

**BANGLADESH-INDIA FRIENDSHIP POWER COMPANY
(PVT.) LIMITED, BANGLADESH**

**2X660 MW MAITREE STPP,
RAMPAL, BANGLADESH**

**TECHNICAL SPECIFICATION
FOR
EXOTHERMIC WELDING MATERIALS**

SPECIFICATION NO. : PE-TS-421-509-E005, (REV. 00)



**BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA, UP**



DOCUMENT TITLE

**TECHNICAL SPECIFICATION FOR
EXOTHERMIC WELDING MATERIALS**

SPECIFICATION NO. PE-TS- 421-509-E005

VOLUME II B

SECTION ---

REVISION 00

DATE: 02.09.2017

SHEET 1 OF 1

CONTENTS:

Sl. No.	DESCRIPTION	NO. OF SHEETS
1.0	INSTRUCTIONS TO BIDDERS	01
2.0	PREAMBLE	01
3.0	SECTION – 'A' (SCOPE OF ENQUIRY)	02
4.0	SECTION – 'B' (PROJECT INFORMATION)	02
5.0	SECTION – 'C'	
5.1	SPECIFIC TECHNICAL REQUIREMENTS	02
5.2	ANNEXURE-I TO SECTION-C (BOQ)	02
5.3	ANNEXURE-II (LIST OF DELIVERABLES)	01
5.4	ANNEXURE-II (VENDOR DRAWINGS/DOCUMENTS SCHEDULE)	01
6.0	SECTION- 'D'	
6.1	STANDARD TECHNICAL SPECIFICATION	03
6.2	DATASHEET-A	03
6.3	DATASHEET-B	03

NOTE: PACKING SHALL BE AS PER "TECHNICAL SPECIFICATION FOR SEAWORTHY PACKING FOR EXPORT JOBS' DOC. NO. PE-TS-888-100-A001

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

BIDDER'S STAMP & SIGNATURE



DOCUMENT TITLE

**TECHNICAL SPECIFICATION FOR
EXOTHERMIC WELDING MATERIALS**SPECIFICATION NO. PE-TS-**421**-509-E005

VOLUME II B

SECTION ---

REVISION 00

DATE: 02.09.2017

SHEET

1

OF

1

INSTRUCTIONS TO BIDDERS FOR PREPARING TECHNICAL OFFERS

1. Two signed and stamped copies of the following shall be furnished by all bidders as technical offer :
 - a. Unpriced Price Schedule (Annexure-I: to Section-C: BOQ, as enclosed with the specification).
 - b. A copy of this sheet ("Instructions to Bidders for Preparing Technical Offer").
 - c. A copy of previous sheet ("Contents").
 - d. Datasheet-B duly filled by bidder.
 - e. Catalogues
 - f. Technical deviations/ clarifications (if any)
2. No technical submittal (unless specified in Technical specification) such as copies of test certificates, write-up, drawing, technical literature, etc. is required during tender stage. Any such submission, even if made, shall not be considered as part of offer.
3. No comments/ additions/ deletions shall be made by the bidder on the signed & stamped copy of the specification. Any such changes made by the bidder shall not be considered.
4. Confirmations/ comments (if any) regarding delivery schedules shall be furnished as part of the commercial offer. Any reference elsewhere/ covering letter of technical offer shall not be considered by BHEL.
5. Any comments/ clarifications on technical/ inspection requirements furnished as part of bidder's covering letter shall not be considered by BHEL, and bidder's offer shall be construed to be in conformance with the specification.
6. Any changes made by the bidder in the price schedule with respect to the cable description/ quantities, notes etc. from those given in Annexure-I to Section-C of specification [Bill Of Quantities] shall not be considered (i.e., technical description, quantities, notes etc. as per specification shall prevail).

BIDDER'S STAMP & SIGNATURE



DOCUMENT TITLE

**TECHNICAL SPECIFICATION FOR
EXOTHERMIC WELDING MATERIALS**

SPECIFICATION NO. PE-TS-421-509-E005

VOLUME II B

SECTION ---

REVISION 00

DATE: 02.09.2017

SHEET 1 OF 1

PREAMBLE

1.0 The tender document contains two (2) volumes. The bidder shall meet the requirements of all the two volumes.

1.1 **Volume-I (CONDITIONS OF CONTRACT)**

This consists of four parts as below:-

- Volume-IA : This part contains instructions to bidders for making bids to BHEL.
Volume-IB : This part contains general commercial conditions of the tender & includes provision that vendor is responsible for the quality of item supplied by their sub-vendors.
Volume-IC : This part contains special conditions of contract.
Volume-ID : This part contains commercial conditions for erection & commissioning site work, as applicable.

1.2 **Volume-II TECHNICAL SPECIFICATIONS**

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

- Volume-IIA : General Technical Conditions
Volume-IIB : Technical Specification including Drawings, if any.

1.2.1 **Volume-IIB**

This volume is sub-divided into following sections:-

- Section-A : This section outlines the scope of enquiry.
Section-B : This section provides "Project Information".
Section-C : This section indicates technical requirements specific to the contract, not covered in Section-D.
Section-D : This section comprises of technical specifications of equipments complete with data sheet A and B.

Data Sheet – A Specifies data and other requirements pertaining to the Equipment.

Data Sheet – B Specifies data to be filled by the bidder.

2.0 The requirements mentioned in Section-C / Data Sheets-A of section-D shall prevail and govern in case of conflict between the same and the corresponding requirements mentioned in the descriptive portion in Section-D.



DOCUMENT TITLE

**TECHNICAL SPECIFICATION FOR
EXOTHERMIC WELDING MATERIALS**

SPECIFICATION NO. PE-TS- **421**-509-E005

VOLUME II B

SECTION A

REVISION 00

DATE: 02.09.2017

SHEET 1 OF 2

SECTION – A

SCOPE OF ENQUIRY



DOCUMENT TITLE

**TECHNICAL SPECIFICATION FOR
EXOTHERMIC WELDING MATERIALS**SPECIFICATION NO. PE-TS- **421**-509-E005

VOLUME II B

SECTION A

REVISION 00

DATE: 02.09.2017

SHEET 2 OF 2

SCOPE OF ENQUIRY

- 1.0 This specification covers the design, manufacture, inspection and testing at manufacturer's works, proper packing and delivery to Haldia port of **Exothermic Welding Materials & Copper Clad steel rod** as mentioned in different sections of this specification for the project as indicated in Section B (Project Information).
- 2.0 It is not the intent to specify herein all the details of design & manufacture. However, the equipment shall conform in all respects to high standards of design engineering and workmanship and shall be capable of performing in continuous commercial operation at site conditions.
- 3.0 The general terms and conditions, instructions to bidders and other attachment referred to elsewhere are hereby made part of the tender specification.
- 4.0 The bidder shall be responsible for and governed by all requirements stipulated hereinafter.
- 5.0 Deviations if any should be brought out very clearly on deviation sheet. Otherwise it will be presumed that the bidder's offer is in line with what has been stated/ asked for in this specification.
- 6.0 The documents shall be in English Language and MKS system of units.



TITLE :
**TECHNICAL SPECIFICATION FOR
EXOTHERMIC WELDING MATERIALS**

SPECIFICATION NO. PE-TS-421-509-E005

VOLUME NO. : II-B

SECTION : B

REV NO. : 00 DATE : 02.09.2017

SHEET : 1 OF 2

SECTION 'B'

PROJECT INFORMATION



TITLE :
**TECHNICAL SPECIFICATION FOR
EXOTHERMIC WELDING MATERIALS**

SPECIFICATION NO. PE-TS-421-509-E005

VOLUME NO. : II-B

SECTION : B

REV NO. : 00 DATE : 02.09.2017

SHEET : 2 OF 2

Please refer GCC/NIT for Project information.

	DOCUMENT TITLE TECHNICAL SPECIFICATION FOR EXOTHERMIC WELDING MATERIALS	SPECIFICATION NO. PE-TS- 421 -509-E005	
		VOLUME II B	
		SECTION C	
		REVISION 00	DATE: 02.09.2017
		SHEET 1 OF 2	

SECTION –C

SPECIFIC TECHNICAL REQUIREMENTS

	DOCUMENT TITLE TECHNICAL SPECIFICATION FOR EXOTHERMIC WELDING MATERIALS	SPECIFICATION NO. PE-TS- 421 -509-E005	
		VOLUME II B	
		SECTION C	
		REVISION 00	DATE: 02.09.2017
		SHEET 2 OF 2	

1.0 SCOPE OF ENQUIRY

1.1 This enquiry covers the supply of **Exothermic Welding materials & Copper clad steel rod** conforming to this specification.

1.2 General technical requirements of the Exothermic Welding materials and Copper clad steel rod are indicated in Section-D. Project specific technical/ quality requirements / changes are listed in Section-C.

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

2.0 BILL OF QUANTITIES:

2.1 Quantity requirements shall be as per Annexure-I (Bill of Quantities (BOQ)) enclosed.

3.0 SPECIFIC REQUIREMENTS:

3.1 Technical:

S. No.	Reference clause No. of Section D (if any)	Specific Requirement/ Change

3.2 Quality/ Inspection:

S. No.	Reference clause No. of Section D (if any)	Specific Requirement/ Change



DOCUMENT TITLE

**TECHNICAL SPECIFICATION FOR
EXOTHERMIC WELDING MATERIALS**

SPECIFICATION NO. PE-TS- 421-509-E005

VOLUME II B

SECTION C

REVISION 00

DATE: 02.09.2017

SHEET 1 OF 2

ANNEXURE – I TO SECTION - C

[BILL OF QUANTITIES]

	2X660 MW MAITREE STPP, RAMPAL, BANGLADESH	SPECIFICATION NO. PE-TS-421-509-E005	
		VOLUME IIB	
		SECTION -	
		REVISION 00	
		SHEET 1 OF 1	
TECHNICAL SPECIFICATION FOR EXOTHERMIC WELDING MATERIAL			

ANNEXURE -I

BOQ-CUM-PRICE SCHEDULE FOR EXOTHERMIC WELDING MATERIALS

Sr. No.	Item code	Description	Unit		Ordered Quantity	UNIT PRICE (EX-WORKS) Rs
1	507-41044-A	18MM DIA. 3 M LONG COPPER CLAD STEEL RODS	NOS		1800	
2	507-41003-A	BRUSH	NOS		30	
3	507-41070-A	IGNITOR GUN	NOS		30	
4	507-41032-A	GRAPHITE MOULD FOR 240X240 CROSS JOINT	NOS		33	
5	507-41033-A	GRAPHITE MOULD FOR 240X240T HOR. JOINT	NOS		23	
6	507-41034-A	GRAPHITE MOULD FOR 240X240 STRAIGHT JOINT	NOS		12	
7	507-41035-A	GRAPHITE MOULD FOR 240X240T VER. UP JOINT	NOS		70	
8	507-41036-A	GRAPHITE MOULD FOR 240X18 T VER. DN. JOINT	NOS		60	
9	507-41015-A	HANDLE CLAMP	NOS		198	
10	507-41038-A	WELD POWDER FOR 240 X 240 CROSS JOINT	NOS		1000	
11	507-41039-A	WELD POWDER FOR 240X240 T HOR.JOINT	NOS		700	
12	507-41040-A	WELD POWDER FOR 240X240 STRAIGHT JOINT	NOS		350	
13	507-41041-A	WELD POWDER FOR 240X240 VER UP. JOINT	NOS		2100	
14	507-410442-A	WELD POWDER FOR 240X18 T VER. DN JOINT	NOS		1800	

Notes :

- All quantities shall be released for manufacture along with LOI
- Manufacturing of quantities shall be released along with LOI after the approval of technical and quality documentation, and supply of same shall be completed within two months of date of approval of documents.
- Subsequent lots, if any, shall be cleared for manufacture based on progress of engineering and site requirements. A lead-time of two months shall be given for completion of supply of each lot from the date of clearance of the quantities.
- The quantity variation shall be limited to (+) 30% of the total contract value derived on the basis of the order quantities. Same shall be in line with NIT.
- Any additional item (not indicated above) required for satisfactory performance & completion of job, shall be supplied free of cost by the bidder in adequate nos.



DOCUMENT TITLE

**TECHNICAL SPECIFICATION FOR
EXOTHERMIC WELDING MATERIALS**

SPECIFICATION NO. PE-TS- 421-509-E005

VOLUME II B

SECTION C

REVISION 00

DATE: 02.09.2017

SHEET 1 OF 1

ANNEXURE- II

List of standard deliverables to be submitted by successful bidder after award of contract:

Sl. No.	Drawings/Document Description	Drawings / Document Number	Submission date by vendor
1	GA drawings of Exothermic Welding Material & Copper clad steel rod.	PE-V0- 421 -507-E081	Within two weeks from the date of LOI
2	Technical Datasheet	PE-V0- 421 -507-E082	Within two weeks from the date of LOI
3	Installation Procedure	PE-V0- 421 -507-E083	Within two weeks from the date of LOI
4	Test reports/ certificates	PE-V0- 421 -507-E084	Within two weeks from the date of LOI
5	Catalogues	PE-V0- 421 -507-E085	Within two weeks from the date of LOI
6	Export Seaworthy Packing details	PE-V0- 421 -507-E086	Within two weeks from the date of LOI
7	Quality Plan for Exothermic Welding Material & Copper Clad Steel Rod.	PE-V0- 421 -507-E911	Within two weeks from the date of LOI

	DOCUMENT TITLE TECHNICAL SPECIFICATION FOR EXOTHERMIC WELDING MATERIALS	SPECIFICATION NO. PE-TS- 421-509-E005	
		VOLUME II B	
		SECTION C	
		REVISION 00	DATE: 02.09.2017
		SHEET 1 OF 1	

ANNEXURE-III

Nos. OF DRAWINGS/ DOCUMENTS REQUIRED FROM VENDOR

Unless agreed otherwise, **five (5) hard copies** and **three (3) sets of electronic copies** of all documents are to be submitted in the English language. In addition, operation and maintenance manuals shall be translated into Bangla and provided as paper copies and in electronic format. Electronic Copies shall be submitted in primary original data format (e.g. DOC, XLS, DWG) as well as in a printable non-proprietary document format (e.g. PDF).

All documentation shall comply with uniform documentation instructions according to Customer/BHEL's requirements. Detailed requirements of documentation will be determined during contract execution by the Customer/BHEL.



DOCUMENT TITLE
**TECHNICAL SPECIFICATION FOR
EXOTHERMIC WELDING
MATERIAL**

SPECIFICATION NO. PE-TS- 421-509-E005

VOLUME II B

SECTION D

REVISION 00

DATE: 02.09.2017

SHEET 1 OF 3

SECTION-D

STANDARD TECHNICAL SPECIFICATION

	DOCUMENT TITLE TECHNICAL SPECIFICATION FOR EXOTHERMIC WELDING MATERIAL	SPECIFICATION NO. PE-TS- 421-509-E005	
		VOLUME II B	
		SECTION D	
		REVISION 00	DATE: 02.09.2017
		SHEET 2 OF 3	

1.0 SCOPE OF ENQUIRY

- 1.1 This specification covers the design, manufacture, assembly, testing and inspection at vendor's/sub vendor's works, Packing and despatch to site of **EXOTHERMIC WELDING MATERIALS & COPPER CLAD STEEL ROD** as described in various sections of this specification.

2.0 CODES & STANDARDS

- 2.1 Unless specified otherwise, the latest revision of relevant international standards / codes (like BS7430, BS970, IEEE-837 & UL-467) and other applicable rules and regulations are applicable and shall be referred to.

3.0 TECHNICAL REQUIREMENTS

3.1 **FOR EXOTHERMIC WELD JOINTS**

Exothermic Weld joints shall comprise of the following items:

- 3.1.1 Quantity of weld powder and starting powder required for each size & type of joints.
- 3.1.2 Quantity of handle Clamps of suitable type as required for each type of joint.
- 3.1.3 Quantity of Mould (Graphite) of suitable size as required for each type of joint.
- 3.1.4 Ignitor Guns (Flint/ Flame etc.) as required for igniting the powder & brush for cleaning purpose.
- 3.1.5 Though items required for Exothermic Weld joints are stipulated above, however if any additional item(s) are required for satisfactory performance & completion of job, same shall be supplied free of cost to BHEL.

3.2 **FOR COPPER CLAD STEEL EARTH ELECTRODE**

- 3.2.1 The electrode shall have a core of low carbon steel of grade 080A20 of BS970 with a high tensile strength of at least 600N/sq. mm. Threads (if any) for coupling of the rod shall be rolled onto the rod to ensure that even copper covering is maintained even at the root of the thread. 99.9% pure electrolytic copper shall be molecularly bonded onto the steel core in accordance with international standards to a thickness of 0.25 mm. There must not be any metal interface so that dissimilar metal reaction cannot occur and the copper cannot be separated from steel.
- 3.3 Installation Procedure/ Manual for Exothermic Welding Material shall be provided by the bidder along with storage requirements.

4.0 INSPECTION & TESTING

- 4.1 All tests and inspection of the equipment specified in this specification shall be performed to the extent and in the manner as stipulated in the relevant standards and in this specification. Wherever equipment similar to the one being offered has already been tested; test reports of the same shall be submitted for scrutiny.
- 4.2 Following Tests for thermo weld joints and copper clad earthing electrodes shall be conducted by the bidder.
- (i) Inspection for visual & dimensional checks with respect to standard drawings of the bidder.
- 4.3 The bidder shall include in his total price, the cost of carrying out all the tests as specified above.

5.0 PRICES

	DOCUMENT TITLE TECHNICAL SPECIFICATION FOR EXOTHERMIC WELDING MATERIAL	SPECIFICATION NO. PE-TS- 421-509-E005	
		VOLUME II B	
		SECTION D	
		REVISION 00	DATE: 02.09.2017
		SHEET 3 OF 3	

5.1 The bidder shall indicate the unit price of all the items required for Exothermic Weld joints for each size & type of joints and copper clad steel rod. The quantities indicated are tentative and liable to change during contract.

5.2 Based on project requirement, the quantities required shall be informed to bidders before the final price bids called for from the bidders & shall be known as ordered quantity. Addition / deletion of quantities shall be applicable at the quoted unit price. The quantity variation shall be limited to (+) 30% of total contract value derived on the basis of order quantities.

6.0 **DELIVERY**

The delivery shall be as per NIT (Notice Inviting Tender).

7.0 **PACKING**

Material should be packed to ensure protection against damage during transit, storage for prolonged periods of storage. For sea worthy packing of equipment/ items, Seaworthy packing for export jobs Doc. (No. **PE-TS-888-100-A001**) is to be followed.

8.0 **DOCUMENTATION**

8.1 Purchaser's documents as part of tender:

- a) Technical specification along with BOQ.
- b) Specification of sea-worthy packing forms part of the specification for exports jobs.

8.2 Documents to be submitted by the bidder along with the bid.

- a) A copy of sheet "Contents" with bidder's signature & company stamp
- b) A copy of sheet "Instructions to bidders for preparing Technical offer" with bidder's signature & company stamp.
- c) Unpriced copy of "Annexure-I to Section-C (Bill of Quantities)" with bidder's signature & company stamp.
- d) "Datasheet-B" (Duly filled by bidder)
- e) Catalogues.
- f) Technical deviations/ clarifications (if any)
- g) PQR documents (if required)

No other documentation is required to be submitted as technical offer. Any information contained in other parts of the offer (e.g. covering letter, annexures, etc.) which is deviating from specification requirements in any way shall not be considered by BHEL as part of offer.

8.3 List of Deliverables shall be as per Annexure-II.

8.4 Vendor drawings/ document schedule shall be as per Annexure-III.



DOCUMENT TITLE

**TECHNICAL SPECIFICATION FOR
EXOTHERMIC WELDING MATERIALS**SPECIFICATION NO. PE-TS- **421**-509-E005

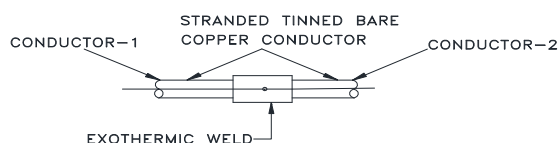
VOLUME II

SECTION D

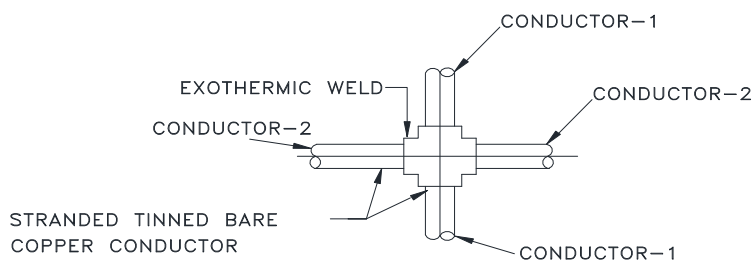
REVISION 00

DATE: 02.09.2017

SHEET 1 OF 3

DATASHEET-A**1) STRAIGHT JOINT**

S.No.	Conductor-1 area (Sq.mm.)	Conductor-2 area (Sq.mm.)
1	240	240

2) CROSS JOINT

S.No.	Conductor-1 area (Sq.mm.)	Conductor-2 area (Sq.mm.)
1	240	240



DOCUMENT TITLE

**TECHNICAL SPECIFICATION FOR
EXOTHERMIC WELDING MATERIALS**

SPECIFICATION NO. PE-TS- 421-509-E005

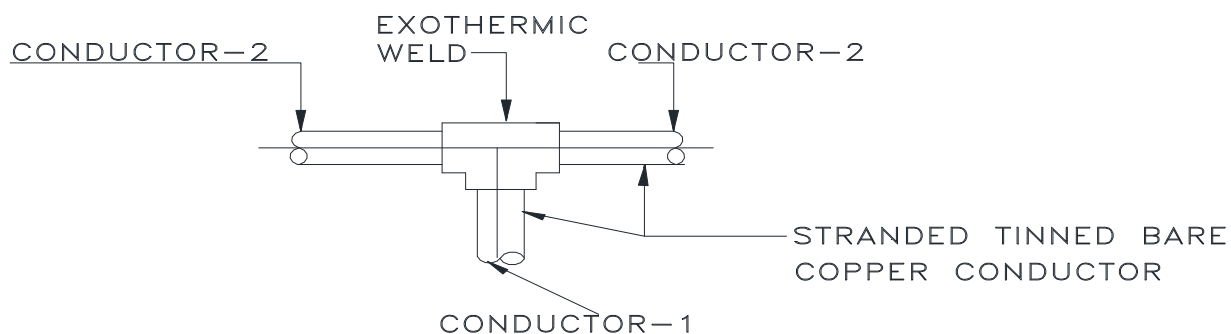
VOLUME II

SECTION D

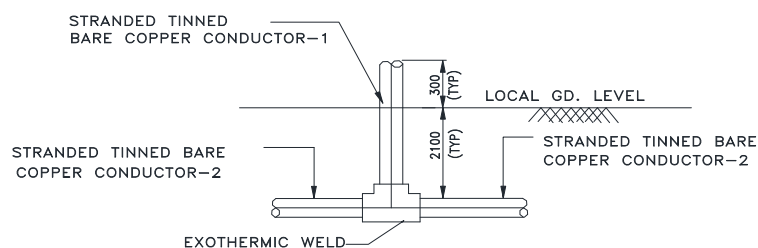
REVISION 00

DATE: 02.09.2017

SHEET 2 OF 3

3) T JOINT (HORIZONTAL)

S.No.	Conductor-1 area (Sq.mm.)	Conductor-2 area (Sq.mm.)
1	240	240

4) T JOINT (VERTICAL UP)

S.No.	Conductor-1 area (Sq.mm.)	Conductor-2 area (Sq.mm.)
1	240	240



DOCUMENT TITLE

**TECHNICAL SPECIFICATION FOR
EXOTHERMIC WELDING MATERIALS**SPECIFICATION NO. PE-TS- **421**-509-E005

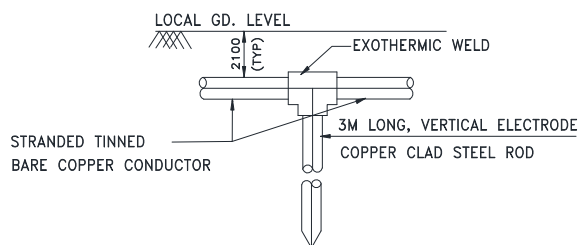
VOLUME II

SECTION D

REVISION 00

DATE: 02.09.2017

SHEET 3 OF 3

5) T JOINT (VERTICAL DOWN)

S.No.	Conductor area (Sq.mm.)	Rod dia (mm.)
1	240	18



DOCUMENT TITLE

**TECHNICAL SPECIFICATION FOR
EXOTHERMIC WELDING MATERIALS
& COPPER CLAD STEEL**SPECIFICATION NO. PE-TS- **421**-509-E005

VOLUME III

SECTION D

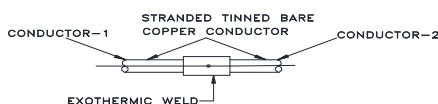
REVISION 0

DATE: 02.09.2017

SHEET OF 3

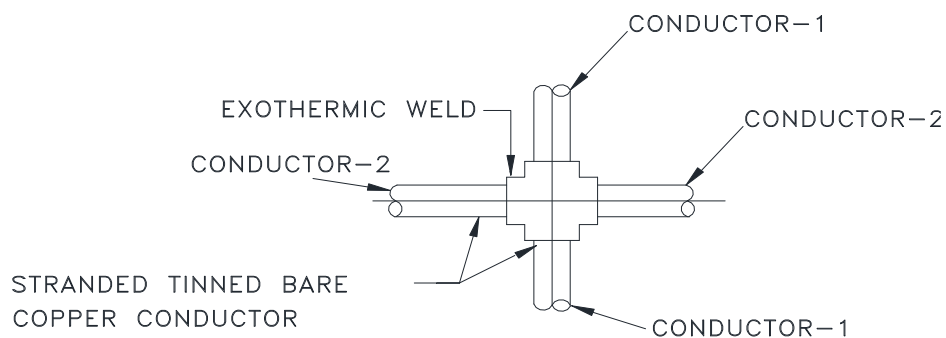
DATASHEET-B**TECHNICAL PARTICULARS TO BE SUBMITTED ALONG WITH THE OFFER**

- 1) **BRAND/ MAKE OF MATERIAL** :
- 2) **STRAIGHT JOINT**



S.No.	Conductor-1 area (Sq.mm.)	Conductor-2 area (Sq.mm.)	Weld powder /Joint (Weight in gms. x no. of packets)
1	240	240	

- 3) **CROSS JOINT**



S.No.	Conductor-1 area (Sq.mm.)	Conductor-2 area (Sq.mm.)	Weld powder /Joint (Weight in gms. x no. of packets)
1	240	240	



DOCUMENT TITLE

**TECHNICAL SPECIFICATION FOR
EXOTHERMIC WELDING MATERIALS
& COPPER CLAD STEEL**

SPECIFICATION NO. PE-TS- **421**-509-E005

VOLUME III

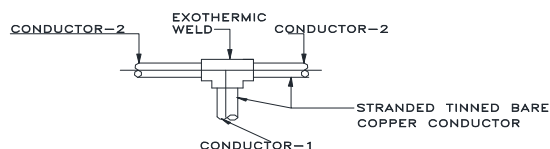
SECTION D

REVISION 0

DATE: 02.09.2017

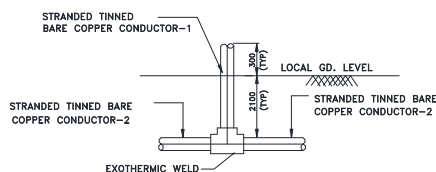
SHEET OF 3

4) T JOINT (HORIZONTAL)



S.No.	Conductor-1 area (Sq.mm.)	Conductor-2 area (Sq.mm.)	Weld powder /Joint (Weight in gms. x no. of packets)
1	240	240	

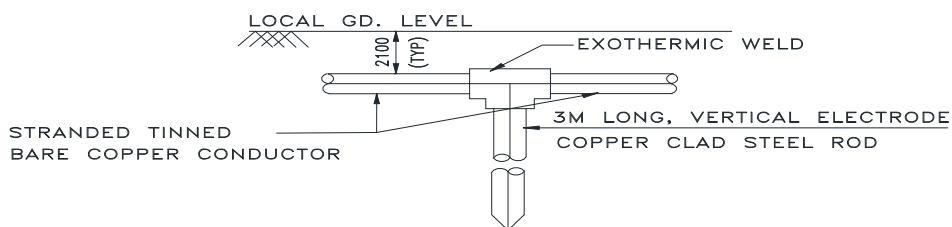
5) T JOINT (VERTICAL UP)



S.No.	Conductor-1 area (Sq.mm.)	Conductor-2 area (Sq.mm.)	Weld powder /Joint (Weight in gms. x no. of packets)
1	240	240	

	DOCUMENT TITLE TECHNICAL SPECIFICATION FOR EXOTHERMIC WELDING MATERIALS & COPPER CLAD STEEL	SPECIFICATION NO. PE-TS- 421 -509-E005	
		VOLUME III	
		SECTION D	
		REVISION 0	DATE: 02.09.2017
		SHEET	OF 3

6) **T JOINT (VERTICAL DOWN)**



S.No.	Conductor area (Sq.mm.)	Rod dia (mm.)	Weld powder /Joint (Weight in gms. x no. of packets)
1	240	18	

- 7) Minimum number of joints catered per mould :
- 8) Minimum number of Moulds catered per handle clamp :
- 9) Minimum number of Joints catered per Ignitor gun :
- 10) Minimum number of Joints catered per Brush :

***NOTE:**

Bidder to ensure the correctness of numbers mentioned above, from execution point of view at site. In case of failure of material to achieve the data indicated above; bidder to compensate the same by supplying additional quantity free of cost to BHEL. This additional quantity shall be mutually agreed between BHEL & bidder, derived on the basis of feedback received from site on actual execution of the job.