

**TENDER
SPECIFICATION
BHEL PSSR SCT 2184**

FOR

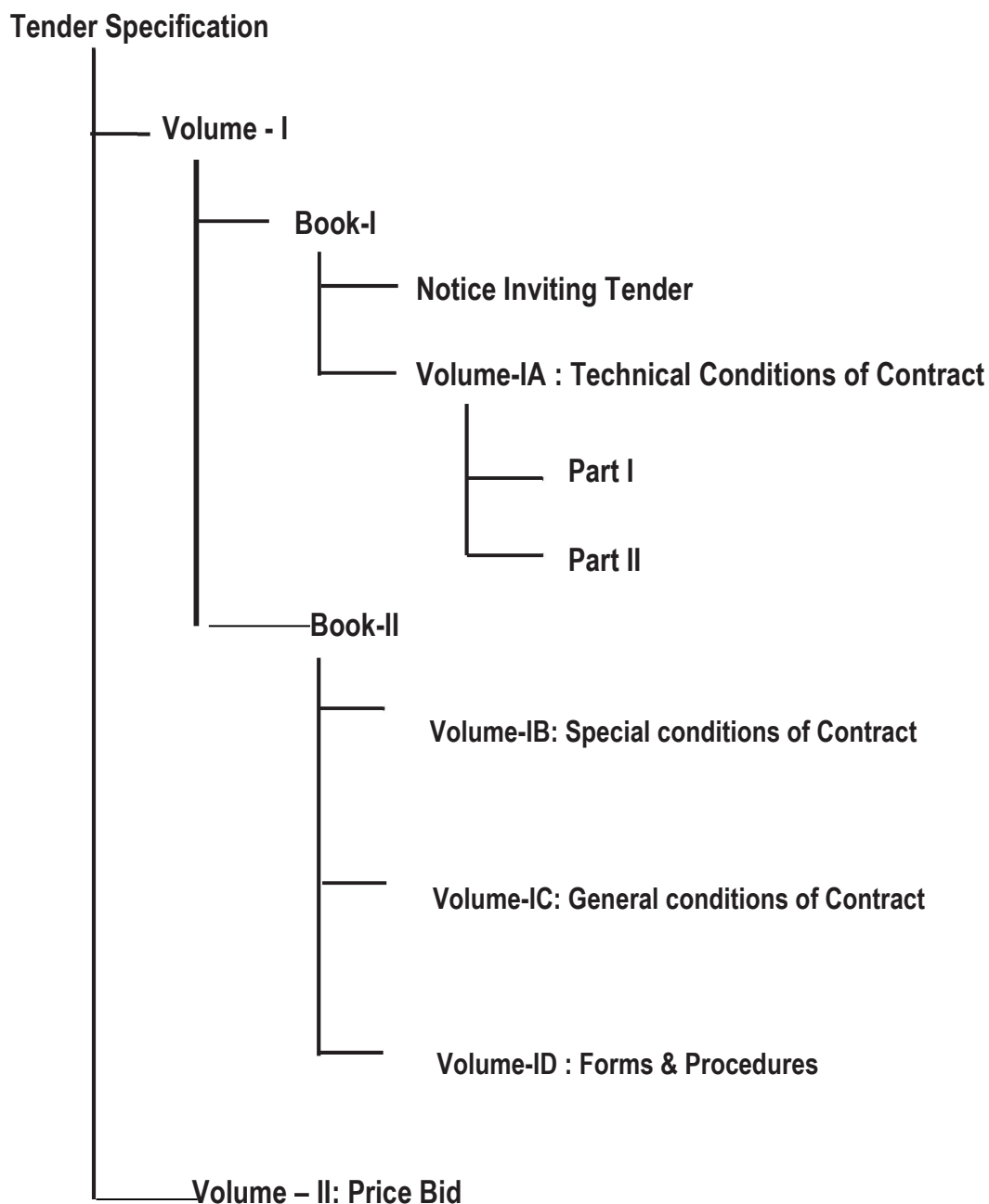
Insulation works for Turbine, Piping, Equipments etc. including handling of materials at site stores /storage yard, transporting to site, inspection, Fabrication, pre-assembly, erection, alignment, welding, painting and application of refractory & insulation as per requirement or drawings at Unit#3 KUDANKULAM NUCLEAR POWER PROJECT, TAMILNADU.

**PRICEBID
VOLUME –II**



BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
Power Sector – Southern Region
BHEL Integrated Office Complex, TNEB Road
Pallikaranai, Chennai -600100

TENDER SPECIFICATION CONSISTS OF



PRICE BID

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PRICE BID

PART A **Instruction to Bidders:**

1. Bidders shall only quote “Total Lumpsum amount” in the format given in the price bid. The “Total Lumpsum amount” is for the entire scope of work. Payment will be as per actual quantity executed as certified by BHEL Engineer.
2. Tenderers are requested to affix their company seal and authorized signature in all pages.
3. Bidders shall quote ‘Total Amount’ in the format enclosed as a separate Excel File in BHEL NIC e-Procurement portal for the subject tender and upload the same under ‘Packet details - > Tender covers -> Finance '(Cover Type Description – Price Bid)’ and same shall be taken into account for evaluation and awarding and hence, shall be complete in all respect for the full scope of work defined in specification and in accordance with terms & conditions of the tender. Any other entry elsewhere in the price bid shall be treated as Null and Void. Quoting of rates in any other form/ formats will not be entertained.
4. The above mentioned ‘Total amount’ is for the entire Bill of Quantity (BOQ) given in Part -C of the Price Bid
5. Contractor shall prepare billing break up in consultation with BHEL Engineer and submit the same for approval of BHEL Engineer Incharge. Though the work is being tendered on lumpsum price basis, the payment shall be effected only based on the billing break up to the extent of work executed.
6. Payment shall be made for the actual quantities of work executed at the unit rate arrived as per the billing break up approved by BHEL. Refer TCC Vol 1A PART-1 Chapter-8 BOQ.

Part C : Bill of Quantities

Tender Specification for Insulation works for Turbine, Piping, Equipments etc. including handling of materials at site stores /storage yard, transporting to site, inspection, Fabrication, pre-assembly, erection, alignment, welding, painting and application of refractory & insulation as per requirement or drawings at Unit#3 KUDANKULAM NUCLEAR POWER PROJECT, TAMILNADU

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - TG & SWS Package

| Ref.No. | Description | Unit of Measurement | Qty. | Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount |
|----------------|--------------------------|----------------------------|-------------|---|
| | Thermal Insulation Works | -- | | |

Part C : Bill of Quantities

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| Ref.No. | Description | Unit of Measurement | Qty. | Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount |
|---------|--|---------------------|------|--|
| 1.0 | <p>Application of multiple layer ceramic fibre insulation with cement plastering for HP turbine & Turbine drive components: Materials will be issued as Free issue material (FIM) by BHEL).</p> <p>Application of insulation system with stitched mats of ceramic fibre of density 96kg/cum in single layer or in multiple layers enclosed in glass fabric, metal cladding, ceramic paper and aluminium foil, supporting components like pins, support racks, metal flats etc joint sealing, bandage, steel wire stitching/reinforcing, twisted steel wire mesh layering, zinc chromate painting on supporting structure, 2 x 20 mm thick cement plastering (portland cement with perlite sand), oil resistant painting on plastering for HP turbine & Turbine drive components with various categories and thickness in sub items, preparation of reports, inspection, temperature measurement on insulated surface and work completion as per the drawings, documents and specification with acceptance of BHEL & NPCIL Erection Incharge.</p> <p>The work scope includes shifting of materials from BHEL/NPCIL stores to site location, handling, inspection at store, preparation of IMIR (incoming material inspection report), fabrication of insulation mats & metal cladding, fabrication of supporting devices, stitching, cleaning, welding and touch-up painting of supporting devices, application, arrangement of man power, qualification of procedures, scaffolding and platforms, tools & tackles, P&M, supporting materials, paints, consumables including welding electrodes.</p> <p>Note: 1. In some places, removable type insulations with toggle clips are required for flange joints, valves, manholes, instrumentation points, etc. In such cases, where removable type insulation are installed, no separate payment shall be made. 2. Material supplies is in the scope of BHEL. Materials will be issued as Free issue material (FIM). 3. All required consumables is in the scope of the contractor.</p> | -- | | |

Part C : Bill of Quantities

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| Ref.No. | Description | Unit of Measurement | Qty. | Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount |
|---------|---|---------------------|------|--|
| 1.1 | Lower Half of HP turbine in 4 layers of insulation + 2 layers of cement plastering with total thickness of 300 mm | Square Meter | 33 | .0024005 |
| 1.2 | Lower Half of Turbine drive in 4 layers of insulation + 2 layers of cement plastering with total thickness of 320 mm | Square Meter | 15 | .0010948 |
| 1.3 | Upper Half of HP turbine in 3 layers of insulation + 2 layers of cement plastering with total thickness of 240 mm | Square Meter | 35 | .0022557 |
| 1.4 | Upper Half of Turbine drive in 3 layers of insulation + 2 layers of cement plastering with total thickness of 260 mm | Square Meter | 15 | .0009704 |
| 1.5 | Valve's of LPC in 3 layers of insulation + 2 layers of cement plastering with total thickness of 260 mm | Square Meter | 65 | .004205 |
| 1.6 | Flange joint of HP turbine in 3 layers of insulation + 1 layers of cement plastering with total thickness of 220 mm | Square Meter | 13 | .0008184 |
| 1.7 | Regulation & Automatic gate valve's body of HPC, Automatic gate valve's body, Throttle valve's body of Turbine drive, Flange joint of TDFP, Heat steam regulation valve body (LBB) in 3 layers of insulation + 1 layers of cement plastering with total thickness of 240 mm | Square Meter | 133 | .0083082 |
| 1.8 | Front and Rear seals of HPC in 2 layers of insulation + 1 layers of cement plastering with total thickness of 140 mm | Square Meter | 8 | .0004353 |
| 1.9 | Front and Rear seals of LPC and steam out valve body (MSR discharge valves- 4 nos.) in 2 layers of insulation + 1 layers of cement plastering with total thickness of 180 mm | Square Meter | 50 | .002733 |
| 1.1 | Middle part and flange joint of LPC in 1 layers of insulation + 1 layers of cement plastering with total thickness of 100 mm | Square Meter | 165 | .0076502 |
| 1.11 | Steam to & from seals of LPC(LBW&MAM) in 1 layers of insulation +1 layers of cement plastering with total thickness of 130 mm | Square Meter | 18 | .0008631 |

Part C : Bill of Quantities

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at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - TG & SWS Package

| Ref.No. | Description | Unit of Measurement | Qty. | Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount |
|---------|--|---------------------|-------|--|
| 1.12 | Valve's cover of HPC,LPC,Heat steam(LBB),Turbine drive and steam supply pipeline to HPC (MAA)+Compensator from MSR in 3 layers of insulation with Al cladding (with inside protective coating) total thickness of 220 mm | Square Meter | 123 | .0077249 |
| 1.13 | TDFP cross over pipes + Steam out valve's cover in 2 layers of insulation with Al cladding(with inside protective coating) total thickness of 160 mm | Square Meter | 213 | .0116624 |
| 1.14 | Steam to HPH-6 from HPC in 2 layers of insulation with Al cladding(with inside protective coating) total thickness of 140 mm | Square Meter | 10 | .0005451 |
| 1.15 | Steam to HPH-5, Dearator from HPC in 2 layers of insulation with Al cladding(with inside protective coating) total thickness of 130 mm | Square Meter | 25 | .0013627 |
| 1.16 | Steam to LPH-2,3 from LPC in 2 layers of insulation with Al cladding(with inside protective coating) total thickness of 110 mm | Square Meter | 45 | .0024529 |
| 1.17 | Pipes from HPC to MSR(SS cross over) in 1 layers of insulation+ 1 layers of cement plastering+ 1 layers of insulation with Al cladding(with inside protective coating) total thickness of 180 mm | Square Meter | 753 | .0402847 |
| 1.18 | Pipes from MSR to LPC(CS cross over) in 1 layers of insulation+ 1 layers of cement plastering+ 2 layers of insulation with Al cladding(with inside protective coating) total thickness of 240 mm | Square Meter | 1,210 | .0691619 |
| 1.19 | Housing of Turbine & Bearing pedestal's in 1 layers of insulation with steel gauze(wire mesh) thickness of 60 mm | Square Meter | 445 | .0201852 |

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| Ref.No. | Description | Unit of Measurement | Qty. | Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount |
|---------|---|---------------------|-------|--|
| 2.0 | <p>Application of mineral wool insulation on CS/SS pipelines and equipments: Materials will be issued as Free issue material (FIM) by BHEL).</p> <p>Application of insulation system with stitched mats of mineral wool with density of 120 Kg/Cum. enclosed in glass fabric, GI metal cladding with inside protective coating, supporting components (support ring is applicable for 325mm OD and above, flat and pin welding for equipments), binding wire, riveting, joint sealing with sealant, wrapping of aluminum foil (0.1mm thick) on SS pipe/equipment surface, ceramic cord bandage, mat stitching, steel wire stitching, zinc chromate painting on supporting structure, with various categories and thickness in sub items, preparation of reports, inspection, temperature measurement on insulated surface and work completion as per the drawings, documents and specification with acceptance of BHEL & NPCIL Erection Incharge.</p> <p>The work scope includes shifting of materials from BHEL/NPCIL stores to site location, handling, inspection at store, preparation of IMIR (incoming material inspection report), fabrication of insulation mats & metal cladding, fabrication of supporting devices, stitching, welding and touch-up painting of supporting devices, cleaning, application, arrangement of man power, scaffolding and platforms, tools & tackles, qualification of procedures, supporting materials, paints, P&M, consumables including welding electrodes.</p> <p>Note :</p> <p>1. In some places, removable type insulations with toggle clips are required for flange joints, valves, manholes, instrumentation points, etc. In such cases, where removable type insulation are installed, no separate payment shall be made.</p> <p>2. Material supplies is in the scope of BHEL. Materials will be issued as Free issue material (FIM).</p> <p>3. All required consumables is in the scope of the contractor.</p> | -- | | |
| 2.1 | CS pipes with mineral wool with single layer up to 50 mm thickness. | Square Meter | 5,634 | .1143907 |

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| Ref.No. | Description | Unit of Measurement | Qty. | Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount |
|---------|---|---------------------|--------|--|
| 2.2 | SS pipes with mineral wool with single layer up to 50 mm thickness. | Square Meter | 240 | .0051188 |
| 2.3 | CS pipes with mineral wool with single layer thickness | Square Meter | 10,021 | .2132423 |
| 2.4 | SS pipes with mineral wool with single layer thickness | Square Meter | 159 | .0035464 |
| 2.5 | CS pipes with mineral wool with double layer thickness | Square Meter | 7,626 | .20321 |
| 2.6 | SS pipes with mineral wool with double layer thickness | Square Meter | 282 | .0078034 |
| 2.7 | CS equipments with mineral wool with single layer up to and including 50 mm thickness. | Square Meter | 450 | .0091366 |
| 2.8 | SS equipments with mineral wool with single layer up to and including 50 mm thickness. | Square Meter | 116 | .0024741 |
| 2.9 | CS equipments with mineral wool with single layer thickness | Square Meter | 2,160 | .0459638 |
| 2.1 | CS equipments with mineral wool with double layer thickness | Square Meter | 673 | .0171124 |
| 2.11 | SS equipments with mineral wool with double layer thickness | Square Meter | 23 | .0006364 |
| 2.12 | CS pipes with mineral wool with single layer up to 50 mm thickness (without cladding and supporting components) on temporary pipeline for flushing including removal, reuse (max 3 times) and disposal after flushing. | Square Meter | 842 | .0170957 |

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| Ref.No. | Description | Unit of Measurement | Qty. | Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount |
|---------|--|---------------------|------|--|
| 3.0 | <p>Application of ceramic wool insulation on rotary equipments: Materials will be issued as Free issue material (FIM) by BHEL).</p> <p>Application of insulation system with stitched mats of of ceramic wool with density of 64 Kg/Cum enclosed in glass fabric, GI metal cladding with inside protective coating, supporting components, binding wire, riveting, joint sealing, wrapping of aluminum foil (0.1mm thick) on SS equipment surface, mat stitching, steel wire stitching, zinc chromate painting on supporting structure, with various categories and thickness in sub items, preparation of reports, inspection, temperature measurement on insulated surface and work completion as per the drawings, documents and specification with acceptance of BHEL & NPCIL Erection Incharge.</p> <p>The work scope includes shifting of materials from BHEL/NPCIL stores to site location, handling, inspection at store, preparation of IMIR (incoming material inspection report), fabrication of insulation mats & metal cladding, fabrication of supporting devices, stitching, welding and touch-up painting of supporting devices, cleaning, application, arrangement of man power, scaffolding and platforms, tools & tackles, P&M, qualification of procedures, paints, supporting materials, consumables including welding electrodes.</p> <p>Note :</p> <p>1. In some places, removable type insulations with toggle clips are required for flange joints, instrumentation points, etc. In such cases, where removable type insulation are installed, no separate payment shall be made.</p> <p>2. Material supplies is in the scope of BHEL. Materials will be issued as Free issue material (FIM).</p> <p>3. All required consumables is in the scope of the contractor.</p> | -- | | |
| 3.1 | Single layer up to 50mm thickness. | Square Meter | 45 | .0016405 |
| 3.2 | Single layer of thickness | Square Meter | 110 | .004681 |

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|---------|--|---------------------|-------|--|
| 3.3 | Double layer of thickness | Square Meter | 15 | .0006969 |
| 4.0 | <p>Application of insulation on CS/SS piping with cords : Materials will be issued as Free issue material (FIM) by BHEL).</p> <p>Application of insulation system with insulating cords of density 200 kg/cum in roving loom made of Glass thread / ceramic wool, superfine basalt / ceramic fibre, GI metal cladding (0.5 mm thick) with inside protective coating, riveting, joint sealing, wrapping of aluminum foil (0.1mm thick) on SS pipeline surface, with various categories and thickness in sub items, preparation of reports, inspection, temperature measurement on insulated surface and work completion as per the drawings, documents and specification with acceptance of BHEL & NPCIL Erection In charge.</p> <p>The work scope includes shifting of materails from BHEL/NPCIL stores to site location, handling, inspection at store, preparation of IMIR (incoming material inspection report), fabrication of metal cladding, fabrication of supporting devices, application, qualification of procedures, arrangement of man power, scaffolding and platforms, tools & tackles, paints, P&M, consumables including welding electrodes.</p> <p>Note : 1. In some places, removable type insulations with toggle clips are required for flange joints, valves, instrumentation points, etc. In such cases, where removable type insulation are installed, no separate payment shall be made. 2. Material supplies is in the scope of BHEL. Materials will be issued as Free issue material (FIM). 3. All required consumables is in the scope of the contractor.</p> | -- | | |
| 4.1 | Insulation of CS piping upto 70 mm thickness | Square Meter | 3,125 | .1091943 |
| 4.2 | Insulation of SS piping upto 70 mm thickness with wrapping of aluminium foil (0.1 mm thk) | Square Meter | 1,525 | .0589421 |

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| Ref.No. | Description | Unit of Measurement | Qty. | Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount |
|------------------------|--------------------|----------------------------|-------------|---|
| TOTAL Weightage | | | | 0.9999997 |