



An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

MATERIALS MANAGEMENT

TITLE	Phone: +91 431 257 7876 Email : prateekkumar@bhel.in
CORRIGENDUM for NIT_47047	

	Reference Number: Enquiry 1801900561	Enquiry Date: 20.06.2019	Due date for submission of quotation: 19.08.2019
You are requested to quote the Enquiry number date and due date in all your correspondences. This is only a request for quotation and not an order			

Details of Corrigendum-1
1. The Due date for submission of TENDERS has been extended from 19.08.2019 to 29.08.2019
All other terms and conditions as published in the NIT_47047 remain unaltered.

BHEL commercial terms & conditions with Price Bid formats and all annexure can be downloaded from BHEL web site http://www.bhel.com or from the Government tender website http://tenders.gov.in (public sector units) Bharat Heavy Electricals Limited) under enquiry reference " 1801900561 "	
Tenders should reach us before 14:00 hours on the due date Technical bid will be opened at 14:30 hours on the due date Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present.	Yours faithfully, For Bharat Heavy Electricals Limited



VOLUME II
SUB-SECTION - 2.19.0
CRANES & HOISTS

1.0.0 GENERAL

This part of the specification covers the requirements for Cranes and Hoists.

This section of the specification shall be read in conjunction with other sections of the specification as appropriate and the equipment offered shall meet the requirements as spelt out therein. The system shall comprise of cranes and hoists.

2.0.0 SCOPE OF SUPPLY

The scope of supply shall have to meet all the requirements to make the system complete as per specification and for satisfactory performance guarantee of the complete crane and hoist.

Crane and Hoist shall be provided in the following area considering the design requirement of crane and hoist.

Crane:

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- ~~a) Two number of EOT crane for Power House building.~~
- ~~b) GIS building~~
- ~~c) BFP and its auxiliaries and its drives~~
- ~~d) CW pump house~~
- ~~e) Sea water intake pump house~~
- ~~f) Screens and gates~~
- ~~g) Desalinated water pump house~~
- ~~h) Filtered water pump house~~
- ~~i) Sea water outfall pump house~~
- ~~j) Fuel oil pump house (unloading and forwarding)~~
- ~~k) Air Compressor room (Instrument and service air)~~
- ~~l) Ash Slurry pump & ash water pump house~~
- ~~m) Recovery water pump house~~
- ~~n) Conveying air compressor room~~
- ~~o) Ash clarified water tank and pump house~~
- ~~p) Sea water tank and ash slurry pump house.~~
- ~~q) One number of 15T EOT crane for Store~~
- ~~r) One number of 10T EOT crane for Workshop~~
- ~~s) DG set building~~
- ~~t) Any other areas as applicable~~

Hoist :

- ~~a) Boiler area(ID fan, FD fan, PA fan, Boiler circulation pump, coal feeder area, Air preheater, seal air fan)~~
- ~~b) ESP~~
- ~~c) Bottom ash silo, fly ash silo and mill reject ash silo~~
- ~~d) Mill reject compressor~~
- ~~e) Power house building(Vacuum pumps, CEP, DMCW pumps, ACW pumps, butterfly valves at condenser inlet and outlet, condenser water box, Lube oil unit, control oil unit and central lube oil system)~~
- ~~f) Electro Chlorination building~~
- ~~g) Desalination building~~



- ~~h) Gravity filtered pipe gallery~~
- ~~i) Coal Handling System (Crusher House, Transfer towers, Head/Tail end of conveyors, Bunker building, flap gate, flow divider, junction tower, ERH, etc.)~~
- ~~j) Water treatment plant, Effluent treatment plant and Sewage treatment plant~~
- ~~k) Sea water intake pump house stop-log gates and screens.~~
- ~~l) HVAC Building.~~
- ~~m) AC plant,~~
- ~~n) Fuel Oil Pump House,~~
- ~~o) ETP~~
- ~~p) Air Washer Room~~
- ~~q) Chemical house~~
- ~~r) Hydrogen generation building~~
- ~~s) Any other areas as applicable~~

2.1.0 Crane

~~Crane shall be provided complete with all accessories as specified under, but not limited to the following:~~

- ~~a) Box type steel bridge girder complete with bridge rails, end stoppers, walkway platforms across the span of either side of crane and access ladders for double girder crane, (cabin for TG hall EOT crane, etc)~~
- ~~b) End carriage complete with minimum two (2) nos. of wheels for each end carriage and access ladders from gantry platforms, spring buffers etc.~~
- ~~c) Service cage with all protections and access ladder, for maintenance of DSL's.~~
- ~~d) Crab (trolley) with wheels and drive equipment for hoists and trolley complete with motors, gear reducers with Suitable arrangement for collection of oil spillage, brakes, limit switches, couplings, rope drums, wire ropes, main hook, auxiliary hook, end stoppers etc.~~
- ~~e) Set of crane longitudinal drive equipment complete with motor, gear reducers with Suitable arrangement for collection of oil spillage, brakes, shaft bearings, gear pinions, and limit switches.~~
- ~~f) EOT crane runway gantry rails complete with fixtures comprising of fixing clamps (machined to suit rail flange contour), bolts, nuts etc for effective crane longitudinal runway length, end stoppers specified.~~
- ~~g) Brakes for all motion, Anti-collision switch for TG hall EOT crane and limit switch for over hoisting/lowering, CT and LT motion.~~
- ~~h) Runway conductors & bridge cross conductors with accessories.~~
- ~~i) Crane shall be operated through Pendant Push Button station. TG hall EOT crane shall be operated from cabin as well as Pendant Push Button station.~~
- ~~j) Crane buffer stops shall include the buffers on the crane itself. The stoppers to be fixed on the building frame and wheel stoppers shall be provided at either end of the crane runway.~~
- ~~k) Lifting beam, loose slings and cradle shall be provided as required.~~
- l) The complete electrical equipment basically including:
 - Load break changeover switch mounted on the building structure.



- Cabling between the load break switch and the down shop leads.
- Down shop leads and current collector for crane.
- Load break switch on the crane bridge walkway
- Protective and control switch gear
- Motors
- Festoon cable system for crab
- Master controllers
- Pendant controller (where specified)
- Wireless remote control (where specified)
- Indicating lamps, push buttons.
- Lighting panel, lighting fixtures, Cabin fan, light, alarm/bell, socket outlets etc.
- All power and control cables.
- Cable trays & supports, Conduits, Cable glands, lugs & clamps etc.
- Crane earthing system
- Variable Voltage and Variable Frequency (VVVF) control for speed control of crane motors.
- Electronic Anti-collision device

2.2.0 Hoist

- a) Electrically operated trolley suspended, mono girder type hoists complete with drive motor.
- b) Hoisting cable, hoisting block and hooks complete with drive motor.
- c) Limit switches to prevent over travel while hoisting and lowering of the hook.
- d) Limit switches to prevent over travel of hoist assembly at both ends.
- e) Runway conductors for feeding power to trolley assembly.
- f) Pendant control stations suspended from hoist.
- g) Monorails for the travelling of hoist assembly.
- h) Brakes for hoist and trolley motion.
- i) Protective and control switch gear
- j) Motors
- k) All power and control cables including Festoon cable system
- l) Conduits, Cable glands, lugs & clamps, earthing etc.

2.3.0 Lifting tackles

The crane installations shall be supplied with all the ropes (slings), lifting beam (if required), chains, shackles etc. needed for maintenance of the plant equipment/component.

The minimum scope of supply per handling equipment (crane & hoist) for each lifting tackle includes the following items:

- Two (2) nos. single ropes each with 2 eyes at the ends, each rope 2 m long
- Two(2) nos. single ropes each with 2 eyes at the ends, each rope 4 m long
- Four (4) nos. shackles.

The load-bearing capacity of the ropes and shackles must be suitable for the relevant crane & hoist.

The maximum tension in the rope shall not exceed 1/8 of the calculated braking capacity of the rope. The ropes shall be of the stranded type, and galvanized wires shall be used.

The eyes of the single ropes must be secured with compression fittings. The length of the eyes must be at least 15 times the nominal diameter of the rope.

In special cases, where safe lifting of the relevant component is not certain, specially-made devices shall be provided. At least two (2) of these shall be provided in each individual case.



For each installation a list shall be submitted, showing the number, type, nominal load-carrying capacity and strength characteristics of the materials used. In addition, factory and acceptance certificates shall be submitted for all ropes (slings) and materials.

3.0.0 DESIGN REQUIREMENTS

- a) ~~Cranes & hoist shall be provided in the areas where handling of the equipment /component to be lifted for maintenance weighing above 300 kg..~~
- b) ~~The cranes and hoist designed to operate at 100% safe working load and subjected to over load test at 125% of rated load.~~
- c) ~~The Turbine Building EOT crane is required to handle the heaviest component other than the generator stator. The main hoist is used for maintenance of the main steam turbine and electric generators, generator coolers, condensate pumps, lube oil units and other equipment located in power house building. The auxiliary hoist is used to handle smaller components more rapidly.~~
- d) Cranes and hoist shall be designed considering the ambient temperature of 50 °C.
- e) The cranes and hoist would be designed considering for hazardous area or non hazardous classification as required.
- f) Crane and hoist control shall be from Variable Voltage and Variable Frequency (VVVF) drive. Creep speed shall be achieved through VVVF drive for cranes.
- g) The hoists shall be provided with flexible trailing cable system.
- h) Manual Hoists shall be operated at floor level by means of endless chain.
- i) Specification for the gantry/semi gantry crane shall be referred from the single or double girder crane (based on the type of crane)
- j) ~~The CW Pump house EOT crane shall be rated for the heaviest component to be handled in the CW Pump house.~~
- k) ~~The lift for the CW Pump house EOT crane shall be based on lifting the circulating water pump out of the pump suction flume onto the maintenance floor area.~~
- l) ~~Layout Considerations: The span of EOT cranes shall be derived based on the building layout with considerations to clearances and hook approach to handle all equipments.~~
- m) ~~At crane girder level, Access walkway of minimum 500 mm width with safety handrails on one side shall be provided along the full span length of the cooling water building crane and other double girder cranes except TG hall EOT crane.~~
- n) ~~At crane girder level, Access walkway of minimum 500 mm width with safety handrails on both side shall be provided along the full span length of the TG hall EOT crane.~~

~~3.1.0 Sizing Criteria~~

- a) ~~The TG hall crane capacity shall be taken as 10% more than the single heaviest equipment/component to be lifted. And other cranes and hoists capacity shall be selected by considering 20% margin over the weight of the component to be lifted.~~

b) ~~Crane and hoist selection criteria~~

~~Crane shall be provided in the areas where the handling of the equipments / components shall have requirement in both transverse and longitudinal direction. Otherwise, hoist shall be considered. Curved monorail with hoist shall also be considered, if the equipments / components are located inline with the monorail. Height of the building shall be finalized considering the required lift over other equipments, piping etc.~~

Type of Handling equipment	Crane & Hoist's Safe working load (SWL)
CRANE	-
Double Girder EOT Crane	> 7.5T
Single Girder over head / Under Slung cranes	≤ 7.5T
HOIST	-
Electric hoists	≥ 1000 Kg
Manual hoists with trolley	> 300 Kg and < 1000 Kg

~~**Note:** Electrical hoists shall be provided at all equipments / components location which has a lift more than 10 m (for all >300 kg and < 1000 kg). Hook shall be provided for all possible maintenance location for the weight less 300kg. Hoists shall also be provided if required specifically as mentioned in respective section..~~

~~c) Auxiliary hoist shall be provided, for TG hall EOT crane and CW pump house EOT crane. AH capacity shall be rated for a minimum capacity of 20% from the main hoist capacity or 20% more than the single heaviest equipment/component to be lifted whichever is higher.~~

d) For guidance purposes the following crane speeds shall be considered:-

	Double girder Cranes	Single Girder Crane
• Main Hoist	1m/min (for TG hall EOT crane) 2m/min (for other cranes)	2.5 to 5m/min
• Aux Hoist (if applicable)	5m/min	N/A
• Trolley Travel	10 m/min	10 to 15 m/min
• Bridge Travel	15 m/min	15 m/min
• Creep speeds	10% of operating speeds for all motion	

e) Speeds for the electric hoist shall be

- Hoisting speed 3.5 m/min to 5 m/min
- Travel speed 5 m/min to 10 m/min
- Creep speeds 10% of operating speeds for all motion

**4.0.0 DOCUMENTATION****4.1.0 Drawings, data / documents to be submitted along with bid**

- 4.1.1 Completely filled up technical schedules and data sheets of tender documents
- 4.1.2 Crane clearance diagram showing various dimensions/data. (Including highest crane hook position, safe working load etc.)
- 4.1.3 General Arrangement Drawing of the E.O.T. crane assembly.
- 4.1.4 Wheel Loading Diagram.
- 4.1.5 Detailed drawing showing the features of the components of the Crane Bridge and trolley.
- 4.1.6 A detailed write-up on the crane control system. Drawings and data sheets showing the particulars of the controllers, switches, contactors, relays, other control devices and limit switches.
- 4.1.7 General arrangement drawing of protection, control and lighting panels.
- 4.1.8 Electrical /Control Schematic diagrams.
- 4.1.9 Equipment arrangement drawing.
- 4.1.10 Quality Assurance Plan /Inspection and Test Plan (ITP).
- 4.1.11 Field Quality Plan
- 4.1.12 List of tests to be conducted at shop and at site.
- 4.1.13 Testing procedures.
- 4.1.14 A comprehensive write-up and /or brochure on the details of the manufacturing facilities and the test facilities in the shop of the supplier..
- 4.1.15 Detailed engineering, manufacturing, delivery, erection and commissioning schedule and PERT chart.
- 4.1.16 Details of similar job executed in last five years.
- 4.1.17 Lubricants list (with quantities for initial fill and make-up).
- 4.1.18 List of erection and commissioning spares for each crane.
- 4.1.19 List of recommended O&M spares for 3 years normal operation.
- 4.1.20 List of Special Tools & Tackles.
- 4.1.21 List of makes of bought out items.
- 4.1.22 End user certificates.

4.2.0 Drawings, data / documents to be furnished by the successful bidder

	Description	Approval Category
4.2.1	Technical data sheets	A
4.2.2	Crane clearance diagrams showing various dimensions.	A



	Description	Approval Category
4.2.3	Drawings showing general arrangement, clearance requirement, assembly, cross sectional data and material of construction for : a. E.O.T. Crane Unit b. Bridge Assembly and Components c. Bridge and long travel and Wheel Assembly d. Trolley e. Trolley Wheel Assembly f. Drive and Transmission Unit for Bridge Travel, Trolley Travel, and Hoist g. Suspension Unit for Hook Block h. Main Hook Block i. Protection, control and lighting panels. j. Electric hoist k. Manual hoist	A
4.2.4	Drawings on runway rails, fixtures to fix runway rails with the runway main girder and stops etc.	A
4.2.5	Design calculations of the following : Bridge girder, Rope drum, Machinery Shafts, Gearbox excluding proprietary items, Motor rating, Brake capacity, Bearing life, Wheel loading and current collector, angle iron conductor sizing.	A
4.2.6	Leaflets on proprietary items such as motors, brakes, gear box, coupling etc.	A
4.2.7	Electrical documents as listed in respective sections.	A
4.2.8	Material test certificates, including those for the Hooks and wire rope.	I
4.2.9	Report on various tests at shop and at site and certificates of approval by authorised authority for all flame proof components and test reports for the same if required.	I
4.2.10	Quality plans/ Inspection test plan and Field Quality Plan	A
4.2.11	Erection Manual	I
4.2.12	Operation and Maintenance Manuals	I
4.3.0	To be submitted after the award of contract: • Completely filled in technical Schedules. • Dimensional General arrangement drawing for Panels, Main Switch, Master controller etc. • Schematic wiring diagram for Panels. • Dimensional General arrangement drawing for Motors, Brakes etc • Characteristic curves for Motors. • Load requirement for each crane / hoist • VVVF Control Features. • Control write-up for tandem operation. • Catalogues for the all the electrical items such as cables, brakes, limit switches, relays, meters, etc. • Quality Plans for agreed list of equipments.	



- Type test certificates.
- Sizing calculation for DSL.
- Sizing calculation for Motors & Brakes
- Sizing calculation for Cables.
- Lighting arrangement.
- Earthing layout drawing.
- Cable routing drawing.

4.4.0 Any other drawings required for review during the detailed engineering stage, same shall also be submitted by contractor.

CORRIGENDUM

The following may be noted for the subject Tender

- Hoist and Cranes(UHC) shall have VVFD as mentioned in Clause 3.0.0. of page 4 of 8 of the special project requirement section 5.0.
- **Hoist up to 20 tons.**
Supply of all the electrical handling equipment shall be of VVVD drives. However, vendor can select any specific speed in the range of **3.5 M/Min. to 5.0 M/Min** as mentioned in clause 3.1.0 of volume II, sub section 2.19.0(file is attached).
- **Hoist above 20 tons.**
Supply of all the electrical handling equipment shall be of VVVD drives. However, vendor can select any specific speed in the range **1.5 M/Min. to 2.0 M/Min.**