

# VOLUME - IA

Technical Conditions of Contract (TCC)  
“Pre-Engineered Closed store Building”


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FOR

JSW 1x250 MW STG project

BHARAT HEAVY ELECTRICALS LIMITED



 <p><b>BHEL</b> Maharashtra Company</p>	<p><b>Technical Conditions Of Contract (TCC)</b>  <b>PROJECT ENGINEERING &amp; SYSTEMS</b>  <b>DIVISION</b>  <b>HYDERABAD</b></p>			<p>Ref No: HYD/PE&amp;SD/SC- Projects/TCC/2025-26/ PEB/ JSW DOLVI /01</p>	
		Rev. No.	00	<p><b>TECHNICAL CONDITIONS OF CONTRACT (TCC)</b></p> <p><b>FOR</b></p> <p><b>“Pre-Engineered Closed store Building”</b></p> <p><b>FOR</b></p> <p><b>JSW 1x250 MW STG project</b></p>	
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**1. INTENT OF SPECIFICATION:**

- 1.1. The intent of this document is to establish the minimum requirement of design, design certification, engineering, selection, manufacture, assembly, inspection, shop testing, shop painting, delivery at site properly packed for transportation suitably protected from weather, unloading, safe storage at site, final painting, erection, final handling over as mentioned hereinafter for the Pre-Engineered Buildings (PEB), which form part of project.
- 1.2. It is not the intent to completely specify all details of design, manufacture and construction. Nevertheless, the installations shall conform to high standard of engineering/quality and shall be capable of serving the intended purpose continuously for entire life span of the power plant in a manner acceptable to the purchaser (BHEL).

**2. SPECIAL NOTES TO BIDDERS**

- 2.1. This specification shall be read in conjunction with all its enclosures. In case of any discrepancy arising between this job specification & its enclosures, Relevant IS standards shall be followed after confirmation from purchaser. Further, if a requirement in this specification or any of the enclosures, calls for a decision from the Purchaser, it shall be bidder's sole responsibility to clearly bring out/highlight the same distinctively in his prebid queries, so as to enable purchaser to furnish their decision/clarification. If such issues/requirements are not duly addressed by bidder during the pre-bid stage and if such issues/requirements have been observed later during order execution stage, it shall be binding on the bidder to comply with the final decision made by the purchaser subsequently, without any cost, delivery, or any other commercial implications.
- 2.2. Any additional equipment, material, services etc., which are not specifically mentioned in this specification, but required to make the PEBs complete in all respects, in accordance with the intent of this technical specification, contractual agreement, statutory requirements, relevant/applicable codes/standards, good engineering practices, and safety shall be deemed to be covered under the scope of this specification.
- 2.3. Any specific hardware/item/ etc. required as indicated in 2.2 above but not listed elsewhere in this specification or its enclosures, shall be deemed to be included in the basic price quoted by the bidder. Also, all mounting hardware/ accessories/fittings etc. required for above and the E&C of the PEBs shall be deemed to be included in the basic price quoted by the bidder. Bidder, at no point of time, shall be eligible to raise any extra claim in this regard.
- 2.4. Bidder shall quote strictly as per the scope of supply and requirements of this specification. Unsolicited or Alternate offers from the bidders will not be entertained.
- 2.5. Any clarifications required by the bidder shall be intimated to BHEL together as a single notice within a week of receipt of enquiry by bidder. In case no such clarifications are sought

- during pre-bid stage, it will be assumed that bidder has no comments or observations on BHEL’s specification and no deviations to the specifications will be taken by the bidder.
- 2.6. Bidder to quote strictly as per BHEL’s price format. Failure to do shall make their offer liable for rejection. Any tampering/modification/change of the BHEL’s price format is not allowed and is liable for rejection of bidders offer.
- 2.7. Compliance with this specification shall not relieve the bidder of the responsibility of furnishing equipment and accessories/auxiliaries of proper design, materials and workmanship to meet the specified purpose. Accordingly, bidder to furnish their comments if any on this specification as a part of pre-bid query
- 2.8. The design information, specifications and drawings indicate the "Minimum" requirements and are intended to enable Bidders to ascertain the extent of the work involved. Bidders are expected to supplement the information included in this specification as required and submit a comprehensive bid.
- 2.9. Bidder may offload erection works to third party agency with prior approval from BHEL.

### 3. Location of the plant

Plant Location	:	JSW Dolvi
State	:	Maharashtra
Nearest Important Town	:	PEN
Nearest Railway Station	:	PEN
Nearest Airport	:	CSM International Airport, Mumbai

#### 4. BIDDER'S SCOPE OF SUPPLY AND ERECTION-COMMISSIONING OF PRE-ENGINEERED STORE BUILDING:

The bidder is required to Design, Manufacture, Supply and Install a Pre-Engineered closed store Building sized **15mx30mx6m** (approximately).

Bidder will submit the design (Including foundation, plinth beams & flooring) for approval of BHEL.

Structural steel framed structure for the building to be considered as per basic engineer design.

Supply and Fixing of external sheet of Permanent colour coated metal cladding with troughed M.S. sheets manufactured out of 0.55 mm TCT(Total coated thickness) permanently colour coated zincalume sheet (150 gsm zinc-aluminium alloy coating total of both sides as per AS 1397:1993) having 300 Mpa yield strength. The colour coating shall comprise of 20 microns finish coat over a 5-micron primer coat on the exposed side and a back coat of 5 microns over a primer coat of 5 micron on the reverse side. The metal cladding shall have 500 mm cover width, 47 mm high crests at 250 mm centers with special male/female side laps and anti-siphoning feature to prevent leakage. The sheet shall be fixed with the help of concealed compatible interlocking clips and wafer head zinc coated self-drilling fastener/screws 4.2X25 mm long on to the sub-girts. The clips shall be concealed and no fastener are to be penetrate the external sheeting all complete as per specification. Measurement of cladding shall be of the elevation/plan area of side covered by cladding as per approved drawing. No overlap shall be considered in measurement for the purpose of payment.

Major supply and services included in bidder's scope:

<u>S.No</u>	<u>Description</u>	<u>Quantity</u>
1.	Supply of PEB structural materials such as columns, rafters, beams, purlins, steel sheets, insulation etc. (Note: 1 set is for one PEB).	1 Set
2.	Supply of PEB architectural items such as doors, windows, rolling shutters, etc . (Note: 1 set is for one PEB).	1 Set
3.	Supply of Electrical Services as Cl.7.3 & 7.4. (Note: 1 set is for one PEB).	1 Set
4.	E&C: Erection of PEB structural materials (Note: 1 set is for one PEB).	1 Set
5.	E&C: Erection of PEB architectural items. (Note: 1 set is for one PEB).	1 Set
6.	E&C: Erection and Commissioning of Electrical Services as per Cl.7.3 & 7.4 (Note: 1 set is for one PEB).	1 Set

**5. BIDDER’S SCOPE OF SERVICES**

**5.1. LIST OF MAJOR SERVICES INCLUDED IN BIDDER’S SCOPE:**

- i. DETAILED Engineering
- ii. Technical services relating to planning, procurement, manufacturing, inspection, expediting, packing, shipping, storing, etc.
- iii. Submission and obtaining approval of all engineering documents before start of works
- iv. Engineering for procurement
- v. Preparation of all MTOs and MRs, as required
- vi. ORDERING of all materials
- vii. Construction at site including minor fabrication, erection and installation. Supervision of work during fixation of foundation bolts. Grouting, alignment and necessary activities for installation of complete Pre-Engineered buildings.
- VIII. Overall Project Management and progress reporting to owner/consultant
- IX. Expediting suppliers and sub vendors
- X. Procurement
- XI. Manufacture, fabrication and assembly at works and site
- XII. Inspection and testing including third party Inspection
- XIII. Painting at works, painting at site including touch up paint
- XIV. Dispatch and transportation of materials, consumables, construction aids etc to site.
- XV. Establishment of site office complete with all facilities and communication network, as required
- XVI. Storage, loading, unloading, security and handling at site
- XVII. Insulation with cladding and painting.
- XVIII. Engineering for interfacing all inputs and outputs.
- XIX. Site clearing and cleaning.
- XX. Total day to day supervision of construction including erection and specialized services if any.
- XXI. Clearance for installations from the statutory and other concerned authorities on behalf of Purchaser. The Contractor shall also assist in preparing application forms, providing necessary drawings, documents, test certificates etc including necessary Co-Ordination with statutory and other concerned authorities.
- XXII. Liaisoning with other contractors in the plant.
- XXIII. Handing over the PEBs to purchaser.
- XXIV. Supply of all test reports/ Certificates
- XXV. Providing as Built drawings.

**Notes:**

Bidder to note that the above list is not exhaustive and any other service required as per the intent of this specification / project requirements /good engineering practice shall be deemed to be included in bidder’s scope without any commercial implication to the purchaser.

**6. CLARITY OF SCOPE IN OTHER AREAS (In addition to Cl.5.0.0):**

S.No	Item	By BHEL	By Vendor	Remarks
1	Complete civil foundation works for all the PEB store rooms	Yes	No	Vendor shall submit the loading details for foundation design
2	RCC cable trenches, if any, within all PEB store rooms	Yes	No	
3	Flooring works within all PEB rooms	Yes	No	
4	Plinth protection around all PEB rooms	Yes	No	
5	Steps/ ramps on front/back sides of the room as applicable	Yes	No	
6	Composite slab, if adopted by bidder, incl. all shuttering, reinforcement, bolts, decking, formwork, fasteners, painting, finishes, waterproofing, etc	No	Yes	
7	Electrical works including supply and E&C of wiring, room appliances (lights, ceiling fans, exhaust fans, ventilators, etc), switchboards, MCB boxes etc as specified in clause 7.3. (A)	No	Yes	
8	Cut out/ provision of supports & fixtures for the room appliances	No	Yes	

**7. TECHNICAL DETAILS**

**7.1 Design, supply and erection of Pre-Engineered Buildings**

**7.1.1. Design and supply of PEB structural materials**

- a) After receipt of BHEL PO, following documents shall be submitted to BHEL for approval:
  - 1 GA drawings along with BOM.
- b) Vendor shall supply the pre-fabricated structural materials such as columns, rafters, beams, purlins, tie rods, sheets, wall cladding/roofing PUF insulation, hardware etc. to the site as per approved drawings. Raw materials for steel sections, sheets etc. should be of reputed make of supplier to similar construction / infrastructure projects conform to relevant Indian / International Standards. The Bidder should furnish documentary evidence for the same.

To the extent possible, the Contractor shall consider the standard steel sections and plates available in India. In case the Contractor uses raw materials conforming to standards other than Indian Standards, the contractor should clearly indicate the Indian equivalent of the same and approval from the purchaser is to be obtained for use of such raw materials. In case for any raw materials standards other than Indian Standards is already specified in the Contract, approval as mentioned above is not required. In case of non-availability of raw materials in India, the Contractor shall switch over to import of the required raw materials expeditiously at its own cost and responsibility. The Purchaser shall not grant any time extension, on account of any delay in the procurement of raw materials. The Contractor shall take samples and test them in laboratories in India and/or abroad as may be required at his own cost & time, and fully satisfy himself of the suitability of the raw materials for the purpose of the plant & equipment offered by him.

- d) Vendor shall also supply the J bolts/nuts/washers, alignment plates and other related hardware that are used for positioning and anchoring of the PEB structures to the RCC foundation plinth.
- e) All the fabricated items, fasteners & materials required for complete assembly etc. shall be supplied to the project site.

#### **7.1.2. Design and supply of PEB architectural items**

- a) After receipt of BHEL PO, vendor shall submit GA drawings along with BOM (item-wise description, quantity, make, model etc) of the architectural items for BHEL approval.
- b) The architectural items submitted for approval shall meet the requirements of various aspects of the room such as electrical, illumination, ventilation, exhaust, thermal, safety, security etc.
- c) Accordingly, this shall include all items (except the electrical wiring and appliances as listed under BHEL scope) such as windows with shades, doors with shades/lock/key, rolling shutters with lock/key, ventilator provisions, exhaust provisions, rain water gutters/ down comers/ pipes etc. Raw materials for steel sections, sheets etc shall be of reputed make such as Jindal Steel and Power, RINL, SAIL, TISCO, JSW Steel, Essar Steel, Ispat Industries, Lloyd Steel Industries

#### **7.1.3. Erection of structures of PEB**

- a) Vendor shall erect the structural items such as columns, rafters, beams, purlins, tie rods, sheets, wall cladding/roofing insulation, hardware etc as per the BHEL approved drawings / BoM.
- b) Vendor shall also carry out necessary finishing activities such as painting etc.
- c) Vendor shall deploy qualified/competent team at site to carry out the above erection activity.

- d) Vendor shall also deploy their specialized team during plinth casting of J bolts / alignment (base) plates etc in order to provide the needed support/guidance to the BHEL civil construction team at site.
- e) All necessary labour, tools & tackles, shuttering materials, measuring instruments, machinery shall be in vendor scope of supply. This shall include spanner sets, drilling machines, welding machines, hydra, JCB, truck, trolley etc as required for the erection work.

#### **7.1.4. Erection of architectural**

- a) Vendor shall carry out erection of the architectural items such as windows with shades, doors with shades/lock/key, rolling shutters with lock/key, structural provisions for ventilators / exhausts, rain water gutters/ down comers/ pipes etc as per the BHEL approved drawings / BoM.
- b) Vendor shall also carry out necessary finishing activities such as painting etc.
- c) Vendor shall deploy qualified/competent team at site to carry out the above erection activities.
- d) All necessary labour, tools & tackles, shuttering materials, measuring instruments, machinery shall be in vendor scope of supply. This shall include spanner sets, drilling machines, welding machines, hydra, JCB, truck, trolley etc as required for the erection work.

#### **7.2.1. Structure & Material Specification:**

The PEB room shall have a steel frame primary structural member. Primary members fabricated from plates shall conform to IS2062 min Grade E250 Quality BR/ ASTM A572-12 Grade 50 with minimum yield strength of 345 Mpa. Steel shall be semi-killed/killed. Minimum thickness of steel plates shall be 4 mm. Hot rolled primary structural members and Rod/Angle bracing shall conform to IS2062 Grade E250 Quality A. Secondary members for Purlins and Girts shall conform to the specification of IS 811 or ASTM A1003-12 made from steel sheets conforming to ASTM A1011-12b Grade 50 having a minimum yield strength of 345 Mpa. The minimum thickness of secondary members shall be 3.15 mm. All other miscellaneous secondary members shall have minimum yield strength of 250 Mpa.

#### **7.2.2. Fasteners & Connections:**

Special coated self-drilling screws/fastener shall be used conforming to class 3 as per AS: 3566.1 and AS: 3566.2. Steel bolts, nuts and washers complying with AS 1112:2000. High Strength Bolts for Primary Connections IS: 1367 (Part III) Gr. 8.8 / ASTM A325. Bolts for Secondary Connection IS: 1367 (Part III) Gr. 4.6 /ASTM A307. Anchor/foundation Bolts shall conform to IS: 5624 and relevant IS code.

#### **7.2.3. Roof & Wall Cladding:**

Permanent color coated metal cladding with troughed M.S. sheets manufactured out of J0.55 mm TCT(Total coated thickness) permanently color coated zinalume sheet (150 gsm zinc-aluminium alloy coating total of both sides as per AS 1397:1993) having 300 Mpa yield strength. The color

coating shall comprise of 20 microns finish coat over a 5-micron primer coat on the exposed side and a back coat of 5 microns over a primer coat of 5 micron on the reverse side. The metal cladding shall have 500 mm cover width, 47 mm high crests at 250 mm centers with special male/female side laps and anti-siphoning feature to prevent leakage .The sheet shall be fixed with the help of concealed compatible interlocking clips and wafer head zinc coated self-drilling fastener/screws 4.2X25 mm long on to the sub-girts. The clips shall be concealed and no fastener are to be penetrate the external sheeting all complete as per specification. Measurement of cladding shall be of the elevation/plan area of side covered by cladding as per approved drawing. No overlap shall be considered in measurement for the purpose of payment.

#### **7.2.4. Doors Frames:**

Door frames shall be of T-iron frame of mild steel Tee-sections as per DSR-2013 item no 10.13. All doors shall be provided necessary fittings like hinges, handles, mortice locks, tower bolts, stopper, hydraulic door closer, etc. of CP brass complete.

Black powder coated aluminum doors shall be with extruded built up standard tubular sections, appropriate Z sections and other sections of approved make conforming to IS: 733 and IS: 1285, fixed to Pre-Engineered structure including necessary filling up of gaps at junctions with required PVC/neoprene felt etc. including hinges /pivots and double action hydraulic floor spring of approved brand and manufacture IS: 6315 marked, lock, handle and all necessary fittings as detailed in tender drawing or submitted by bidder in shop drawing and approved by BHEL.

The door entrance shall include Mild Steel single leaf door. The structural steel shall conform to IS: 7452 and IS: 2062. The holdfasts shall be made from steel flats (50 mm and 5 mm thick). The fixtures, fastenings and door latch are to be made with same materials.

#### **7.2.5. Rolling Shutters:**

Rolling shutter (Hand operated) shall be fabricated from 18-gauge steel and machine rolled with 75 mm rolling centers with effective bridge depth of 12 mm lath sections, interlocked with each other and ends locked with malleable cast iron clips to IS:2108 and shall be designed to withstand a wind load without excessive deflection. Metal rolling shutters and rolling grills as IS: 6248.

#### **7.2.6. Painting and Coating:**

Steel shall be color coated with total coating thickness of 25 microns (nominal) dry film thickness (DFT) comprising of silicon modified polyester (SMP with silicon content of 30% to 50 %) paint or Super Durable Polyester (XRW) paint of 20 microns (nominal) on one side (exposed face) on 5-micron (nominal) primer coat and 10 microns (nominal) SMP or Super Durable Polyester paint over 5-micron (nominal) primer coat on other side. SMP and polyester paints system shall conform to Product type 4 as per AS/ANZ 2728.

The structural steel shall be hot-dipped galvanized, conform to IS: 4759 or relevant Indian standard

**7.2.7. Lighting:**

The PEB Building shall be provided with electric light to achieve average illumination level of 100 Lux. Vendor shall ensure that the room is designed to utilize maximum natural light during the day.

**7.2.8. Description of PEB Structures:**

Primary Members: Primary structural framing shall include the transverse rigid frames, columns, corner columns, end wall wind columns, beams, truss member, base plate.

Secondary Members: Secondary structural framing shall include the purlins, girts, eave struts, bracing, flange bracing, base angles, clips, flashings and other miscellaneous structural parts. Suitable wind bracings sag rods to be reckoned while designing the structure.

Sealant: Sealant used for cladding shall be butyl based, two parts poly sulphide or equivalent approved, non-staining material and be flexible enough not to interface with fit of the sheets.

Closures: Solid or closed cell closures matching the profiles of the panel shall be installed along the eaves, rake and other locations.

Flashing and Trim: Flashing and / or trim shall be furnished at the rake, corners, eaves, and framed openings and wherever necessary to provide weather tightness and finished appearance. Color shall be matching with the color of wall. Material shall be 26-gauge thick conforming to the physical specifications of sheeting.

Gutters and Downcomers: Gutters shall be fabricated out of same metal sheet. Material shall be same as that of sheeting. Down comers shall be of galvanized steel pipes or PVC designed to ensure proper roof drainage system.

All steel materials supplied by the Agency shall be in a sound condition, of recent manufacture, free from defects, loose mill scale, slag intrusions, laminations, pitting, flaky, rust, etc. and be of full weight and thickness specified.

### 7.3. ELECTRICAL SERVICES

A. Supply, erection and commissioning of following electrical services items shall be in the scope of PEB vendor. The following items minimum shall be supplied by PEB vendor to meet the illumination level of 100 lux.

A.1 Electrical services BOQ per PEB room			
SL No.	DESCRIPTION (FIXTURES / LAMPS / ACCESSORIES)	UNIT	QTY
1	22W LED tubelights with frame, of standard manufacturer, for illumination	Nos	20
2	SSB-2 + R surface mounted swbd with 2 nos 5A piano type switches and one electronic fan regulator. (modular type)	Nos	6
3	SSB-2 surface mounted swbd with 2 nos 5A piano type switches (modular type)	Nos	6
4	Domestic type 5/15A receptacle with switch (Surface mounted mounted modular)	Nos	6
5	6 Way TPN Indoor type Lighting Panel (Surface mounted) with 32A, 4pole RCBO at the incomer & 6 Nos 10A SPN MCB at the outgoing .	Nos	1
6	3 Way 1Ph Indoor type UPS Power distribution board (Surface mounted) with 32A DP RCBO at the incomer & 6 Nos 10A SPN MCB at the outgoing .	Nos	1
7	32A TPN Welding receptacle with Plug & interlock Switch	Nos	1
8	Ceiling Fan 1200mm blade	Nos	2
9	Flexible Wires 1.5sqmm for fixture & 4sqmm for sockets, cable, conduits (rigid and GI stripped flexible ), accessories for Conduits (All conduits shall be 25mm dia heavy duty GI type), ISA/ISMC/GI FLAT and any other accessories for installation of above items - 1 LOT	LOT	1
10	Exhaust Fan with DOL starter (415V, 3 PHASE) (Industrial grade)	Nos	4

#### Notes:

1. Illumination Layout & BOQ shall be prepared by the bidder and submitted for approved by BHEL after order placement. Illumination fixture, conduits etc. as mentioned in above table are tentative and final nos. and position shall be supplied and fixed as pe approved “Illumination Layout” and BOQ.
2. Installation & commissioning of above equipment and its associated cabling work within the PEB shall be in the scope of PEB vendor.

B. Supply & Installation of Fire Extinguishers: following items shall be in the scope of PEB vendor

Sl. No.	Items	Quantity	Unit
1.	45 Lit. Foam type Fire Extinguisher	4	No.s
2.	25 kg DCP type Fire Extinguisher	4	No.s
3.	4.5 kg CO2 type Fire Extinguisher	4	No.s
4.	Sand Buckets (Stand with 4 buckets in each set)	4	Sets

#### 7.4. TECHNICAL SPECIFICATION FOR ELECTRICAL SERVICES

Lighting panels shall be powder coated with color shade RAL9002. Lighting panels shall have IP55 degree of protection.

Wires of different phase shall normally run in separate conduit.

Electrification of all building shall be carried out as per IS 732-1989, IS 4648-1968 and other relevant standards.

All luminaries and their accessories and components shall be of type readily replaceable by available Indian makes.

Following test reports to be submitted for LED chip/LED luminaires:

a) LED parameters like Lumen per watt, CRI, Beam angle from manufacturer. b)

LM 80/IS: 16105 report.

c) LM 79/IS: 16106 report

#### **LIGHTING WIRES**

Lighting wires shall be 1100 V grade, light duty PVC insulated unsheathed, stranded copper/ aluminium wire for fixed wiring installation. Color of the PVC insulation of wires shall be Red, Yellow, Blue and Black for R, Y, B phases & neutral, respectively. Minimum size of wire shall not be less than 1.5 sq.mm Copper for lighting fixture & 4 Sq.mm Copper for receptacles. Lighting panels etc. shall be earthed by two separate and distinct connections with earthing system.

### **RECEPTACLE**

Receptacles boxes shall be fabricated out of MS sheet of 2mm thickness and hot dipped galvanized or of die-cast aluminium alloy of thickness not less than 2.5 mm. The boxes shall be provided with two nos. earthing terminals, gasket to achieve IP55 degree of protection, terminal blocks for loop-in loop-out for cable of specified sizes, mounting brackets suitable for surface mounting on wall/column/structure, gland plate etc. The ON-OFF switch shall be rotary type heavy duty, double break, AC23 category, suitable for AC supply. Plug and Socket shall be shrouded Die-cast aluminium. Socket shall be provided with lid safety cover. Robust mechanical interlock shall be provided such that the switch can be put ON only when the plug is fully engaged and plug can be withdrawn only when the switch is in OFF position. Also cover can be opened only when the switch is in OFF position. Wiring shall be carried out with 1100 V grade PVC insulated stranded aluminium/copper wire of adequate size. The Terminal blocks shall be of 1100 V grade. The Terminal blocks shall be of 1100 V grade made up of unbreakable polyimide 6.6 grade with adequate current rating and size. The welding receptacles shall be provided with inbuilt ELCB rated for suitable mA sensitivity.

### **GALVANISING**

Galvanising of steel components and accessories shall conform to IS:2629 , IS4759 & IS:2633. Additionally, galvanising shall be uniform, clean smooth, continuous and free from acid spots. The amount of zinc deposit over threaded portion of bolts, nuts, screws and washers shall be as per IS:1367. The removal of extra zinc on threaded portion of components shall be carefully done to ensure that the threads shall have the required zinc coating on them as specified.

### **CONDUITS/PIPES/DUCTS INSTALLATION**

GI pull wire of adequate size shall be laid in all conduits before installation. Metallic conduit runs at termination shall have two lock nuts wherever required for junction boxes etc. Conduit runs/sleeves shall be provided with PVC bushings having round edge at each end. All conduits/pipes shall have their ends closed by caps until cables are pulled. After cables are pulled, the ends of conduits/pipes shall be sealed with Glass wool/Cement Mortar/Putty to prevent entrance of moisture and foreign material. Exposed conduit/pipe shall be adequately supported by racks, clamps, straps or by other approved means. Conduits /pipe support shall be installed square and true to line and grade with an average 1 Meter spacing between the supports.

### **Ventilation**

Provision shall be made to allow fresh air from outside to enter the compartment through suitable filter capable of preventing entry of sand during severe sand storms. The ventilation system fans shall be mounted on side walls with suitable sand filter / louver having easy access for cleaning and maintenance.

## **8. GENERAL TECHNICAL REQUIREMENTS:**

For the design of the plant, it is necessary to consider the requirements (by suitably planning the layout) of the convenience of inspection, cleaning, maintenance and repair.

Equipment design and engineering shall incorporate adequate safety features (as per applicable specifications of respective installation as well as Health, Safety and Environment

Codes & Standards applicable for the subject project) to provide protection to operating personnel, equipment and environment.

No claim in terms of cost or relaxation in time shall be entertained for any redesign, rework and for the safety measures provided. If at any stage of work, any dismantling or modification or relocation of any facilities is required to be done to complete the work in bidder's scope and which has been agreed by the Owner, the same shall be done by the bidder at no extra cost or time implication to the Owner. All such changes will be executed only after the proposed drawings and work plan are approved by the purchaser.

The Bidder shall take all necessary precautions to protect all the existing equipment, structures, facilities and buildings etc. from damage. In case any damage occurs due to the activities of the Bidder on account of negligence, ignorance, accidental or any other reason whatsoever, the damage shall be immediately made good by the Bidder at his own cost to the satisfaction of the Owner. The Bidder shall also take all necessary safety measures at his own cost, to avoid any harm or injury to his workers and staff from the equipment and facilities of the power station.

#### **9. CONSTRUCTION REQUIREMENT:**

Erection & commissioning of all the items supplied by bidder is included in bidder's scope.

Bidder is advised to visit the project site and appraise himself about the local conditions and infrastructure available in the area for fulfilling their commitments under the contract. BHEL will not admit any claims whatsoever on account of Contractor's non-familiarization of local conditions.

The Contractor shall make all necessary arrangements to deliver the equipment at the site by wagons/trucks/trailers and receive the material at site, build his own stores for the proper storage of equipment, maintain the stores and all related documents and records, transport the equipment to site for erection purpose. Necessary security arrangements also shall be made by the Contractor. Area only for construction of stores and construction site office shall be made available, free of cost, to the Contractor by the Purchaser.

The Contractor shall be provided with construction power at 415 V, three phase, 50 Hz for the purpose of the construction and erection at free of charge. The Contractor shall make his own arrangements for further distribution.

Construction water shall be supplied free of cost by the Purchaser to the Contractor at one point at each location of project.

All machinery such as cranes, hydra, JCBs, forklifts, transport trucks, trolleys, concrete mixers, Ajax machines etc necessary for movement and installation of materials shall be organized by the bidder. Bidder shall arrange all the items required like scaffolding, rope, sling etc. for construction of the facilities in their scope.

All necessary tools and tackles such as screw driver set, power screw drivers, cutting pliers, nose pliers, spanner sets, adjustable spanners, hole saw cutter set, bending tools, torque wrenches, hack saw blades, pipe wrenches, flat / round files, drilling machines, welding machines, steel bar bending tools / templates for RCC works, spade, shovel, hammer etc shall be organized by the bidder.

All necessary measuring instruments such as measuring tapes, digital multimeters, electrical testers, meggers etc shall be organized by the bidder.

The contractor shall submit to the employer, draft instruction manual specifically compiled for the project, containing full detail required for E&C and Maintenance if any. The E&C manuals/checklists shall be submitted prior to the commencement of erection activities.

Bidder shall make their own arrangements for necessary food, drinking water and accommodation for their labour and employees posted at the site. Similarly, food and drinking water required at the site, during the construction operations, shall also be in scope of the bidder.

Bidder shall organize all necessary steps to meet statutory requirements such as labour license, PF, ESI, insurance etc and also ensure compliance with relevant acts such as minimum wages act, income tax act, employee insurance act etc for their labour deployed at site.

Bidder shall maintain updated labour register, with name, age, qualification, salary, attendance details etc at the site.

It is advised to Bidders to visit the site and ascertain all site intensive requirements such as Health, Safety and Environment (HSE) requirement, work permits and other special requirements of site etc. Bidder shall ensure safety of man and machinery during work at site. For this necessary safety measures like use of PPEs, use of danger board/tapes etc to be ensured by the bidder. It is the ultimate responsibility of the bidder in all respect to prevent accidents at the site and safeguard man and machinery from accidents.

Bidder shall, at the completion of every work, clear off the debris, which resulted out of the work.

#### **10. QUALITY ASSUARANCE:**

- 10.1. All materials, components, and equipment covered under this specification shall be procured, manufactured, erected, commissioned and tested at all the stages as per a comprehensive Quality Assurance Program (QAP) to be submitted by bidder and approved by the purchaser.
- 10.2. It will be the responsibility of the bidder to adhere to the approved Quality Plans. The bidder shall further identify specific hold points beyond which work will not proceed without purchaser's consent so as to further ensure that he performs the above quality functions effectively.

- 10.3. Field Quality Plans will detail out for all the items, the quality practices and procedures etc. to be followed by the bidder at site, during various stages of site activities starting from receipt of materials at site.
- 10.4. Bidder to note that all the cost involved in the various Inspection and testing as per approved QAPs /ITPs shall be deemed to be included in bidder’s quoted price. Bidder at no point of time shall be eligible to raise any extra claim on account of any requirement necessitated as a part of approval of QAPs/ ITPs.
- 10.5. At various stages of manufacturing, procurement, construction, as per approved QAP inspection/testing shall be carried out by Inspection Agency (BHEL / Third Party appointed by BHEL). The inspection agency shall be indicated in the quality plan and shall be as per the approved quality plan.
- 10.6. Bidder shall notify in writing to the Purchaser, at least two weeks (Ten working days) in advance of the date and the place at which the items will be ready for witnessing of inspection / testing by Purchaser. In case any postponement becomes necessary, the CONTRACTOR shall provide written notification at least 48 hours prior to the original scheduled date.
- 10.7. In case bidder find any deviation or non- conformity with respect to the agreed specifications, during manufacturing of the item and where corrective action is not feasible, the bidder shall report the same to Purchaser and / or PMC in the designated “Waiver / Deviation Request” format and seek prior approval from Purchaser /PMC before proceeding with the job.
- 10.8. Bidder after satisfying that all inspection requirements as per approved ITP and applicable specifications / documents have been taken care by Inspection Agency, shall submit copy of the Inspection Certificate and all Quality control records to Purchaser in requisite copies along with Statutory Certificates if any, duly endorsed by their Quality Control Manager.
- 10.9. Purchaser reserve the right to carry out surprise checks on all material either at manufacturer’s works or at site. In case of any rejection at site, the whole lot will be rejected and bidder shall get the entire lot replaced without any time or delivery implication to the purchaser.
- 10.10. Inspection Agency shall check the calibration status and traceability of all instruments used by the supplier, for testing. In case, TPIA uses their own instruments for testing purposes, similar certification shall be ensured.
- 10.11. Bidder shall submit, copy of each Inspection Certificate (IC) / Inspection Release Note (IRN) issued by Inspection Agency, along with all attachments mentioned therein.
- 10.12. No material shall be dispatched from the manufacturer’s works before the same is accepted, subsequent to pre-dispatch final inspection including verification of records of all previous test/inspections by authorized Inspection Agency and duly authorized for dispatch by issuance of Material Dispatch Clearance Certificate (MDCC).

## **11. MARKING, PACKING AND DESPATCH**

### **MARKING**

- 11.1. All items shall be marked (stamped/etched) in accordance with the applicable Code/standard/specification. In addition, the item code, if available, shall also be marked.
- 11.2. For ease of identification, the color of painted strip (wherever required) shall be as per the applicable standard.
- 11.3. Paint or ink for marking shall not contain any harmful metal or metal salts which can Cause corrosive attack either ordinarily or in service. Special items/smaller items shall have attached corrosion resistant tag providing salient features.

### **DESPATCH**

- 11.4. All the materials shall be divided into several sections for protection and ease of handling during transportation. The equipment shall be properly packed for transportation by hip/rail or trailer.
- 11.5. Special notations such as 'Fragile', 'This side up', 'Center of gravity', 'Weight', 'Owner's particulars', 'PO Nos.' etc. shall be clearly marked on the package together with other details as per purchaser order.
- 11.6. The equipment may be stored outdoors for long periods before installation. The packing shall be completely suitable for outdoor storage in areas with heavy rains/high ambient temperature, unless otherwise agreed.
- 11.7. The following minimum packing procedures shall be followed :
  - a. All items shall be dry, clean and free from moisture, dirt and loose foreign material of all kind.
  - b. All items shall be protected from rust, corrosion, and mechanical damage during Transportation, shipment and storage.
  - c. Rust preventive on machined surfaces to be welded shall not be harmful to welding and shall be easily removable with a petroleum solvent.
  - d. Ends shall be suitably protected, and the protectors shall be securely and tightly attached.
  - e. Each variety and size of item shall be supplied in separate packaging marked with the purchase order no., item code (if available), and the salient specifications.
  - f. Prior to shipment components of the unit shall be completely cleaned, Flange faces, threaded portion and other machined surfaces shall be protected by coating with easily removable rust

preventive. All the items shall be properly packed to prevent damage during transit damage, loading, unloading and storage.

**12. DOCUMENTATION:**

- 12.1. A master documentation list shall be prepared during kick off meeting identifying all the DOCUMENTS / DRAWINGS to be submitted by the bidder as part of documentation.
- 12.2. Vendor shall ensure submission of all documentation as per approved Master Document List.
- 12.3. The following minimum documentation shall be submitted by the vendor:
  - i. All PEBs GA drgs indicating base plates, anchor bolts connection detail, purlin, roof panels, wall panels, scope demarcation etc.
  - ii. BOM for Structural items.
  - iii. BOM of architectural items with detail of item wise make, model Quantity etc.
  - iv. Civil interface details
  - v. Welding specification charts
  - vi. Nondestructive Testing specifications
  - vii. Quality plan
  - viii. Painting schedule & procedure (shop painting & site painting) X
  - ix. Packing procedure
  - x. Erection drawings
  - xi. Site storage procedure
  - xii. Erection procedure
  - xiii. Testing procedure
  - xiv. 'AS BUILT' drawings
  - xv. Any other document, as deemed necessary BY BHEL, during detail engineering or erection – commissioning stage.

**13. REVIEW MEETINGS & KICK OFF MEETING:**

- 13.1. A kick off meeting shall be held at Purchaser's office, preferably within one week of receipt of order
- 13.2. An agenda shall be prepared for this meeting and would include the following points related to technical aspects.
  - a. Any clarifications required by the Bidder on purchaser's order.
  - b. Bidder Data Index & Schedule.
  - c. Bidder Data Review/approval modalities.
  - d. Sub-Bidder lists proposed by Bidder.
  - e. Utility requirements.

- f. List of input drawings required from BHEL
- g. Preliminary General Arrangement & layout drawings

13.3. As and when required, the bidder will be called upon to attend design co-ordination meeting / review meeting with the BHEL during the period of the Contract. The Contractor shall attend such meetings at his own cost at venues decided by BHEL.

#### 14. DELIVERY SCHEDULE (TENTATIVE) & CONTRACT PERIOD

14.1 Please find below the indicative delivery schedule for supply and site execution of PEBs. However, Same will be discussed and mutually agreed during Kick Off meeting.

##### i. Schedule of Delivery:

- a. Drawings/documents Submission : 7 days from date of commencement of the work (BHEL will furnish their approvals / comments within 7 days after submission of drawings/documents)
- b. Supply & E&C : vendor to supply & execute the total scope (Including clause no.14.1 (i (a)) of work within **three months** w.e.f. date of commencement of the work.

14.2 The entire work as detailed elsewhere in the Tender Specification shall be completed within **Three ( 3 )** Months from the date of commencement of work.

14.3 The date of commencement of work/contract period shall be the mutually agreed date between the bidder and BHEL engineer to start the work. In case of any ambiguity, the decision of BHEL engineer will be final.

#### 15. Sub Vendor List:

##### A.1 For structural steel:

1. It should conform to relevant Indian / International Standards.
2. It should be of reputed make of supplier to similar construction /infrastructure projects.
3. The Bidder should furnish documentary evidence to prove (1) and (2) above

##### A.2 Makes of Electrical and mechanical items

Item	Vendor	Remark
LED Lamp fixtures for indoor		
	BAJAJ	
	CGL	
	Havells	
	Philips	

## Technical Conditions of Contract (TCC) for “Pre -Engineered Closed Store Building”

	Wipro	
Lighting panel	Havels India Limited	Equivalent other make also may be proposed by bidder and prior approval shall be obtained from purchaser before finalization of make.
	Indo Asian Fusegear	
	STANDARD ELECTRICALS LTD	
	C&S Electric Limited	
	ABB Limited	
Cable Lugs	Dowell, Mumbai	Equivalent other make also may be proposed by bidder and prior approval shall be obtained from purchaser before finalization of make.
	Electromac Industries	
	Chenta Engineering Co	
	Forward Engineering Industries	
MCB	Any make-Model shall have mark of CE/VDE/UL/CSA/BIS with CML no.	Equivalent other make also may be proposed by bidder and prior approval shall be obtained from purchaser before finalization of make.
Axial flow Fans	Khaitan, Kolkata	Equivalent other make also may be proposed by bidder and prior approval shall be obtained from purchaser before finalization of make.
	Marathon Electric, Kolkata	
	CB-Doctor, Ahmedabad	
	Solyvent Flakt, Kolkata	
	Advance ventilation, Sonapat	
	Krugar, Singapore	
	TCH Nadi, Chennai	
	Almonard, Chennai	
Propeller Fan (Up to 2 HP)	Khaitan, Kolkata	Equivalent other make also may be proposed by bidder and prior approval shall be obtained from purchaser before finalization of make.
	Marathon Electric, Kolkata	
	CB-Doctor, Ahmedabad	
	Solyvent Flakt, Kolkata	

### 16. Payment Terms : Following break up of milestone payments shall be applicable:

S. No.	Description	Percentage payment of the full rate
1.	Pro-rata payment on supply of the fabricated & other materials as per approved BOQ	60%
2.	Pro-rata payment on erection of the fabricated & other materials as per approved BOQ	25%
3.	Final touch up painting, Inspection and Handing Over	15%

#### Note:

1. Bill shall be raised as monthly R.A.Bills/Final Bills based on completed milestones and as per relevant clauses of GCC & SCC.
2. Two or more milestones can be combined in one bill as per convenience of the contractor.
3. All statutory & other deductions shall be applicable as per GCC/SCC/TCC as the case may be.

## **17. Statutory Regulation**

**17.1 GST:** For All types of works excepting works covered under sl no 17.2

**17.2 BUILDING & OTHER CONSTRUCTION WORKERS (REGULATION OF EMPLOYMENT AND CONDITIONS OF SERVICE) ACT, 1996 (BOCW Act) AND RULES OF 1998 READ WITH BUILDING & OTHER CONSTRUCTION WORKERS CESS Act, 1996 & CESS RULES, 1998 and**

**INTER-STATE MIGRANT WORKMEN ACT, 1979 (IN CASE BIDDER ENGAGE MANPOWER FROM OTHER STATE)**

In case any portion of work involves execution through building or construction workers and/or inter-state migrant workers, then compliance to the above titled Acts as applicable shall be ensured by the contractor and contractor shall obtain license and deposit the cess under the Act. In the circumstances, it may be ensured as under:-

It shall be the sole responsibility of the contractor in the capacity of employer to forthwith (within a period of 15 days from the award of work) apply for a license to the Competent Authority under the BOCW Act and/or ISMW Act as applicable and obtain proper certificate thereof by specifying the scope of its work. It shall also be responsibility of the contractor to furnish a copy of such certificate of license / permission to BHEL within a period of one month from the date of award of contract.

It shall be the sole responsibility of the contractor as employer to ensure compliance of all the statutory obligations under these acts and rules including that of payment / deposit of cess as per the applicability under above referred Acts within a period of one month from the receipt of payment.

It shall be the responsibility of the sub-contractor to furnish the receipts / challans towards deposit of the cess together with the number, name and other details of beneficiaries (building/Inter-state Migrant workmen) engaged by the sub-contractor during the preceding month.

It shall be the absolute responsibility of the sub-contractor to make payment of all statutory payments & compensations to its workers including that is provided under the Workmen’s Compensation Act, 1923.