

**IB THERMAL POWER STATION
BANHARPALLI
2x660MW UNITS 3&4**

**TECHNICAL SPECIFICATION
FOR
BONDED MINERAL (ROCK) WOOL MATTRESSES**

VOLUME – IIB

SPECIFICATION NO: PE-TS-391-169-M032 (REV-00)



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

| | | | |
|---|-----------------|--------------------------------------|------------------|
|  | TITLE: | SPECIFICATION NO. PE-SS-999-100-Q001 | |
| | PREAMBLE | VOLUME | |
| | | SECTION | |
| | | REV. NO. | DATE: 26/08/2011 |
| | | SHEET 1 OF 1 | |

1.0 The tender document contains three (3) volumes. The bidder shall meet the requirements of all the three 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, B and C.

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


Data Sheet - B Specifies data to be filled by the bidder (Data Sheet-B is contained in Volume-III).

Data Sheet -C Indicates data/documents to be furnished after the award of contract as per agreed schedule by the vendor (as applicable).

1.2.2 **Volume-III (TECHNICAL SCHEDULES)**


This volume contains technical schedules and Data Sheets-B, which are to be duly filled by the bidder and the same shall be furnished with the technical bid.

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

| | | | |
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|  | TITLE: TECHNICAL SPECIFICATION BONDED MINERAL (ROCK) WOOL MATTRESSES IB THERMAL POWER STATION, BANHARPALLI 2x660MW UNITS 3&4 | SPECIFICATION NO. PE-TS-391-169-M032 | |
| | | VOLUME : IIB | |
| | | SECTION: | |
| | | REV. NO.: 00 | DATE: 03.02.2015 |
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SECTION-A

SCOPE OF ENQUIRY

| | | | |
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|  | SCOPE OF ENQUIRY BONDED MINERAL (ROCK) WOOL MATTRESSES IB THERMAL POWER STATION, BANHARPALLI 2x660MW UNITS 3&4 | SPECIFICATION NO. PE-TS-391-169-M032 | |
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SCOPE OF ENQUIRY

1 SCOPE

This specification covers the design, materials, manufacture and testing of Bonded mineral (rock) wool mattress at Vendor's or/ and sub-Vendor's works inclusive of packing requirements for IB THERMAL POWER STATION, BANHARPALLI 2x660MW UNITS 3&4


2 GENERAL TECHNICAL INSTRUCTIONS

- 2.1 It is not the intent to specify herein all the details of design and manufacture. However the item being procured shall conform in all respects to high standards of design, engineering and workmanship, and shall be capable of performing the required duties in a manner acceptable to Engineer/ Owner, who will interpret the meaning of drawing and specifications, and shall be entitled to reject any component or material, which in his judgement is not in full accordance herewith.
- 2.2 BHEL's / customer's representative shall be given access to the shop in which the item is being manufactured or tested and all test records shall be made available to him.
- 2.3 The item covered under this specification shall not be despatched unless the same have been accepted and shipping release issued by BHEL.

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SECTION-B

PROJECT INFORMATION

| | | | |
|---|---|---------------------------------------|------------------|
|  | TITLE: IB THERMAL POWER STATION, BANHARPALLI 2x660MW UNITS 3&4 | SPECIFICATION NO. PE-TS-391-169-M 032 | |
| | | VOLUME : II B | |
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PROJECT INFORMATION

The site is located at Banharpalli in Jharsuguda district of Orissa on the bank of Hirakud reservoir and about 20kms of Belapur railway station and 40km south west of Jharsuguda. The main Howrah-Mumbai railway line passes 20kms north of the plant (at Belapur). NH-200 (Chandikhole to Raipur) and SH-10 (Sambalpur to Sundargarh) pass through Jharsugudah town.

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SECTION-C

SPECIFIC TECHNICAL REQUIREMENTS

| | | | |
|---|---|--------------------------------------|------------------|
|  | TITLE: SPECIFIC TECHNICAL REQUIREMENTS BONDED MINERAL (ROCK) WOOL MATTRESSES IB THERMAL POWER STATION, BANHARPALLI 2x660MW UNITS 3&4 | SPECIFICATION NO. PE-TS-391-169-M032 | |
| | | SECTION C | |
| | | REV. NO.: 00 | DATE: 03.09.2014 |
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1 GENERAL

- 1.1 The Bonded mineral (rock) wool mattress shall meet the technical requirements and conform to the standard technical specifications and Data sheet A of Section D. In addition, the requirements of this Section-C shall also be complied with. However, wherever the details given in the standard technical specification of Section-D and Data sheet-A are different, the requirements of Data sheet-A shall prevail. Similarly in the event of contradictions between Section-C & Section -D/ Data sheet A, Section -C shall prevail.
- 1.2 The technical requirements for Bonded mineral (rock) wool mattress shall, in general, be as per the attached standard Technical specification for Bonded mineral (rock) wool mattress, and Data sheet A of Vol. II B Section D.

2 SCOPE OF SUPPLY

The Bonded mineral (rock) wool mattress to be supplied shall be as per Data sheet A of Section D.

3 EXCLUSIONS:

Equipment required for Erection & Commissioning at site are excluded from the bidder's scope.

QUALITY ASSURANCE:


The Quality Plans enclosed with this specification specify minimum quality control requirement. During contract stage vendor shall furnish these Quality Plans duly signed & stamped for their compliance. Quality plans shall be approved by BHEL and customer (if necessary). All inspection and testing shall be carried out by BHEL and CUSTOMER (if necessary). In case inspection is by both BHEL and CUSTOMER, then the inspection can be carried out jointly or separately, which will be informed later.

4 DOCUMENTS TO BE SUBMITTED ALONG WITH OFFER

1. Compliance sheet as enclosed in Volume III
2. Schedule of Deviations if any.
3. Schedules of Price & Unit Price.
4. Schedule of declaration.


6.0 PACKING INSTRUCTIONS:

Vendor to provide soft copy of photos/snaps of duly packed insulation material. The soft copies to be provided by vendor after final inspection of Insulation material. Clearance for despatch of insulation material will be given only after satisfactory packing conditions from vendors work.

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SECTION-D

STANDARD TECHNICAL SPECIFICATION DATA SHEET – A QUALITY PLAN DATA SHEET – C

| | | | |
|---|---|---|------------------|
|  | TITLE: | STD SPECIFICATION NO:PE-SS-999-169-M032 | |
| | STANDARD TECHNICAL SPECIFICATION FOR BONDED MINERAL (ROCK) WOOL MATTRESSES | VOLUME II-B | |
| | | SECTION "D" | |
| | | REV. NO. 05 | DATE: 12.07.2012 |
| | | SHEET 1 OF 4 | |

1 GENERAL

This specification covers the design requirements, materials, manufacture, inspection and testing of bonded mineral (rock) wool mattresses having metallic hexagonal wire netting as facing on one or both sides, at Vendor's or/ and sub-Vendor's works inclusive of packing requirements.

2 CODES AND STANDARDS

- 2.1 The manufacture, physical & chemical properties, inspection and testing of the bonded mineral wool mattresses shall conform to the latest editions of the following appropriate standards.

IS:8183 Specification for bonded mineral wool.


IS:3144 Methods of test for mineral wool thermal insulation materials.

IS:3346 Methods for the determination of thermal conductivity of thermal insulation materials(two slab, guarded hot plate method).

- 2.2 In case of any conflict between the above standards and this specification, the latter shall prevail and in case of any further conflict in the matter, the interpretation of the specification by the Purchaser's Engineer shall be final and binding.

3 MANUFACTURE

- 3.1 The mattresses shall be made from rock processed from a molten state into fibrous form with minimum organic thermosetting binder, and shall be machine felted, baked and metallic stitched / faced with metallic hexagonal wire netting on one or both sides (as specified in the BOM) and shall be suitable for service temperatures upto 750 deg C
- 3.2 The metallic hexagonal wire netting shall be of Galvanized steel (made from wire to IS:280 medium coated to IS:4826) / Stainless steel (made from wire to IS:6528) having size 0.56 mm/ 0.71 mm diameter and 13 mm aperture conforming to IS:3150, unless otherwise specified in the Data sheet-A.
- 3.3 The mattress shall be continuously stitched / tied on to the wire netting with 0.4 mm dia galvanized steel / stainless steel wire, unless otherwise specified in Data sheet-A. The spacing between the stitchings / ties shall not be more than 250 mm along the width and 150 mm along the length.

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| | | SECTION "D" | |
| | | REV. NO. 05 | DATE: 12.07.2012 |
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4 DIMENSIONS AND DIMENSIONAL TOLERANCES

- 4.1 The length and width of the mattresses shall be 1520 mm x 1220 mm or 1640 mm x 1220 mm except for export orders where the length and width of the mattresses shall be 1520 mm x 1150 mm in order to make optimum use of the container. Nominal thickness shall be 25, 40, 50, 60 or 75 mm.
- 4.2 The method of measuring the dimensions i.e. length, width and thickness shall be as prescribed in IS:3144. The following dimensional tolerances are applicable for the bonded mineral wool mattresses :

Length + 3% and - 2% of nominal length

Width + 3% and - 2% of nominal width

Thickness + 6 mm and - 2 mm for thickness not exceeding 40 mm

Thickness + 10 mm and - 2 mm for thickness over 40 mm

5 BULK DENSITY AND TOLERANCES ON DENSITY

- 5.1 The bulk density of the bonded mineral (rock) wool mattresses without the facings, shall be 150 / 100 kg/m³ unless otherwise specified. Tolerances on bulk density shall be +15 % and - 5% when tested as per method prescribed in IS: 3144.
- 5.2 The bulk density shall be calculated by dividing the actual weight of the mattress in kilograms by the volume in cubic meters arrived at as the product of the average actual length, average actual width and nominal / specified thickness (subject to the condition that the thickness is maintained within the specified tolerance limits).

6 MATERIAL PROPERTIES

6.1 Shot Content :


- a) The shot content, when sieved through the 500 and 250 micron IS sieves (Refer IS:460 for IS Sieve) shall not be more than 5% and 15% (by weight) respectively.
- b) The method for determination of shot content shall be as prescribed in IS:3144. Any shot present in the materials shall not be greater than 5 mm in any dimension.

6.2 Thermal Conductivity

The thermal conductivity (k-value) of the bonded mineral wool mattresses shall not exceed the values given in IS:8183 when determined in accordance with the method prescribed in IS:3346.

6.3 HEAT RESISTANCE

When a sample of mattress is heated to the maximum recommended temperature of use (550 °C for 100 kg/m³ density and 750 °C for 150 kg/m³ density) as per method prescribed in IS:3144 (test for maximum recommended temp), the material shall not suffer any fusion of fibers and visible deterioration of the fibrous structure. Any colour change shall not be considered as deterioration of fibrous structure.

| | | | |
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|  | TITLE: | STD SPECIFICATION NO:PE-SS-999-169-M032 | |
| | STANDARD TECHNICAL SPECIFICATION FOR BONDED MINERAL (ROCK) WOOL MATTRESSES | VOLUME II-B | |
| | | SECTION "D" | |
| | | REV. NO. 05 | DATE: 12.07.2012 |
| | | SHEET 3 OF 4 | |

6.4 Moisture Content

The bonded mineral (rock) wool mattress shall not contain more than 2% moisture when determined by the method prescribed in IS:3144.

6.5 Moisture Absorption

The mattress shall not gain in weight by more than 2% when tested by the method prescribed in IS:3144.

7 Incombustibility

The material shall be rated as incombustible when tested by the method as prescribed in IS:3144. The loss in total weight when determined by this test shall not exceed 5%.

8 Sulphur Content

The material, after removal of the facing (wire netting), shall not contain more than 0.6% of sulphur when determined by the method as prescribed in IS:3144.

9 Compressibility and Resilience :

9.1 The objects of this test are firstly to ensure that the mattress applied at greater than nominal thickness shall be sufficiently compressible to be fitted as its nominal thickness and secondly that the mattress shall be sufficiently resilient to recover its nominal thickness after being subjected to compression.

9.2 The material shall be tested as stated in Annex A of IS:8183

9.3 When tested in accordance with the method, the recovery, after compression of 75% of the original thickness, shall not be less than 90% of the original thickness.

10 Alkalinity

When tested as described in Annex B of IS:8183, the pH value of the solution of the material shall be between 7.0 and 10.0.

11 Chloride Content


The material shall not contain leachable chloride in excess of 0.01% when determined by the method prescribed in IS:3144.

12 Fibre Diameter

The average fibre diameter of mineral (rock) wool shall not be more than 7 microns when determined by the method prescribed in IS:3144.

13 Resistance to Vibration

The mattress shall show not more than 1% height of settlement when tested by the method prescribed in IS 3144.

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|  | TITLE: | STD SPECIFICATION NO:PE-SS-999-169-M032 |
| | STANDARD TECHNICAL SPECIFICATION FOR BONDED MINERAL (ROCK) WOOL MATTRESSES | VOLUME II-B |
| | | SECTION "D" |
| | | REV. NO. 05 DATE: 12.07.2012 |
| | | SHEET 4 OF 4 |

14 Resistance to Jolting


The mattress shall show not more than 3% height of settlement when tested by the method prescribed in IS:3144.

15 INSPECTION AND TESTING

Bonded mineral wool mattresses to be supplied under this specification shall be of tested quality and workmanship. Inspection and testing of thermal insulation materials shall be as per this specification / quality plan enclosed. Manufacturer shall conduct all tests and stage inspections as per the approved quality plan to ensure that the materials conform to the requirements of this specification and of applicable standards. All shop tests shall be conducted in the presence of BHEL's / BHEL's customer's representative, on the samples identified by him / them.

16 PACKING AND MARKING

- 16.1 Stack of mattresses shall be packed in Polythene lined HDPE bags and sealed / properly stitched to prevent moisture absorption during transit and storage.
- 16.2 In case of export orders stack of mattresses shall be packed in 0.2 mm thick Polythene all around and further shall be packed in HDPE Bags and sealed / properly stitched to prevent moisture absorption during transit and storage. For moisture absorption minimum four (4) packets of silica gel (25 grams each) shall be placed inside Polythene at different positions in each package. Silica gel shall be of indicating type conforming to IS:3401-1992 packed in cotton bags and shall not come into direct contact with the material inside the package.
- 16.3 Each bag of mattresses shall be serial numbered. Also, printed sheets indicating the nominal thickness, density and wire netting details (i.e. material and size) shall be placed below the wire netting.
- 16.4 Following details shall be legibly written on the packages.
- a) Project Name
 - b) Purchase Order No.
 - c) Sl. No. of package
 - d) Size of mattresses (Thickness x Length x Width)
 - e) Density of mattresses
 - f) Wire netting material and size
 - g) Weight of the package
 - h) No. of mattresses in the package
 - i) A caution note "Always store under covered shed and on raised platforms"

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|---|---|---------------------------------------|------------------|
|  | TITLE: BONDED MINERAL (ROCK) WOOL MATTRESS IB THERMAL POWER STATION, BANHARPALLI 2x660MW UNITS 3&4 DATA SHEET- A | SPECIFICATION NO. PE-TS-391-169-M 032 | |
| | | VOLUME : II B | |
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B.O.M.

| S.No | MATERIAL | SPECIFICATION | DENSITY/ SIZE/ THICK | UNIT | QUANTITY (One Unit) | QUANTITY to be ordered (Two Units) |
|------|--|--------------------|----------------------|-------|--|---|
| 1 | Bonded mineral (Rock) wool mattresses with one side GS wire netting of 13 mm x 0.711 mm size stitched with 0.4 mm GS wire | PE-SS-999-169-M032 | 150 Kg/cub.m | Sq.M. | 25 mm – 650 40 mm – 4900 50 mm – 2250 60 mm – 1550 75 mm – 14050 | 25 mm – 1300 40 mm – 9800 50 mm – 4500 60 mm – 3100 75 mm – 28100 |
| 2 | Bonded mineral (Rock) wool mattresses with one side SS wire netting of 13mm X 0.711mm size stitched with 0.4mm SS wire | PE-SS-999-169-M032 | 150 Kg/cub.m | Sq.M | 75 mm – 4300 | 75 mm – 8600 |
| 3 | Bonded mineral (Rock) wool mattresses with one side GS wire netting of 13 mm x 0.711 mm size stitched with 0.4 mm GS wire. | PE-SS-999-169-M032 | 100 Kg/cub.m | Sq.M | 25 mm – 4400 40 mm – 6750 50 mm – 4500 60 mm – 10400 75 mm – 11400 | 25 mm – 8800 40 mm – 13500 50 mm – 9000 60 mm – 20800 75 mm – 22800 |

Pradyumn Singh

| | | | | | | | | | | | | |
|----------------------|---------------------|-------------------------|------------------------|---------------|---|--------------------|--|------------------|---|----------|---|---------|
| | QUALITY PLAN | | CUSTOMER: OPGCL | | PROJECT: IB THERMAL POWER STATION 2x660MW | | SPEC. NO.: PE-SS-999-169-M032 | | | | | |
| | SHEET 2 OF 2 | | VENDOR: --- | | Q.P. NO.: PE-QP-391-169-M031 REV. 00 DT: 03.02.2015 | | SPEC. TITLE: THERMAL INSULATION | | | | | |
| COMPONENT/ OPERATION | | CHARACTERISTICS CHECKED | CATEGORY | TYPE OF CHECK | EXTENT OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE NORMS | FORMAT OF RECORD | P | AGENCY W | V | REMARKS |

ITEM: **THERMAL INSULATION - RESIN BONDED MINERAL (ROCK) WOOL MATTRESSES**

CONTRACTOR : **BHEL, PEM, NOIDA**

| S.NO. | COMPONENT/ OPERATION | CHARACTERISTICS CHECKED | CATEGORY | TYPE OF CHECK | EXTENT OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE NORMS | FORMAT OF RECORD | P | AGENCY W | V | REMARKS |
|-------|---|--|----------|---------------|------------------|--|--|----------------------------|---|----------|---|-----------------|
| 2. | Hexagonal wire netting & stitching wire | | | | | | | | | | | |
| i) | GS Wire | Dimensional, Gauge dia, Coating test, Tensile test, Wrapping test, Bend test Appearance | MA | Physical | 1 sample per lot | IS:4826, IS:3150, IS:280 & Tech. spec. Tech. Spec. | IS:4826, IS:3150, IS:280 & Tech. spec. Shall be bright & free from defects | Test report | 3 | - | 2 | } Ref. note "B" |
| | | | | Visual | Random | | | Inspection Report | 3 | - | 2 | |
| ii) | SS Wire | Dimensional, Gauge dia, Chemical analysis, Tensile test, Wrapping test, Reverse Bend test Appearance | MA | Physical | 1 sample per lot | IS:6528 & Tech. spec. Tech. Spec. | IS:6528 & Tech. spec. Shall be bright & free from defects | Test report | 3 | - | 2 | } Ref. note "B" |
| | | | | Visual | Random | | | Inspection Report | 3 | - | 2 | |
| 3. | Packing and marking | Packing type and identification marking | MA | Visual | Random | Tech. Spec. | Tech. Spec. Photographs of packed material to be verified by BHEL before issuing MDCC. | (Soft copy of photographs) | 3 | 2 | - | |


NOTES:

A) 'K' Value test will be carried out on samples identified and sealed by customer / BHEL Inspector once in twelve (12) months irrespective of ongoing projects. The tests will be carried out at govt. approved labs (at CBRI - Roorkee, IIT - Chennai or PIBCO R & D Centre, N. Delhi).
 B) Manufacturer's / supplier's compliance certificate will be furnished.

LEGEND

| | | | |
|----|----------------------|---|---------------------|
| MA | MAJOR CHARACTERISTIC | 1 | CUSTOMER |
| P | PERFORM | 2 | BHEL |
| W | WITNESS | 3 | VENDOR OR SUBVENDOR |
| V | VERIFICATION | | |

| | | | | | |
|-----------------------|--|-------------|--|------------------------------|--|
| BHEL | | PARTICULARS | | BIDDER/VENDOR | |
| <i>P. RAJESH</i> | | NAME | | | |
| <i>Prashant Singh</i> | | SIGNATURE | | | |
| <i>07/02/2015</i> | | DATE | | | |
| | | | | BIDDERS/VENDORS COMPANY SEAL | |

| | | | |
|---|---|--------------------------------------|--|
|  | DATA SHEET C BONDED MINERAL (ROCK) WOOL MATTRESS IB THERMAL POWER STATION, BANHARPALLI 2x660MW UNITS 3&4 | SPECIFICATION NO. PE-TS-391-169-M032 | |
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DATA SHEET - C

Before dispatch of the equipment the vendor shall furnish the following in original for BHEL review and acceptance.

- a) Material Test certificates.
- b) Shop test reports and certificates.
- c) Quality Plan duly signed & stamped with bidder's seal.

**IB THERMAL POWER STATION, BANHARPALLI
2x660MW UNITS 3&4**

VOLUME – III

TECHNICAL SCHEDULES


FOR

BONDED MINERAL (ROCK) WOOL MATTRESSES

SPECIFICATION NO. PE-TS-391-169-M033(REV-00)




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

| | | | |
|---|---|--------------------------------------|------------------|
|  | TITLE: TECHNICAL SCHEDULES BONDED MINERAL (ROCK) WOOL MATTRESSES IB THERMAL POWER STATION, BANHARPALLI 2x660MW UNITS 3&4 | SPECIFICATION NO. PE-TS-391-169-M032 | |
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|  | TITLE: TECHNICAL SCHEDULES BONDED MINERAL (ROCK) WOOL MATTRESSES IB THERMAL POWER STATION, BANHARPALLI 2x660MW UNITS 3&4 | SPECIFICATION NO. PE-TS-391-169-M032 | |
| | | VOLUME : III | |
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A) Technical Details: Bidder to tick whichever is applicable.

| | | | |
|---|---|-----------------|---------------------|
| 1 | Specific Technical requirements of Vol. II B Section-C | Accepted | Not Accepted |
| 2 | Standard Technical Specification of Vol. II B Section-D | Accepted | Not Accepted |
| 3 | DATA SHEET-A of Vol. II B Section-D | Accepted | Not Accepted |
| 4 | QUALITY PLAN | Accepted | Not Accepted |
| 5 | Documentation requirement as per Data sheet-C | Accepted | Not Accepted |

B) Deviations to the technical specification are not acceptable. However, if there are any deviations due to unavoidable reasons then the same to be clearly specified in the schedule of deviation. In case of no deviations, schedule of deviations to be filled as NIL by bidder.

C) All reports, test certificates etc. to be submitted during contract shall be subject to BHEL/Customer review/ approval.



TITLE
*** SCHEDULE OF DEVIATIONS**
() From Technical Specifications (Volume –II B)

SPECIFICATION NO
PE-TS-391-169-M032

VOL III

SHEET..... OF.....

We the undersigned hereby certify that the above mentioned are the only deviations.



TITLE

***SCHEDULE OF DECLARATIONS**

SPECIFICATION NO
PE-TS-391-169-M032

VOL III

SHEET..... OF.....

* Bidder shall include this schedule both in technical and Price offers

DECLARATION

Icertify that all the technical data and information pertaining to this specification are correct and are true representation of the equipment/system covered by our format proposal number Dated and there is no deviation to the specification other than those listed in "Schedule of Deviations" at Vol. III.

I hereby certify that I am duly authorized representative of the Bidder's company whose name appears above my signature.

Bidder's Company Name

Authorised representative's Signature

Name

Bidder's Name with

The bidder hereby agrees to fully comply the requirements and intent of this specification for the price indicated