3x 660 MW NORTH KARANPURA STPP

VOLUME – IIB

TECHNICAL SPECIFICATION
FOR
MV CABLE TERMINATION & JOINTING KITS

SPECIFICATION NO: ***PE-TS-405-507-E009***
REVISION: ***0***

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

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	TOTAL NO. OF SHEETS (Including Cover Sheet & Content Sheet)	=30

IT IS CONFIRMED THAT OUR TECHNICAL OFFER COMPLIES WITH THE SPECIFICATION IN TOTAL & THAT THERE ARE NO TECHNICAL DEVIATIONS.

BIDDER'S STAMP & SIGNATURE
(REFER INSTRUCTION NO. 1 OF 'INSTRUCTIONS TO BIDDERS')

INSTRUCTIONS TO BIDDERS FOR PREPARING TECHNICAL OFFEER

1.0 Two signed and stamped copies of the following shall be submitted by the bidder as technical offer.

a. Unpriced price schedule with bidder's signature and company stamp.

b. A copy of this sheet (''Instructions to Bidders for Preparing Technical Offer''), with bidder's signature and company stamp.

c. A copy of previous sheet (''Contents''), with bidder's signature and company stamp.

No other technical submittal (such as copies of type test certificates, technical literature, etc.) is required during tender stage, unless specifically mentioned otherwise.

2.0 No comments/ additions/ deletions shall be made by the bidder on the signed & stamped copy of the specification. Any such changes made by the bidder shall not be considered.

3.0 Confirmations/ comments (if any) regarding delivery schedules shall be furnished as part of the commercial offer. Any reference in the technical offer/ covering letter shall not be considered by BHEL.

4.0 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.

5.0 Any changes made by the bidder in the price schedule with respect to the material description/ quantities from those given in Annexure-A to Section-C of specification [Bill Of Quantities cum price schedule] shall not be considered (i.e., technical description & quantities as per specification shall prevail)

BIDDER'S STAMP & SIGNATURE

PREAMBLE

1. The Tender documents contain Two (2) volumes. The bidder shall meet the requirements of all Two Volumes.

1.1 VOLUME - I CONDITIONS OF CONTRACT

This consists of four parts as below: -

Volume – IA This part contains Instructions to bidders for making bids to BHEL.

Volume – IB This part contains General Commercial Conditions of the Tender & includes provision that vender shall be responsible for the quality of item supplied by their sub-vendors.

Volume – IC This part contains Special Conditions of Contract.

Volume – ID This part contains Commercial Conditions for Erection & Commissioning site work, as applicable.

1.2 VOLUME – II TECHNICAL SPECIFICATIONS

Technical requirements are stipulated in Volume – II, which comprises of: -

Volume – IIA General Technical Conditions.

Volume – IIB Technical Specification including Drawings, if any.

1.3 VOLUME – IIB

This volume is sub-divided in to following sections:-

Section – A This section outlines the Intent of Specification

Section – B This section provides “Projection Information”.

Section – C This section indicates Technical Requirements specific to Contract, not covered in Section - D

Section – D This section comprises of Technical Specifications of Equipment’s Complete with Data Sheets A & C.

Data sheet - A: - Specific data and other requirements are pertaining to the equipment’s.

Data sheet – C: - Indicates data / documents to be furnished after the award of Contract as per agreed schedule by the vendor (as applicable)

1.1. The stipulations of Section-C, followed by those of Datasheet-A shall prevail in case of any conflict between the stipulations of Section-C, Datasheet-A and Section-D.

SECTION – 'A'

SCOPE OF ENQUIRY

SCOPE OF ENQUIRY

1.0 This specification covers the design, manufacture, inspection and testing at manufacturer's works, proper packing and delivery to site of MV CABLE TERMINATION AND JOINTING KITS as mentioned in different sections of this specification for the project **3x 660 MW NORTH KARANPURA STPP**

2.0 It is not the intent to specify herein all the details of design & manufacture. However, the equipment shall conform in all respects to high standards of design engineering and workmanship and shall be capable of performing in continuous commercial operation up to bidder's guarantee.

3.0 The general terms and conditions, instructions to bidders and other attachment referred to elsewhere are hereby made part of the Technical Specification.

4.0 The bidders shall be responsible for and governed by all requirements stipulated hereinafter.

5.0 Bidders shall confirm total compliance to the specification without any deviations from the technical/ quality assurance requirements stipulated.

6.0 The documents shall be in English language and MKS system of units.

SECTION – 'B'

PROJECT INFORMATION

1.00.00 **BACKGROUND**

North Karanpura Super Thermal Power Project (3x660 MW), a pit head coal based thermal power project, is located in Hazaribagh and Chatra districts of Jharkhand State. Basic inputs i.e. coal, water and land have already been tied up. The project is proposed for the States & Union Territories of Northern, Western and Eastern Regions and the State of Jharkhand.

The capacity of the project is 1980 MW comprising of three (3) units of 660 MW each.

1.01.00 **Location and Approach**

The power project is proposed to be located near Tandwa town in Chatra districts in the state of Jharkhand on Hazaribagh-Chatra State highway at a distance of about 50 kms from Hazaribagh city. The nearest commercial airport is Ranchi at a distance of 150 kms from project site. The nearest railhead Khalari Railway Station on Ranchi-Garhwa section of Eastern Railways is about 40 kms from project site.
Major rail/road distances from the project site are as under:

City		Distance Approx. (kms)
Ranchi	:	150
Khalari	:	40

The site is located near Tandwa town having latitude and longitude of about 23^0 50' N to 23º 52' N and 84^0 59' E to 85º 2' E respectively. The Vicinity Plan of the project is placed at **Annexure-I.**

Further to the information given in this sub-section, Bidders are also advised to visit the project site and collect data on local site conditions.

1.02.00 **Land**

About 2245 acres of land is being acquired for the project. About 1500 acres of land is under possession/legal possession and out of 1500 acres, about 890 acres of land is to be used for plant, ash dyke and initial enabling township. No additional land is envisaged to be acquired in plant area. About 15 acres of land is envisaged to be acquired in Hazaribagh city for Township.
Commissioner, Chatra vide dated 25.05.1999 and 14.06.2000 has given in-principle clearance for NKSTPP.

1.03.00 **Water**

Make up water available for this project would be about 22 cusec and will be arranged by constructing a dam/reservoir across river Garhi.

1.04.00 **Fuel (Coal)**

1.04.01 **Coal Requirement, Availability and Linkage**

Coal requirement for the project is estimated as 10.6 Million Tonne/Annum (MTPA), considering a GCV of 3800 kcal/kg. Ministry of Coal vide letter dated 21.10.99 accorded in-principle coal linkage of 10.00 MTPA subject to ratification by Standing Linkage Committee-Long Term (SLC (LT)), of MOC. SLC (LT) in its meeting held on 15.12.2000 firmed up the coal linkage of 10.24 MTPA for the project. Subsequently, the coal linkage was withdrawn by SLC (LT) in its meeting held on 22/23.10.08.

Cabinet Committee on Investment (GOI) in its meeting on 20.02.13 decided in-principle to restore the original coal linkage granted to NKSTPP (i.e. from Magadh Coal Block) with the stipulation that the coal supply will commence during the 13th Five Year Plan. MOC vide letter dated 09.05.2013 restored the coal linkage with the stipulation that the coal supply will commence during the 13th five year plan.

1.04.02 **Coal Transportation**

Coal from Magadh block of North Karanpura Coalfields is proposed to be transported to the project site through conveyor belt system. One external coal handling plant and one internal coal handling plant are envisaged.

1.05.00 **Meteorological Data**

Important meteorological data from nearest observatory at Hazaribag is placed at Annexure-II**.**

1.06.00 **Plant Water Scheme**

The Plant water scheme is described below.

1.06.01 **Condenser Cooling System**

It is proposed to adopt Air Cooled Condenser for the project.

1.06.02 **Equipment Cooling Water (ECW) System (Unit Auxiliaries)**

All plant auxiliaries shall be cooled by De-mineralized water (DM) in a closed circuit. The primary circuit DM water shall be cooled through heat exchangers by auxiliary cooling water system. The hot secondary circuit cooling water shall be cooled in the cooling towers and shall be returned back to the system.

1.06.03 **Ash Water System**

It is proposed to have HCSD (High concentration Slurry Disposal) system for combined fly ash and bottom ash. No recirculation of ash water from ash disposal area is envisaged.

1.06.04 **Other Miscellaneous Water Systems**

(a) Raw water shall be used for meeting the Fly ash and bottom ash system requirement etc.

(b) The service water shall be taken from clarified water tank of Pretreatment plant. Service water (wash water) collected from various areas shall be treated using oil water separators, tube settlers, coal settling pits etc. as per requirement and treated water from liquid effluent treatment plant shall be recycled back to the service water system for re-use.

(c) The drinking water requirement of the plant shall be provided from water treatment plant.

(d) Steam Cycle make-up water, makeup to the primary circuit of ECW (unit auxiliaries) system, boiler fill water and makeup to the hydrogen generation plant shall be provided from Demineralising plant.

(e) The quality of Raw water is enclosed with this sub-section as Annexure-III.

1.07.00 **Criteria for Earthquake Resistant Design of Structures and Equipment**

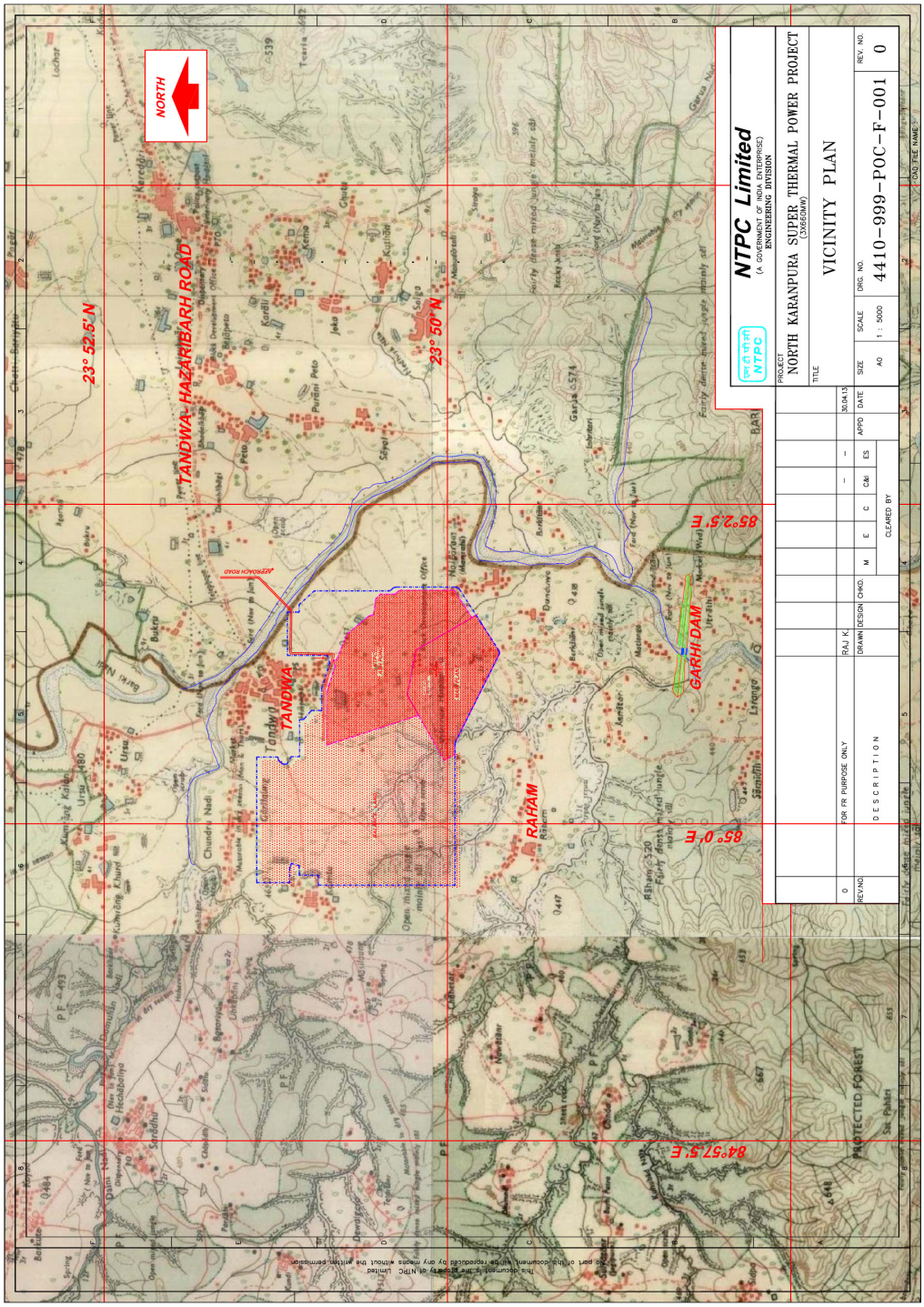
All power plant structures and equipment, including plant auxiliary structures and equipment shall be designed for seismic forces as given in the Part - B of this section.

1.08.00 **Criteria for Wind Resistant Design of Structures and Equipment**

All structures and equipment of the power plant, including plant auxiliary structures and equipment, shall be designed for wind forces as given as given in Part B of this section.

Annexure-I

VICINITY PLAN



CLIMATOLOGICAL TABLE

Annexure-II

CLIMATOLOGICAL TABLE

स्टेशन : हजारीबाग
STATION : Hazaribagh

अक्षांश LAT 23°59′ N देशांतर LONG 85°22′ E समुद्री तल माध्य से ऊँचाई HEIGHT ABOVE M. S. L 611 METRES

1951 से 1980 तक के प्रेक्षणों पर आधारित
BASED ON OBSERVATIONS FROM 1951 TO 1980

माह / MONTH	स्टेशन का सतह दाब / STATION LEVEL PRESSURE (एच. पी. ए. / hPa)	वायु तापमान / AIR TEMPERATURE — माध्य / MEAN: शुष्क बल्ब / DRY BULB (डि.सें. / °C)	नम बल्ब / WET BULB (डि.सें. / °C)	दैनिक अधिकतम / DAILY MAX (डि.सें. / °C)	दैनिक न्यूनतम / DAILY MIN (डि.सें. / °C)	माह में उच्चतम / HIGHEST IN THE MONTH (डि.सें. / °C)	माह में निम्नतम / LOWEST IN THE MONTH (डि.सें. / °C)	चरम / EXTREMES: उच्चतम / HIGHEST (डि.सें. / °C)	दिनांक और वर्ष / DATE AND YEAR	निम्नतम / LOWEST (डि.सें. / °C)	दिनांक और वर्ष / DATE AND YEAR	आर्द्रता / HUMIDITY: सापेक्ष आर्द्रता / RELATIVE HUMIDITY (प्रतिशत / %)	वाष्प दाब / VAPOUR PRESSURE (एच.पी.ए. / hPa)	मेघ की मात्रा / CLOUD AMOUNT: समस्त मेघ / ALL CLOUDS (आकाश के अष्टमांश / Oktas of sky)	निम्न मेघ / LOW CLOUDS (आकाश के अष्टमांश / Oktas of sky)	वर्षा / RAINFALL: मासिक योग / MONTHLY TOTAL (मि.मि. / mm)	वर्षा के दिनोंकी संख्या / NO. OF RAINY DAYS	वर्षसहित सबसे नम महीने का योग / TOTAL IN WETTEST MONTH WITH YEAR (मि.मि. / mm)	वर्षसहित शुष्कतम महीने का योग / TOTAL IN DRIEST MONTH WITH YEAR (मि.मि. / mm)	24 घंटोंकी सबसे भारी वर्षा / HEAVIEST FALL IN 24 HOURS (मि.मि. / mm)	दिनांक और वर्ष / DATE AND YEAR	माध्य पवन गति / MEAN WIND SPEED (कि.मी. प्र. घं. / Kmph)
जनवरी JAN I	947.6	14.7	10.9	22.6	9.3	26.7	4.6	30.6	31 1881	0.9	07 1980	62	10.4	1.4	0.5	23.5	1.7	113.0 1919	0.0	68.1	06 1945	6.2
II	944.5	18.9	12.8									49	10.4	1.6	0.5							
फरवरी FEB I	945.7	17.9	12.3	25.7	12.0	30.5	6.9	33.6	22 1967	1.7	08 1974	52	10.3	1.3	0.4	16.2	1.4	117.3 1907	0.0	63.5	23 1927	7.3
II	942.6	22.6	14.4									39	10.4	1.4	0.6							
मार्च MAR I	944.0	23.4	15.0	30.8	16.6	35.6	11.4	38.9	27 1892	6.7	04 1898	39	10.8	1.5	0.3	18.4	1.7	164.3 1905	0.0	44.2	20 1946	7.9
II	940.6	27.8	16.3									29	10.2	1.9	0.5							
अप्रैल APR I	941.0	28.6	18.2	35.7	21.3	39.3	16.4	41.7	22 1956	10.6	01 1968	36	13.3	1.8	0.3	17.0	1.4	81.6 1952	0.0	60.5	22 1925	8.6
II	937.1	32.4	18.8									26	11.8	2.2	0.7							
मई MAY I	937.0	30.7	21.1	37.8	24.0	41.5	19.3	43.9	18 1897	15.6	22 1977	43	18.1	2.5	0.3	43.4	2.9	187.2 1936	0.0	84.1	27 1887	9.1
II	933.4	34.3	21.2									32	15.7	2.9	0.7							
जून JUN I	933.4	28.4	23.3	34.1	24.1	40.1	21.0	46.6	14 1975	18.3	02 1975	67	25.0	5.3	1.8	177.1	9.2	774.5 1911	0.5 1905	249.2	24 1911	8.7
II	930.4	30.4	23.5									60	23.8	5.8	2.5							
जुलाई JUL I	933.1	25.6	23.8	29.5	23.0	33.2	21.4	39.6	08 1975	19.3	18 1975	86	28.2	6.5	3.8	310.0	16.2	693.2 1930	99.8 1911	221.7	06 1953	7.9
II	930.5	26.8	24.1									80	28.1	6.4	3.7							
अगस्त AUG I	934.5	25.2	23.7	29.1	22.7	31.5	21.3	34.2	03 1972	20.0	29 1967	88	28.3	6.4	3.8	320.1	16.2	706.1 1943	83.8 1928	180.1	17 1888	7.6
II	931.6	26.4	24.3									84	28.7	6.4	3.5							
सितम्बर SEP I	936.2	25.1	23.1	29.0	22.2	31.5	20.4	33.3	24 1960	17.8	29 1950	85	26.8	5.1	2.9	260.9	11.6	530.9 1893	40.7 1966	167.4	28 1963	7.3
II	935.1	26.0	23.5									81	27.2	5.6	2.9							
अक्तूबर OCT I	943.6	23.9	20.4	28.5	18.9	31.3	14.3	34.0	04 1966	9.7	12 1972	73	21.4	2.4	1.2	80.6	4.1	378.6 1963	0.0	149.4	24 1963	5.2
II	940.6	24.9	20.7									68	21.3	2.9	1.3							
नवम्बर NOV I	947.0	20.2	15.5	25.8	13.3	28.3	9.0	31.7	01 1896	4.4	25 1879	60	14.3	1.2	0.4	5.5	0.4	160.0 1924	0.0	95.0	08 1924	4.8
II	943.9	21.4	16.0									56	14.2	1.6	0.5							
दिसम्बर DEC I	948.2	15.7	11.8	23.1	9.3	26.2	5.1	29.4	20 1950	0.5	24 1961	62	11.1	1.1	0.2	5.2	0.4	81.3 1885	0.0	39.4	13 1885	5.3
II	945.1	18.7	13.1									52	11.1	1.2	0.2							
वार्षिक योग या माध्य ANNUAL TOTAL OR MEAN I	941.1	23.3	18.3	29.3	18.1	41.9	3.8	46.6		0.5		63	18.2	3.0	1.3	1277.9	67.2	2146.0	739.6	249.2		7.2
II	938.0	25.9	19.1									55	17.7	3.3	1.5			1893	1966			
वर्षोंकी सं NUMBER OF YEARS I	28	27	27	27	28	27	28	83		83		27	27	29	23	29	29	99	99	99		23
II	28	28	28									28	27	30	22							

1.00.00 **General Requirements**

1.01.00 For the purpose of design of equipment/systems, an ambient temperature of 50 deg. Centigrade and relative humidity of 95% shall be considered. The equipment shall operate in a highly polluted environment. However, for equipment in air conditioned areas, design ambient temperature shall be 35 deg.C, if 2x100% air conditioning system is provided.

1.02.00 All equipments shall be suitable for rated frequency of 50Hz with a variation of +3% & -5%, and 10% combined variation of voltage and frequency unless specifically brought out in the specification. The step-up voltage level for the project shall be 400 KV. The turbo generator unit will be connected to its own step-up transformers for feeding power into the EHV grid. The overall system shall be designed considering voltage variation of +/- 5% and fault level of 50kA for 400KV and 40kA for 220 KV system. Under black start condition the minimum fault level of 1000 MVA shall be considered at 400KV voltage level and voltage variation at 400kV may be considered as +/-10% till system stabilization.

1.03.00 Contractor shall provide fully compatible electrical system, equipments, accessories and services for the entire station/plant in his scope as well as those specifically required by the Employer.

1.04.00 All the equipment, material and systems shall, in general, conform to the latest edition of relevant National and International Codes & Standards, especially the Indian Statutory Regulations.

1.05.00 The auxiliary AC voltage supply arrangement shall have 33 kV, 11 kV, 3.3KV and 415V systems. It shall be designed to limit voltage variations as given below under worst operating condition:

a)	33KV/11KV/3.3KV (MV)	+/- 6%
b)	415 V/240 V	+/- 10%
c)	220V DC	-15% to +10% However the nominal continuous DC power supply shall be 240V.

1.06.00 The voltage level for motors shall be as follows:

a) Upto 0.2 KW	:	Single phase 240V AC / 3 phase 415V AC
b) Above 0.2 KW and upto 200 KW	:	3 phase, 415V AC
c) Above 200 KW and upto 1500 KW	:	3 phase, 3.3 kV AC
d) Above 1500 KW	:	11 kV

The bidder may adopt 415V/3.3 KV for the drives rated in the range of 160-210 KW.

For CHP conveyor motor's rating above 160 kW, 3.3 KV, three phase AC supply is to be used.

The voltage rating of the drives indicated above is for basic guideline. Minor variations in above can be accepted on case to case basis based on techno-economic considerations of the various sub-systems.

Voltage rating for special purpose motors viz, VFD and screw compressors, shall be as per manufacturer's standard. All the motors ratings on Stacker/ reclaimer shall be 415V ac supply only.

1.07.00	The preferred AC control supply voltage shall be 110V for all 415 V non breaker controlled feeders. Control supply voltages other than above may be offered by bidder based on the bidder's standard proven practice.
1.08.00	The designed fault levels for 11 KV & 3.3 KV systems shall be restricted to 40 kA rms for 1 second and 50 kA rms for 1 second for 415 V systems. The 33 KV system equipments shall have a minimum short circuit fault withstand rating of 12.5 kA for 1 second.
1.09.00	The nominal voltage of main DC system shall be 220V. DC batteries shall be designed for continuous float operation with trickle charge, hence all the associated components like batteries, battery chargers, DC motors, relays, contactors, timers etc shall be suitable for continuous operation at the maximum continuous battery float voltage including suitable temperature correction factors. The operational limits of variation of DC voltage is (+)10 % to (-)15%. In addition, the bidder may propose 110V, 48V or 24V systems as per requirements of control and instrumentation of his equipment and design.
1.10.00	The Contractor shall furnish calculations of maximum loading and fault levels under the most onerous conditions for the various equipment/systems as defined else where in the specification to prove adequacy of their parameters. In case any equipment or system is found to be inadequate, it shall be changed/ modified without any additional liability to the Employer.

SECTION – 'C'

SPECIFIC TECHNICAL REQUIREMENTS

SECTION – C

SPECIFIC TECHNICAL REQUIREMENTS

2. SCOPE OF ENQUIRY

2.1. This enquiry covers the supply of MV termination kits and jointing kits for cables as per requirement of this specification.

2.2. General technical requirements of MV terminations and jointing kits are indicated in Section-D and Datasheet-A. Project specific technical/ quality requirements/ changes are listed below.

2.3. Termination and jointing kit shall conform in all respects to the requirements stipulated in all the above parts of the specification.

3. BILL OF QUANTITIES:

3.1. Quantity requirements shall be as per Annexure-A (Bill of Quantities (BOQ cum price schedule)) enclosed.

3.2. Delivery schedule (i.e. contractual calendar dates) for the package shall be given separately to the bidders for compliance. Supplies shall be completed conforming to the lot requirements stipulated in the BOQ within the overall delivery schedule.

4. SPECIFIC TECHNICAL REQUIREMENTS:

3.1 Specific technical requirements shall be as listed below :

3.1.1 Technical :-

S. No.	Reference Clause No. of Section D (if any)	Specific Requirement/ Change
	2.3	To be read as "The Kit shall complete with tinned copper solderless crimping type cable lugs and ferrule as per DIN standard suitable for aluminium compacted conductor cables. Kit contents shall be supplied from the same source as were used for testing".
	Additional requirement	Critical components used in cable accessories shall be type tested and proven quality as per relevant product specification/ESI specification.

Quality/ Inspection:

S. No.	Reference Clause No. of Section D (if any)	Specific Requirement/ Change
	3.5	Bidder shall furnish signed & stamped Manufacturing Quality Plan after award of contract. The same shall be subjected to the BHEL approval. All materials, components covered under this specification shall be procured, manufactured, inspected and tested as per BHEL approved Quality Plan. There shall be no commercial implication to BHEL on account of QP approval. NTPC Quality Assurance & Inspection detail is attached as annexure D. Bidder to furnish the Quality Plan accordingly.

3.2 Drawings/ Documents Distributions: -

3.2.1 Document distribution schedule for the project shall be as per Annexure-B enclosed.

3.3 Documents to be submitted by all the bidders Along with Bid

a. Unpriced price schedule with bidder's signature & company stamp.

b. ''Instructions to Bidders for preparing technical offer'' with bidder's signature and company stamp.

c. ''contents'' sheet with bidder's signature and company stamp.

3.4 After award of contract, vendor is required to furnish Drawings / Documents as per Annexure–C of this specification.

ANNEXURE A

(BILL OF QUANTITIES (BOQ CUM PRICE SCHEDULE)

Item. No	Item	Unit	Order Quantity	Lot-I qnty	Unit Price (in Rs)
1	**HT CABLE TERMINATIONS KITS**				
1.1	**FOR 11/11 KV GRADE, XLPE INSULATED, ALUMINIUM CONDUCTOR CABLES FOR THE FOLLOWING SIZES**				
a)	1CX630 Unarmoured (Indoor type)	Nos	210	147	
b)	1CX630 Armoured (Indoor type)	Nos	27	19	
c)	03C X 185 SQ. MM Unarmoured (Indoor type)	Nos	200	140	
d)	03C X 185 SQ. MM Armoured (Indoor type)	Nos	6	5	
1.2	**FOR 3.3/3.3 KV GRADE, XLPE INSULATED, ALUMINIUM CONDUCTOR CABLES FOR THE FOLLOWING SIZES**				
a)	1C X 185 SQ. MM Unarmoured (Indoor type)	Nos	21	15	
b)	3C X 185 SQ. MM Unarmoured (Indoor type)	Nos	180	126	
c)	1C X 630 Armoured (Indoor type)	Nos	39	28	
d)	1C X 400 SQ. MM Unarmoured (Indoor type)	Nos	12	9	
1.3	**19/33kV,XLPE INSULATED ARMOURED AL CABLE FOR THE FOLLOWING SIZES**				
a)	1C X 185 SQ. MM armoured (Indoor type)	Nos	39	28	

Item. No	Item	Unit	Order Quantity	Lot-I qnty	Unit Price (in Rs)
1	**STRAIGHT THROUGH JOINTING KITS**				
1.1	**FOR 11/11 KV GRADE, XLPE INSULATED, ALUMINIUM CONDUCTOR CABLES FOR THE FOLLOWING SIZES**				
a)	1CX630 Unarmoured (Indoor type)	Nos	**3**	**0**	
b)	1CX630 Armoured (Indoor type)	Nos	**14**	**12**	
c)	03C X 185 SQ. MM Unarmoured (Indoor type)	Nos	**4**	**0**	
d)	03C X 185 SQ. MM Armoured (Indoor type)	Nos	**2**	**0**	
1.2	**FOR 3.3/3.3 KV GRADE, XLPE INSULATED, ALUMINIUM CONDUCTOR CABLES FOR THE FOLLOWING SIZES**				
b)	3C X 185 SQ. MM Unarmoured (Indoor type)	Nos	**1**	**0**	

Notes-

1. The Lot-1 quantities indicated above shall be released for manufacture along with LOI.
2. Manufacturing of Lot-1 quantities shall be done after the approval of technical and quality documentation, and Supply of same shall be completed within two months of date of approval of documents.
3. The total quantity variation shall be limited to (+) 30 % of the total contract value derived on the basis of the Order Quantities.
4. Subsequent lots, if any shall be cleared for manufacture based on progress of engineering and site requirements. A lead-time of two months shall be given for completion of supply of each lot from the date of clearance of quantities.
5. Bidders shall furnish the reports of the type test for the type and voltage grade of termination kits/ jointing kits ordered under this contract carried out within last ten years. In case bidder is not able to submit report of type test(s) conducted in last ten years, or in case type test reports are not found to be meeting the specification/relevant standard requirements, then type testing shall be conducted under this contract without any commercial implication to BHEL, and reports shall be submitted for approval. No charges shall be paid for testing under such circumstances.
6. Bidder to offer 6.6kV termination kits for **Sl .No 1.3** if they cannot produce relevant type test Certificates for 3.3kV kits conducted in any GOVT. /GOVT .approved lab.

ANNEXURE – B

(VENDOR DRAWING/DOCUMENT SCHEDULE)

1. No. of prints to be submitted by vendor after award of contract shall be as under:

   (a) First submission of document/drawing for checking : 02 sets

   (b) Second & subsequent submission of document /drawing for approval/information : 05 sets

   (c) Final distribution prints of approved documents : 05 sets

   (d) Final distribution prints of As built documents/ O&M manuals : 05 sets

   (e) Test certificates : 05 sets

2. Soft copy of all approved technical/quality documentation shall be submitted in CDs (five copies).

ANNEXURE – C

LIST OF DRAWINGS / DOCUMENTS

(REQUIRED TO BE FURNISHED BY SUCCESSFUL BIDDER AFTER AWARD OF CONTRACT)

Sl. No.	Drawings / Document Description	Drawings / Document Number	Submission schedule by vendor
a)	Data Sheet - C	PE-V0-405-507-E801	Within two weeks of award of contract
b)	Termination & Jointing kits Manufacturing / Detailed Drawing	PE-V0-405-507-E802	Within two weeks of award of contract
d)	Manufacturing Quality Plan	PE-V0-405-507-E803	Within two weeks of award of contract
e)	Recommended Field Quality Plan	PE-V0-405-507-E804	Within two weeks of award of contract
f)	Type Test Reports for Tests conducted in last ten years (Ref. Cl. 3.2 of section-D enclosed with this spec.)	PE-V0-405-507-E805	Within two weeks of award of contract
g)	Type Test Reports for Tests conducted under this contract (Ref. Cl. 3.3. & 3.4. of section-D enclosed with this spec.)	PE-V0-405-507-E806	Within a week from the date of conduction of Type Test
h)	O & M Manual	PE-V0-405-507-E807	Within eight weeks of award of contract

CLAUSE NO.	QUALITY ASSURANCE

CABLING, EARTHING, LIGHTNING PROTECTION

ATTRIBUTES / CHARACTERISTICS / ITEMS/COMPONENTS / SUB SYSTEMS	Dimension	Paint shade, paint thickness, adhesion	Pre-treatment of sheet	IP protection	Proof load*	Surface finish	Deflection test*	HV & IR	Galvanise Test (If Applicable)	Functional	Bought out items/Bill of material	Routine tests as per relevant standard & specification	Acceptance tests as per relevant standard & specification	Constructional feature as per NTPC
Wall Mounted-Lighting Panel (IS-513, IS:5, IS:2629, 2633, 6745)	Y	Y	Y	Y		Y		Y	Y	Y	Y	Y	Y	Y
Switch box/junction box/ Receptacles Panel (IS-513, IS:5, IS:2629, 2633, 6745)	Y	Y	Y	Y		Y		Y	Y	Y	Y	Y	Y	Y
Cable glands(BS-6121)	Y											Y		
Cable lug(IS-8309)	Y											Y		
Lighting wire(IS-694)	Y											Y		
Flexible conduits	Y											Y		Y
Conduits(Galvanise & Epoxy) IS-9537 & IS-2629,2633 ,6745	Y		Y								Y	Y		Y
RCC Hume Pipe (IS-458)												Y		
Cable termination & straight through joint (VDE-0278)	Y											Y		Y
Cable Trays, Flexible supports system & accessories IS-513, 2629,2633,6745	Y		Y		Y	Y	Y	Y	Y	Y		Y	Y	Y
Trefoil clamp	Y													Y
GI flats for earthing & lighting protection (IS 2062, 2629, 6745,2633)	Y		Y						Y			Y		Y
GI wire (IS-280)	Y											Y		
Fire Sealing System (BS –476)												Y	Y	Y

.Note:1.This is an indicative list of tests /checks. The manufacturer is to furnish a detailed Quality Plan indicating the practice and procedure along with relevant supporting documents.
2.* Deflection Test on cable trays and Proof Load test on cable trays support system will be as per details given in the NTPC technical specification & approved MQP. The above acceptance tests shall be done only on one sample from each size of offered lot.
3. Make of all items will be subject to NTPC approval.

SECTION – 'D'

STANDARD TECHNICAL SPECIFICATION

SECTION – 'D'

STANDARD TECHNICAL SPECIFICATION

1.0 GENERAL

1.1 This specification covers the design, manufacture, inspection, testing at vendor's/sub-vendor's works, packing, forwarding, transportation and delivery to site of MV termination kits and jointing kits for cables as per the requirements specified in this specification.

1.2 Termination kits shall be of proven design and make, which have already been extensively used and fully type, tested. Make and type of the termination shall be to the approval of purchaser.

2.0 DESIGN REQUIREMENTS AND CONSTRUCTIONAL FEATURES

2.1 The termination/jointing kits shall be suitable for site ambient conditions and polluted atmosphere, and for storage without deterioration at ambient temperature specified in project information for the project execution period.

2.2 Termination kits shall be suitable for installation inside motor terminal boxes, metal clad switchgear, transformer terminal box etc. 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.

2.3 Kits shall be complete with all accessories and consumables required for complete termination or jointing. Aluminium solder less crimping type Cable lugs for termination kits & jointing ferrules for straight through jointing kits shall form part of the kit.

2.4 Termination and jointing kits shall have requisite stress relieving characteristics.

2.5 Termination and joints shall have provision for shield connection and earthing, wherever cable screening is specified.

2.6 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.

2.7 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.

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

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

3.0 INSPECTION & TESTING

3.1 All items to be supplied shall conform to type tests as per relevant standards and proven type.

3.2 The bidder shall furnish the reports of all the type tests carried out in within last ten years of the date of bid opening. 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.

3.3 In case bidder is not able to submit report of type test(s) conducted in last ten years, 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.

3.4 Irrespective of the bidder furnishing type test report as indicated above, BHEL may get type tests conducted as specified in Datasheet-A. Separate price shall be quoted for the conduction of type testing per lot, which shall be used for cost comparison.

3.5 Inspection and testing shall be as per approved Manufacturing Quality Plan, to be submitted by the supplier.

4.0 DOCUMENTATION

Following documents are to be submitted by the successful bidder within two weeks of award of contract.

a) Drawings showing dimensions of components and constructional features of terminations/ jointing kits. The drawing shall include reference/ correlation of each type & size of termination/ jointing kits with those being supplied for the project.

b) Drawing showing dimensions of the completely installed terminations with phase to phase and phase to ground clearance along the length of termination for cable sizes mentioned in BOQ (in case this information is not contain in ‘a’ above).

c) Descriptive literature & catalogues giving design features and manufacturing details.

d) Type tests certificates.

f) Manufacturing Quality Plan.

DATASHEET A

SPECIFIC TECHNICAL REQUIREMENTS

1.0 TERMINATION KITS

1.1	Voltage grade:	3.3/ 3.3kV, 19/33 kV& 11/11 kV
1.2	Application:	Indoor
1.3	Type:	Heat shrinkable/Taped/Pre moulded
1.4	Sizes:	As per BOQ
1.5	Type testing conforming to	As per IS 13573(for 19/33kV & 11/11 kV) and as per VDE 0278 (for 3.3/3.3 kV)
1.6	Make	To purchaser's approval
1.7	Total shrouding of all live parts required	Yes

2.0 STRAIGHT THROUGH JOINTING KITS

2.1	Voltage grade:	11/11 kV
2.2	Type:	Heat shrinkable/Taped/ Pre moulded
2.3	Sizes:	As per BOQ.
2.4	Testing requirement conforming to	As per IS 13573
2.5	Make:	To purchaser's approval
2.6	Shelf Life:	More than 5 years at 50 deg C.

3.0 BRIEF CABLE SPECIFICATION

3.1	Voltage grade:	3.3/ 3.3 kV , 19/33kV & 11/11 kV
3.2	Conductor material:	Stranded circular aluminium conductor, class2, grade H2
3.3	Conductor screening material:	Extruded Semi conducting compound
3.4	Insulation material:	Extruded Cross-linked polyethylene

3.5 Insulation Screen materials

a) Non-conducting: Extruded Semi-conducting compound

b) Conducting: Copper tape

3.6 Armour: Not Applicable

3.7 Inner sheath material: PVC Type ST2
(Applicable to multi core cable only)

3.8 Outer sheath material: PVC Type ST2 (FRLS Type)

4.0 Other Technical Particulars:

4.1 System fault level:
RMS value – 40kA for 1 sec
Peak value – 100 kA

5.0 Type testing requirement: - NO (Type test certificates to be furnished in line with clause 3.2, 3.3 of Section-D of specification)

If yes, standard to which type testing shall conform to As per IS 13573(for 19/33kV & 11/11 kV) and as per VDE 0278 (for 3.3/3.3 kV)

DATA SHEET - C

GURANTEED TECHNICAL PARTICULARS

(TO BE SUBMITTED BY SUCCESSFUL BIDDER)

(SEPARATE FOR EACH TYPE & SIZE OF CABLE)

1.0.0 GENERAL

1.1.0 Name of manufacturer:
1.2.0 Place of manufacture:

2.0.0 Standard Applicable:

IS: 13573/ VDE 0278 for testing of kits:

3.0.0 TECHNICAL DETAILS

3.1.0 TERMINATION KITS

a) Make:
b) Type:
c) Application: Indoor/ Outdoor
c) Voltage Grade:
d) Kit no. as per catalogue:
e) Applicable conductor size:
f) Whether previously type tested/ within past ten years:
g) Shelf life of the least durable component: years
h) Aluminium solderless crimping type cable lugs form part of termination kits: Yes
i) Total shrouding of all live parts: Yes

3.2.0 STRAIGHT THROUGH JOINTS

a) Make:
b) Type:
c) Voltage Grade:
d) Kit no. as per catalogue:
e) Applicable conductor size:
f) Whether previously type tested within past ten years:
g) Shelf life of the least durable component: years