



Bharat Heavy Electricals Limited

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

MATERIALS MANAGEMENT

4th Floor, 24 Bldg. HPBP BHEL, Trichy-620014

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NOTICE INVITING e-TENDER

Bid No.: GEM/2021/B/1354328

13.07.2021

Subject: Two-part e-Tender inviting techno-commercial and price bid for supply of PTFE Instrumentation & Control Cable for Coal Fired Thermal Power Plant / Panki TPS (660MW) 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. Bidders, those who tampers 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.
- 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.
- The qualification of vendors will be based Pre-Qualification Requirement (PQR) document. Subsequently techno-commercial evaluation will be done; hence, it is mandatory to submit the documents sought in PQR.
- DISCLAIMER CLAUSE: Neither 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.
- Customer approval of Bidder is applicable. Techno-commercially qualified Bidders will be asked to submit the credentials for customer approval. The Part-2 bids (Price bid) of the Bidder will be opened, subject to fulfilment of Pre-Qualification Requirement, successful techno-commercial (Part-1 bid) evaluation and Customer acceptance, based on the credentials.
- In order to avail benefits as per MSE clause. Bidders have to upload the Udyam Registration certificate.
- The Annexure-A / Additional Terms & Conditions (ATC) & Annexure-B / Vendor Details Questionnaire shall be submitted.
- All the documents attached with this covering letter has to be filled up (wherever necessary) with sign & seal of company & submitted for evaluation.
- It is mandatory to submit the mentioned documents called for in Pre-Qualification Requirement.
- 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.

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

ANNEXURE-A
ADDITIONAL TERMS & CONDITIONS (ATC)

Description of the Material:		PTFE Instrumentation & Control Cable for Coal Fired Thermal Power Plant
BHEL Tender No. & Date		BID NO: GEM/2021/B/1354328
GENERAL INFORMATION		
The bidder has to keep track of any changes by viewing the addendum / Corrigendum's Issued by the Purchaser on time-to- time basis in the E-Procurement platform. The Company calling for tenders shall not be responsible for any claims/problems arising out of this.		
Sl. No.	Terms and conditions	Vendor's confirmation
1	Firm Price: The quoted / finalised rates shall be Firm till execution of the supplies. Vendor has to quote price according to the requirement as detailed in the attached technical documents. 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/GEM. Rates/ other price elements once quoted in the price bid BoQ Format online in the Enterprise Procurement System (EPS)/GEM cannot be changed after due date shall remain final.	Accepted
2	The tender is floated as a Single Package.	Accepted
3	Delivery term: F.O.R basis Inclusive of Packing, Forwarding, Freight, Insurance & GST upto Destination as mentioned.	Accepted
4	Techno-Commercial bids of vendors will be evaluated; however, the Price bid will be opened, subject to our customer's approval, else the offer will be rejected. Vendors shall submit credentials for taking up with customer, for their approval.	Accepted
5	Guarantee / Warranty Period : Guarantee clause 18 months from the date of delivery or 12 months from the date of actual put in use; whichever is earlier.	Accepted
6	Deviation in Guarantee / Warranty Period: No Deviation is permitted. If still vendor offered any deviation on the Guarantee / warranty period. Their offer will be rejected.	Accepted
7	Delivery Period: 90 Days from manufacturing clearance / document approval. Vendor quoted delivery period shall include all activities i.e. manufacturing / production, Inspection, Packing, Forwarding, dispatch.	Accepted
8	RISK PURCHASE: In case of abnormal delays (beyond the maximum late delivery period as per LD clause) or non-fulfilment of any other terms and conditions given in work order, BHEL may cancel the work order in full or part thereof, and may also make a contract of such work/service from elsewhere / alternative source at the risk and cost of the original contractor. BHEL will take all reasonable steps to complete the contract obligations from alternate source at optimum cost. If bidder does not agree to the above Risk Purchase Clause, BHEL reserves the right to reject the offer. In case for compelling reasons BHEL accepts the offer without acceptance of this clause by the bidder and in the eventuality of Risk Purchase, appropriate action will be taken as per BHEL extant rules. This will be without prejudice to any other right of BHEL under the contract. Risk & cost clause, in line with conditions of contract may be invoked in any of the following cases: 1. Contractor's poor progress of the work vis-à-vis execution timeline as stipulated in the contract, backlog attributable to contractor/ supplier including unexecuted portion of work/ supply does not appear to be executable within balance available period (#) considering its performance of execution. 2. Withdrawal from or abandonment of the work by contractor before completion of the work as per contract. 3. Non completion of work / Non-supply by the contractor within scheduled completion/delivery period as per contract or as extended from time to time, for the reason attributable to the contractor. 4. Termination of contract on account of any other reason (s) attributable to contractor. 5. Assignment, transfer, subletting of contract without BHEL's written permission resulting in termination of Contract or part thereof by BHEL. 6. Non-compliance to any contractual condition or any other default attributable to contractor. Risk and Cost amount against balance work will be calculated as follows: Risk & Cost Amount= [(A-B) + (A x H/100)] Where, A= Value of Balance scope of Work/ Supply (*) as per rates of new contract B= Value of Balance scope of Work/ Supply (*) as per rates of old contract being paid to the contractor/ supplier at the time of termination of contract i.e. inclusive of PVC & ORC, if any.	Accepted

	H = Overhead Factor to be taken as 5 In case (A-B) is less than 0 (zero), value of (A-B) shall be taken as 0 (zero). *(Balance scope of work/ supply) Difference of Contract Quantities and Executed Quantities as on the date of issue of Letter for 'Termination of Contract', shall be taken as balance scope of Work/ Supply for calculating risk & cost amount. Contract quantities are the quantities as per original contract. If, Contract has been amended, quantities as per amended Contract shall be considered as Contract Quantities. Items for which total quantities to be executed have exceeded the Contract Quantities based on drawings issued to contractor from time to time till issue of Termination letter, then for these items total Quantities as per issued drawings would be deemed to be contract quantities. Substitute/ extra items whose rates have already been approved would form part of contract quantities for this purpose. Substitute/ extra items which have been executed but rates have not been approved, would also form part of contract quantities for this purpose and rates of such items shall be determined in line with contractual provisions. However, increase in quantities on account of additional scope in new tender shall not be considered for this purpose. NOTE: In case portion of work is being withdrawn, contract quantities pertaining to portion of work withdrawn shall be considered as 'Balance scope of work/supply' for calculating Risk & Cost amount.	
9	Document Submission: Along with the offer: 1. All the technical documents which have been attached along with our enquiry i.e Specification, Drgs, Data Sheet etc, signature to be endorsed on all pages with company seal Technical documents & Sub-delivery enquiry deviation format. 2. Filled-in/signed Annexure-A, Commercial terms and conditions. (Mandatory for Commercial evaluation) 3. Unpriced offer submitted through EPS shall contain minimum of above documents, without which offer is liable for rejection. 4. If MSE vendor, please attach Udyam Regn Certificate.	Submitted/ Not Submitted
10	Any deviation on technical/QP/packing requirements shall specifically be indicated in the "sub-delivery enquiry deviation format" attached along with the enquiry. Deviations / clarifications declared elsewhere will not be evaluated. <u>Also, any deviations from the commercial terms and conditions shall be clearly spelt out in this format itself.</u> Deviations / clarifications declared elsewhere will not be evaluated. Deviations taken, if any, by vendor as per our requirement above shall be clearly got accepted by BHEL in writing during enquiry stage itself. In the event of an order no deviations, unless accepted clearly by BHEL in writing during enquiry stage will be entertained and all other techno-commercial requirements will be binding on successful bidder and failure to execute the terms will lead to disciplinary action by BHEL against the said bidder.	No Deviation Format Submitted/ Not Submitted
11	All the technical documents, if attached by BHEL along with the tender (Specification / Datasheet / Drawing / QP / Packing Procedure etc.) which are part of this e-tender, should bear your conformation / confirmation and sign with seal on each page. The same shall be scanned & attached as PDF files along with the offer for technical evaluation.	Technical Docs Submitted / Not Submitted
12	Technical / commercial clarification, if any, will be initiated through EPS / email. Vendor to respond to the clarifications within 3 working days. If the vendor fails to respond, even after three reminders, then the vendor will be considered as non-responsive and is liable to be rejected.	Accepted
13	PO Acknowledgement: Within 7 days from the date of receipt of scanned PO copy through email.	Accepted
14	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.	Accepted
15	Fraud Prevention Policy Suppliers involving in fraudulent practices or delayed supply (or) non-Supply will be dealt with provision as indicated in "Guidelines for Suspension of Business Dealings with Suppliers / Contractors" which is hosted in website www.bhel.com. The offers of the bidders who are under suspension as also the offers of the bidders, who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL web site www.bhel.com. 1.0 Integrity commitment, performance of the contract and punitive action thereof: 1.1 Commitment by BHEL: BHEL commits to take all measures necessary to prevent corruption in connection with the tender process and execution of the contract. BHEL will during the tender process treat all Bidder(s) in transparent and fair manner, and with equity. 1.2 Commitment by Bidder / Supplier / Contractor: 1.2.1. The bidder / supplier / contractor commit to take all measures to prevent corruption and will not directly or indirectly influence any decision or benefit which he is not legally entitled to nor will act or omit in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India. 1.2.2. The bidder / supplier / contractor will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in	Accepted

	connection with the award of the contract and shall adhere to relevant guidelines issues from time to time by Govt. of India / BHEL. 1.2.3. The bidder / supplier / contractor will perform / execute the contract as per the contract terms & Conditions and will not default without any reasonable cause, which causes loss of business / money / reputation, to BHEL. If any bidder / supplier / contractor during pre-tendering / tendering / post tendering / award / execution / post-execution stage indulges in mal-practices, cheating, bribery, fraud or and other misconduct or formation of cartel so as to influence the bidding process or influence the price or acts or omits in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India, then action may be taken against such bidder / supplier / contractor as per extant guidelines of the company available on www.bhel.com and / or under applicable legal provisions.	
16	Inspection & testing requirements shall be done as per approved vendor QP	Accepted
17	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.	Accepted
18	BHEL reserves the right to cancel / modify the tender, if the need so arises, without assigning any further notice or reason therefore.	Accepted
19	JURISDICTION: In case of any suit or other legal proceedings arising under or relating to this Contract, the courts at Trichy, Tamil Nadu only shall have the Jurisdiction and is only after exhausting the aforesaid arbitration clause.	Accepted
20	SECRECY OF CONFIDENTIAL INFORMATION: The Contractor undertakes and agrees that he/it will not disclose or reveal in part or full the proprietary/confidential information, which terms shall mean and include patents, trademarks, service marks, registered designs, copyright, design rights, know-how, confidential information, trade and business names and any other similar protected information of BHEL received during negotiation or currency of the contract to any third party or governmental authorities without written permission from BHEL. In the event of termination or expiry of the contract, the contractor shall return all proprietary/confidential information to BHEL. This clause shall survive termination or expiry of the contract. All the input details: transmittals and sample drawings supplied for preparation of drawings are confidential information of BHEL for specific purpose only. The contractor shall never pass on / part with the information to anybody and shall maintain the secrecy of the information. As soon as the bills are certified by BHEL, all the relevant drawing files shall be erased from PCs and shall not be made use under any circumstances. BHEL reserves the right to initiate appropriate action including legal proceeds / termination of contract, recovery of damages, penalties etc., if the contractor is found guilty / wrong usage of the documents given by BHEL for any unauthorised activity.	Accepted

By signing this Annexure, the vendor consents the above Additional Terms & Conditions (ATC) are accepted, this Annexure-A, shall be binding between BHEL and the Vendor; and no other terms quoted / mentioned by vendor, elsewhere in the Offer / Quotation will be considered / accepted by BHEL.

Sign / Seal of Company on all the pages

This document is part of Tender terms & Conditions & shall be mandatorily submitted along with the offer documents in GeM Portal in ATC.

ANNEXURE-B

1	GEM ID NO	
2	ITEM	

VENDOR DETAILS

SI No	DESCRIPTION	DETAILS TO BE FILLED
1.	VENDOR / FIRM NAME	
2.	BHEL VENDOR CODE (IF ANY)	
3.	QUOTATION REFERENCE & DATE	
4.	CONTACT PERSON NAME	
5.	CONTACT PERSON MOBILE NO	
6.	CONTACT PERSON EMAIL ID	
7.	WORKS ADDRESS & TELE NO	
8.	OFFICE ADDRESS & TELE NO	
9.	PAN NO	
10.	GST NO	
11.	MSE VENDOR / NON MSE VENDOR	MICRO / SMALL

Sign & Seal of Company

Sl no	Terms	Questions	Vendor confirmation
1	HSN CODE	Pl mention	
2	GST	Pl Mention	%
3	MII	Pl mention the percentage of Local content	%
4	Attachments 1	Have you submitted the Udyam registration certificate? (applicable only for Micro & Small Enterprises)	Yes / No
5	Attachments 2	Have you submitted the point wise supporting documents required against Pre-Qualification Report (PQR)?	Yes / No
6	Attachments 3	Have you submitted the filled-in, signed / with company seal "NIL Deviation Format ".	Yes / No
7	Attachments 4	Have you submitted the signed / with company seal, all pages of "Technical Specification, Drawing, datasheet & Quality Plan" with respect to this tender along with your quoted offer.	Yes / No
8	Attachments 5	Have you submitted the filled-in, signed, sealed "Self declaration format for MII clause" as per format in your company letter head. (Indicate the % of Local Content)	Yes / No

PLEASE UPLOAD THIS DOCUMENT IN GEM PORTAL DULY FILLED SIGNED AND STAMPED ALONG WITH YOUR OFFER

Sign & Seal of Company

PACKAGE DETAILS						
SL No.	MATL CODE	DESCRIPTION	UNIT	QTY	QUOTED / NOT QUOTED	REMARKS
10	L172819509112002	2 Pair x 0.5 sq.mm., PTFE insulated, Over all shielded, PTFE inner sheathed, braided, PTFE outer sheathed Instrumentation Cable, as per Data Sheet No.DS:TCI:145/PTFE INSTRUMENTATION CABLE, Rev. 01 Colour of Outer sheath - BLUE.	METER	1,000.00		
20	L172819509112003	4 Pair x 0.5 sq.mm., PTFE insulated, Over all shielded, PTFE inner sheathed, braided, PTFE outer sheathed Instrumentation Cable, as per Data Sheet No.DS:TCI:145/PTFE INSTRUMENTATION CABLE, Rev. 01 Colour of Outer sheath - BLUE.	METER	4,300.00		
30	L172819509112006	8 Pair x 0.5 sq.mm., PTFE insulated, Over all shielded, PTFE inner sheathed, braided, PTFE outer sheathed Instrumentation Cable, as per Data Sheet No.DS:TCI:145/PTFE INSTRUMENTATION CABLE, Rev. 01 Colour of Outer sheath - BLUE.	METER	1,700.00		
40	L172819509112007	4 Pair x 0.5 sq.mm., PTFE insulated, Pair Shielded and Over all shielded, PTFE inner sheathed, braided, PTFE outer sheathed Instrumentation Cable, as per Data Sheet No.DS:TCI:145/PTFE INSTRUMENTATION CABLE, Rev. 01 Colour of Outer sheath - BLUE.	METER	500.00		
50	L172819509112008	3 Core x 2.5 sq.mm., PTFE insulated, PTFE inner sheathed, braided, PTFE outer sheathed Control Cable, as per Data Sheet No.DS:TCI:245/PTFE CONTROL CABLE, Rev. 01 Colour of Outer sheath - BLACK.	METER	5,000.00		
NOTE:						
1. The tender is floated as a Single Package. It is mandatory to quote for all the above items (SL No. 10-50).						
2. Kindly mention Quoted or Not Quoted against each Sl No. Do not mention the price in this sheet.						

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.



Bharat Heavy Electricals Limited

HIGH PRESSURE BOILER PLANT, TIRUCHIRAPPALLI 620 014.

CONTROLS AND INSTRUMENTATION/FB

DATA SHEET FOR PTFE INSULATED & SHEATHED, MULTIPAIR SHIELDED INSTRUMENTATION CABLE

(PAIR SHIELDED AND OVER ALL SHIELDED)
&
(OVER ALL SHIELDED)

Data sheet No.: DS:TCI:145/PTFE INSTRUMENTATION CABLE, Rev. 01

Revision History

Rev. No.	Date	Description	Prepared	Reviewed	Approved
			K Sudharsan	K Sudharsan	Aswini Kumar 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 SHIELDED INSTRUMENTATION CABLE

Data sheet No.: DS:TCI:145/PTFE INSTRUMENTATION 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, IS-8130, VDE 207-P6, VDE-0815, VDE-0472, IEC 60332-3, ASTM-D-2116, IS-3975, IEC-754, ASTM-D-2843, ASTM-D-2863, IS-10810, IEEE-383, SS-4241475 & 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. Repaired Cables are not acceptable.
7	Conductor:-		
a	No. of Pairs		2 Pair / 4 Pair / 8 Pair As per Purchase Enquiry / Purchase order
b	Area of Conductor	Sq.mm	0.5 Sq.mm / 1.5 Sq.mm As per Purchase Enquiry / Purchase order
c	Number of Strands / Strand Diameter (for finished cable)	No./ mm	7/0.307 for 0.5 sq.mm & 23/0.3 for 1.5 Sq.mm (Stranded & Non-compacted)
d	Material		Silver plated Annealed Copper
e	Grade / Standard		High Conductivity, Electrolytic grade copper conforming to IS-8130 & Silver plating conforming to JSS-51034
8	Insulation :-		
a	Material		PTFE
b	Type and Standard		VDE 207 Part-6/ASTM D 2116
c	Thickness (minimum) as per JSS-51038	mm	0.3
d	Method of application		PTFE wrapped and sintered / PTFE extruded
e	Pair Identification		As per Data sheet Clause No. 36
f	Volume Resistivity	Ω cm	> 10 ¹⁴
9	Lay for Pairing	mm	50
10	Direction of Lay		Right hand

**DATA SHEET FOR PTFE INSULATED & SHEATHED, MULTIPAIR SHIELDED
INSTRUMENTATION CABLE**

Data sheet No.: DS:TCI:145/PTFE INSTRUMENTATION CABLE, Rev. 01

Sl. No.	Parameter		Value/Requirement
11	No. of Pairs for making a bundle		4 pairs - lapped to form a bundle (Not applicable for 2 pair cable)
12	Lay for laid-up Pairs	Twist/ metre	4 - 6
13	Lay for Laid-up Bundle	Twist/ metre	2 - 3 (Not applicable for 2 & 4 pair cable)
14	Binding material :-		
a	Type of Material		PTFE Tape
b	Thickness (min)	mm	0.028
c	Coverage (min)	%	100
d	Overlap (min)	%	25
e	Coloured PTFE tape		For 8 pair cables, each bundle(4 pair) shall be provided with coloured PTFE tape
15	Fillers (wherever applicable)		Flame retardant, Non-Hygroscopic, suitable for the operating temperature of the cable. Position, Shape and Number of fillers will be decided by the vendor. Applicability of Fillers will be decided by the vendor for all the varieties of cables.
16	Shielding :-		
a	Type of Material		Aluminium Backed Mylar Tape
b	Thickness (min)	micron	For Pair Shielding 28 Micron, 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).	
17	Drain wire for shielding :-		
a	Material		Silver plated Annealed Copper
b	Number of strands / Diameter of strand	No./ mm	7/ 0.307
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

**DATA SHEET FOR PTFE INSULATED & SHEATHED, MULTIPAIR SHIELDED
INSTRUMENTATION CABLE**

Data sheet No.: DS:TCI:145/PTFE INSTRUMENTATION CABLE, Rev. 01

Sl. No.	Parameter		Value/Requirement
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 (Nominal)		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” @ 1 metre interval. Example Marking :
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	± 2

DATA SHEET FOR PTFE INSULATED & SHEATHED, MULTIPAIR SHIELDED INSTRUMENTATION CABLE

Data sheet No.: DS:TCI:145/PTFE INSTRUMENTATION CABLE, Rev. 01

Sl. No.	Parameter		Value/Requirement	
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	%	± 5	
30	Tolerance on Overall quantity	%	+ 0 / - 2	
31	Non-standard Length		Last length shall be supplied in single length	
32	Electrical Parameters :-		0.5 sq.mm. Cable	1.5 sq.mm. Cable
a	Conductor DC Resistance (max.) @ 20° C as per BS-60228	Ω/km	36.7	12.2
b	Characteristic impedance @ 1 kHz	Ω	320 Ω for Pair & Overall shielded cables	
			340 Ω for Overall shielded cables	
c	Insulation Resistance (min.) @ 20°C	MΩ/km	100	
d	Mutual Capacitance (max.) @ 0.8 KHz	nF/km	120 nF/km for Pair & Overall shielded cables	
			100 nF/km for Overall shielded cables	
e	Attenuation (max.) @ 1 kHz	dB/ km	1.2	
f	Cross talk (min.) @ 0.8 kHz	dB/km	60	
g	Test Voltage - Between Conductor- Conductor	kV/ minute	2	
h	Test Voltage - Between Conductor - Shield (min.)	kV/ minute	2	
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	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 so as to eliminate	

**DATA SHEET FOR PTFE INSULATED & SHEATHED, MULTIPAIR SHIELDED
INSTRUMENTATION CABLE**

Data sheet No.: DS:TCI:145/PTFE INSTRUMENTATION CABLE, Rev. 01

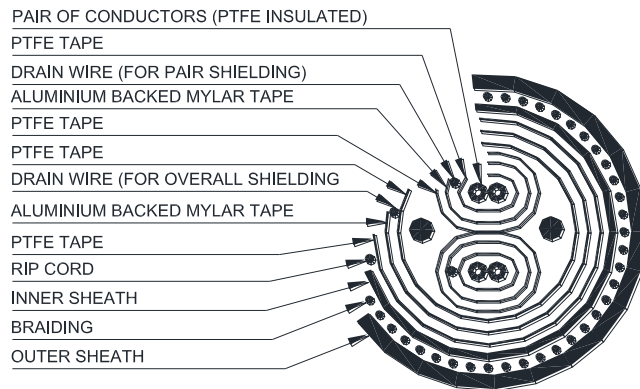
Sl. No.	Parameter	Value/Requirement										
		ingress of water during transportation, storage and erection. Wood preservative anti-termite treatment shall be applied to the entire drum. Wooden drums shall comply with IS-10418. Each drum shall carry Manufacturer's name or trademark, Type of cable, Voltage 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.										
36	<u>Colour coding and Numerical order of cores</u> The twisted pair of conductors are identified by 8 colours. The same colours are repeated in different Bundles. <table><tr><th>Pair</th><th>Colour</th></tr><tr><td>1</td><td>Blue & Red</td></tr><tr><td>2</td><td>Grey & Yellow</td></tr><tr><td>3</td><td>Green & Brown</td></tr><tr><td>4</td><td>White & Black</td></tr></table> For 8 pair cable, each bundle shall be provided with distinct coloured PTFE binder tape 1st bundle – Blue coloured PTFE binder tape 2nd bundle – Red coloured PTFE binder tape		Pair	Colour	1	Blue & Red	2	Grey & Yellow	3	Green & Brown	4	White & Black
Pair	Colour											
1	Blue & Red											
2	Grey & Yellow											
3	Green & Brown											
4	White & Black											

DATA SHEET FOR PTFE INSULATED & SHEATHED, MULTIPAIR SHIELDED INSTRUMENTATION CABLE

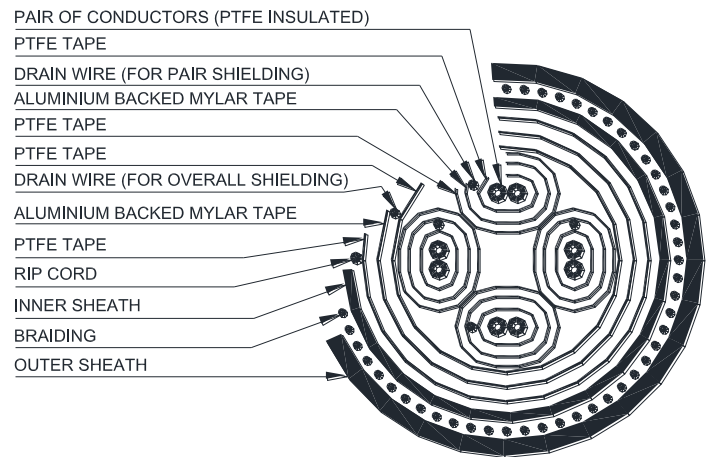
Data sheet No.: DS:TCI:145/PTFE INSTRUMENTATION CABLE, Rev. 01

Constructional Diagram for Pair Shielded and Overall Shielded Cables

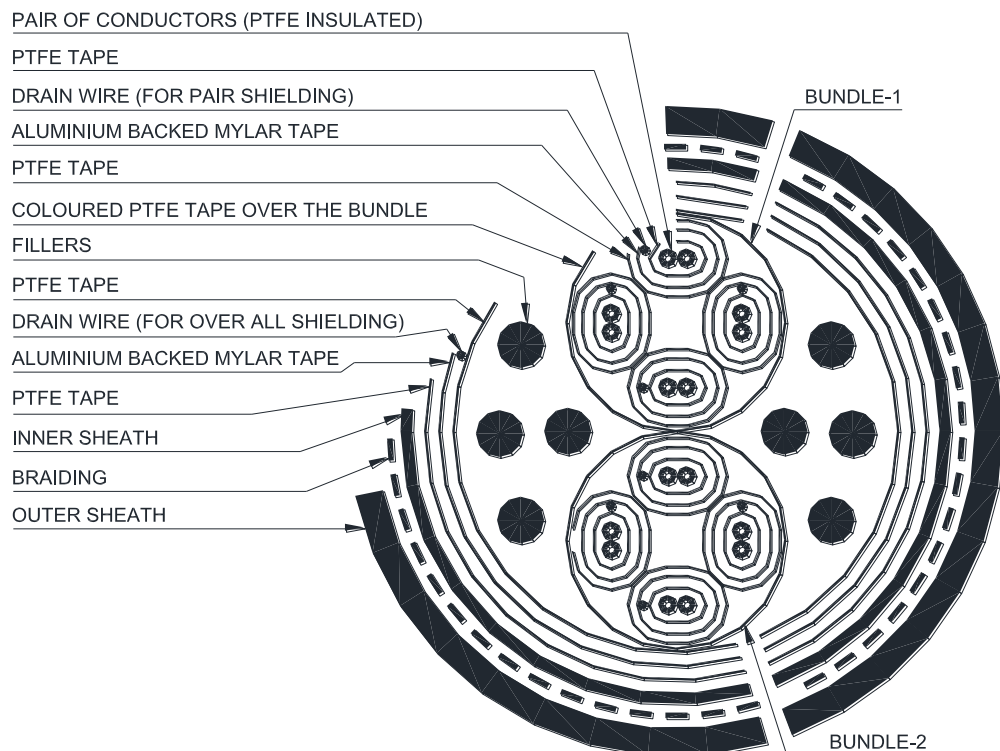
TYPICAL CONSTRUCTIONAL DIAGRAM OF A
2 PAIR, PAIR SHIELDED & OVER ALL SHIELDED CABLE



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



TYPICAL CONSTRUCTIONAL DIAGRAM
OF A 8 PAIR, PAIR SHIELDED & OVER ALL SHIELDED CABLE

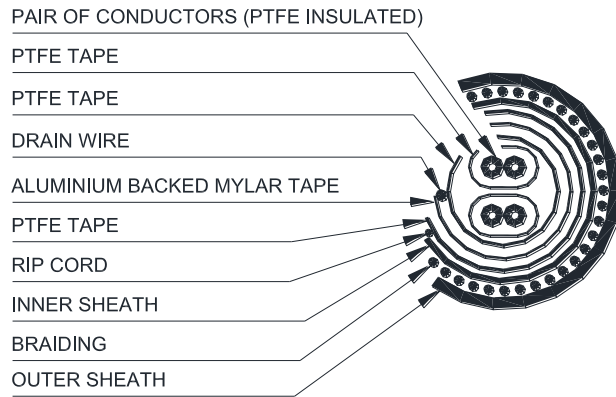


DATA SHEET FOR PTFE INSULATED & SHEATHED, MULTIPAIR SHIELDED INSTRUMENTATION CABLE

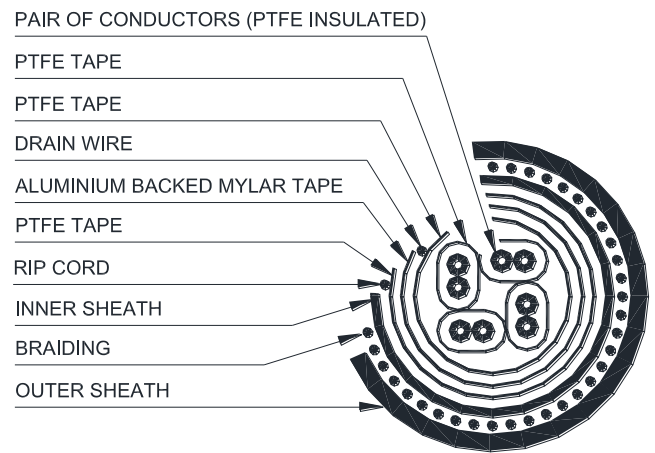
Data sheet No.: DS:TCI:145/PTFE INSTRUMENTATION CABLE, Rev. 01

Constructional Diagram for Overall Shielded Cables

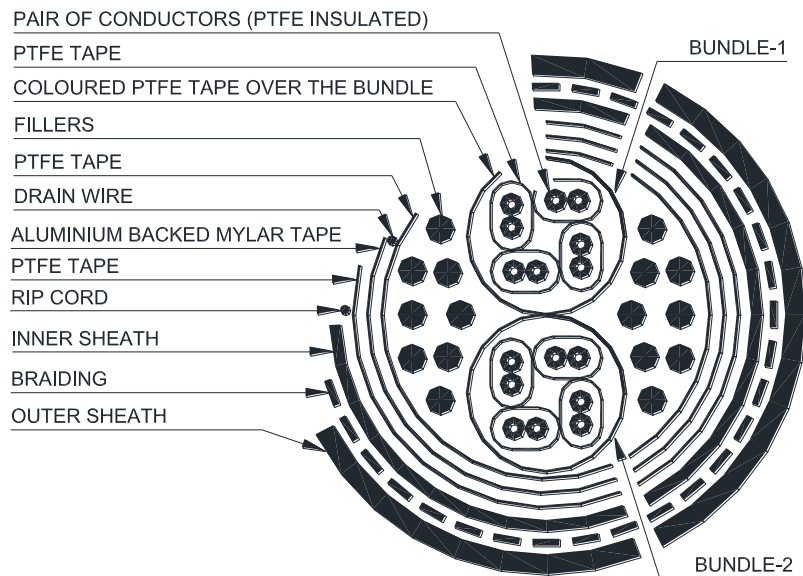
TYPICAL CONSTRUCTIONAL DIAGRAM OF A
2 PAIR OVER ALL SHIELDED CABLE



TYPICAL CONSTRUCTIONAL DIAGRAM OF A
4 PAIR OVER ALL SHIELDED CABLE



CONSTRUCTIONAL DIAGRAM OF A
8 PAIR 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.	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. 2. Technical deviation/non-conformance indicated elsewhere in the offer will not be considered. 3. In the absence of Sub-Delivery Enquiry Deviation format, the vendor's offer will not be evaluated.

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**DATA SHEET FOR PTFE INSULATED & SHEATHED, MULTIPAIR SHIELDED
INSTRUMENTATION CABLE**

Data sheet No.: DS:TCI:145/PTFE INSTRUMENTATION CABLE, Rev. 01

ANNEXURE TO INSTRUMENTATION CABLE DATA SHEET

Pair shielded & Over all shielded Cable

Type of cable / No. of Pair			2 Pair x 0.5 sq.mm.	4 Pair x 0.5 sq.mm.	8 Pair x 0.5 sq.mm.	2 Pair x 1.5 sq.mm.
01	Dia. over Conductor	mm				
02	Thickness of Insulation (minimum)	mm				
03	Dia. over insulated conductor	mm				
04	Dia. Over laid up pair	mm				
05	Dia. under Inner Sheath	mm				
06	Thickness of Inner Sheath (Minimum)	mm				
07	Dia. over Inner Sheath	mm				
08	Braiding – Strand diameter	mm				
09	Braid Angle					
10	Dia. over Braiding	mm				
11	Thickness of outer Sheath (Minimum)	mm				
12	Overall Diameter	mm				
13	Weight of cable	kg/ km				
14	Short circuit rating of Conductor for 1 second	kA				

SIGNATURE OF THE VENDOR WITH SEAL

**DATA SHEET FOR PTFE INSULATED & SHEATHED, MULTIPAIR SHIELDED
INSTRUMENTATION CABLE**

Data sheet No.: DS:TCI:145/PTFE INSTRUMENTATION CABLE, Rev. 01

ANNEXURE TO INSTRUMENTATION CABLE DATA SHEET

Over all shielded Cable

Type of cable / No. of Pair			2 Pair x 0.5 sq.mm.	4 Pair x 0.5 sq.mm.	8 Pair x 0.5 sq.mm.
01	Dia. over Conductor	mm			
02	Thickness of Insulation (minimum)	mm			
03	Dia. over insulated conductor	mm			
04	Dia. Over laid up pair	mm			
05	Dia. under Inner Sheath	mm			
06	Thickness of Inner Sheath (Minimum)	mm			
07	Dia. over Inner Sheath	mm			
08	Braiding – Strand diameter	mm			
09	Braid Angle				
10	Dia. over Braiding	mm			
11	Thickness of outer Sheath (Minimum)	mm			
12	Overall Diameter	mm			
13	Weight of cable	kg/km			
14	Short circuit rating of Conductor for 1 second	kA			

SIGNATURE OF THE VENDOR WITH SEAL



Bharat Heavy Electricals Limited

HIGH PRESSURE BOILER PLANT, TIRUCHIRAPPALLI 620 014.
CONTROLS AND INSTRUMENTATION/FB

DATA SHEET FOR PTFE INSULATED & SHEATHED, CONTROL CABLES

Data sheet No.: DS:TCI:245/PTFE CONTROL CABLE, Rev. 01

Revision History

Rev. No.	Date	Description	Prepared	Reviewed	Approved
			K Sudharsan	K Sudharsan	Aswini Kumar Panda
00	24-06-17	Initial Release	-Sd-	-Sd-	-Sd-
01	09-06-20	Revised to Remove FRLS references			

Technical Data sheet for PTFE Insulated & Sheathed, Multicore Control Cable

Data sheet No.: DS:TCI:245/PTFE CONTROL CABLE, Rev 01

Sl. No.	Parameter	Value/Requirement	
1	Application	From Field Instruments In Hot Zones to Field Junction Boxes	
2	Applicable Standards	JSS 51038, MIL-W-16878, IS-8130, VDE 207-P6, VDE-0815, VDE-0472, IEC 60332-3, ASTM-D-2116, IS-3975, IEC-754, ASTM-D-2843, ASTM-D-2863, IS-10810, IEEE 383, SS-4241475 & IS-10418	
3	Voltage grade	V	1000
4	Temperature Rating	°C	260
5	Construction of cable	As per Constructional diagram enclosed with this Data sheet	
6	Conductor		
a)	No. Of Cores	2 Core/3 core /4 Core/5 Core (As per Purchase Enquiry / Purchase order)	
b)	Area of Conductor	Sq.mm	1.5 / 2.5 (As per Purchase Enquiry/ Purchase order)
c)	Number of Strands / Strand Diameter (for finished cable)	No./ mm	7/0.53 for 1.5 sq.mm 7/0.68 for 2.5 sq.mm (Stranded & Non-compacted)
d)	Material	Silver Plated Annealed Copper Conductor	
e)	Grade / Standard	High Conductivity, Electrolytic grade copper conforming to IS-8130 & Silver plating conforming to JSS-51034	
7	Insulation		
a)	Material	PTFE	
b)	Type and Standard	VDE 207 Part-6/ASTM D 2116	
c)	Thickness (minimum) as per JSS-51038	mm	0.3
d)	Method of application	PTFE wrapped and sintered / PTFE extruded	
e)	Core Identification	2 core → Red & Black 3 core → Red, Yellow & Blue 4 core → Red, Yellow, Blue & Black 5 core → Red, Yellow, Blue, Black & Grey	
f)	Volume Resistivity	Ω cm	> 10 ¹⁴

Technical Data sheet for PTFE Insulated & Sheathed, Multicore Control Cable

Data sheet No.: DS:TCI:245/PTFE CONTROL CABLE, Rev 01

Sl. No.	Parameter	Value/Requirement	
8	Fillers (wherever applicable)	Flame retardant, Non-Hygroscopic, suitable for the operating temperature of the cable.	
9	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	
10	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
11	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 (Nominal)	0.5	
e)	Colour	As per Purchase Enquiry	
f)	Cable Marking on Outer sheath by indelible Inkjet printing	“Manufacturer’s name, Year of manufacture, PTFE, No. of Cores & Conductor size, Voltage rating, Type of Cable” @ 1 metre interval. Sample Marking:	
g)	Sequential marking on outer sheath by indelible Inkjet printing	Every 1 Metre for Progressive Length	
h)	Special Properties for Outer sheath	Material of outer sheath shall be resistant to water, fungus, rodent, moisture and termite attack.	

Technical Data sheet for PTFE Insulated & Sheathed, Multicore Control Cable

Data sheet No.: DS:TCI:245/PTFE CONTROL CABLE, Rev 01

Sl. No.	Parameter	Value/Requirement	
12	Tolerance on Outer diameter	mm	± 2
13	Tolerance on Outer diameter for the entire length	mm	1
14	Ovality	mm	1
15	Bending Radius (min)	12 times the Outer diameter	
16	Standard Packing Length	metre	1000
17	Tolerance on standard packing length	%	± 5
18	Tolerance on Overall quantity	%	+ 0 / - 2
19	Non-standard Length	Last length shall be supplied in single length	
20	Electrical Parameters		
a)	Conductor DC Resistance (max.) @ 20° C as per BS-60228	Ω/km	1.5 Sq.mm – 12.2
			2.5 Sq.mm – 7.56
b)	Short circuit rating of conductor for 1 second	kA	1.5 Sq.mm – 0.215
			2.5 Sq.mm – 0.35
c)	Insulation Resistance (min.) @ 20°C	MΩ/km	100
d)	Test Voltage between Conductor- Conductor	kV/ minute	2
21	Flammability Tests asper IEC-60332-1-2		Shall pass
22	Quality Plan		Vendor Quality Plan
23	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 so as to eliminate ingress of water during transportation, storage and erection. Wood preservative anti-termite treatment shall be applied to the entire drum. Wooden drums shall comply with IS-10418. Each drum shall carry Manufacturer’s name

Technical Data sheet for PTFE Insulated & Sheathed, Multicore Control Cable

Data sheet No.: DS:TCI:245/PTFE CONTROL CABLE, Rev 01

Sl. No.	Parameter	Value/Requirement
		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.

TYPICAL CONSTRUCTIONAL DIAGRAM OF 3 CORE PTFE INSULATED & SHEATHED CABLE

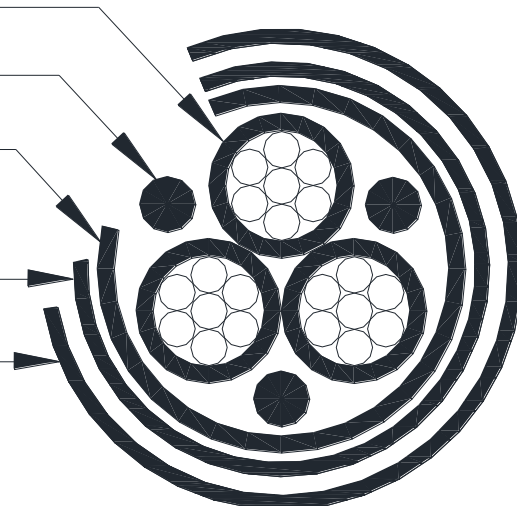
CONDUCTOR (PTFE INSULATED)

FILLERS (If Applicable)

PTFE INNER SHEATH

BRAIDED ARMOUR

PTFE OUTER SHEATH



Technical Data sheet for PTFE Insulated & Sheathed, Multicore Control Cable

Data sheet No.: DS:TCI:245/PTFE CONTROL CABLE, Rev 01

INSTRUCTION TO VENDOR

Atmosphere	Dusty, Salty, corrosive & Heavily polluted.
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.
General	All the parameters shall comply with the applicable standards, wherever applicable.
Confirmation to be given by the vendor.	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. 2. Technical deviation/non-conformance indicated elsewhere in the offer will not be considered. 3. In the absence of Sub-Delivery Enquiry Deviation format, the vendor's offer will not be evaluated.

TOLERANCE ON OUTER DIAMETER

Definition:-

This is the allowable Limits on the diameter of the actual cable from the Data sheet value /Design value.

The Data sheet indicates ± 2 mm. This means that if the Data sheet value / Design value of the cable diameter is 'X' mm, then all the actual cable diameter measured over the entire length / quantity shall fall within the Upper Limit 'X + 2' mm and the Lower Limit 'X - 2' mm. However, the following clauses must also be satisfied.

Example:-

Let the Data sheet value / Design value of the cable diameter be 14 mm (X)

Then, the measurements of the actual cable diameter taken over the entire length shall fall between the Limits 16 mm and 12 mm.

i.e. (X + 2) (X - 2)

Technical Data sheet for PTFE Insulated & Sheathed, Multicore Control Cable

Data sheet No.: DS:TCI:245/PTFE CONTROL CABLE, Rev 01

TOLERANCE ON OUTER DIAMETER FOR THE ENTIRE LENGTH

Definition:-

This is the maximum allowable difference between the Highest actual cable diameter and the Lowest actual cable diameter measured over a drum length.

The Data sheet indicates 1 mm. This means that if the Highest actual cable diameter is say, 'D1' mm, and the Lowest actual cable diameter is 'D2' mm, then, 'D1 - D2' shall be maximum 1 mm and 'D1' and 'D2' shall also fall within the Upper and Lower limits as above.

Example:-

Let the Highest actual cable diameter measured be 16 mm (D1)

Let the Lowest actual cable diameter measured be 15 mm (D2)

Then, Tolerance for the entire length = 16 mm - 15 mm = 1 mm
(D1) (D2)

Comment:-

As the Highest actual cable diameter and Lowest actual cable diameter falls within the Upper and Lower Limits as above, and the difference between them is 1 mm maximum, the diameter values are acceptable.

OVALITY

Definition:-

This is the maximum allowable difference between the measurements of the actual cable diameter in 'x' and 'y' directions in any particular section.

The Data sheet indicates 1 mm. This means that if the actual cable diameters measured are say, 'D3' mm, and 'D4' mm, in 'x' and 'y' directions respectively in one particular section. Then, the difference between 'D3' and 'D4' shall be maximum 1 mm. Also 'D3' and 'D4' shall fall within the Upper and Lower limits as above.

Example:-

Let the actual cable diameter in 'x' direction in one section be 16 mm (D3)

Let the actual cable diameter in 'y' direction in the same section be 15 mm (D4)

Then, Ovality = 16 mm - 15 mm = 1 mm
(D3) (D4)

Comment:-

As the actual cable diameters measured in 'x' and 'y' directions of the same section falls within the Upper and Lower limits as above, and the difference between them is 1 mm maximum, the diameter values are acceptable.

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**PURCHASE / M M / BOI
ENQUIRY DEVIATION**

429-024

PAGE

1 OF 1

**SCHEDULE OF DEVIATION TO
BOI ENQUIRY NO:**

BID NO: GEM / 2021/ B/ 1354328

DATE

13.07.2021

DESCRIPTION

PTFE INSTRUMENTATION CABLE FOR PANKI PROJECT

SPECIFICATION

DS:TCI:145/ PTFE INSTRUMENTATION CABLE, Rev.01

QUALITY PLAN

VENDOR QUALITY PLAN IN BHEL FORM AT

PACKING PROCEDURE

AS PER DATASHEET

DOCUMENT REFERENCE

BHEL ENQ. CALLED FOR

FIRM'S ALTERNATIVE OFFER

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.

2. If necessary, use additional sheets with page control number.

/ On Bidder's office letter pad /

Self-Declaration

Enquiry No.	
Enquiry Date	

In line with Government public procurement order Number P-45021/2/2017-B.E-II dated 15.06.2017, and further modified order dt. 28.05.2018,

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)