



A Maharatna Company  
ISO 9001 Company  
ISO 50001 Company

# भारत हेवी इलेक्ट्रिकल्स लिमिटेड Bharat Heavy Electricals Limited

(A Government of India Enterprise)  
High Pressure Boiler Plant  
Tiruchirappalli - 620 014

## MATERIALS MANAGEMENT

4<sup>th</sup> Floor, 24 Bldg. HPBP BHEL, Trichy-620014

Phone: 0431 - 257 8109, 7446; E-mail: kevin@bhel.in, mohann@bhel.in; www.bhel.com

### NOTICE INVITING e-TENDER

Ref: GEM/2021/95PTE

31.03.2021

Ref : Tender No. BID NO: GEM/2021/B/1150330 DT 31.03.2021

Subject : Two-part e-Tender inviting techno-commercial and price bids for supply of **PTFE Extension Cable for Coal Fired Thermal Power Plant for Panki project.**

#### General Instructions

- The tender documents shall be deemed to form an integral part of the purchase order.
- Tender can be cancelled at any stage due to unavoidable circumstances.
- Bidders are advised not to wait till the last minutes w.r.t tender closing time to submit their offer to avoid complications related with internet connectivity / network problem/ power failure etc.
- Bidders are advised take due care while quoting the technical and price bid forms in the e-procurement system. Bidders, those who tamper with tendering procedure affecting ordering process or misusing the technical information of the tender document or withdrawing their offer after price bid opening, will be penalized as per BHEL guidelines on suspension of business dealings with suppliers/ contractors. Abridged version of the guideline is available in [www.bhel.com](http://www.bhel.com).
- It is advised that all the documents to be submitted are kept scanned or converted to PDF format in a separate folder on your computer before starting online submission.
- Prequalification of vendors will be as per the PQR document. It is mandatory to submit the PQR related documents; else the offer is liable not be evaluated.
- DISCLAIMER CLAUSE: Neither the Organization (Bharat Heavy Electricals Ltd.) nor the service provider for e-tendering is responsible for any failure of submission of bids, due to failure of internet or other connectivity problems or reasons thereof.
- Deviations, if any, may be indicated in the Sub-Delivery Enquiry Deviation Format.
- Document Submission after PO: Complete set of valid Documents as per BHEL format viz., Datasheet, GA drawing and QAP / RQP / VQP are to be submitted within 15 days from the date of receipt of PO (e-mail copy). If there is a delay in submission of valid documents within 15 days, the delay will be accounted for the calculation of LD.
- Inspection & testing requirements: Inspection and testing requirements are to be carried out as per the specification and BHEL/customer approved QAP and all test certificates are to be submitted in complete set as indicated in our specification /QAP. In case of Vendor QP the same shall be submitted for approval along with the offer.

- Customer approval of Bidder is applicable. Bidders will be asked to submit the credentials, for customer approval. Subsequently, the Part-2 bids (Price bid) of the Bidder will be opened subject to Customer acceptance and fulfilment of PQR requirement, techno-commercial (Part-1 bid) qualification.
- PAYMENT TERM: 100% payment will be released within ten (10) days of issue of consignee receipt-cum-acceptance certificate (CRAC) and on-line submission of bills unless otherwise specified in STC / ATC.
- LIQUIDATED DAMAGES: If the Seller/Service Provider fails to deliver any or all of the Goods/Services within the original/re-fixed delivery period(s) specified in the contract, the Buyer will be entitled to deduct/recover the Liquidated Damages for the delay, unless covered under Force Majeure conditions aforesaid, @ 0.5% of the contract value of delayed quantity per week or part of the week of delayed period as pre-estimated damages not exceeding 10% of the contract value of delayed quantity without any controversy/dispute of any sort whatsoever.
- The terms & conditions in GeM will form part of Contract / Order.
- Any pre-bid query, kindly contact: Mr. Kevin Ark Kumar, Manager/Materials Management/BOI Tel: 0431-2578109, email: kevin@bhel.in; Mr. N Mohan, Asst./Engineer/Materials Management/BOI Tel: 0431-2577446, email: mohann@bhel.in and get your queries cleared before submitting the offer in EPS. Rates once quoted online in the E-tendering Portal cannot be changed, after due date and shall remain final.

For **Bharat Heavy Electricals Limited**

**Kevin Ark Kumar**

Manager / Materials Management

Fourth floor, 24 Building

B.H.E.L., Tiruchirappalli – 620 014, Tamil Nadu

Phone: 0431-2578109 / Email: [kevin@bhel.in](mailto:kevin@bhel.in)

## **Pre-Qualification Requirement**

### **PTFE Insulated Instrumentation / Control Cables**

- 1) All machineries and facilities that are required for the complete manufacturing of cables, such as wire drawing, stranding, bunching, sheathing (extrusion/wrapping) and armouring processes shall be available in-house.  
➤ Vendor to submit list of machineries / facilities.
- 2) All measuring instruments and testing facilities required to carry out the necessary tests that are to be conducted in process and on finished cables shall be available in-house.  
➤ Vendor to submit list of Measuring instruments & Testing facilities.
- 3) None of the stages/processes involved in the manufacturing of the cable, shall be off loaded or out-sourced.  
➤ Vendor to give confirmation.
- 4) Vendor should have facilities to carry out acceptance, routine and type tests as per Quality plan, either in-house or at NABL accredited labs.  
➤ Vendor to give confirmation & submit Sample report.
- 5) Vendor should have supplied similar design/rating & varieties of PTFE insulated Instrumentation/Control cables to Power plant / Industrial installations in India or abroad with satisfactory performance for the past 2 years.  
➤ Vendor to submit PO copies.
- 6) Vendor to submit copy of largest purchase order executed by them in terms of quantity & value, in the last three years.  
➤ Vendor to submit PO copy.

**PART-1 BID**

| SI No. | MATLCD           | DESCRIPTION                                                                                                                                                                                                                                                                           | UNIT | QTY      | QUOTED /<br>NOT QUOTED |
|--------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----------|------------------------|
| 10     | L172819509113001 | 2 Pair x 1.31 Sq.mm, Solid Conductor,Chromel-Alumel, KX-type, PTFE Insulated, Pair shielded and overall shielded, PTFE inner sheathed, Braided, PTFE outer sheathed Extension cable as per Technical datasheet DS:TCI:254/PTFE EXTENSION CABLE/01<br>Colour of outer sheath - Yellow. | M    | 3,000.00 |                        |

**Note: The tender is floated as a single package. Partial offer will be rejected. Do not mention the prices here.**

|                                                                                                                                         |                                                        |                                                                                                                                 |                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
|                                                        |                                                        | <b>PURCHASE / MM / BOI</b><br><b>ENQUIRY DEVIATION</b>                                                                          |                                  |
| 429-024                                                                                                                                 |                                                        | <div style="text-align: right;">PAGE</div> <div style="border: 1px solid black; padding: 2px; text-align: center;">1 OF 1</div> |                                  |
| <b>SCHEDULE OF DEVIATION TO<br/>BOI ENQUIRY NO:</b>                                                                                     |                                                        | <b>GEM/2021/B/1150330</b>                                                                                                       | <b>DATE</b><br><b>31.03.2021</b> |
| <b>DESCRIPTION</b>                                                                                                                      | 2P X 1.31 SQ.MM PTFE EXTENSION CABLE FOR PANKI PROJECT |                                                                                                                                 |                                  |
| <b>SPECIFICATION</b>                                                                                                                    | DS:TCI:254/PTFE EXTENSION CABLE, Rev.01                |                                                                                                                                 |                                  |
| <b>QUALITY PLAN</b>                                                                                                                     | VENDOR QUALITY PLAN IN BHEL FORMAT                     |                                                                                                                                 |                                  |
| <b>PACKING PROCEDURE</b>                                                                                                                | AS PER DATASHEET                                       |                                                                                                                                 |                                  |
| <b>DOCUMENT REFERENCE</b>                                                                                                               | <b>BHEL ENQ. CALLED FOR</b>                            | <b>FIRM'S ALTERNATIVE OFFER</b>                                                                                                 |                                  |
|                                                                                                                                         |                                                        |                                                                                                                                 |                                  |
| CERTIFIED THAT OTHER THAN THE ABOVE DEVIATIONS, WE ARE ACCEPTING ALL THE OTHER SPECIFICATIONS AND REQUIREMENTS IN FULL TO YOUR ENQUIRY. |                                                        |                                                                                                                                 |                                  |
| STATION:                                                                                                                                |                                                        |                                                                                                                                 |                                  |
| DATE:                                                                                                                                   |                                                        | SIGNATURE OF FIRM'S REPRESENTATIVE                                                                                              |                                  |
|                                                                                                                                         |                                                        | FIRM SEAL                                                                                                                       |                                  |
| NOTE 1. Deviations should be taken only in the extreme case.<br>2. If necessary, use additional sheets with page control number.        |                                                        |                                                                                                                                 |                                  |

**/ On Bidder's office letter pad /**

**Self-Declaration**

|                     |  |
|---------------------|--|
| <b>Enquiry No.</b>  |  |
| <b>Enquiry Date</b> |  |

In line with Government public procurement order Number P-45021/2/2017-B.E-II dated 15.06.2017, and further modified order dt.04.06.2020 issued by DPIIT,

I / We hereby declare that I / We are a "Local Supplier" meeting the requirement of minimum local content (.....%) defined in the above government notification for the goods against above mentioned enquiry Number.

Details of location at which local value addition will be made is as follows:

|                    |  |
|--------------------|--|
| Door No.           |  |
| Street / Address 1 |  |
| Street / Address 2 |  |
| District           |  |
| State              |  |
| Country            |  |
| PIN Code           |  |

We also understand that the false declarations will be considered as breach of Integrity and liable for action.

**For Company Name:**

**Seal:**

**Signature:**

**Date:**

**Place:**

(Please fill all the yellow color field)

## **TECHNICAL DETAILS**

**MATL CODE:** L172819509113001

**ITEM NAME:** 2P X 1.31 SQ.MM PTFE EXTENSION CABLE

**ITEM DESCRIPTION:** 2P X 1.31 SQ.MM PTFE EXTENSION CABLE

2 Pair x 1.31 Sq.mm, Solid Conductor, Chromel-Alumel, KX-type, PTFE Insulated, Pair shielded and overall shielded, PTFE inner sheathed, Braided, PTFE outer sheathed Extension cable as per Technical datasheet DS:TCI:254/PTFE EXTENSION CABLE/01 Colour of outer sheath -.

**Colour of Outer sheath** - Yellow

### **TECHNICAL TERMS:**

Manufacturing, of PTFE CONTROL CABLE shall be as per the following:

1. Data Sheet: No. DS:TCI:254/PTFE CONTROL CABLE, Rev. 01
2. Quality Plan: Vendor Quality Plan in the BHEL format.
3. Packing Procedure: As mentioned in the Datasheet.

**Deviations**, if any, may be indicated in the Sub-Delivery Enquiry Deviation Format.

**Document Submission after PO:** Complete set of valid Documents as per BHEL format viz., Datasheet, GA drawing and QAP / RQP / VQP are to be submitted within 14 days from the date of receipt of PO (e-mail copy). If there is a delay in submission of valid documents within 14 days, the delay will be accounted for the calculation of LD.

**Inspection notice period:** Vendor shall raise inspection call to Third Party Inspection Agency / BHEL at least three working days, prior to the proposed date of inspection. Place shall be vendor Works. Vendor shall dispatch the consignment immediately after getting dispatch clearance from BHEL, subsequent delay will be accounted for calculation of LD.

**Inspection & testing requirements:** Inspection and testing requirements are to be carried out as per the specification and BHEL/customer approved QAP and all test certificates are to be submitted in complete set as indicated in our specification /QAP. In case of Vendor QP the same shall be submitted for approval along with the offer.

**Repair & replacements:** Within the guarantee period vendor has to replace / rectify the defective/ damaged items on free of cost within a reasonable time of reporting from our end. All incidental charges like freight, insurance and customs duty / GST are to vendor account only. The defective parts and components shall be collected by your Indian agent or / authorized person, only after completing the replacement / repairs. The defective parts / components will not be returned back to vendor works by us due to procedural problems.

Vendor Sign and Seal



# Bharat Heavy Electricals Limited

HIGH PRESSURE BOILER PLANT, TIRUCHIRAPPALLI 620 014.

CONTROLS AND INSTRUMENTATION/FB

## DATA SHEET FOR PTFE INSULATED & SHEATHED, MULTIPAIR EXTENSION CABLE (PAIR SHIELDED AND OVER ALL SHIELDED)

Data sheet No.: DS:TCI:254/PTFE EXTENSION CABLE, Rev. 01

### Revision History

| Rev.<br>No. | Date     | Description                       | Prepared                                                                             | Reviewed                                                                              | Approved                                                                              |
|-------------|----------|-----------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|             |          |                                   | K. Sudharsan                                                                         | K. Sudharsan                                                                          | Aswini Kumar<br>Panda                                                                 |
| 00          | 01-08-17 | Initial Release                   | -sd-                                                                                 | -sd-                                                                                  | -sd-                                                                                  |
| 01          | 09-06-20 | Revised to remove FRLS references |  |  |  |



# DATA SHEET FOR PTFE INSULATED & SHEATHED, MULTIPAIR EXTENSION CABLE

**Data sheet No.: DS:TCI:254/PTFE EXTENSION CABLE, Rev. 01**

| Sl. No. | Parameter                                                                                          |         | Value/Requirement                                                                                                                                                                              |                                                   |
|---------|----------------------------------------------------------------------------------------------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 1       | Application                                                                                        |         | From Field Instruments in Hot Zones to Field Junction Boxes - FSSS, SADC, SBC & APH system field interconnection                                                                               |                                                   |
| 2       | Site Condition                                                                                     |         | Dusty, Salty, corrosive & Heavily polluted.                                                                                                                                                    |                                                   |
| 3       | Applicable Standards                                                                               |         | JSS 51038,JSS 51034, MIL-W-16878, ANSI MC 96.1, VDE-207-P6, VDE-0815, VDE- 0472, IEC 60332-3,ASTMD-2116,IS-10810, IEEE-383, SS-4241475, IEC-754, ASTM-D-2843, ASTM-D-2863, IS-10810 & IS-10418 |                                                   |
| 4       | Voltage grade                                                                                      | V       | 1000                                                                                                                                                                                           |                                                   |
| 5       | Temperature Rating                                                                                 | °C      | 260                                                                                                                                                                                            |                                                   |
| 6       | Construction of cable                                                                              |         | As per Constructional diagram enclosed with this Data sheet                                                                                                                                    |                                                   |
| 7       | Conductor:-                                                                                        |         |                                                                                                                                                                                                |                                                   |
| a       | Number of Pairs                                                                                    |         | 2 Pair /4 Pair<br>As per Purchase Enquiry / Purchase order                                                                                                                                     |                                                   |
| b       | Area of Conductor                                                                                  | Sq.mm   | 0.5 Sq.mm / 0.75 Sq.mm / 1.31 sq.mm<br>As per Purchase Enquiry / Purchase order                                                                                                                |                                                   |
| c       | Solid / Stranded                                                                                   |         | As per purchase enquiry                                                                                                                                                                        |                                                   |
| d       | If Stranded,<br>No. of Strands / Strand Dia.<br>(for finished cable)<br>(Stranded & Non-compacted) | No./ mm | 07/0.3 for 0.5 Sq.mm<br>24/0.2 for 0.75 Sq.mm<br>19/0.3 for 1.31 Sq.mm                                                                                                                         |                                                   |
| e       | If Solid, Conductor diameter<br>(for finished cable)                                               | mm      | 0.8 for 0.5 Sq.mm<br>0.98 for 0.75 Sq.mm<br>1.29 for 1.31 Sq.mm                                                                                                                                |                                                   |
| f       | Conductor Type<br>(as per purchase enquiry)                                                        |         | ANSI Type KX                                                                                                                                                                                   | ANSI Type SX                                      |
| g       | Grade / Standard                                                                                   |         | As per ANSI MC 96.1                                                                                                                                                                            |                                                   |
| h       | Material                                                                                           |         | Positive - Chromel<br>Negative - Alumel                                                                                                                                                        | Positive - Copper<br>Negative – Copper-<br>Nickel |
| 8       | Insulation :-                                                                                      |         |                                                                                                                                                                                                |                                                   |
| a       | Material                                                                                           |         | PTFE                                                                                                                                                                                           |                                                   |
| b       | Type and Standard                                                                                  |         | VDE 207 Part-6/ASTM D 2116                                                                                                                                                                     |                                                   |

# DATA SHEET FOR PTFE INSULATED & SHEATHED, MULTIPAIR EXTENSION CABLE

Data sheet No.: DS:TCI:254/PTFE EXTENSION CABLE, Rev. 01

| Sl. No. | Parameter                        |                                                                                                                                                                                                                 | Value/Requirement                                                                                                                                                         |                                                  |
|---------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| c       | Thickness<br>(Minimum / Nominal) | mm                                                                                                                                                                                                              | 0.4 / 0.5                                                                                                                                                                 |                                                  |
| d       | Method of application            |                                                                                                                                                                                                                 | PTFE wrapped and sintered / PTFE extruded                                                                                                                                 |                                                  |
| e       | Colour of Insulation             |                                                                                                                                                                                                                 | Positive - <b>Yellow</b><br>Negative - <b>Red</b>                                                                                                                         | Positive - <b>Black</b><br>Negative - <b>Red</b> |
| e       | Pair Identification              |                                                                                                                                                                                                                 | Each pair shall be bound with distinct coloured PTFE tape<br>1st Pair – <b>Blue</b> ; 2nd Pair – <b>Red</b> ;<br>3rd Pair – <b>Grey</b> ; 4th Pair – <b>Yellow</b> .      |                                                  |
| f       | Volume Resistivity               | Ω cm                                                                                                                                                                                                            | 2.8x 10 <sup>14</sup> @ 20 °C & 2x10 <sup>11</sup> @ 260 °C.                                                                                                              |                                                  |
| 9       | Pairing & Twisting :-            |                                                                                                                                                                                                                 |                                                                                                                                                                           |                                                  |
| a       | Lay for Pairing                  | mm                                                                                                                                                                                                              | 50                                                                                                                                                                        |                                                  |
| b       | Direction of Lay                 |                                                                                                                                                                                                                 | Right hand                                                                                                                                                                |                                                  |
| c       | Lay for laid-up Pairs            | Twist/<br>metre                                                                                                                                                                                                 | 4 - 6                                                                                                                                                                     |                                                  |
| 10      | Binding material :-              |                                                                                                                                                                                                                 |                                                                                                                                                                           |                                                  |
| a       | Type of Material                 |                                                                                                                                                                                                                 | PTFE Tape                                                                                                                                                                 |                                                  |
| b       | Thickness (min)                  | mm                                                                                                                                                                                                              | 0.028                                                                                                                                                                     |                                                  |
| c       | Coverage (min)                   | %                                                                                                                                                                                                               | 100                                                                                                                                                                       |                                                  |
| d       | Overlap (min)                    | %                                                                                                                                                                                                               | 25                                                                                                                                                                        |                                                  |
| e       | Fillers (wherever applicable)    |                                                                                                                                                                                                                 | Flame retardant, Non-Hygroscopic, suitable for the operating temperature of the cable. Position, Shape, Number of fillers and applicability will be decided by the vendor |                                                  |
| 11      | Shielding :-                     |                                                                                                                                                                                                                 |                                                                                                                                                                           |                                                  |
| a       | Type of Material                 |                                                                                                                                                                                                                 | Aluminium Backed Mylar Tape                                                                                                                                               |                                                  |
| b       | Thickness (min)                  | micron                                                                                                                                                                                                          | For Pair Shielding 28 Micron,<br>For Overall Shielding 60 Micron.                                                                                                         |                                                  |
| c       | Coverage (min)                   | %                                                                                                                                                                                                               | 100                                                                                                                                                                       |                                                  |
| d       | Overlap (min)                    | %                                                                                                                                                                                                               | 25                                                                                                                                                                        |                                                  |
| e       | General                          | The Aluminium mylar tape shall be provided in such a way that the aluminium side of the tape shall get in contact with the drain wire for all varieties of cables (both Pair shielding and over all shielding). |                                                                                                                                                                           |                                                  |

# DATA SHEET FOR PTFE INSULATED & SHEATHED, MULTIPAIR EXTENSION CABLE

**Data sheet No.: DS:TCI:254/PTFE EXTENSION CABLE, Rev. 01**

| Sl. No. | Parameter                                           |         | Value/Requirement                                                                                                                                                                 |
|---------|-----------------------------------------------------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 17      | Drain wire for shielding :-                         |         |                                                                                                                                                                                   |
| a       | Material                                            |         | Silver plated Annealed Copper                                                                                                                                                     |
| b       | Number of strands / Diameter of strand              | No./ mm | 7/0.3                                                                                                                                                                             |
| c       | Area of cross section                               | sq.mm   | 0.5                                                                                                                                                                               |
| d       | Grade / Standard                                    |         | High Conductivity, Electrolytic grade copper conforming to IS-8130 & Silver plating conforming to JSS-51034                                                                       |
| 18      | Rip Cord                                            |         | Non-metallic Rip cord shall be provided under inner sheath                                                                                                                        |
| 19      | Inner Sheath :-                                     |         |                                                                                                                                                                                   |
| a       | Material                                            |         | PTFE                                                                                                                                                                              |
| b       | Type and Standard                                   |         | VDE 207 Part-6/ASTM D 2116                                                                                                                                                        |
| c       | Thickness (minimum)                                 | mm      | 0.3                                                                                                                                                                               |
| d       | Method of application                               |         | PTFE wrapped and sintered / PTFE extruded                                                                                                                                         |
| e       | Colour                                              |         | BLACK                                                                                                                                                                             |
| 20      | Braiding :-                                         |         |                                                                                                                                                                                   |
| a       | Material                                            |         | Nickel Plated Copper Alloy (High Strength)                                                                                                                                        |
| b       | Strand diameter                                     |         | As per JSS – 51038                                                                                                                                                                |
| c       | Braid Angle                                         |         | As per JSS – 51038                                                                                                                                                                |
| d       | Position                                            |         | Over Inner Sheath                                                                                                                                                                 |
| e       | Coverage                                            | %       | 85 - 90                                                                                                                                                                           |
| 21      | Outer Sheath :-                                     |         |                                                                                                                                                                                   |
| a       | Material                                            |         | PTFE                                                                                                                                                                              |
| b       | Type and Standard                                   |         | VDE 207 Part-6/ASTM D 2116                                                                                                                                                        |
| c       | Method of application                               |         | PTFE wrapped and sintered / PTFE extruded                                                                                                                                         |
| d       | Thickness (Minimum / Nominal)                       |         | 0.4/0.5                                                                                                                                                                           |
| e       | Colour                                              |         | As per Purchase Enquiry                                                                                                                                                           |
| 22      | Cable Marking on Outer sheath by indelible printing |         | “Manufacturer’s name, Year of manufacture, Insulation material (PTFE), No. of pairs & Conductor size, Voltage rating, Type of Cable” @ 625 mm interval.<br><b>Sample Marking:</b> |

**DATA SHEET FOR PTFE INSULATED & SHEATHED, MULTIPAIR EXTENSION CABLE****Data sheet No.: DS:TCI:254/PTFE EXTENSION CABLE, Rev. 01**

| <b>Sl. No.</b> | <b>Parameter</b>                                         |            | <b>Value/Requirement</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------|----------------------------------------------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 23             | Sequential marking on Outer sheath by indelible printing |            | Every 1 Metre for Progressive Length by non-erasable printing.                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 24             | Tolerance on Outer diameter                              | mm         | $\pm 2$                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 25             | Tolerance on Outer diameter for the entire length        | mm         | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 26             | Ovality                                                  | mm         | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 27             | Bending Radius (min)                                     |            | 12 times the Outer diameter                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 28             | Standard Packing Length                                  | metre      | 1000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 29             | Tolerance on standard packing length                     | %          | $\pm 5$                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 30             | Tolerance on Overall quantity                            | %          | + 0 / - 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 31             | Non-standard Length                                      |            | Last length shall be supplied in single length                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 32             | Electrical Parameters :-                                 |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| a              | Insulation Resistance (min.) @ 20°C                      | MΩ/km      | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| b              | Mutual Capacitance (max.) @ 0.8 kHz                      | nF/km      | 120                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| c              | Test Voltage - Between Conductor- Conductor              | kV/ minute | 2.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| d              | Test Voltage - Between Conductor - Shield (min.)         | kV/ minute | 0.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 33             | Flammability Tests per IEC-60332-1-2                     |            | Shall pass                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 34             | Special Properties for Outer sheath                      |            | Outer sheath will be resistance to water, fungus, rodent, moisture and termite attack.                                                                                                                                                                                                                                                                                                                                                                                               |
| 35             | Quality Plan                                             |            | Vendor Quality Plan                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 36             | Packing Details                                          |            | Cables shall be supplied in Non-returnable wooden drums of heavy construction. The surface of the drum and the outer most cable layer shall be covered with waterproof cover. Both the ends of the cables shall be properly sealed with heat shrinkable PVC/Rubber caps secured by 'U' nails to eliminate ingress of water during transportation, storage & erection. Wood preservative anti-termite treatment shall be applied to the entire drum. Wooden drums to comply IS-10418. |

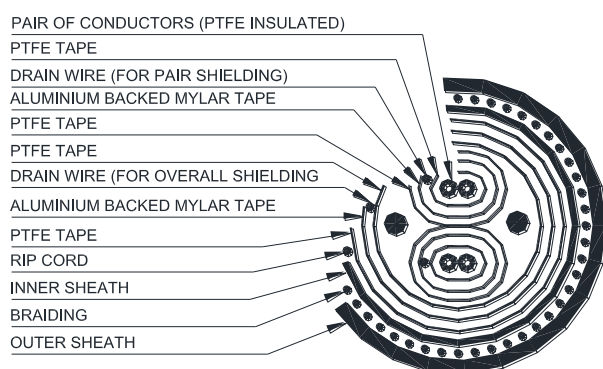
# DATA SHEET FOR PTFE INSULATED & SHEATHED, MULTIPAIR EXTENSION CABLE

Data sheet No.: DS:TCI:254/PTFE EXTENSION CABLE, Rev. 01

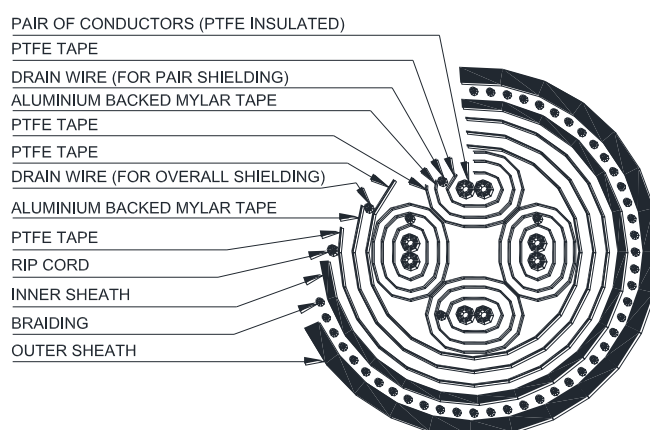
| Sl. No. | Parameter | Value/Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         |           | Each drum shall carry Manufacturer's name or trademark, Type of cable, Voltage grade, Year of manufacture, Type of insulation, Number of pairs & size of conductor, Cable code, Length of cable on drum, Drum number/Total number of drums (for the respective variety), Approximate gross mass. A tag containing same information shall be attached to the both ends of the cable. An arrow and suitable accompanying wording shall be marked on one end of the reel indicating the direction of rotation in which it should be rolled. |

## Constructional Diagram for Pair Shielded and Overall Shielded Cables

TYPICAL CONSTRUCTIONAL DIAGRAM OF A  
2 PAIR, PAIR SHIELDED & OVER ALL SHIELDED CABLE



TYPICAL CONSTRUCTIONAL DIAGRAM OF A  
4 PAIR, PAIR SHIELDED & OVER ALL SHIELDED CABLE



| SPECIAL INSTRUCTION TO VENDOR           |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Guarantee                               | A Guarantee Certificate for 18 months of trouble-free operation/performance from the date of shipment or 12 months from the date of commissioning whichever is earlier shall be furnished.                                                                                                                                                                                                                                                       |
| Confirmation to be given by the vendor. | <ol style="list-style-type: none"> <li>1. Sub-Delivery Enquiry Deviation format filled with "No Deviation", indicating the Data sheet and Quality Plan reference and shall be furnished along with the offer.</li> <li>2. Technical deviation/non-conformance indicated elsewhere in the offer will not be considered.</li> <li>3. In the absence of Sub-Delivery Enquiry Deviation format, the vendor's offer will not be evaluated.</li> </ol> |

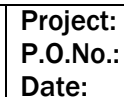
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**DATA SHEET FOR PTFE INSULATED & SHEATHED, MULTIPAIR EXTENSION CABLE****Data sheet No.: DS:TCI:254/PTFE EXTENSION CABLE, Rev. 01****ANNEXURE TO EXTENSION CABLE DATA SHEET****Pair shielded & Over all shielded Cable**

| <b>Type of cable / No. of Pair</b> |                                     |       |  |  |
|------------------------------------|-------------------------------------|-------|--|--|
| 1                                  | Dia. over Conductor                 | mm    |  |  |
| 2                                  | Thickness of Insulation (minimum)   | mm    |  |  |
| 3                                  | Dia. over insulated conductor       | mm    |  |  |
| 4                                  | Dia. Over laid up pair              | mm    |  |  |
| 5                                  | Dia. under Inner Sheath             | mm    |  |  |
| 6                                  | Thickness of Inner Sheath (Minimum) | mm    |  |  |
| 7                                  | Dia. over Inner Sheath              | mm    |  |  |
| 8                                  | Braiding – Strand diameter          | mm    |  |  |
| 9                                  | Braid Angle                         |       |  |  |
| 10                                 | Dia. over Braiding                  | mm    |  |  |
| 11                                 | Thickness of outer Sheath (Minimum) | mm    |  |  |
| 12                                 | Overall Diameter                    | mm    |  |  |
| 13                                 | Weight of cable                     | kg/km |  |  |
| 13                                 | Conductor loop resistance @ 20 °C   | Ω/km  |  |  |
| 14                                 | Drain wire resistance               | Ω/km  |  |  |
| 15                                 | L/R ratio                           | μH/Ω  |  |  |

SIGNATURE OF THE VENDOR WITH SEAL

|                                                                                                                                         |                                                        |                                                        |             |
|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------|-------------|
|                                                        |                                                        | <b>PURCHASE / MM / BOI</b><br><b>ENQUIRY DEVIATION</b> |             |
| 429-024                                                                                                                                 |                                                        | <div> <div>PAGE</div> <div>1 OF 1</div> </div>         |             |
| <b>SCHEDULE OF DEVIATION TO<br/>BOI ENQUIRY NO:</b>                                                                                     |                                                        |                                                        | <b>DATE</b> |
| <b>DESCRIPTION</b>                                                                                                                      | 2P X 1.31 SQ.MM PTFE EXTENSION CABLE FOR PANKI PROJECT |                                                        |             |
| <b>SPECIFICATION</b>                                                                                                                    | DS:TCI:254/PTFE EXTENSION CABLE, Rev.01                |                                                        |             |
| <b>QUALITY PLAN</b>                                                                                                                     | VENDOR QUALITY PLAN IN BHEL FORMAT                     |                                                        |             |
| <b>PACKING PROCEDURE</b>                                                                                                                | AS PER DATASHEET                                       |                                                        |             |
| <b>DOCUMENT REFERENCE</b>                                                                                                               | <b>BHEL ENQ. CALLED FOR</b>                            | <b>FIRM'S ALTERNATIVE OFFER</b>                        |             |
|                                                                                                                                         |                                                        |                                                        |             |
| CERTIFIED THAT OTHER THAN THE ABOVE DEVIATIONS, WE ARE ACCEPTING ALL THE OTHER SPECIFICATIONS AND REQUIREMENTS IN FULL TO YOUR ENQUIRY. |                                                        |                                                        |             |
| STATION:                                                                                                                                |                                                        |                                                        |             |
| DATE:                                                                                                                                   |                                                        | SIGNATURE OF FIRM'S REPRESENTATIVE                     |             |
|                                                                                                                                         |                                                        | FIRM SEAL                                              |             |
| NOTE 1. Deviations should be taken only in the extreme case.<br>2. If necessary, use additional sheets with page control number.        |                                                        |                                                        |             |



|                                      |                                                                                                                                                             |                                                  |                                              |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|----------------------------------------------|
|                                      | <b>M</b> - Manufacturer/Sub-Vendor;<br><b>B</b> - BHEL / TPI ; <b>C</b> - Customer / TPI<br><b>P</b> - Perform; <b>W</b> - Witness <b>V</b> - Verification; |                                                  |                                              |
| Signature of Manufacturer/Sub-Vendor |                                                                                                                                                             | Name & Signature of Customer approving authority | Name & Signature of BHEL approving authority |



|                                                                                  |                             |                                        |                           |                                 |
|----------------------------------------------------------------------------------|-----------------------------|----------------------------------------|---------------------------|---------------------------------|
|  | <b>Manufacturer Address</b> | <b>QUALITY PLAN FOR</b><br><b>Xxxx</b> | <b>QP No.:</b>            | <b>Project:</b>                 |
|                                                                                  |                             |                                        | Rev: yy    Date: zz/zz/zz | <b>P.O.No.:</b><br><b>Date:</b> |

| Sl. No   | Component & Operation   | Characteristics | Class | Type of Check | Quantum of check |     | Ref Doc. & Acceptance STD | Format of record | AGENCY |   |   | REMARKS |
|----------|-------------------------|-----------------|-------|---------------|------------------|-----|---------------------------|------------------|--------|---|---|---------|
|          |                         |                 |       |               | M                | B/C |                           |                  | M      | B | C |         |
|          |                         |                 |       |               |                  |     |                           |                  |        |   |   |         |
|          |                         |                 |       |               |                  |     |                           |                  |        |   |   |         |
|          |                         |                 |       |               |                  |     |                           |                  |        |   |   |         |
|          |                         |                 |       |               |                  |     |                           |                  |        |   |   |         |
|          |                         |                 |       |               |                  |     |                           |                  |        |   |   |         |
|          |                         |                 |       |               |                  |     |                           |                  |        |   |   |         |
|          |                         |                 |       |               |                  |     |                           |                  |        |   |   |         |
| <b>C</b> | <b>FINAL INSPECTION</b> |                 |       |               |                  |     |                           |                  |        |   |   |         |
| 1        | ROUTINE TEST            |                 |       |               |                  |     |                           |                  |        |   |   |         |
|          |                         |                 |       |               |                  |     |                           |                  |        |   |   |         |
|          |                         |                 |       |               |                  |     |                           |                  |        |   |   |         |
|          |                         |                 |       |               |                  |     |                           |                  |        |   |   |         |
|          |                         |                 |       |               |                  |     |                           |                  |        |   |   |         |
|          |                         |                 |       |               |                  |     |                           |                  |        |   |   |         |
|          |                         |                 |       |               |                  |     |                           |                  |        |   |   |         |
|          |                         |                 |       |               |                  |     |                           |                  |        |   |   |         |
|          |                         |                 |       |               |                  |     |                           |                  |        |   |   |         |
| 2        | TYPE TEST               |                 |       |               |                  |     |                           |                  |        |   |   |         |
|          |                         |                 |       |               |                  |     |                           |                  |        |   |   |         |
|          |                         |                 |       |               |                  |     |                           |                  |        |   |   |         |

NOTE: 1. TYPE TEST CERTIFICATE DONE ON SIMILAR EQUIPMENT SHALL BE SUBMITTED FOR BHEL/TPI VERIFICATION. THE VALIDITY OF TC SHALL BE 5 YEARS

|                                      |                                                                                                                                                             |                                                  |                                              |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|----------------------------------------------|
|                                      | <b>M</b> - Manufacturer/Sub-Vendor;<br><b>B</b> - BHEL / TPI ; <b>C</b> - Customer / TPI<br><b>P</b> - Perform; <b>W</b> - Witness <b>V</b> - Verification; |                                                  |                                              |
| Signature of Manufacturer/Sub-Vendor |                                                                                                                                                             | Name & Signature of Customer approving authority | Name & Signature of BHEL approving authority |