

## NTPC DADRI – 2X490 MW FLUE GAS DESULFURIZATION SYSTEM

### TECHNICAL SPECIFICATION:

ELECTRICALLY OPERATED WIRE ROPE HOIST (EOWRH)  
WITH MOTOR DRIVEN TROLLEY & ALL ACCESSORIES  
AND WITH MONORAIL I BEAM NPB 600 OR ISMB 600  
FOR HOIST.

CUSTOMER: NATIONAL THERMAL POWER CORPORATION LIMITED



Ref: DAR: EOH: 004: REV 00

Prepared	Checked	Approved
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#### **CONTENTS**

1.0	INTENT OF SPECIFICATION
2.0	SCOPE
3.0	CODES AND STANDARDS
4.0	DESIGN REQUIREMENT
5.0	FEATURES OF CONSTRUCTION (MECHANICAL SYSTEM)
6.0	ELECTRICAL SYSTEM
7.0	EARTHING
8.0	MAKE OF COMPONENTS
9.0	PAINTING PROCEDURE
10.0	WARRANTY
11.0	STARTUP & COMMISSIONING SPARES
12.0	ERECTION, TESTING AND COMMISSIONING
13.0	DOCUMENTS DURING BID STAGE
14.0	DOCUMENTS ON PLACEMENT OF ORDER
15.0	INSPECTION
16.0	O&M MANUAL
17.0	PACKING
18.0	NAME PLATE

#### **1.0.0 INTENT OF SPECIFICATION**

This specification covers design, manufacture, inspection, testing at bidder's and/ or his sub vendor's work(s), packing, and transportation of HOIST along with accessories and Monorail I beam for Hoist etc. which is to be furnished in the Flue Gas Desulphurization plant.

- a. It is not the intent to specify herein all the details of design and manufacture. However, the equipment 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 Purchaser/ Customer, who will interpret the meaning of drawings and specifications and shall be entitled to reject any work or material, which in his judgment is not in full accordance herewith.
- b. The requirement(s) specified under different sections of this specification shall be considered while quoting for this tender. In case of variance between sections, the requirement of CUSTOMER TECHNICAL SPECIFICATION shall prevail. NTPC DADRI contract specification provided as Annexure III to the specification & shall be referred strictly.
- c. The bidder shall be deemed to have understood completely all the tender drawings and documents and quoted accordingly.
- d. The bidder has to note carefully the parameters, estimated capacities of equipment indicated and the tender drawing in the specification are only for guidance of the bidder. The system shall be designed as per relevant standards/ codes and exact capacities and quantities are to be estimated by the bidder. All such estimations and design calculations shall be submitted for Purchaser's approval.
- e. Contract shall be unit rate basis for this package. Variations in quantities during contract stage shall be settled on basis of unit rate quoted by the bidder in the tender. During contract stage, quantities of various items of BOQ may vary to any extent and same unit rates will be applicable.
- f. Deviation: There shall preferably be no deviation on technical specification. In case of any deviation, the bidder shall indicate separately the deviations clause-wise with respect to the specification in the 'Schedule of Deviation' given in Annexure-I. Deviations in any other form including clarifications / assumptions / etc will not be considered and it will be construed that the bid conforms strictly to the specification.
- g. Compliance to 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 start up and operating conditions.
- h. All accessories, items of work, though not indicated but required to make the system complete for its safe, efficient, reliable and trouble free operation and maintenance shall also be in supplier's scope unless specifically excluded.

## NTPC DADRI (2X490MW) FGD PROJECT

### TECHNICAL SPECIFICATION FOR EOWRH

#### 2.0.0 **SCOPE:**

This specification covers the design, material constructional features, manufacture, testing, inspection, packing and supply of electrically operated hoists assembly, with cross travel complete in all respect including control box, flexible trailing cable, cable trolleys, drag chain, auxilliary girder, FUSE-SWITCH unit, Monorail I beam for Hoist etc. The assembly shall be complete in all respect ready for erection & commissioning.

#### 2.1.0 **APPLICATION**

The electrical hoist and trolley is meant for handling Vacuum belt filter.

#### 2.2.0 **HOIST & MONORAIL I BEAM DATA:**

S.N	Capacity (Tonnes)	Quantity (number)	Speed of the hoist (meter per minute)	Speed of cross travel (meter per minute)	Height (Floor to Botto m of Beam)  (m)	Head Room  (mm)	Length of cross travel (m)	Radius of travel in (m)	Monorail I beam for Hoist & Length  (ISMB/NPB & meter)
1	10	1	6 meter/min. <b>(Maximum)</b>	15 meter/min. <b>(Maximum)</b>	20	<b>Vendor to Specify</b>	10	NA	NPB 600 or ISMB 600, Length 10 meter. <b>(shall be part of Supply of Hoist Manufacturer)</b>

S. No	Description	Unit	EOWRH capacity, Height of Lift, Length of travel, As Per Spec.
1	EOWRHH assembly for lifting & cross travel including brakes, drum with ropes suitable for required height of lift, electrical control panel, Pendant PB with control cable with link chain suitable against each crane capacity, Height (H), Length of travel (L)	ST	To suit
2	Fuse with enclosure suitable for outdoor installation, wall mounted Per Crane	NO	1
3	Trailing flexible copper cable for power supply	MR	To suit
4	Galvanized link drag chain	MR	To suit
5	Cable trolley assembly	ST	To suit
6	Auxiliary girder assembly for trailing cable for a cross travel length	MR	To suit
7	Rain hood for Hoist motor, cross travel motor and control box per Hoist	ST	1
8	Grease gun with grease	NO	1
9	10% Lubricant	ST	1
10	Monorail I beam for Hoist	MR	To suit

**3.0.0 CODES AND STANDARDS**

The applicable codes and standards are as given below (with latest amendments if any) equivalent international standards.

- |       |  |  |
|-------|--|--|
| 3.1.0 | Electrical wire rope hoist   | : IS 3938  |
| 3.2.0 | Service class  | : IS 807   |
| 3.3.0 | Drum, Sheave   | : IS 3938  |
| 3.4.0 | Gears  | : IS 3681, IS 7403                                       |
| 3.5.0 | Rope   | : IS 2266  |
| 3.6.0 | Hook   | : IS 3815  |
| 3.7.0 | Bearings   | : IS 6455, IS 6457                                       |
| 3.8.0 | Grease nipple  | : IS 4009  |
| 3.9.0 | Motor  | : IS 325, IS 4691, IS 4729                               |
| 3.10  | Cables   | : IS 694 Part I&II, IS 3961<br>IS 1554, IS 9968, IS 6380 |
| 3.11  | Structural materials   | : IS 2062  |
| 3.12  | Earthing   | : IS 3043  |
| 3.13  | Colour shade   | : IS 5   |
| 3.14  | AC Contactors  | : IS 13947 Part - IV                                     |
| 3.15  | HRC Cartridge fuse links upto 650V   | : IS 9224  |
| 3.16  | Heavy duty air brake switches and composite units for air brake switches and fuses for voltage not exceeding 1000V | : IS 4064  |
| 3.17  | General requirements for switchgear and control gear for voltage not exceeding 1000V                               | : IS 4237  |



- 3.18 Control switches for voltage upto and including 1000 V AC, 1200 V DC (Part-I&II) : IS 6875
- 3.19 The offered Hoist shall comply with all the latest statutory regulation and safety code/standard applicable. Nothing in this specification shall relieve the vendor of his responsibility.

#### **4.0.0 DESIGN REQUIREMENT**

Electrical hoists and trolley shall be complete with hoisting and cross travel motor, wire rope drum, wire rope, hook, gear box for CTs hoist wheels with Trolley necessary gearing, sheaves, Brake Electro mechanical type with asbestos lining for hoisting & cross travel, guides, weather and dust proof pendent push button station, & control panel, all wiring, 4 core trailing cable for power supply connection galvanised drag (link) chain with complete supporting arrangement, pendent cable, limit switches, earthing terminals and other accessories to make system complete and ready for erection & commissioning. The hoist assembly shall be fully balanced. Counter weight, if any, required shall be supplied as a part of the system. Limit switches shall be provided for over hoisting, over lowering and for cross travel limits at both extreme position.

The supplier shall provide 63A fuse switch unit (FSU) with enclosure designed for IP 55 degree of protection, to receive the power supply. The FSU shall be provided with crimping type ATC lug to receive owner's Aluminium unarmoured power cable. The FSU shall be located 5meters away from the hoist. Control supply shall be 110V AC, 50Hz and the same shall be derived from 3ph, 415V, and 50Hz supply provided at 63A FSU. Suitable earthing terminal shall be provided in the FSU enclosure for terminating the earth conductor of the flexible trailing cable. All outdoor Electrical equipments shall be suitable for IP 55 Degree of protection.

#### **5.0.0 FEATURES OF CONSTRUCTION (MECHANICAL SYSTEM)**

##### **5.1.0 DRUM**

Rope drum shall be either cast/seamless/welded to sustain concentrated loads resulting from the rope pull. Drum shall be machine grooved right or left or both with grooves of a proper shape to suit the ropes used.

Drum shall accommodate all the length of the rope required for the lift plus two dead wraps at each anchor point, without over lapping. The hoist mechanism shall consist of a grooved rope drum driven by electric motor through gears. Each end of the rope shall be anchored to the drum in such a way as the anchorage is readily available for maintenance. Each rope shall have two (2) full turns of the drum when the hook is at its lowest position and one (1) spare groove when the hook is at its highest position. The leading rope taken by the drum should not slope sideways when slack and it should not be caught between the gear wheel.

##### **5.2.0 SHEAVES**

Rope sheaves shall be of rolled or cast steel. Grooves shall be machined to the proper shape

## **NTPC DADRI (2X490MW) FGD PROJECT**

### **TECHNICAL SPECIFICATION FOR EOWRH**

for the rope used. Sheaves shall be equipped with sheave guards to retain the rope in groove. Sheaves shall be fully guarded so that the rope cannot come off.

#### **5.3.0 GEARS**

Gears shall be cut from quality alloy steel of chromium, nickel. Pinions shall be of heat treated alloy steel.

#### **5.4.0 BEARINGS**

Bearings shall comply with relevant IS/BS. Depending upon the capacity and loading conditions the manufacturer shall design suitable grease lubricated or oil lubricated bearings.

#### **5.5.0 ROTATING AND STATIONERY SHAFT**

Shafts and axles shall be of 080 M40 as per BS 970

#### **5.6.0 LUBRICATION**

The hoists shall be supplied with all required lubricants, **one number** grease gun shall be supplied.

#### **5.7.0 HOIST ROPE**

Hoist ropes shall be of Pre-formed type, hemp cored, regular lay 6/36 construction with a breaking strength of 160 -175 kgf/ sq. mm. The rope shall be of sufficient length so that two full wraps shall remain on the drum at the extreme low position of the hook. Number of falls shall be FOUR. Braking loads for the hoist rope shall not be less than six times the calculated load in the ropes at the drum, based on rated load on hook plus the weight of the bottom block plus the weight of the rope. Hoisting rope shall conform to IS 2266. The rope shall be hot dip galvanised. The rope shall be free from kinks and shall be continuous.

#### **5.8.0 HOOK**

Hooks made of EN-8 material shall be solid, forged, heat treated, high tensile steel of tough construction and shall be provided with a standard depress type safety latch. It shall have swivels and operate on bearings with hardened race. Lock to prevent hooks from unscrewing shall be provided.

#### **5.9.0 BRAKES**

Hoisting motor and trolley motor shall be equipped with Electro Mechanical type with asbestos lining. The brakes shall apply when either the motor starter or the main power switch is in OFF position or in the event of "power failure". The braking capacity of the brakes shall be 150% of the rating of the hoist.

#### **5.10.0 ROPE GUIDE**

Rope guides shall have wear resistant property, prevents slack rope, and retains wire rope in the barrel grooves.

#### **5.11.0 LINK (DRAG) CHAIN**

Hot dip Galvanised Link (drag) chain shall be provided for the Flexible Trailing cable, to avoid direct loading on the cable.

#### **5.12.0 AUXILIARY GIRDER FOR TRAILING CABLE**

Auxiliary girder system shall be provided for the support of Flexible Trailing cable. The Trolleys for the trailing cable shall be supported by the Auxiliary Girder. The Auxiliary Girder will be supported by the main beam (main beam will be supplied by the Purchaser). The hoist supplier shall provide obligatory support materials to support the Auxiliary Girder on the main beam at an interval not exceeding 750mm. complete structural materials required for Auxiliary Girder system shall be included in the scope of supply of the hoist supplier.

#### **5.13.0 MONORAIL BEAM FOR HOIST**

The Monorail Beam for Hoist shall be part of supply of Hoist Manufacturer. The supply of Monorail beam shall be in a Single pieces for required Length (10 meter).

#### **6.0.0 ELECTRICAL SYSTEM**

Electrical system comprises of 63A Fuse Switch Unit, Control panel, Pendent Push Button Station, Trailing cable, Pendent cable, Hoist & Cross travel motors with electro mechanical brake etc., to make the system complete.

#### **6.1.0 CONTROL PANEL**

**6.1.1** Control panel shall be provided to house the electrical components like fuses, contactors, over load relays, isolators, switches, control supply transformers etc along with necessary wiring. The components shall be clearly identified by labels. The panel shall be made of sheet steel of minimum 2mm thick CRCA sheet steel and shall be dust and vermin proof, suitable for outdoor condition. The control panel shall be designed for IP 55 degree of protection. Adequate number of DOUBLE COMPRESSION type cable glands (heavy duty) of brass with nickel plating and Annealed Tinned Copper lugs shall be provided with dummy plugs. The door, removable cover plates and metal- to-metal joints shall be fully neoprene gasketed.

**6.1.2** The control panel shall be pre treated in seven tank process and epoxy painted. The paint colour will be informed during drawing approval.

**6.1.3** Dry type step down control supply transformer 415V/110V AC shall be provided to derive control supply for starter operation and indication. The transformer shall have minimum class 'B' insulation. The rating of the transformer shall be decided based on maximum power consumption plus 25% margin. The transformer shall meet IS 12021

#### **6.2.0 MOTOR**

The motor shall meet IS 325 or equivalent international standards. The motor shall be designed for frequent reversal, braking and acceleration. Frequency of reversal shall be minimum 125 times/hour. The motor shall be rated for S4 duty 40% cyclic duration factor. Maximum continuous rating shall have at least 10% margin over maximum load demand including voltage and frequency variations, temperature rise and other variations. The body shall have two earthing points on opposite sides.



#### **6.2.1 ENCLOSURE**

The motor shall be provided with an enclosure fully meeting the requirements of IP 55 as per IS 4691 meant for outdoor service. In addition rain-hood shall be provided for the motors. The motor shall be Totally Enclosed Fan Cooled (TEFC) type.

#### **6.2.2 INSULATION AND WINDING**

Motors shall have minimum class "B" type insulation. The winding shall be suitable for successful operation in hot, humid, & tropical climate with the ambient temperature of 50 degree centigrade. The temperature rise shall be limited to 70 degree C (by resistance method) over an ambient of 50 degree C. The insulation shall be given fungicidal and tropical treatment as per IS 3202.

#### **6.2.3 MOTOR FRAME**

The frame shall be cast and rigid.

#### **6.2.4 DIRECTION OF ROTATION**

The motors shall be designed for both directions of rotation.

#### **6.2.5 TERMINAL BOX OF MOTORS**

The terminal box shall be weather and water tight and suitable for outdoor service, having a degree of protection of IP 55. It shall be provided with removable front cover for making connections. Neoprene gaskets at cover joints shall be provided. The terminal box shall be suitable to withstand 31 MVA for 0.25 seconds without damaging the box with fuse protection. Nickel-plated brass double compression cables glands and ATC lugs shall be provided to receive the power cables.

#### **6.2.6 VIBRATION**

The motor vibration and noise shall be within the limits specified in IS 12065 and IS 12075. The noise level shall be limited to 85 dB when measured at a distance of 1.5m from the Hoist assembly.

#### **6.3.0 SWITCHES**

Heavy-duty power switches with quick make and brake mechanism meeting relevant IS requirements shall be provided. The switches shall be adequately rated to get complete protection even under abnormal operating conditions.

#### **6.4.0 CONTACTOR**

6.4.1 All Contactors shall be suitable for DOL application of full voltage with coils suitable for the control voltage provided by the supplier. Contactor construction shall be rugged and such as to avoid ingress.

6.4.2 For control purpose, only Auxiliary contactors shall be used. Relays are not acceptable in place of Auxiliary Contactors.

6.4.3 The power contactors shall have Mechanical interlocking in addition to Electrical interlocking so that at any point of time only any one of the two Power contactors (either Up or Down, Left or Right) will be energized.

#### 6.5.0 **THERMAL OVER LOAD RELAYS**

Thermal over load relays wherever provided shall be ambient temperature compensated with suitable setting ranges. The relay shall be provided with a door mounted hand reset push button. The O/L relay shall have inbuilt single phasing protection as built-in feature.

#### 6.6.0 **FUSES**

6.7.0 Only HRC fuses of plug-in type with Class-4 AC duty shall be provided.

6.7.1 Fuse base shall be rugged. Adequate shrouding shall be provided for live accessible parts and it shall be possible to replace any fuse without damages of contacts when the circuit is alive.

#### 6.7.0 **INDICATING LAMPS**

LED type indicating lamps of low watt consumption with suitable built-in series resistor shall be used. LED and lenses shall be inter-changeable and easily replace- able from the front. The indication lamps shall be properly shrouded so as to prevent the dust and water entry. Indicating lamp shall be provided for "Hoist motor ON", "CT motor ON", "Hoist motor TRIP", " CT motor TRIP", "Supply ON" etc.,

#### 6.8.0 **WIRING**

The control panel wiring shall be complete in all respects and ready for connection of external power for terminating external cables. Necessary cable glands alongwith suitable terminal blocks and lugs to receive trailing cable and pendent push button cable shall be provided. The cable glands, lugs and terminal blocks shall not be supplied loose. Point to point wiring shall be adopted. Not more than two wires shall be terminated at each terminal. Wiring shall be neatly laid out and bunched together suitably. The wiring shall be done with min. 2.5 sq.mm multistranded copper, PVC insulated 650V/1100V wires.

#### 6.8.0 **TERMINATION**

6.8.1 All power and control wires shall be terminated on terminal block/component using crimping type tinned copper lugs/connectors.

6.8.2 Terminal block shall be used for control wiring. The terminal blocks shall be complete with insulated barriers, terminal studs, washers, nuts, lock nuts and identification strips with terminal numbering.

#### 6.9.0 **PENDANT PUSH BUTTON STATION**

6.9.1 The Pendant Push Button station shall have the following Push Buttons.

Hoist, Lower, Forward, Reverse & Emergency Stop. The Emergency Pus Button shall be Lockable type.

6.9.2 The Pendant Push Button station shall have the following LED type Indicating lamps. SUPPLY ON, HOIST MOTOR ON, CT MOTOR ON, HOIST MOTOR TRIP, CT MOTOR TRIP.

6.9.3 The Pendant Push Button station shall be supported from the Control Panel with hot dip galvanized Link Chain.

- 6.9.4 The Pendant Push Button Station shall be connected to the Control Panel using multi-core copper flexible control cable of 10m length.
- 6.9.5 The Enclosure of Pendant Push button station shall be designed for IP 55 degree of protection.
- 6.9.6 Push button shall be spring return type with 2NO+2NC self reset contacts rated for 5A at 415 volts AC. The push buttons for different operations like "HOIST / LOWER, FORWARD/ REVERSE", "STOP" shall have different colours. All push buttons shall be as per relevant IS.

- 6.9.7 The Push button shall be properly shrouded so as to prevent water & dust entry.

#### 6.10.0 LIMIT SWITCHES:

- 6.10.1 Limit switches shall be provided for over hoisting, over lowering, Extreme left and Extreme right positions.
- 6.10.2 Necessary Limit switch actuating arrangement shall be provided to actuate the limit switch at the above positions.
- 6.10.3 The Limit switches shall have enclosures designed for IP 55 degree of protection.
- 6.10.4 Proximity switches are not acceptable in place of Limit switches.

#### 6.11.0 FUSE SWITCH UNIT

Metal enclosed, FOUR POLE fuse switch unit of 63A, 415V, AC, rating suitable for indoor location shall be provided. Suitable Nickel-Chromium plated brass DOUBLE COMPRESSION glands and crimp type ATC lugs to receive purchaser's 3c-6 sq. mm AL unarmoured FRLS cable & vendor's 4C-4 sqmm copper unarmoured cable shall be provided. Cable glands and lugs shall also be provided for the flexible trailing cable. The FSU shall be provided with 2 Nos of earthing terminals with M12 screws, nuts and washers.

#### 6.11.0 CABLES

- 6.11.1 The trailing cable shall be 1100 V grade extra flexible having 4 cores and as per IS 9968. The trailing flexible cable shall carry the power supply to the Hoist from the Switch Fuse unit. The conductor cross section shall be minimum 4 sq.mm multi- stranded tinned copper of class 5 of IS 8130. the insulation shall be heat resistant elastomeric compound based on ETHYLENE PROPYLENE RUBBER (EPR) with continuous withstanding temperature of 90 Deg C The inner sheath shall be heat resistant elastomeric compound with black colour. The outer sheath shall be marked with cable size, voltage grade by embossing , sequential marking at every one meter of length by embossing .
- 6.11.2 The power cables between HOIST / CT MOTORS to control box, the pendent cable and other control cables shall be as per IS 1554. The conductor shall be multi- stranded PLAIN ANNEALED copper with minimum cross section of 1.5 sqmm for control. The insulation shall be extruded PVC. The inner sheath shall be extruded PVC and the outer sheath shall be extruded-PVC. In addition, the outer sheath shall be marked with cable size, voltage grade, the word FRLS at every 5 meters and sequential marking of length at every one meter. The sheath shall be black in colour.

## NTPC DADRI (2X490MW) FGD PROJECT

### TECHNICAL SPECIFICATION FOR EOWRH

#### 7.0.0 **EARTHING**

The structure, motor frames and enclosures of electrical equipment shall be effectively connected to earth complying with Indian Electricity rules and IS 3043. The earthing materials from hoist to FSU shall be in supplier's scope. BHEL will provide the earthing material from the Switch Fuse Unit to the nearest Earth Grid. Any other Items/components other than specified above, which are required for proper functioning of the Hoist are also part of the vendor Scope of Supply.

#### 8.0.0 **MAKE OF COMPONENTS:**

Only one of the following makes shall be used. Mix up of make for same item is not acceptable. Any deviation with respect to the makes given below is not acceptable.

Sl No.	Components	Make
1.	Hoist/Cross travel motor	AUTOLEC/SIEMENS/KEC/NGEF/ABB/CROMPTON GREAVES/BHARATBIJLEE/GEC
2.	Cable	INCAB/CCI/DELTON/FORT GLOS-TER/ UNIVERSAL CABLES/ ASIAN CABLES /NICCO/ IACL/IN-DUSTRIAL CABLES/KEI
3.	Fuse switch unit	L&T/ SIEMENS
4.	Power switch	L&T/ SIEMENS
5.	Power contactor	L&T/SIEMENS/TELEMEC-HANIQUE / BCH
6.	Auxiliary contactor	L&T/SIEMENS/TELEMECHNIQUE/BCH
7.	Thermal overload relay	L&T/SIEMENS/TELEMECHNIQUE/BCH
8.	Fuse	L&T/ SIEMENS
9.	Push button	L&T/SIEMENS/BCH/TEKNIC/VAISHNO
10.	LED type Indicating lamp	L&T/SIEMENS/BCH/TEKNIC/BINAY/VAISHNO
11.	Internal wiring	BIS (IS) CERTIFIED MAKE
12.	Glands	COMET/SUNIL & CO /QUALITY PRECISION / ARUP ENGG.
13.	Lugs	DOWELS
14.	Terminal block	ELMEX/TOSHA/CONNECTWELL
15.	Control switch	L&T/ SIEMENS/KAYCEE
16.	Selector switch	L&T/ SIEMENS/KAYCEE
17.	Fuse carriers	L&T/ SIEMENS
18.	Auxiliary transformer	AE/KAPPA/IND COIL/LOGIC STAT/PACTIC / PRAGATI / PRAYOG/VIKAS/KANIVEY/GPDL
19.	Neutral link	L&T/ SIEMENS
20.	Hoist Brake	L&T/ SIEMENS
21.	Cross Travel Brake	EMCO/PRETHE
22.	WIRE ROPE	USHA MARTIN
23.	Limit Switch	BCH/JAI BALAJI/SIEMENS/KAYCEE
24.	Bearings	SKF/FAG/NORMA

Note: Make of various components are subject to NTPC approval. No additional delivery or price implication is acceptable due to NTPC comment on make of components. Mix up of make for same item is not acceptable in any enquiry.

#### 9.0.0 PAINTING PROCEDURE:

For Painting of Hoist & Monorail I Beam Refer **Annexure-II**.

#### 10.0.0 WARRANTY:

The warranty period shall be twenty four (24) months from the date of Supply or eighteen (18) months from the date of commissioning, whichever earlier.

#### 11.0.0 START UP & COMMISSIONING SPARES:

Start-up & Commissioning Spares shall be part of the main supply of the EOWRH. Start-up & commissioning spares are those spares, which may be required during the start-up, and commissioning of the equipment/system. Bidder shall provide an adequate stock of such start up and commissioning spares to be send the site for the equipment erection and commissioning along with main supply. The spares must be available at site for the equipment's are energized.

#### 12.0.0 ERECTION & COMMISSIONING

Erection & Commissioning of EOWRH with accessory & Monorail I Beam for Hoist will be **done by owner** as per vendor's Erection & commissioning Manual and check List for EOWRH.

#### 13.0.0 DOCUMENTS TO BE SUBMITTED DURING BID STAGE

- (A) Along with the offer
  - i) Quality plan, General arrangement drawings, DSL & interlock mechanisms (female & male) arrangement drawings with complete bill of materials. All despatch able components/assemblies shall be indicated in details. Sub-vendors items, make also shall be indicate in the drawings.
  - ii) Wiring circuit diagram with details of make type and rating of all the components.
  - iii) Spares list for 3 years of trouble free operation along with the prices .commissioning /Initial spares shall form part of the base offer.
  - iv) Write up on special feature if any.
  - v) Technical specification of the equipment.
  - vi) Catalogues and other details of the product shall be submitted along with the offer.
  - vii) Clause by clause conformation for this TEP
  - viii) Rating of cross travel and hoist motor
  - ix) Deviation, if any to be spelt out clearly. Any clarification furnished against any clause of the TEP will be constructed as compliance only.
  - x) BOM for the system



### 14.0.0 DOCUMENTS TO BE FURNISHED ON PLACEMENT OF ORDER:

Immediately on placement of order, the supplier shall submit the following Documents to BHEL for approval. Manufacturing shall be initiated only after obtaining approval from BHEL.

- a. General Arrangement drawing of Hoist, Cross Travel arrangement, Auxiliary Girder & Trailing cable system, Control Panel, Pendant Push button station, Monorail I Beam etc.
- b. Bill of materials for the Hoist, Cross travel arrangement, Auxiliary Girder System, all cables under the scope etc.
- c. Power and Control scheme.
- d. Bill of material indicating description of the item, rating, make, quantity, type reference etc., for a) Panel mounted components, b) Pendant mounted components, c) Items covered in the system like trailing cable, trolley etc., the make of components shall be separate and form part of vendor QP.
- e. Hoist & Monorail I beam mounting arrangement.
- f. Gasketting and locking arrangement of Control panel.
- g. Justification for a) Motor rating selected, b) Rope selected, c) VA rating of control transformer.
- h. List of items mounted in the assembly and list of loose item supplied along with weight.
- i. Packing drawings.
- j. Data sheet for Hoist, Data sheet for Hoist & cross travel motor, Data sheet for Brake and Data sheet for trailing & pendant cable.
- k. Cable schedule for hoist indicating size, termination between which equipment, Rating, quantity, make etc.
- l. Shipping list indicating items, quantity, weight and package number to be submitted before inspection call is given. Despatch shall be maintained in line With the shipping list.
- m. All the drawings shall be prepared in AutoCAD. After final approval the above documents shall be submitted in CD apart from hard copy.
- n. The drawings and data sheets shall be submitted in soft media.pdf format, apart from 6 sets from hard copy. For BHEL approval.

#### **15.0.0 INSEPCION:**

The inspection will be carried out based on the following documents.

1. BHEL Purchase order
2. BHEL Technical specification
3. Quality plan, Quality checklist indicated in the Enquiry.
4. BHEL approved supplier drawing/data sheets.

#### **16.0.0 O&M MANUAL:**

16.1.0 5 copies O&M instruction manual shall be supplied. Instruction manual shall be submitted in SOFT MEDIA apart from the hard copies. Immediately after the despatch of the Hoist, directly to BHEL Ranipet. The O&M manual shall also be submitted in CD apart from hard copies.

16.2.0 Draft O&M manual shall be submitted on obtaining approval of various manufacturing drawings / documents for BHEL review & approval.

16.3.0 The O&M manual shall include but not limited to the following.

- a) Do's & Don'ts during receipt, storage, erection & commissioning.
- b) Instruction to be followed on receipt, storage & erection.
- c) Construction details of the hoist assembly.
- d) Drawing indicating various parts of EOWRH assembly with part numbers.
- e) Recommended lubrication & maintenance schedule.
- f) Cut view drawing for the Gear box assembly.
- g) As Built drawings, BOM & Cable schedule.

#### **17.0.0 PACKING:**

17.1.0 The ELECTRICAL HOIST and accessories shall be properly packed so as to avoid damage during transit and storage.

17.2.0 Wooden crate shall be used for packing various equipment / items as per shipping list. Lining with plastic sheet shall be provided inside the crate to avoid water entry during transit / storage.

17.3.0 Packing drawing shall be submitted for BHEL approval.

17.4.0 Two sets of manual (Hard copies) with drawing & data sheet shall be sent along with the packing box.

17.5.0 Each packing shall be accompanied with packing slip and all relevant drawings.

#### **18.0.0 PACKING AND FORWARDING:**

Each package or shipping units shall be clearly marked or stenciled on at least two sides as follows.

**BHEL SITE OFFICE,  
2 X 490 MW, FGD PACKAGE (STAGE 2)**

**NCTPS – NTPC DADRI**

**GAUTAM BUDH NAGAR, UP – 201008. INDIA**

In addition, each package or shipping unit shall have the symbol painted in red on at least two sides of the package, covering one fourth of the area of the side.

**ANNEXURE-I****LIST OF DEVIATIONS/EXCEPTIONS TO THE ENQUIRY DOCUMENT**

<b>SI No</b>	<b>Clause No</b>	<b>Page No</b>	<b>Description of Deviation</b>

Note: Enlarge the table to incorporate items

SIGNATURE OF BIDDER           -----

NAME                               -----

DESIGNATION                   -----

## NTPC DADRI (2X490MW) FGD PROJECT

### TECHNICAL SPECIFICATION FOR EOWRH

		Bidders Acceptance/ Comments
<b>ANNEXURE-II Painting of Hoist &amp; Monorail I Beam</b>	Refer Enclosed specification.	
<b>ANNEXURE-III Customer Technical specification</b>	Refer Enclosed specification.	
<b>ANNEXURE-IV General Layout of Hoist</b>	Refer Enclosed specification.	

SIGNATURE OF BIDDER -----

NAME -----

DESIGNATION -----

# ANNEXURE - II Painting Schedule

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
30	Handling Equipment in FGD (Clause 20.03.00 of Part-C Section VI)	FW 715	Power Tool Cleaning to st3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats) Idler roller shall be applied with two coats of 70 microns at shop	70	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	60	130



SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
29	Monorail for hoist & cranes <b>(Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)</b>	FW 710	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ  Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70          100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min_1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240

CLAUSE NO.	TECHNICAL REQUIREMENTS			<div>एनटीपीसी NTPC</div>
4.1.8	<div>ANNEXURE - III Customer Technical specification</div>			
4.2.0				
4.3.0				
4.3.1	<div>MONORAILS AND HOISTS</div>	The Monorails & Hoists shall conform to the latest edition of the following standards & codes. Other internationally acceptable standards/codes, which ensure equal or higher performance than those specified, shall also be accepted.		
		IS:3938 : Specification for Electric Wire Rope Hoist		
		-		
		IS:15560 : Points hooks with shank up to 160 Tonne - Specification		
4.3.2				
NCTPP DADRI ST-II (2X490 MW) & IGSTPP JHAJJAR(3X500 MW) FLUE GAS DESULPHURISATION (FGD) SYSTEM PACKAGE		TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC.NO. CS-6130/0330-109-9	SUB-SECTION-I-M6 LIMESTONE AND GYPSUM HANDLING PLANT(LHP & GHP)	Page 6 of 74

CLAUSE NO.	TECHNICAL REQUIREMENTS			<div>एनटीपीसी NTPC</div>
4.3.3	The electric hoist shall be designed and constructed in accordance with the latest revision of IS:3938 and shall be suitable for duty class 2. For electric hoists, trolley movement and hoisting shall be effected by using two separate motors. Motors shall be as per technical requirements discussed elsewhere. However the motors shall be suitable for 150 starts per hour at 40% CDF. Motor operated geared trolley shall have two (2) pairs of wheels, one pair of which shall be driven through motor. An electromechanical brake shall be provided for hoisting as well as cross travel. Brake lining shall be of asbestos			
4.3.4	Wire rope shall be of pre-formed type, hemp cored, regular lay 6/36 construction with a breaking strength of 160 -175 kgf/ sq. mm. Minimum number of falls of rope shall be four (4). All running shafts and wheels shall be fitted with ball / roller bearings with a rated life not less than 20 years based on equivalent running time as per IS:3938.			
4.3.5	<del>All chain pulley blocks shall be designed to IS:3832, the operating hand chain shall conform to IS:2429 grade 30 pitched and polished and the load chain to IS:6216 grade 80. The chain pulley block shall be suitable for duty class 2. Hooks shall be as per IS: 15560 &amp; with antifriction bearing.</del>			
4.3.6	The hoist mechanism shall consist of a grooved rope drum driven by electric motor through gears. Each end of the rope shall be anchored to the drum in such a way as the anchorage is readily available for maintenance. Each rope shall have two (2) full turns of the drum when the hook is at its lowest position and one (1) spare groove when the hook is at its highest position. The leading rope taken by the drum should not slope sideways when slack and it should not be caught between the gear wheel.			
4.3.7	Inline magnetic separator shall have motorised hoist for handling / maintenance purpose. Each suspended magnet shall be provided with a dedicated motorised trolley.			
4.4.0				
4.4.1				

CLAUSE NO.	TECHNICAL REQUIREMENTS		<div>एनटीपीसी NTPC</div>
	DATA SHEET: MONORAILS AND HOISTS		
1.0.0	GENERAL		
1.1.0	Functional Requirement :	To transfer equipment's to maintenance area or outside the building.	
2.0.0	DESIGN & CONSTRUCTION REQUIREMENT		
2.1.0	Hoists		
2.1.1			
2.1.2	Maximum trolley travel speed for electric hoists	15m/min	
2.1.3	Maximum Hoisting speed for electric hoists	6 m/min	
2.1.4	Drive Motors	SQIM, Separate for travel & lift	
2.1.5	No. of starts for drive motor	150 starts/hr at 40% CDF	
2.1.6	Wire Rope		
	(i) Type/Construction	Pre-formed type, hemp cored, regular lay 6/36 construction	
	(ii) Breaking Strength	160-175 kgf/sq. mm	
2.1.7	Bearing		
	(i) Type	Ball/Roller bearing	
	(ii) Life	20 years	
2.1.8	Brake	Electro Mechanical type with asbestos lining.	
2.1.9	Load Hook	Swiveling type forged circular shank section.	
2.1.10	Duty	Class –2	
2.2.0	Monorail location/layout		
2.2.1	Cross section	I beam	
2.2.2	Distance between C/L of monorail & C.G. of equipment to be lifted	Maximum 500 mm	
NCTPP DADRI ST-II (2X490 MW) & IGSTPP JHAJJAR(3X500 MW) FLUE GAS DESULPHURISATION (FGD) SYSTEM PACKAGE		TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC.NO. CS-6130/0330-109-9	SUB-SECTION-I-M6 LIMESTONE AND GYPSUM HANDLING PLANT(LHP & GHP)
			Page 35 of 74

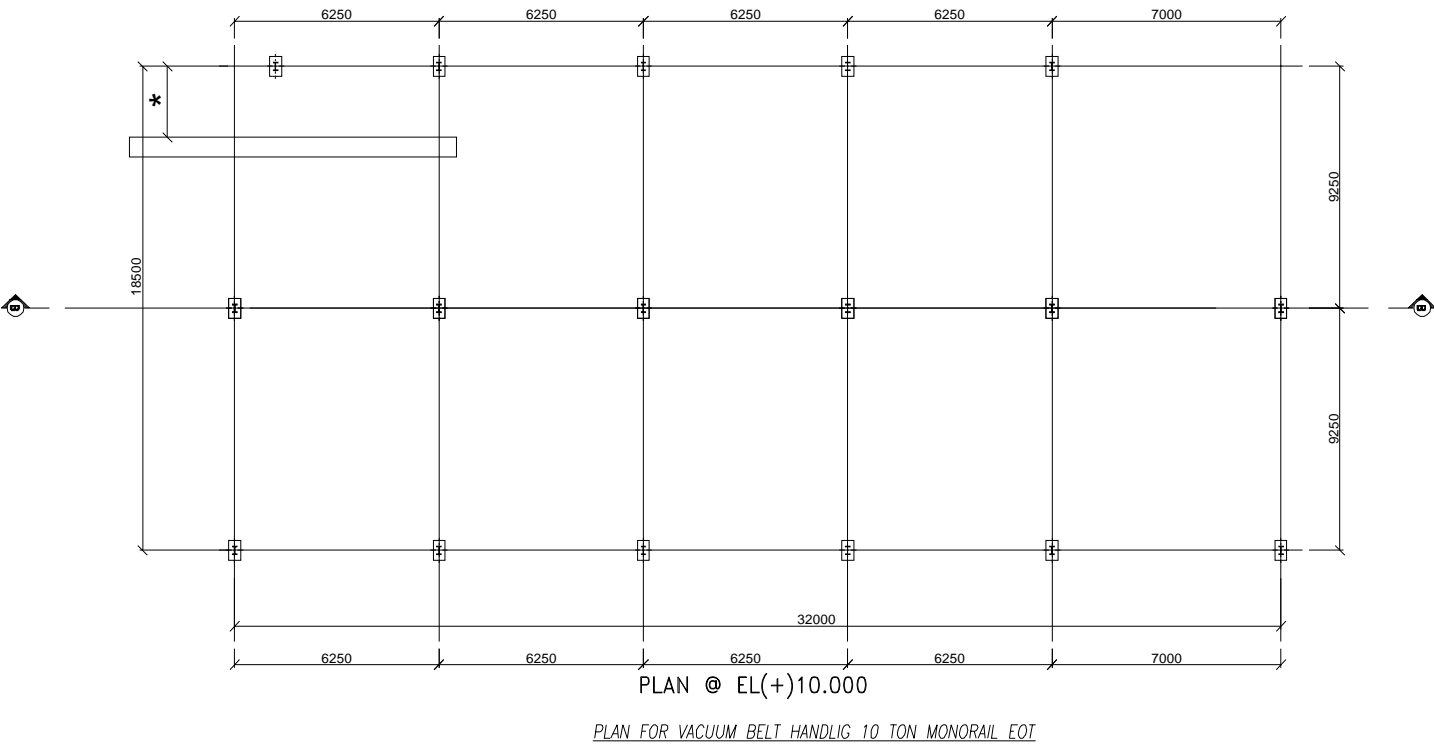
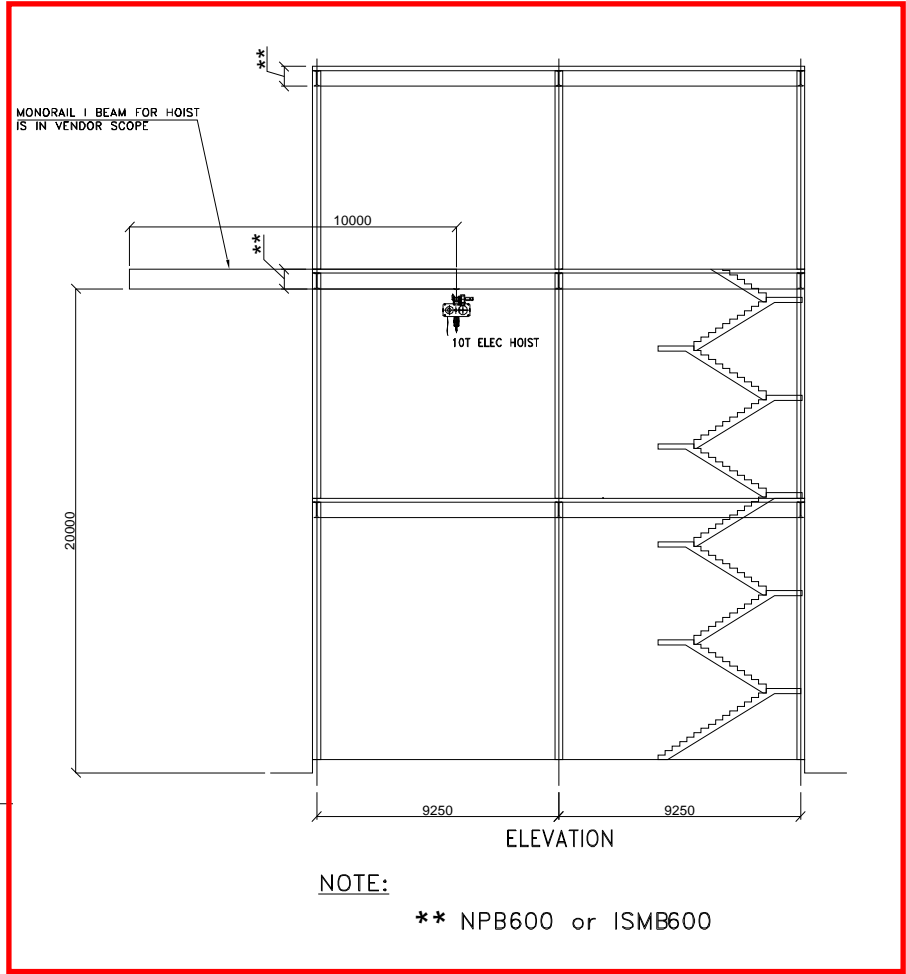




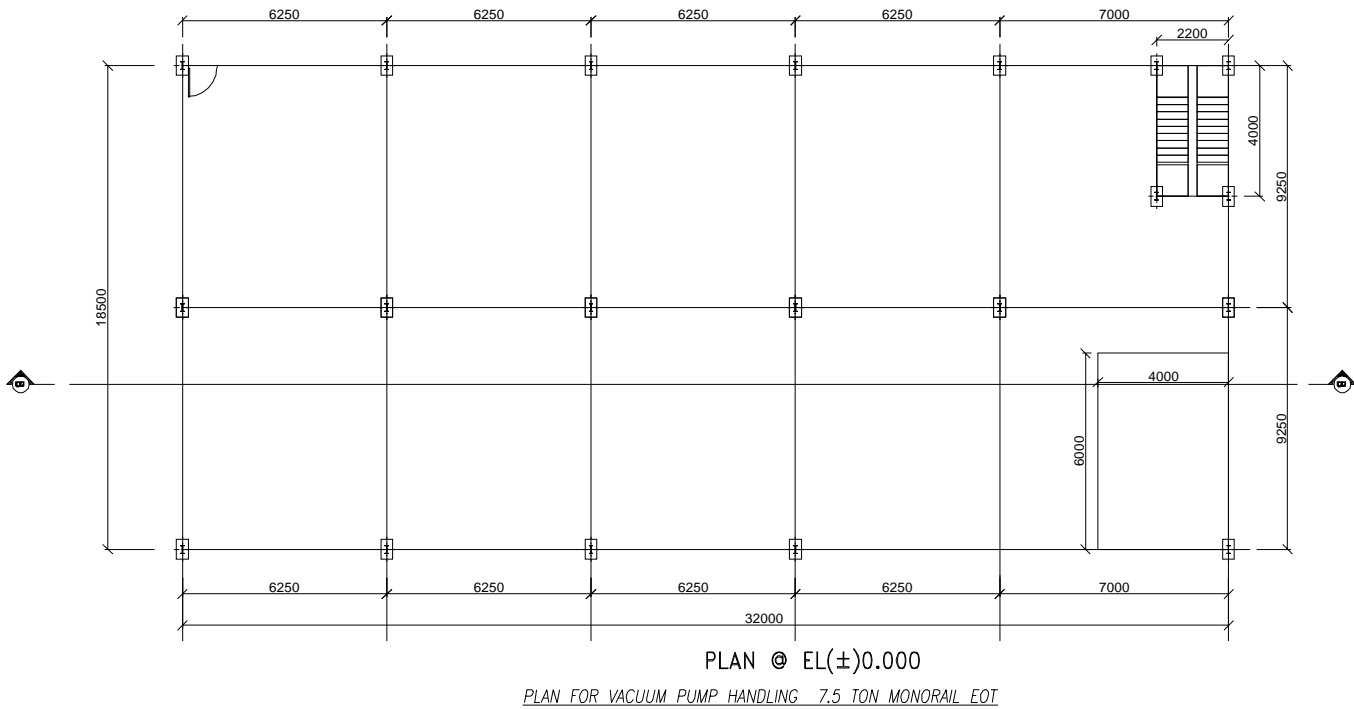
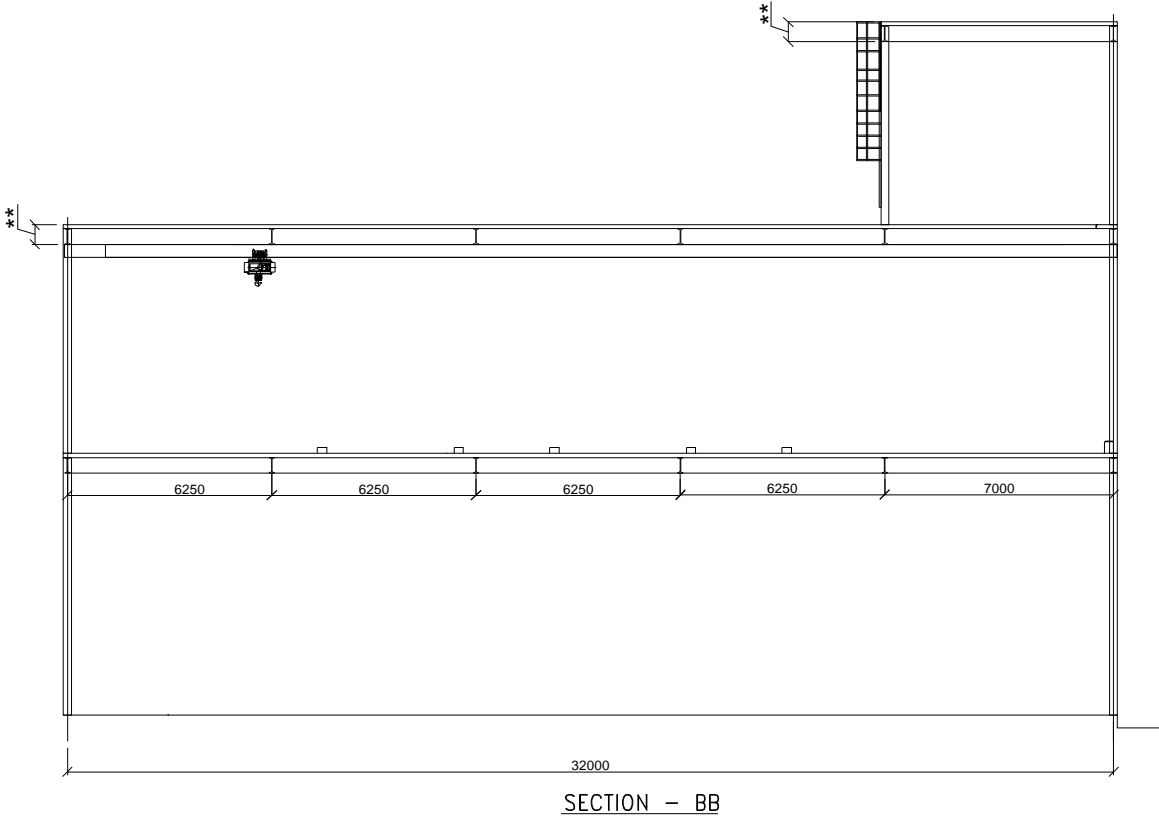
DRAWING NO. 2-FW-000-00316

ALL DIMENSIONS ARE IN MILLIMETRES

FOR PRODUCTION  
REF.-PR:QA:590 FOR PAINTING  
REF.-PR:QA:500 FOR UNTOL. DIMNS.





ANNEXURE-IV General Layout of Hoist



\* TO BE PROVIDED

REV	DATE	ALTERED
		CHECKED
ZONE		

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TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		2X490MW-NTPC-DADRI FLUE GAS DESULPHURIZATION SYSTEM								
		BHARAT HEAVY ELECTRICALS LTD.. UNIT: BOILER AUXILIARIES PLANT. RANIPET - 632 406.			DRN	NAME LOGANATHAN	SIGN	DATE	NO.OF VAR.	
					CHD	V KESAVAN			-	
					APPD	R S BALAJI				
DEPT AQCS-FGD	GRADE OF UNTOL.DIM		SCALE	WEIGHT (KG).	REF. TO ASSY/OLD DRG.				ITEM NO.	NO. OF ITEMS
CODE 789	PR:QA:500								-	0
TITLE EOH FOR VACUUM PUMP AND VACUUM BELT FILTER HANDLING					CARD CODE	DRAWING NO. 2-FW-000-00316				REV 00