



# भारत हेवी इलेक्ट्रिकल्स लिमिटेड

(भारत सरकार का उपक्रम)

## BHARAT HEAVY ELECTRICALS LIMITED

(A Govt. of India Undertaking)

**TCN - 06**

Ref: PSER:SCT:DGP-C807:TCN-06

Date: 20-11-2007

| Sub | Tender change notice (TCN) 06.  |
|-----|---|
| Job | (i) Package-A: Civil, structural, architectural work etc job of Power Block-1; civil work of switch yard and (ii) Package-B: Civil, structural, architectural work etc of Power Block-2 for unit # 1 & 2 for 2x500 MW unit # 1 & 2 Durgapur Steel TPS, West Bengal. |
| Ref | 1.0 Tender no PSER:SCT:DGP-C807:07.   |
|     | 2.0 BHEL's NIT, vide reference no PSER:SCT:DGP-C807:07, dated 18-10-07.   |
|     | 3.0 BHEL's TCN-01, vide reference no PSER:SCT:DGP-C807:TCN-01, dated 26-10-07.  |
|     | 4.0 BHEL's TCN-02, vide reference no PSER:SCT:DGP-C807:TCN-02, dated 29-10-07.  |
|     | 5.0 BHEL's TCN-03, vide reference no PSER:SCT:DGP-C807:TCN-03, dated 03-11-07.  |
|     | 6.0 BHEL's TCN-04, vide reference no PSER:SCT:DGP-C807:TCN-04, dated 13-11-07.  |
|     | 7.0 BHEL's TCN-05, vide reference no PSER:SCT:DGP-C807:TCN-05, dated 14-11-07.  |
|     | 8.0 All other pertinent references till date.   |

With reference to above, following points & documents, relevant to tender, may please be noted & complied with while submitting offer.

- 1.0 Due date of submission is extended from 22-11-07 to **27-11-2007 (15-00 hrs)**.
- 2.0 Amendment/ clarification to tender, Annexure-A.
- 3.0 Specification for earthing work of switch yard as per enclosed Annexure-B.
- 4.0 Revised 'No deviation certificate' format, Annexure-2.
- 5.0 All other terms & conditions shall remain unchanged.

Bidder shall submit specific certificate regarding site visit, endorsed by BHEL, Durgapur Steel TPS site, along with offer. Based on above, offer shall be submitted by revised due date.

Thanking you,

Yours faithfully,  
for BHARAT HEAVY ELECTRICALS LTD

DGM (SCT)

Encl

- 1.0 Annexure-A.
- 2.0 Annexure-B.
- 3.0 Annexure-2.

पावर सेक्टर पूर्वी क्षेत्र (मुख्यालय)

POWER SECTOR EASTERN REGION, DJ-9/1, SALT LAKE CITY, KOLKATA - 700 091

फैक्स/Fax : (033) 23211960 फोन/Phone : बोर्ड/EPABX : 23211691

## JOB

(i) Package–A: Civil, structural, architectural work etc job of Power Block–1; civil work of switch yard and

(ii) Package–B: Civil, structural, architectural work etc of Power Block–2 for unit # 1 & 2 for 2x500 MW unit # 1 & 2 Durgapur Steel TPS, West Bengal.

TENDER NO - PSER:SCT:DGP-C807:07.

| SL NO | VOLUME, CLAUSE NO                 | CLARIFICATION/ MODIFICATION   |     |    |
|-------|-----------------------------------|---|-----|----|
| 1.0   | Volume-III, Package-A             | Following items are included in Schedule-3 under sl no 118.0, 119.0 & 120.0. Bidder shall quote their rates against the following items and shall take into account in total prices.  |     |    |
|       | 118.0                             | Laying of underground earthmat of 40 mm dia MS rods at a depth of 600 mm to 800 mm from top of ground including following works.<br>- Excavation of trenches as per approved earthmat layout drawing.<br>- Layout of MS rod as per approved earthmat layout drawing.<br>- Welding of rods (as per drg no TB-4-240-316-108, sh no 16, 17 & 18, Rev-0 for welding details of rods).<br>- Bringing out rises just below gravel level near the equipment foundations.<br>- Back filing of soil.<br>- Any other work necessary to complete the laying of earthmat. | 105 | MT |
|       | 119.0                             | Fabrication & laying of auxiliary mat of 40 mm dia MS rods at a depth of 300 mm from top of FGL including excavation & back filling as per drg no TB-STD-316-Auxiliary Mat, Rev-0. Any other work necessary to complete the laying of earthmat.   | 246 | NO |
|       | 120.0                             | Installing of 40 mm diameter rod electrode with test pit as per drg no TB-4-240-316-108, sh no 11, Rev-0 including following works.<br>- Excavation.<br>- Installing the rod electrode.<br>- Backfilling and compaction.<br>- Casting the test pit with cast Iron covers.<br>- Any other work necessary to complete the work.   | 8   | NO |
| 2.0   | Volume-III, Package-A             | Sl no 1.0, ST NO GL-1 in SCH-2 is inadvertently repeated in all the 3 pages in print preview. Please note that the item appears only once under sl no 1.0 and bidder may please ignore the same items appearing Page 2 of 3 & Page 3 of 3.  |     |    |
| 3.0   | Volume-III, Package-A & Package-B | The item description in SCH-1 shall be read as per following.<br><br>`BRICKWORK MASONRY INCLUDING SUPPLY OF MATERIAL, COST OF LABOUR ETC COMPLETE, AS PER SPECIFICATIONS (CEMENT WILL BE SUPPLIED BY BHEL FREE OF COST AS PER SCC FOR BRICK MASONRY WORK AND MANUFACTURING OF FLY ASH CEMENT BRICKS, WHICH WILL BE MANUFACTURED BY VENDOR INSIDE PROJECT PREMISES).`  |     |    |
| 4.0   | Volume-III, Package-A & Package-B | The item description of sl no 10.1.2, ST NO 1001(iii), sl no 10.2.2, ST NO 1002(iii) and sl no 10.4.2, ST NO 1004(iii) in SCH-1 shall be read as per following.<br><br>`Using ordinary bricks of class designation 50 of nominal dimension.`  |     |    |
| 5.0   | Volume-III, Package-A &           | The item description of sl no 13.8, ST NO 1308 in SCH-1 shall be read as per following.   |     |    |

|     |   |   |
|-----|---|---|
|     | Package-B   | Providing and applying 2 or more coats of weather-proof cement paint of approved make & colour on exterior surface at all heights including materials, laour, scaffolding, curing etc complete as per specification.' |
| 6.0 | Due date of submission is extended from 22-11-07 to 27-11-2007 (15-00 hrs). |   |
| 7.0 | All other term & conditions shall remain unchanged.                         |   |



# BHARAT HEAVY ELECTRICALS LIMITED

TRANSMISSION BUSINESS GROUP  
ENGINEERING MANAGEMENT, NEW DELHI

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|   |  |                             |                                |                                |  |            |
|---|--|-----------------------------|--------------------------------|--------------------------------|--|------------|
| <b>BHEL Document No.</b><br>TB-298-316-000D         |  | <b>Rev.</b><br>01           | <b>Prepared by</b><br>SK       | <b>Checked by</b><br>DS        | <b>Approved by</b><br>SN   |            |
| <b>Type of Document</b>                             | <b>BILL OF MATERIAL</b>  |                             | <b>Sign</b><br>-Sd-            | <b>-Sd-</b>                    | <b>-Sd-</b>  |            |
| <b>Title</b><br>EARTHING BOQ FOR CIVIL FOR DURGAPUR | <b>Date</b>  |                             | 24.10.07                       | 24.10.07                       | 24.10.07   |            |
|   | <b>Group</b>   |                             | TBEM                           |                                |  |            |
|   | <b>W.O. No</b>   |                             | KODARMA                        |                                |  |            |
| <b>Customer / Consultant</b>                        | DAMODAR VALLEY CORPORATION, KOLKATA  |                             |                                |                                |  |            |
| <b>Contract</b>                                     | 400 kV SUBSTATION DURGAPUR THERMAL POWER PROJECT UNITS-1 & 2 STAGE-I (2x500 MW)        |                             |                                |                                |  |            |
| <b>CONTENTS</b>                                     |  |                             |                                |                                |  |            |
| <b>SL. NO.</b>                                      | <b>TITLE</b>   |                             |                                |                                | <b>PAGE</b>  |            |
| 1   | Bill of Quantities for Under Ground Earthing and Electrodes for 400KV DVC Durgapur S/S |                             |                                |                                | 1  |            |
| 2   | Drg No. TB-4-240-316-108 Sht. Nos.16-18 Rev 00 for Welding details of rods             |                             |                                |                                | 3  |            |
| 3   | Drg No. TB-STD-316-Auxiliary mat Rev 00  |                             |                                |                                | 1  |            |
| 4   | Drg. No. TB-4-240-316-108 Sht. No.11 Rev 00  |                             |                                |                                | 1  |            |
| 5   | Specification of MS Welding at Site Drg. No. TB-4-181-509-003 , 03Sheets Rev 01        |                             |                                |                                | 3  |            |
| 01  | 31.10.07   | <i>[Signature]</i><br>31/10 | <i>[Signature]</i><br>31/10/07 | <i>[Signature]</i><br>31-10-07 | Separate documents for Koderma and Durgapur made. No change inside spec. done. |            |
| <b>Rev No.</b>                                      | <b>Date</b>  | <b>Altered</b>              | <b>Checked</b>                 | <b>Approved</b>                | <b>REVISION DETAILS</b>  |            |
| <b>Distribution</b>                                 |  |                             |                                | <b>To</b>                      | O/C  | TBEM CIVIL |
|   |  |                             |                                | <b>Copies</b>                  | 1  | 1          |

Rev No. 00

Bill of Quantities for Under Ground Earthing and Electrodes for 400KV DVC Durgapur S/S

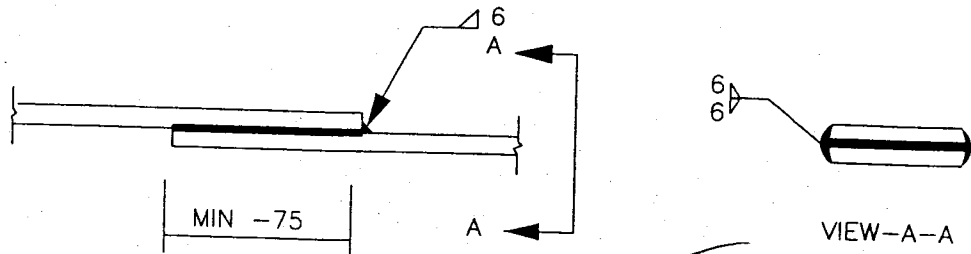
| S. No | Description   | Unit | Estd. Quantity | Remarks  |
|-------|---|------|----------------|--|
| 1     | Laying of Underground earthmat of 40 mm dia MS Rods at a depth of 600 mm to 800mm from top of ground including following works:<br>- excavation of trenches as per approved Earthmat Layout Drawing<br>- laying of MS rod as per approved Earthmat Layout Drawing<br>- welding of rods (refer TB-4-240-316-108 Sht. No.16,17 & 18 Rev 00 for Welding details of rods)<br>- bringing out risers just below gravel level near the equipment foundations<br>- backfilling of soil<br>- any other work necessary to complete the laying of earthmat | MT   | 105            | 40 Diameter MS rod will be supplied by BHEL<br>Quantity may vary by +/- 40% at contract stage. |
| 2     | Fabrication & laying of Auxiliary Mat of 40 mm Dia MS Rods at a depth of 300 mm from top of FGL including excavation & back filling as per Drg No. TB-STD-316-Auxiliary mat Rev 00.<br>- any other work necessary to complete the laying of earthmat  | Nos. | 246            | 40 Diameter MS rod will be supplied by BHEL<br>Quantity may vary by +/- 40% at contract stage. |
| 3     | Installing of 40 mm diameter Rod Electrode with test pit as per Drg. No. TB-4-240-316-108 Sht. No.11 Rev 00 including following works:<br>- excavation<br>- installing the rod electrode<br>- backfilling and compaction<br>- Casting the Test Pit with Cast Iron covers<br>- any other work necessary to complete the work   | Nos. | 8              | 40 Diameter MS rod will be supplied by BHEL<br>Quantity may vary by +/- 15% at contract stage. |

Santosh Kumar  
Sr.Engr.(TBEM)

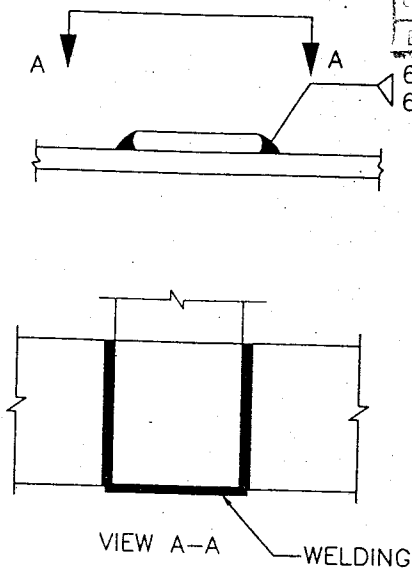
Devinder Singh  
Sr. DGM (TBEM)

### C. STRIP TO STRIP (50X6 MS FLAT ONLY)

#### 1. STRAIGHT LAP JOINT/RISER



#### 2. CROSS LAP JOINT



|   |  |   |  |
|---|--|---|--|
| 1 | Approved   | 3 | Approved except as noted resubmission required |
| 2 | Approved except as noted resubmission not required | 4 | Not Applicable                                 |

Letter No. \_\_\_\_\_ Date \_\_\_\_\_  
**DAMODAR VALLEY CORPORATION**  
 Electricity Department

This approval does not relieve the contractor responsibility for conformity to specifications, correct details and fits of parts when approved.

Engineer [Signature] Date 20/5



### EQUIPMENT EARTHING DETAILS WELDING DETAIL

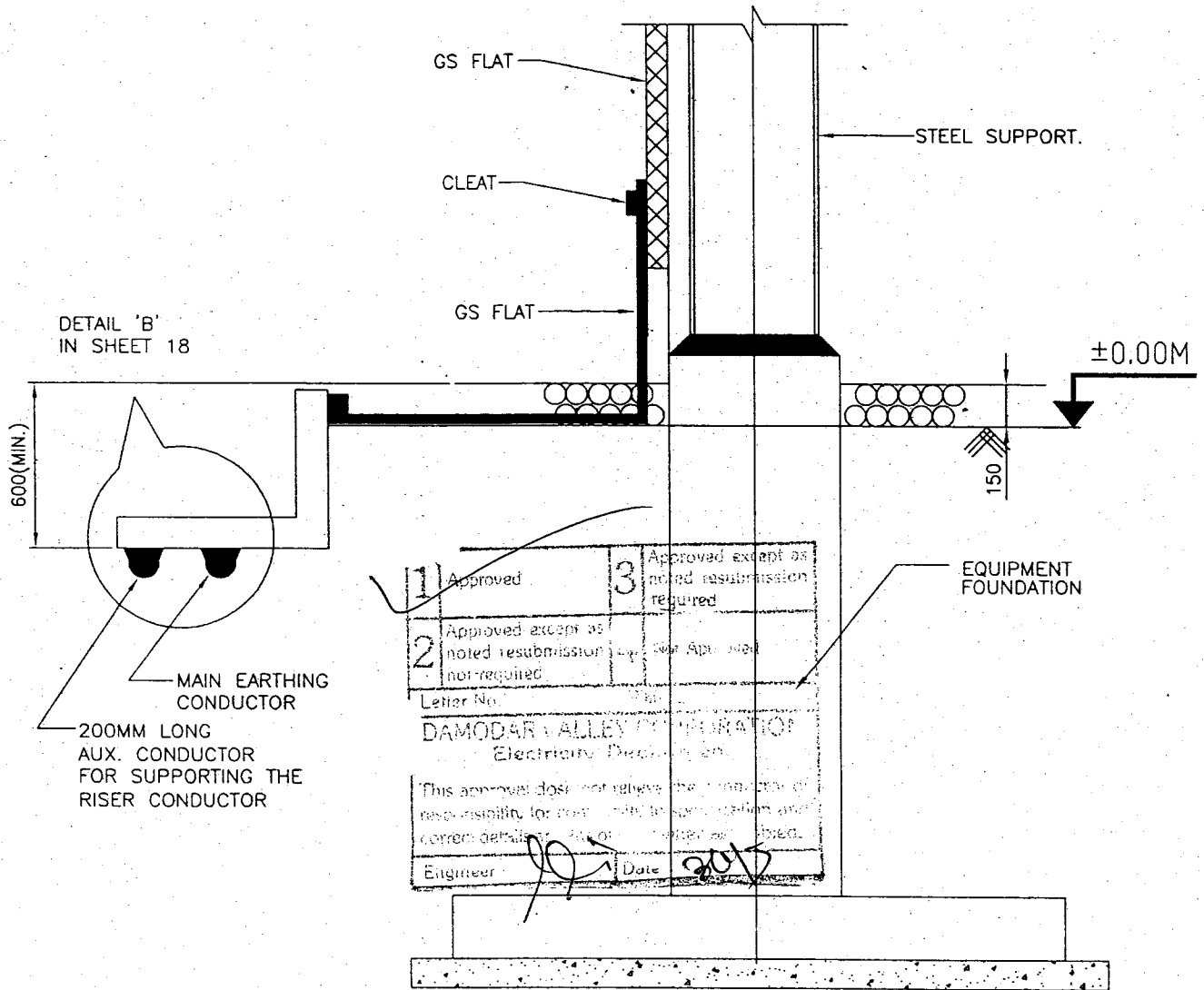
COMPUTER REF. NO.

DRG. No.

TB-4-240-316-108

REV. 00

SHEET No. 16



TYPICAL DETAILS OF RISER



EQUIPMENT EARTHING DETAILS  
WELDING DETAILS

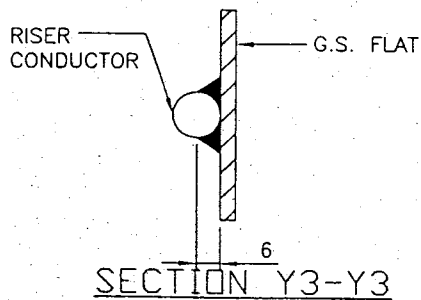
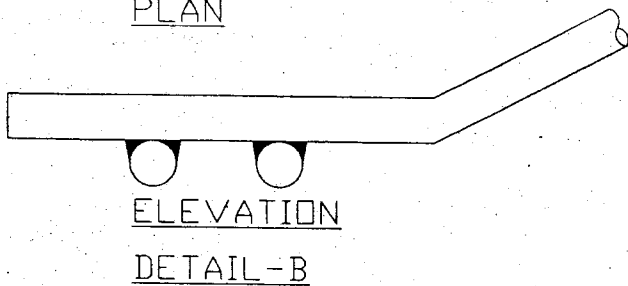
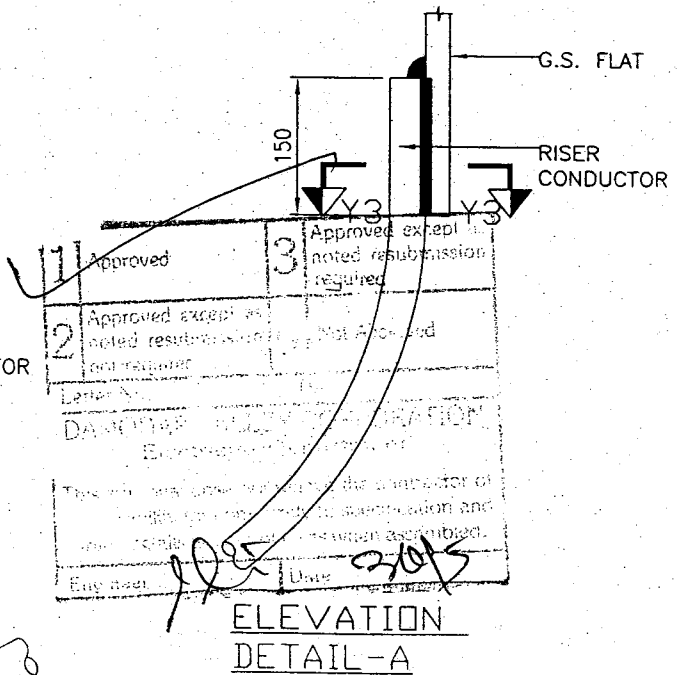
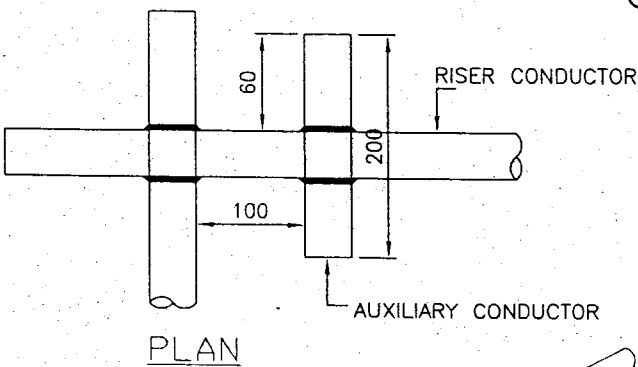
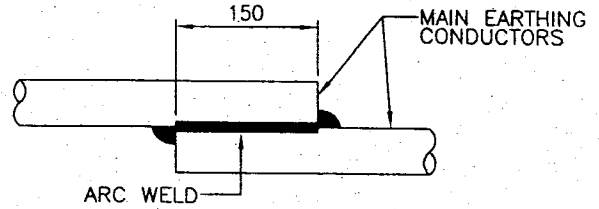
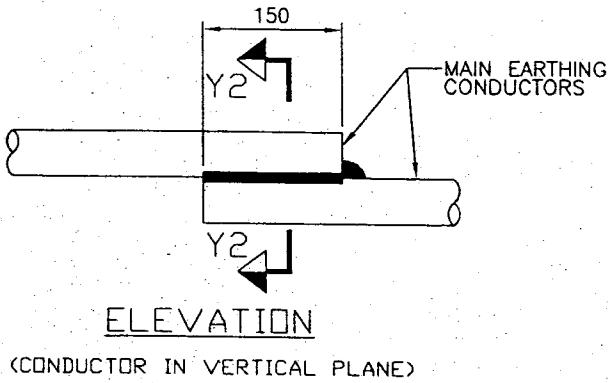
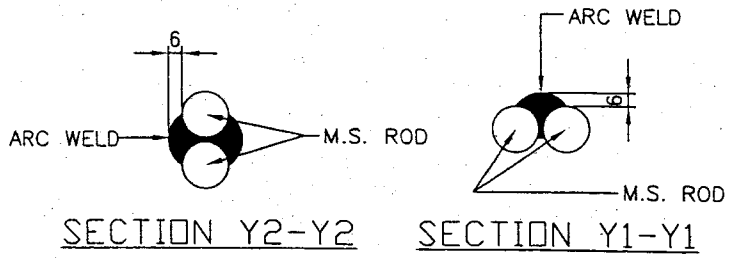
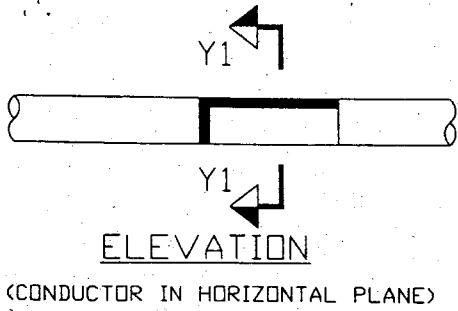
COMPUTER REF. NO.

DRG. No.

TB-4-240-316-108

REV. 00

SHEET No.  
17



**TYPICAL OVERLAPPING JOINT OF TWO CONDUCTORS**



**EQUIPMENT EARTHING DETAILS**  
**WELDING DETAILS**

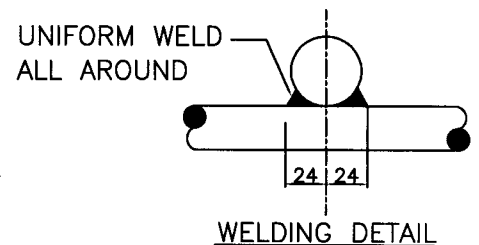
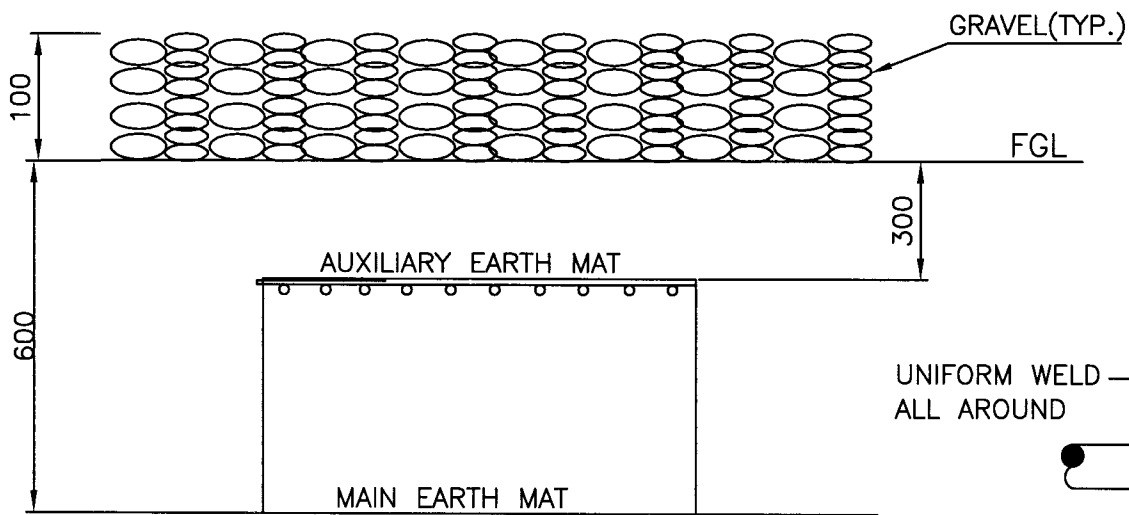
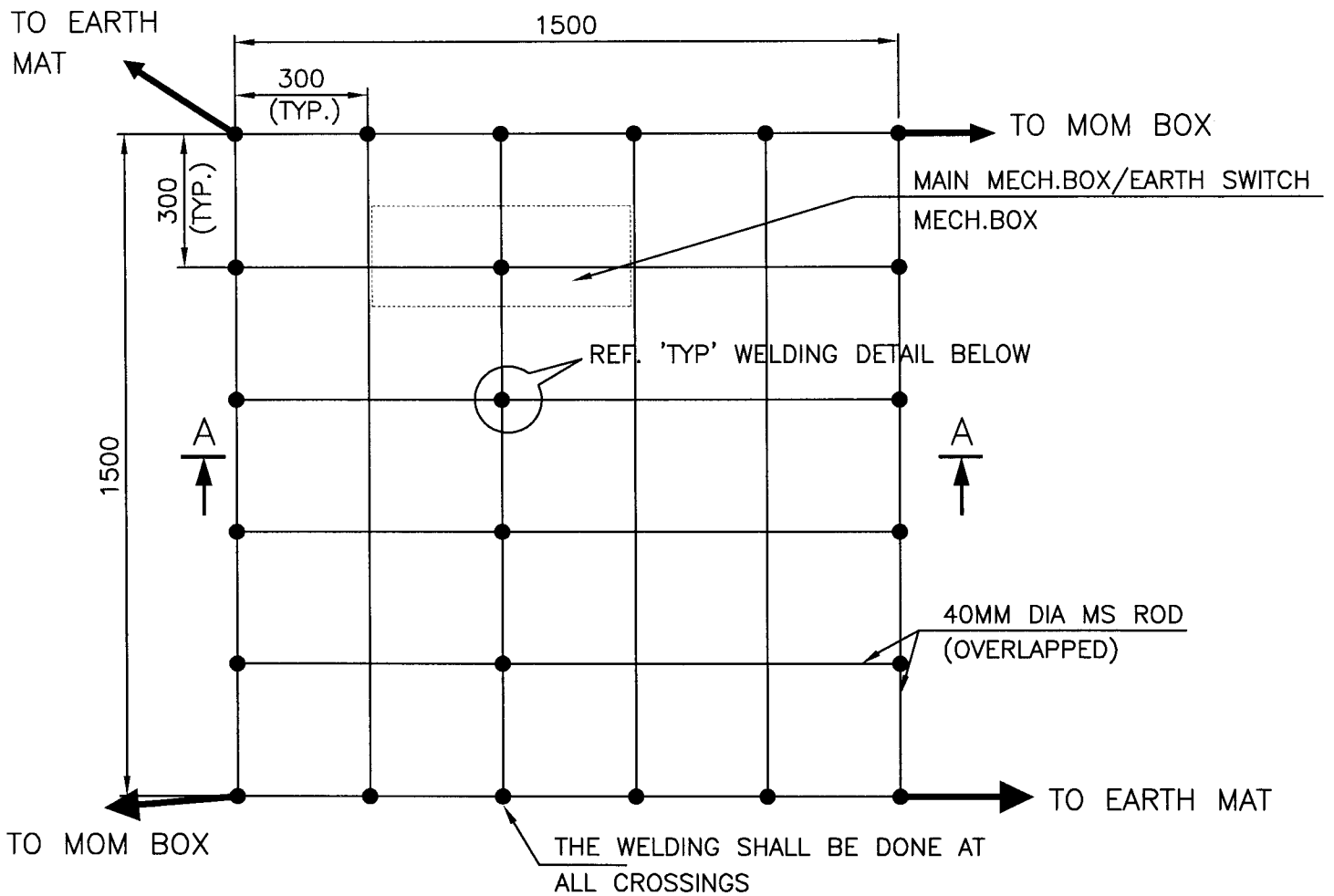
COMPUTER REF. NO. \_\_\_\_\_

DRG. No. \_\_\_\_\_

TB-4-240-316-108

REV. 00

SHEET No. 18



SECTION AA

NOTE:

AUX. EARTH MAT SHALL BE SO POSITIONED THAT THE FOOT OF THE OPERATOR ALWAYS LIE OVER THE AUX. EARTH MAT AREA WHILE ATTENDING / OPERATING THE MECH. BOX THE CABLE TRENCH ROUTING SHALL BE PLANNED ACCORDINGLY.



EQUIPMENT EARTHING DETAILS  
 AUXILIARY EARTH MAT FOR ISOLATOR MAIN MECH. & E/S  
 MECH. BOX (TYP.)

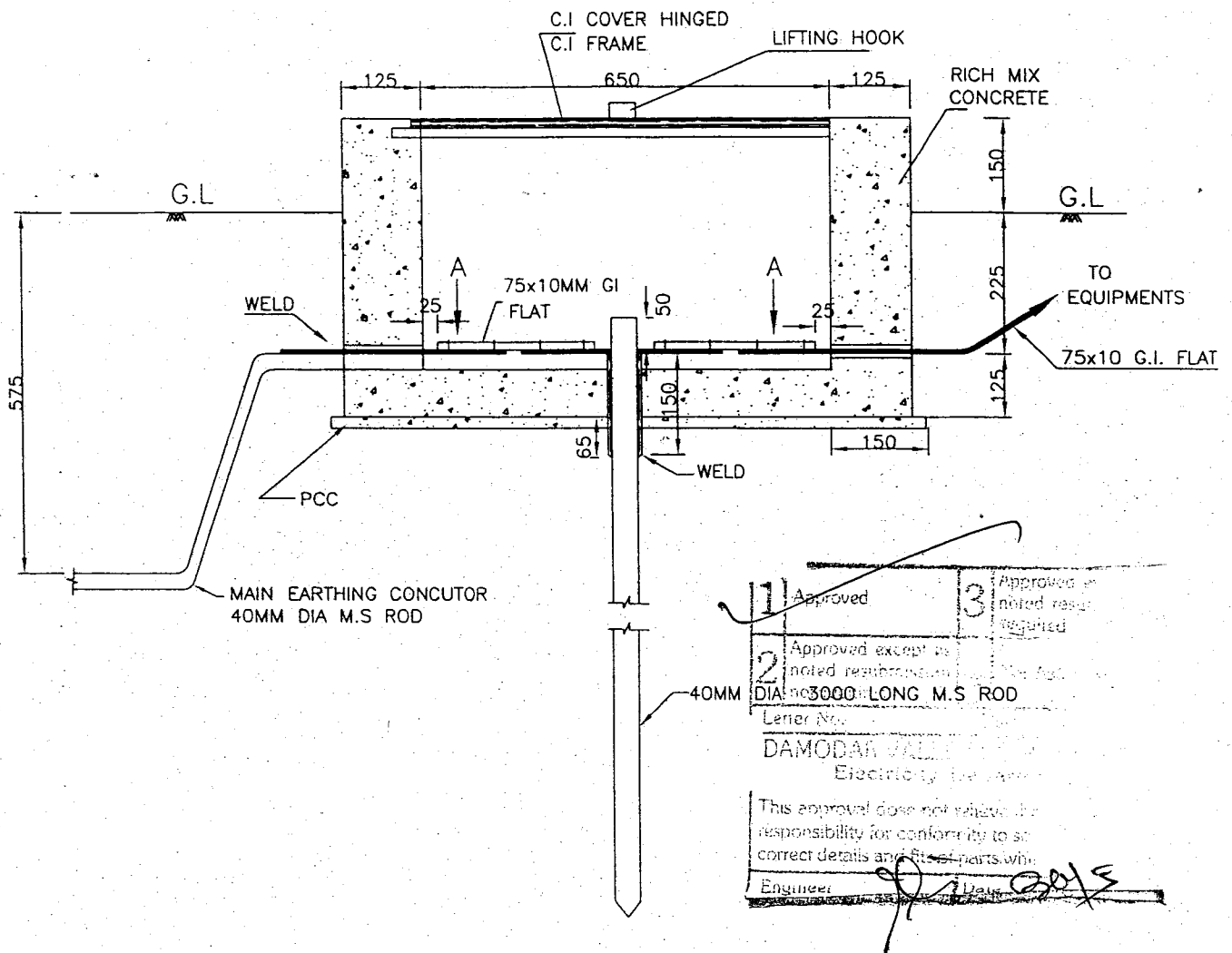
COMPU. DRG. REF.

Report No.

TB-STD-316-Auxiliary Mat

REV. 00

SHEET No.  
00

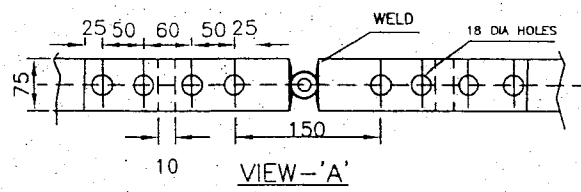


|                                     |                                       |
|-------------------------------------|---------------------------------------|
| 1) Approved                         | 3) Approved as noted remarks required |
| 2) Approved except as noted remarks |                                       |

Letter No. \_\_\_\_\_  
**DAMODAR VALLEY**  
 Electricity Department

This approval does not relieve the responsibility for conformity to all correct details and fit of parts.

Engineer: *[Signature]* Date: *20/1/15*



**NOTE:**

1. SUPPLY OF FIXING BOLTS NUTS & WASHERS FOR GI FLAT EARTHING CONDUCTOR IS ALSO FORMS PART OF THE SCOPE.
2. TO BE USED FOR CONNECTING DOWN CONDUCTOR OF LIGHTNING PROTECTION SYSTEM.
3. APPLICABLE ONLY FOR 2 NO. DIAGONALLY OPPOSITE LMS OF THE S/Y



**EQUIPMENT EARTHING DETAILS**  
**ROD EARTH ELECTRODE WITH TEST PIT**



TRANSMISSION PROJECT  
DIVISION

ENGINEERING MANAGEMENT

PROCESS SPECIFICATION

TB 4 181 509 003

REVISION: 01

PAGE : 1 OF 3

SPECIFICATION FOR MS WELDING  
(AT SITE)

1.0 THIS SPECIFICATION COVERS THE MS WELDING OF STRIP/ROD AT SITE WHICH IS USUALLY REQUIRED FOR BELOW GROUND EARTHING, MAT

THIS SPECIFICATION IS CONSIDERED AS QUALIFIED PROCESS SPECIFICATION AS THE SAME HAS BEEN IN THE PAST PROJECTS. HOWEVER, PROCESS QUALIFICATION SHALL BE DONE IF THE CHANGES ARE MADE BASED ON THE CUSTOMER'S REQUIREMENT

2.0 PROCESS/MATERIAL SPECIFICATION

|   |  |
|---|--|
| STANDARD                                | AS PER IS 2062-1992 (1)  |
| WELDING PROCESS                         | MANUAL METAL ARC WELDING/SHIELDED METAL ARC WELDING  |
| PARENT MEUL                             | MS BLACK ROD/STRIP/GI STRIP  |
| JOINT DESIGN                            | AS ILLUSTRATED BY SKETCHES IN ENCLOSED ANNEXURE  |
| FILLET METAL                            | VORTIC (OR) VORDLAN OF ESAB (1)LTD.<br>(OR)<br>OVERCORD-S OF ADVANI OERLIKON LTD<br>(OR)<br>EQUIVALENT |
| SIZE OF FILLER METAL ;                  | 4MM  |
| PREHEATING AND POST WELD HEAT TREATMENT | NOT REQUIRED   |

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|              |        |  |  |          |         |  |  |              |          |
|--------------|--------|--|--|----------|---------|--|--|--------------|----------|
| REVISION NO. | 01     |  |  | PREPARED | CHECKED |  |  |              |          |
| DATE         | 041200 |  |  |          |         |  |  |              |          |
| REVISION NO. |        |  |  |          |         |  |  |              | APPROVED |
| DATE         |        |  |  |          |         |  |  | HEAD<br>TBEM |          |

#G/C:\BHEL\BKS\WELD-DET.DWG



TRANSMISSION PROJECT  
DIVISION

ENGINEERING MANAGEMENT

PROCESS SPECIFICATION

TB 4 181 509 003

REVISION: 01

PAGE : 2 OF 3

TYPE OF CURRENT AND : AC,100-170 A,40-50 V,1PHASE,  
RANGE THROUGH WELDING TRANSFORMER

3.0 PROCEDURE :

3.1 CLEANING THE JOINT:

THE JOINTS TO BE WELDED SHALL BE CLEANED USING WIRE BRUSH AND WIPED CLEAN WITH CLEAN & DRY CLOTH

3.2 THE JOINTS SHALL BE ARRANGED WITH OVER LAPPING AS ILLUSTRATED IN THE ENCLOSED SKETCHES

3.3 WELDING: (MS BLACK ROD OR STRIP)

3.3.1 WEAVE BEAD FOR THE ROOT RUN AS WELL AS SUBSEQUENT PASSES SHALL BE EMPLOYED.

3.3.2 THE ROOT RUN SHOULD BE CHECKED FOR CRACKS USING A MAGNIFYING GLASS. CRACKS IF NOTICED MAY BE REMOVED BY GRINDING AND RE-WELDING. WELD SLAG SHOULD BE REMOVED BEFORE STARTING THE SUBSEQUENT RUN.

3.3.3 AFTER COMPLETING THE WELDING OF JOINT, IT SHOULD BE ALLOWED TO COOL NATURALLY AND THEN CLEANED. AFTER CLEANING, FIRST ONE OF PRIMER (RED OXIDE) AND THEN TWO COATS OF BLACK BITUMEN PAINT SHALL BE APPLIED TO PREVENT CORROSION.

3.4 WELDING: (GI STRIP-ABOVE GROUND)

3.4.1 PROCEDURE SHALL BE SAME AS GIVEN ABOVE AT 33.1 AND 33.2 FOR MS BLACK ROD OR STRIP.

3.4.2 AFTER COMPLETING THE WELDING OF JOINT, IT SHOULD BE ALLOWED TO COOL NATURALLY AND THEN CLEANED. AFTER CLEANING, FIRST ONE COAT OF PRIMER (RED OXIDE) AND THEN TWO COATS OF ZINC RICH PAINT SHALL BE APPLIED TO THE WELD PORTION TO COVER IT UNIFORMLY AND ADEQUATELY TO PREVENT CORROSION.

4.0 PREQUALIFICATION OF WELDERS

THIS SHALL BE CARRIED OUT AS PER SYSTEM NO." TBSM 417"

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|              |        |  |  |          |         |  |  |          |  |
|--------------|--------|--|--|----------|---------|--|--|----------|--|
| REVISION NO. | 01     |  |  | PREPARED | CHECKED |  |  |          |  |
| DATE         | 041200 |  |  |          |         |  |  |          |  |
| REVISION NO. |        |  |  |          |         |  |  | APPROVED |  |
| DATE         |        |  |  |          |         |  |  | HEAD     |  |
|              |        |  |  |          |         |  |  | TBEM     |  |

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TRANSMISSION PROJECT  
DIVISION

ENGINEERING MANAGEMENT

PROCESS SPECIFICATION

TB 4 181 509 003

REVISION: 01

PAGE : 3 OF 3

5.0 REFERENCES

- (1) IS:2062-1992  
-STEEL FOR GENERAL STRUCTURAL PURPOSES.
- (2) SECTION IX OF AMERICAN SOCIETY OF MECHANICAL ENGINEERS  
(ASME), (1992)

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|              |        |  |  |          |         |  |  |  |              |
|--------------|--------|--|--|----------|---------|--|--|--|--------------|
| REVISION NO. | 01     |  |  | PREPARED | CHECKED |  |  |  |              |
| DATE         | 041200 |  |  |          |         |  |  |  |              |
| REVISION NO. |        |  |  |          |         |  |  |  | APPROVED     |
| DATE         |        |  |  |          |         |  |  |  | HEAD<br>TBEM |

**FORMAT FOR NO DEVIATION CERTIFICATE**  
**(To be submitted in the bidder's letter head)**

BHARAT HEAVY ELECTRICALS LIMITED,  
Power Sector - Eastern Region,  
Plot no 9/1, DJ Block, Sector – II, Salt Lake City,  
Kolkata – 700 091

|     |   |  |
|-----|---|--|
| Sub | No Deviation Certificate.   |  |
| Job | (i) Package–A: Civil, structural, architectural work etc job of Power Block–1; civil work of switch yard and (ii) Package–B: Civil, structural, architectural work etc of Power Block–2 for unit # 1 & 2 for 2x500 MW unit # 1 & 2 Durgapur Steel TPS, West Bengal. |  |
| Ref | 1.0   | Tender no PSER:SCT:DGP-C807:07.  |
|     | 2.0   | BHEL's NIT, vide reference no PSER:SCT:DGP-C807:07, dated 18-10-07.        |
|     | 3.0   | BHEL's TCN-01, vide reference no PSER:SCT:DGP-C807:TCN-01, dated 26-10-07. |
|     | 4.0   | BHEL's TCN-02, vide reference no PSER:SCT:DGP-C807:TCN-02, dated 29-10-07. |
|     | 5.0   | BHEL's TCN-03, vide reference no PSER:SCT:DGP-C807:TCN-03, dated 03-11-07. |
|     | 6.0   | BHEL's TCN-04, vide reference no PSER:SCT:DGP-C807:TCN-04, dated 13-11-07. |
|     | 7.0   | BHEL's TCN-05, vide reference no PSER:SCT:DGP-C807:TCN-05, dated 14-11-07. |
|     | 8.0   | BHEL's TCN-06, vide reference no PSER:SCT:DGP-C807:TCN-06, dated 20-11-07. |
|     | 9.0   | All other pertinent references till date.                                  |

Dear Sirs,

With reference to above, this is to confirm that as per tender conditions, we have visited site before submission of our offer and noted the job content & site conditions etc. We also confirm that we have not changed/ modified the tender documents and in case of observance at any stage, it shall be treated as null and void.

We hereby confirm that we have not taken any deviation from tender clauses together with other references as enumerated in above references and we hereby convey our unqualified acceptance to all terms and conditions & compliance to technical specification as stipulated in tender together with amendment/ changes till date and other references covered above.

In the event of observance of any deviation in any part of our offer at a later date whether implicit or explicit, the deviations shall stand null & void. We confirm to have submitted offer strictly in accordance with tender instructions.

Thanking you,

Yours faithfully,

(Signature, date & seal of authorized  
representative of the bidder)