polyethylene (XLPE)
- 4.5 Insulation Screen material
- a) Non-metallic: Cross-linked semi-conducting compound

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b) Metallic: Copper tape

4.6 Armour: Applicable

(a) Single core: Aluminium round wire

(b) Multi core: Galvanised steel strip/round wire armour

4.7 Inner sheath material: PVC Type ST2

4.8 Outer sheath material: PVC Type ST2 (FRLS)

5.0 Required Fault Level:

	3.3kV	6.6kV	11kV
RMS Value	40kA	40kA	50kA
Peak Value	100kA	100kA	125kA

Fault withstand duration: 1.0 sec

6.0 Type testing requirement:

11 kV, 6.6kV & 3.3kV grade joints and terminations shall be type tested and Type test reports as per IS:13573 Part-II and IEC60502 shall be furnished. Also, heat shrink material shall comply with requirements of ESI 09-13 (external tests). Critical components used in cable accessories shall be of tested and proven quality as per relevant product specification/ESI specification. Cable joints and terminations should be with FRLS properties as per IEC 60754-1&2. Calculation to withstand the required fault level shall also be furnished in case of cold shrinkable type kits.

Type test certificates to be furnished in line with Clause 3.4, 3.5, 3.6 of Section-II of specification. Type testing/Test certificates shall conform to IS: 13573.

Type test reports shall not be older than 30.11.2014.

7.0 CABLE LUGS (As per DIN):

(a) Tinned copper solderless crimping type lugs & ferrule. Cable lugs shall be provided with bimetallic washer.

(b) Aluminium solderless crimping type cable lugs and ferrule as per DIN standard.

(a) or (b) shall be applicable as per BOQ.



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SECTION-II

STANDARD TECHNICAL REQUIREMENTS



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1.0 CODES AND STANDARDS

- 1.1 The material shall comply with all currently applicable safety codes and statutory regulations of India as well as of the locality where the material is to be installed.
- 1.2 The design, material, construction, manufacture, inspection, testing and performance of **Cable Termination & Jointing Kits** shall conform to the latest revision of relevant standards and codes of practices as per Datasheet-A.

2.0 TECHNICAL REQUIREMENTS

- 2.1 Technical particulars of Cable termination & jointing kits are specified in Technical Datasheet.
- 2.2 Termination Kits shall be of proven design and make, which have already been extensively used and fully type tested. Critical components used in cable accessories shall be of tested and proven quality as per relevant product specification/ESI specification. Kit contents shall be supplied from the same source as were used for type testing.
- 2.3 The termination/jointing kits shall be suitable for site ambient conditions and polluted atmosphere, and for storage without deterioration at 50°C ambient temperature.
- 2.4 Termination kits shall be suitable for installation inside motor terminal boxes, metal clad switchgear, transformer terminal box etc.
- 2.5 Each kit shall contain all necessary components, accessories and consumables to make a complete termination in such a way that no live parts of the terminals and connecting lugs are exposed. Cable lugs for termination kits & jointing ferrules for straight through jointing kits shall form part of the kit.
- 2.6 The kit shall be complete with
- (a) The tinned copper solderless crimping type cable lugs & ferrule or mechanical connectors (wherein bolts are tightened that shear off at an appropriate torque) as per DIN standard suitable for aluminium compacted conductor cables. Same shall be provided with bimetallic washer.
 - (b) The aluminium solderless crimping type cable lugs and ferrule as per DIN standard.
- (a) or (b) shall be applicable as per BOQ.
- 2.7 Termination and jointing kits shall have requisite stress relieving characteristics.
- 2.8 Termination and joints shall have provision for shield connection and earthing, wherever cable screening is specified.
- 2.9 All materials and components of the terminations/joints shall be suitable for and compatible with the type of cables for which the terminations/joints are intended.
- 2.10 Any surface treatment or sealants used to ensure environmental protection to the components of termination/joint or on the cable surface shall be non-tracking type and shall withstand the associated electric stress.



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2.11 Cable jointing kits shall be suitable for directly buried cables.

2.12 Cable glands are excluded from the scope of supply of termination kit/ jointing kits.

3.0 QUALITY ASSURANCE, TESTING & INSPECTION

3.1 At contract stage, the successful bidder shall submit the signed & stamped Manufacturing Quality Plan for BHEL/ ultimate customer's approval. In case bidder has reference Manufacturing Quality Plan agreed with ultimate customer, same can be submitted for specific project after award of contract for BHEL/ ultimate customer's approval. There shall be no commercial implication to BHEL on account of Manufacturing Quality plan approval.

3.2 All materials shall be procured, manufactured, inspected and tested by vendor/ sub-vendor as per approved Manufacturing Quality Plan.

3.3 The supplier shall perform all tests necessary to ensure that the material and workmanship conform to the relevant standards and comply with the requirements of the specification. Charges for all these tests for all the equipments & components shall be deemed to be included in the bid price.

3.4 The bidder shall furnish the reports of all the type tests carried out, which shall conform to the latest revision of relevant standards. These reports should be for the tests conducted either in government approved third party laboratory or witnessed by client (such as major utilities/ industries) on identical/ similar items to those ordered under this contract.

3.5 In case bidder is not able to submit report of type test(s), or in case type tests report(s) are not found to be meeting the specification/ relevant standard requirements, then all such tests shall be conducted under this contract by the bidder free of cost to BHEL, and reports shall be submitted for approval. No charges shall be paid for testing under such circumstances.

3.6 Irrespective of the bidder furnishing valid type test report as indicated above, BHEL may get type tests conducted if specified as project requirement, for which cost shall be borne by BHEL as per actual.

3.7 Bidder to offer higher voltage grade termination & jointing kits, if they cannot produce relevant type test certificates for particular kits conducted in any govt. / govt. approved lab, without any price implication.

4.0 PACKING

Individual parts of termination & jointing kits shall be packed in strong plastic bags to protect them from ingress of dust & moisture. Further total kits shall be placed in a strong cardboard container to protect it against damage during transit, storage for prolonged periods and handling. It shall have proper marking over the box for early identification.

BOQ CUM UNPRICED SCHEDULE (NON-NTPC PROJECTS)

S.N.	CABLE TERMINATION & JOINTING KITS (NTPC Specification)	UOM	QUANTITY	UNIT PRICE (EX- WORKS) (Rs)	TOTAL PRICE (EX- WORKS) (Rs)
[A]	Termination Kits CU LUG				
A (1)	11/11 kV Termination Kits for 11/11kV (UE), AL CONDUCTOR XLPE INSULATED,ARMOURED POWER CABLE				
i)	1CX630 sq.mm	Nos.	285	0.0778*X/285	0.0778*X
ii)	1CX500 sq.mm	Nos.	90	0.0304*X/90	0.0304*X
iv)	1CX300 sq.mm	Nos.	40	0.0106*X/40	0.0106*X
v)	1CX240 sq.mm	Nos.	835	0.1962*X/835	0.1962*X
vii)	3CX240 sq.mm	Nos.	325	0.1713*X/325	0.1713*X
A (2)	6.6/6.6 KV Termination Kits for 6.6/6.6 KV (UE), AL CONDUCTOR XLPE INSULATED ARMOURED POWER CABLE				
i)	3CX240 sq.mm	Nos.	120	0.0359*X/120	0.0359*X
ii)	3CX185 sq.mm	Nos.	55	0.0159*X/55	0.0159*X
iii)	1CX240 sq.mm	Nos.	45	0.0096*X/45	0.0096*X
A (3)	3.3/3.3 KV Termination Kits for 3.3/3.3 KV (UE), AL CONDUCTOR XLPE INSULATED ARMOURED POWER CABLE				
ii)	3CX240 sq.mm		305	0.0703*X/305	0.0703*X
[B]	Straight Through Joints				
B (1)	Straight Through Joints for 11/11kV (UE), AL CONDUCTOR XLPE INSULATED,ARMOURED POWER CABLE				
i)	1CX630 sq.mm	Nos.	195	0.1093*X/195	0.1093*X
iii)	1CX240 sq.mm	Nos.	95	0.0452*X/95	0.0452*X
v)	3CX240 sq.mm	Nos.	85	0.0613*X/85	0.0613*X
B (2)	Straight Through Joints for 3.3/3.3 KV (UE), AL CONDUCTOR XLPE INSULATED ARMOURED POWER CABLE				
ii)	3CX240 sq.mm	Nos.	65	0.0365*X/65	0.0365*X
[C]	Termination Kits - AL LUG				
C (1)	11/11 kV Termination Kits for 11/11kV (UE), AL CONDUCTOR XLPE INSULATED,ARMOURED POWER CABLE				
i)	1CX630 sq.mm	Nos.	305	0.0526*X/305	0.0526*X
ii)	3CX240 sq.mm	Nos.	175	0.0399*X/175	0.0399*X
C (2)	3.3/3.3 KV Termination Kits for 3.3/3.3 KV (UE), AL CONDUCTOR XLPE INSULATED ARMOURED POWER CABLE				
i)	1CX240 sq.mm	Nos.	75	0.0069*X/75	0.0069*X
ii)	3CX240 sq.mm	Nos.	165	0.0303*X/165	0.0303*X

1.Bidder to quote grand total value of the complete package (Rs X) only as per the BOQ above. The item wise break up of total price and unit price shall be derived as per the formulae indicated above.

2. The total quantity variation shall be as per NIT.

3. For any clarification please refer technical specification no-PE-RC-999-507-E014A.