



**Bharat Heavy Electricals Ltd**  
**Boiler Auxiliaries Plant**

Ranipet-632 406

FLUE GAS DESULPHURISATION

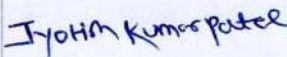
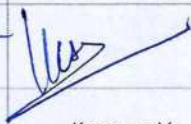
**TECHNICAL SPECIFICATION**

SPECIFICATION NO: FGD:EOH

REV:00

**TECHNICAL SPECIFICATION OF  
ELECTRICALLY OPERATED HOIST (EOH)  
WITH TROLLEY**

REF: FGD: EOH REV: 00

|     |            |               |                                                                                                                                  |                                                                                                                             |                                                                                                                     |
|-----|------------|---------------|----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| 00  | 08-09-2020 | Fresh Release | <br>Pradeep Kumar<br>Behera<br>(AE-I/EDC-FGD) | <br>Jyotish Kumar Patel<br>(SE/EDC-FGD) | <br>Kesavan V<br>(DGM/EDC-FGD) |
| REV | DATE       | DESCRIPTION   | PREPARED                                                                                                                         | CHECKED                                                                                                                     | APPROVED                                                                                                            |

## **CONTENTS**

|      |                                                    |
|------|----------------------------------------------------|
| 1.0  | SCOPE                                              |
| 2.0  | PROJECT INFORMATION                                |
| 3.0  | CODES AND STANDARDS                                |
| 4.0  | ELIGIBLE CRITERIA                                  |
| 5.0  | DESIGN REQUIREMENT                                 |
| 6.0  | FEATURES OF CONSTRUCTION (MECHANICAL SYSTEM)       |
| 7.0  | ELECTRICAL SYSTEM                                  |
| 8.0  | EARTHING                                           |
| 9.0  | MAKE OF COMPONENTS                                 |
| 10.0 | PAINTING PROCEDURE                                 |
| 11.0 | WARRANTY                                           |
| 12.0 | STARTUP & COMMISSIONING SPARES                     |
| 13.0 | SUPERVISION OF ERECTION, TESTING AND COMMISSIONING |
| 14.0 | DOCUMENTS DURING BID STAGE                         |
| 15.0 | DOCUMENTS ON PLACEMENT OF ORDER                    |
| 16.0 | INSPECTION                                         |
| 17.0 | O&M MANUAL                                         |
| 18.0 | PACKING                                            |
| 19.0 | NAME PLATE                                         |
| 20.0 | MARKING                                            |
| 21.0 | ANNEXURES                                          |



**1.0. SCOPE:**

1.1 This specification covers the design, material constructional features, manufacture, testing, inspection, packing, supervision for erection & commissioning and supply of electrically operated hoists assembly, with cross travel complete in all respect including control box, flexible trailing cable, festooning arrangement of feeding power to trolley assembly (cable trolleys), drag chain, auxiliary girder, FUSE-SWITCH unit etc. The assembly shall be complete in all respect ready for erection & commissioning.

**1.2 EOH DATA**

Each Electrically operated Rope Hoist Should necessarily consists of the following items:

Capacity : As per Enquiry

Maximum trolley travel speed for electric hoists : 15 meter/ minute

Maximum trolley hoisting speed for electric hoists : 6 meter/ minute

| S. No | Description                                                                                                                                                                                                                                                                 | Unit | EOH capacity, Height of Lift, Length of travel, Radius As Per Enquiry FOR VACUUM PUMP HOIST | EOH capacity, Height of Lift, Length of travel, Radius As Per Enquiry FOR VACUUM BELT FILTER HOIST | EOH capacity, Height of Lift, Length of travel, Radius As Per Enquiry FOR BALL MILL INNER HOIST | EOH capacity, Height of Lift, Length of travel, Radius As Per Enquiry FOR BALL MILL OUTER HOIST | EOH capacity, Height of Lift, Length of travel, As Per Enquiry FOR BOOSTER FAN MOTOR | EOH capacity, Height of Lift, Length of travel, As Per Enquiry FOR BOOSTER FAN HOISING HOIST |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| 1     | EOH 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) & Radius (R) | ST   | As Per Enquiry                                                                              | As Per Enquiry                                                                                     | As Per Enquiry                                                                                  | As Per Enquiry                                                                                  | As Per Enquiry                                                                       | As Per Enquiry                                                                               |
| 2     | Fuse with enclosure suitable for outdoor installation, wall mounted Per Crane                                                                                                                                                                                               | NO   | 1                                                                                           | 1                                                                                                  | 1                                                                                               | 1                                                                                               | 1                                                                                    | 1                                                                                            |
| 3     | Trailing flexible copper cable for power supply                                                                                                                                                                                                                             | MR   | To suit                                                                                     | To suit                                                                                            | To suit                                                                                         | To suit                                                                                         | To suit                                                                              | To suit                                                                                      |
| 4     | Galvanized link drag chain                                                                                                                                                                                                                                                  | MR   | To suit                                                                                     | To suit                                                                                            | To suit                                                                                         | To suit                                                                                         | To suit                                                                              | To suit                                                                                      |
| 5     | Cable trolley assembly                                                                                                                                                                                                                                                      | ST   | To suit                                                                                     | To suit                                                                                            | To suit                                                                                         | To suit                                                                                         | To suit                                                                              | To suit                                                                                      |
| 6     | Auxiliary girder assembly for trailing cable for a cross travel length                                                                                                                                                                                                      | MR   | To suit                                                                                     | To suit                                                                                            | To suit                                                                                         | To suit                                                                                         | To suit                                                                              | To suit                                                                                      |
| 7     | Rain hood for Hoist motor, cross travel motor and control box per Hoist                                                                                                                                                                                                     | ST   | 1                                                                                           | 1                                                                                                  | 1                                                                                               | 1                                                                                               | 1                                                                                    | 1                                                                                            |
| 8     | Grease gun with grease                                                                                                                                                                                                                                                      | NO   | 1                                                                                           | 1                                                                                                  | 1                                                                                               | 1                                                                                               | 1                                                                                    | 1                                                                                            |
| 9     | 10 % lubricant                                                                                                                                                                                                                                                              | ST   | 1                                                                                           | 1                                                                                                  | 1                                                                                               | 1                                                                                               | 1                                                                                    | 1                                                                                            |

**2.0 PROJECT INFORMATION:**

*NTPC PROJECT SITE / CUSTOMER PROJECT SITE*

**2.2 APPLICATION**

The electrical hoist and trolley is meant for handling 1) WET BALL MILL & its Motor in WBM Building, 2) Vacuum pump & Motor, VBF in Gypsum dewatering Building and 3) BOOSTER fans & Motor components.

**2.3 DESIGN & CONSTRUCTIONAL REQUIREMENTS**

Construction of Electrically Operated Rope Hoist with Trolley shall be of consistent capacity, lift, head room, Hoist & Trolley speed, Travel Length, radius of Travel, Monorail beam size and any other parameters as specified in **Annexure-I**.

**3.0 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<br>for voltage not exceeding 1000V:                                                                           | IS 4064                                                  |
| 3.17 General requirements for switchgear and control gear for voltage not exceeding 1000 V                                                                                                            | : IS 4237                                                |
| 3.18 Control switches for voltage upto and including 1000 V AC, 1200 V DC                                                                                                                             | : IS 6875 (Part-I&II)                                    |
| 3.19 The offered Hoist shall comply with all the latest statutory regulation and safety<br>code/standard applicable. Nothing in this specification shall relieve the vendor of his<br>responsibility. |                                                          |



#### 4.0 **ELIGIBLE CRITERIA**

1. Vendor should be a manufacturer of Electrically Operated Hoist.
2. List of customer to whom Electrically Operated Rope Hoist of similar capacity supplied to silo/bunker application, FGD application, Coal fired Power plant, Industrial application.
3. Previous inspection and test report to be furnished for the similar capacity or higher capacity.

#### 5.0 **DESIGN REQUIREMENT**

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**.

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, shoe type electromagnetic brakes for hoisting & cross travel, guides, weather and dust proof pendent push button station, & control panel, all wiring, 4 core Power cable with Festoon arrangement of feeding power to trolley assembly, 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. Power supply provided for the panels shall be 415V, 3 PH, 3 wire only. Vendor to make suitable transformer arrangement inside the panel for single phase control supply.

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

##### 6.1 **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. 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.

6.2 **BOTTOM BLOCK**

The bottom block shall be of enclosed type and shall have guard against rope jamming in normal use. It shall have standard forged swivel shank hook fitted on antifriction thrust bearing. Lock to prevent hook from rotation and locking arrangement to prevent accidental unlocking shall be provided. Pulley of the bottom block shall be provided with antifriction bearings.

6.3 **SHEAVES**

Rope sheaves shall be cast steel, cast steel, or mild steel as suitable for the Duty conditions and shall be confirm the relevant IS. Grooves shall be machined to the proper shape 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.

When the load is supported by more than one fall of the rope off the drum and bottom block are used, the rope system shall be equalized by using equalizing sheaves.

6.4 **GEARS**

Gears shall be cut from quality alloy steel of chromium, nickel. Pinions shall be of heat treated alloy steel. All gears and pinions shall be of hardened and tempered steel with machine cut teeth in metric modules. Surface hardening of steel is not acceptable.

6.5 **BEARINGS**

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. 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.

6.6 **ROTATING AND STATIONERY SHAFT**

Shafts and axles shall be of 080 M40 as per BS970

6.7 **LUBRICATION**

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

6.8 **HOIST ROPE**

Hoist ropes shall be of extra flexible steel rope with a well lubricated and having six strands of 36 wires per strands, pre-formed type, hemp cored, and regular lay construction. 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. 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 confirm to **IS2266**. The rope shall be hot dip galvanized. The rope shall be free from kinks and shall be continuous. **Minimum number of falls of rope shall be four (4)**. Reverse bend of ropes is not acceptable.



6.9 **HOOK**

Swiveling type forged circular shank section Hooks 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. Hook shall be confirm to the relevant Indian standard.

The materials Hooks shall be as per relevant Indian standard.

6.10 **BRAKES**

Hoisting motor and trolley motor shall be equipped with electrically released, spring set shoe type / disc type / electromagnetic type brakes. 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.

6.11 **ROPE GUIDE**

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

6.12 **TROLLEY WHEELS**

Trolley wheels shall be of single flange type in the taper treads. The wheels shall be mounted on antifriction bearings and shall be easily removable for repair/ replacement.

6.13 **LINK (DRAG) CHAIN**

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

6.14 **AUXILIARY GIRDER FOR TRAILING CABLE**

Auxiliary girder system shall be provided for the support of Festoon arrangement of feeding power to trolley assembly. 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.

6.15 **MOTOR OPERATED GEARED TROLLEY**

Motor operated geared trolley shall have two (2) pairs of wheels, one pair of which shall be driven through motor. Trolley for cross travel shall be designed to accommodate a wide range of I beams and shall Trolley shall be capable of travelling on straight as well as curved monorails with the design being such to maintain uniform distribution of pressure on the flanges.

7.0 **ELECTRICAL SYSTEM**



Electrical system comprises of 63A Fuse Switch Unit/MCB, Control panel, Pendant Push Button Station, Trailing cable, Pendant cable, Hoist & Cross travel motors with electromagnetic brake etc., to make the system complete. All these items are included in the scope of supply of the vendor.

**7.1 CONTROL PANEL**

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. The control panel shall be wall mounted type & easily approachable from the floor by a standing man.

**7.2 CONTROL SUPPLY TRANSFORMER**

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

**7.3 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 150 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. For electric hoists, trolley movement and hoisting shall be effected by using two separate motors.

**7.4 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

**7.5 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.



**7.6 MOTOR FRAME**

The frame shall be cast and rigid.

**7.7 DIRECTION OF ROTATION**

The motors shall be designed for both directions of rotation.

**7.8 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.

**7.9 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.

**7.11 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.

**7.12 CONTACTOR**

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.

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

**7.13 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.

**7.14 FUSES**

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

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.

**7.15 INDICATING LAMPS**

*Bidder's Seal and Signed*



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.,

**7.16 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 along with 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.

**7.17 TERMINATION**

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

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.

**7.18 PENDANT PUSH BUTTON STATION**

Pendant shall be provided with flourscent up, down, forward, reverse travel & Emergency stop push buttons. The Emergency Pus Button shall be Lockable type. Its power supply shall be limited to 24V AC. 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. The Pendant Push Button station shall be supported from the Control Panel with hot dip galvanized Link Chain. The Pendant Push Button Station shall be connected to the Control Panel using multi-core copper flexible control cable of 10m length. The Enclosure of Pendant Push button station shall be designed for IP 55 degree of protection. 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. The Push button shall be properly shrouded so as to prevent water & dust entry.

**7.19 LIMIT SWITCHES:**

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



7.20 **FUSE SWITCH UNIT**

Metal enclosed, FOUR/THREE POLE as suitable fuse switch unit (SFU) 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. FSU with enclosure suitable for outdoor installation, wall mounted.

7.21 **CABLES**

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 .

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.

Power cable supports shall be festoon type arrangement.

8.0 **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.

**9.0 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<br>GREAVES/BHARAT BIJLEE                                |
| 2.     | Cable                    | INCAB/CCI/DELTON/FORT/GLOSTER/UNIVERSAL CABLES/ASIAN CABLES/<br>NICCO                         |
| 3.     | Fuse switch unit/MCB     | L&T/SIEMENS/CONTROLS & SWITCHGEAR<br>(STROMBERG)/GE//SCHNEIDER/SPACEAGE<br>SWITCHGEAR/CGL/ABB |
| 4.     | Power switch             | L&T/ SIEMENS/CONTROLS & SWITCHGEAR/ SCHNEIDER/GE                                              |
| 5.     | Power contactor          | L&T/SIEMENS/TELEMECHANIQUE/BCH/GE                                                             |
| 6.     | Auxiliary contactor      | L&T/SIEMENS/TELEMECHANIQUE/BCH/GE                                                             |
| 7.     | Thermal overload relay   | L&T/SIEMENS/TELEMECHANIQUE/BCH/GE                                                             |
| 8.     | Fuse                     | L&T/SIEMENS/GE/CONTROLS&SWITCHGEAR/BUSMANN/GE                                                 |
| 9.     | Push button              | L&T/SIEMENS/TEKNIK/BCH/CONTROLS&SWITCHGEAR/TELEMECHANIQ<br>UE/GE                              |
| 10.    | LED type Indicating lamp | L&T/SIEMENS/BCH/TEKNIK/RASS CONTROLS/GE                                                       |
| 11.    | Internal wiring          | BIS (IS) CERTIFIED MAKE                                                                       |
| 12.    | Glands                   | COMET/SUNIL&CO/QUALITYPRECISION/BRACCO/ARUP ENGINEERING.                                      |
| 13.    | Lugs                     | DOWELLS/3D                                                                                    |
| 14.    | Terminal block           | ELMEX/TOSHA/CONNECTWELL/WAGO/PHOENIX                                                          |
| 15.    | Control switch           | L&T/SIEMENS/KAYCEE/CONTROLS&SWITCHGEAR/<br>SCHNEIDER/GE                                       |
| 16.    | Selector switch          | L&T/ SIEMENS/KAYCEE/GE                                                                        |
| 17.    | Fuse carriers            | L&T/SIEMENS/GE/CONTROLS&SWITCHGEAR/BUSMANN                                                    |
| 18.    | Auxiliary transformer    | AE/KAPPA/INDCOIL/LOGICSTAT/PRECISE/<br>SOUTHERNELECTRICAL/STATIC TRANSFORMER/G&M              |
| 19.    | Limit switches           | SIEMENS/BCH/JAI BALAJI                                                                        |
| 20.    | Neutral link             | L&T/SIEMENS/GE/SCHENIDER/CONTROLS & SWITCHGEAR                                                |
| 21.    | Hoist Brake              | BCH/L&T/ SIEMENS / NTPC APPROVED                                                              |
| 22.    | Cross Travel Brake       | EMCO/PRETHE / NTPC APPROVED                                                                   |
| 23.    | WIRE ROPE                | USHA MARTIN/ BHARAT WIRE ROPES / MAYUR / ARADHYA                                              |
| 24.    | Limit Switch             | BCH/JAI BALAJI/SIEMENS/KAYCEE                                                                 |
| 25.    | Bearings                 | SKF/FAG                                                                                       |

Make of various components for NTPC projects 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.



**10.0 PAINTING PROCEDURE:**

For Painting of Hoist Refer Annexure-II.

**PAINTING OF CONTROL PANELS:**

(The below details are Tentative, Final details will be given in during drawing approval stage)

- 1) Surface treatment with minimum seven tank process
- 2) Panel 2 coats of synthetic Enamel paint.
- 3) Shade- Siemens Grey
- 4) The minimum coating thickness of power coated surfaces shall be minimum of 80 microns.

Paint shade shall be as per RAL 5012 (Blue) for Motor.

**11.0 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.

**12.0 START UP & COMMISSIONING SPARES:**

Start-up & Commissioning Spares shall be part of the main supply of the EOH. 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 brought by him to the site for the equipment erection and commissioning. The spares must be available at site before the equipment's are energized.

**FIRST FILL OF CONSUMABLES:**

Bidder's scope shall also include supply and filling of all chemicals, reagents, resins, lubricants, grease, filters and consumable items for operation up to COD including top up requirements at the time of issuance of PAC/declaration of COD. All lubricants proposed for the plant operation shall be suitable for all operating and environmental conditions that will be met on site consistent with good maintenance procedures as instructed in the maintenance manuals. First fill of consumable shall be part of the main supply.

13.0 Price of each and every item is to be given separately for SUPERVISION OF ERECTION, TESTING AND COMMISSIONING

Erection of EOH will be done by owner as per vendor's Erection Manual and check List. However, the bidder shall make one / two visit for the supervision of erection, pre-commissioning & post-commissioning check-up, start-up, testing and trial runs of all the items covered under the scope of supply. **Number of days required for supervision of E&C shall be specified by vendor in their offer.**

However,

1. Minimum 1 visit, 5 days per visit per all Gypsum Building Hoist (i.e. Hoist for Vacuum Pump & Vacuum Belt filter) for project wise to be included for supervision of E&C.
2. Minimum 1 visit, 5 days per visit per all Ball mill Building Hoist (i.e. Inner Hoist & outer Hoist) for project wise to be included for supervision of E&C.
3. Minimum 2 visit, 5 days per visit per all Booster Fan & Motor Hoist (i.e. hoist for Booster Fan & Motor) for project wise to be included for supervision of E&C.

Travel charges (visa/passport, all the to/fro travel charges to the site) , TA/DA, boarding and lodging shall be borne by the bidder and shall be inclusive in this portion.

**The charges quoted for the supervision will be considered for L1 evaluation.** However, BHEL reserves the right to engage the services of the bidder for supervision of E&C.

**Note:** Bidder to quote separately for Supervision of E&C for all Hoist for Gypsum Building Hoist (i.e. Hoist for Vacuum Pump & Vacuum Belt filter), all hoist for Ball mill Building Hoist (i.e. Inner Hoist & outer Hoist), all Hoist for Booster Fan & Motor Hoist (i.e. hoist for Booster Fan & Motor) per project wise as per Enquiry.

14.0 DOCUMENTS TO BE SUBMITTED DURING BID STAGE

Along with the offer

1. Clause by clause confirmation for this Technical specification.
2. In case, Deviations are considered essential by the Bidder (after exhausting all possible efforts), the same shall be separately listed, to be spelt out clearly in **Annexure-III**.
3. Typical GA of HOIST with BOM for the system.
4. Rating of cross travel and hoist motor.

The bidders are instructed not to submit bidders' own technical specification and any other technical details.



**15.0 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 etc.
- b. Bill of materials for the Hoist, Cross travel arrangement, Auxiliary Girder System, all cables under the scope etc.
- c. Calculation for Factor of safety on selection of Steel wire rope.
- d. Power and Control scheme.
- e. 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.
- f. Hoist mounting arrangement.
- g. Gasketting and locking arrangement of Control panel.  
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, and 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.

**16.0 INSEPTION:**

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.



**17.0 O&M MANUAL:**

O&M instruction manual in the required quantity as in enquiry shall be supplied directly to BHEL Ranipet in required numbers as per enquiry immediately after the despatch of the hoist. Instruction manual shall be submitted in soft media apart from hard copies. Hard copy of the O&M manual shall be sent along with the hoist. Ten (10) hard copies and five (05) sets of electronic copies of all documents are to be submitted in the English language. In addition, One (1) copy of operation and maintenance manuals shall be translated into "Bangla" and provided as paper copies and in electronic format

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

- a) Dos & 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 EOH 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.
- h) Disposal procedure for environmental hazardous material if any.

**18.0 PACKING AND FORWARDING:**

The ELECTRICAL HOIST and accessories shall be properly packed so as to avoid damage during transit & storage. Wooden crate (fumigated) shall be covered with GI sheet of minimum 1mm thickness and same shall be used for packing various equipment / items as per shipping list. Lining with plastic sheet (water Proof) shall be provided inside the crate to avoid water entry during transit / storage. Two sets of manual (hard copies) with drawing & data sheet shall be sent along with the packing box. Each packing shall be accompanied with packing slip & all relevant drawings.

Each package or shipping units shall be clearly marked or stenciled on at least two sides - **NTPC SITE (ADDRESS AS PER ENQUIRY), PO number, Supplier name.** 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.

**19.0 NAME PLATE**

The name plate shall be non-corrosive material (metallic) indicating manufacturer's name, serial number, rating, capacity type. Name plate to be written in English. Equipment identification number to be mentioned in the name plate. Hoists shall have permanent inscription in English on each side readily recognizable from floor level stating safe working load.

**20.0 MARKING**

As per IS 3938 latest.



21.0 **ANNEXURES**

1. ANNEXURE-I --- DETAILS OF HOIST
2. ANNEXURE-II --- PAINTING OF HOIST

## 3. ANNEXURE-III - LIST OF DEVIATIONS/EXCEPTIONS TO THE ENQUIRY DOCUMENT

| ANNEXURE-III |              |            |                          |
|--------------|--------------|------------|--------------------------|
| SI<br>No     | Clause<br>No | Page<br>No | Description of Deviation |
|              |              |            |                          |
|              |              |            |                          |
|              |              |            |                          |
|              |              |            |                          |
|              |              |            |                          |
|              |              |            |                          |
|              |              |            |                          |

Note: Enlarge the table to incorporate items

SIGNATURE OF BIDDER -----

NAME -----

DESIGNATION -----

**ANNEXURE-I --- DETAILS OF HOIST**

| <b>A</b>                                                                                                     |                                                                                         |                               |                                         |                                |                                 |                          |
|--------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------|-----------------------------------------|--------------------------------|---------------------------------|--------------------------|
| <b>A. Details Of EORH for Gypsum Dewatering Building for NKP, Mouda and Bah-I &amp; II and Panki Project</b> |                                                                                         |                               |                                         |                                |                                 |                          |
|                                                                                                              | <b>Description</b>                                                                      | <b>NTPC Mouda<br/>2X500MW</b> | <b>NTPC North Karanpura<br/>3X660MW</b> | <b>NTPC Barh I<br/>3X660MW</b> | <b>NTPC Barh II<br/>2X660MW</b> | <b>PANKI<br/>1X660MW</b> |
|                                                                                                              | <b>CUSTOMER NUMBER</b>                                                                  | G503 & G504                   | G601, G602 & G603                       | G604, G605 & G606              | G607 & G608                     | R4U2                     |
| <b>EOH NO -01 (GROUND FLOOR)</b>                                                                             |                                                                                         |                               |                                         |                                |                                 |                          |
| <b>Sl no</b>                                                                                                 |                                                                                         |                               |                                         |                                |                                 |                          |
| 1                                                                                                            | Rope Hoist capacity in Ton                                                              | 10                            | 12                                      | 10                             | 10                              | 10                       |
| 2                                                                                                            | Qty (Nos)                                                                               | 1                             | 1                                       | 1                              | 1                               | 1                        |
| 3                                                                                                            | Speed of the Hoist m/min (maximum)                                                      | 6                             | 6                                       | 6                              | 6                               | 6                        |
| 4                                                                                                            | Speed of Cross travel m/min (maximum)                                                   | 15                            | 15                                      | 15                             | 15                              | 15                       |
| 5                                                                                                            | Length of Long Travel<br>( in MM)                                                       | 70000                         | 112000                                  | 100000                         | 90000                           | 65000                    |
| 6                                                                                                            | Radius of travel in (MM)                                                                | 4000                          | 4000                                    | 4000                           | 4000                            | 3000                     |
| 7                                                                                                            | <b>Minimum</b> Height of Lift<br>from the floor level (MM)                              | 12450                         | 13650                                   | 13450                          | 13450                           | 11450                    |
| 8                                                                                                            | Head Room Requirement (MM)<br><b>VENDOR TO SPECIFY</b>                                  | Vendor to specify             | Vendor to specify                       | Vendor to specify              | Vendor to specify               | Vendor to specify        |
| 9                                                                                                            | Monorail Beam TOP<br>Height ( MM) from Floor                                            | 14250                         | 15450                                   | 15250                          | 15250                           | 13250                    |
| 10                                                                                                           | MONORAIL Size (in BHEL scope)<br>Vendor to confirm the beam size as per their<br>design | *NPB 600                      | *NPB 600                                | *NPB 600                       | *NPB 600                        | *NPB 600                 |
| <b>EOH NO -02 (FIRST FLOOR)</b>                                                                              |                                                                                         |                               |                                         |                                |                                 |                          |
| 1                                                                                                            | Rope Hoist capacity in Ton                                                              | 7.5                           | 7.5                                     | 7.5                            | 7.5                             | 7.5                      |
| 2                                                                                                            | Qty (Nos)                                                                               | 1                             | 1                                       | 1                              | 1                               | 1                        |
| 3                                                                                                            | Speed of the hoist m/min (maximum)                                                      | 6                             | 6                                       | 6                              | 6                               | 6                        |
| 4                                                                                                            | Speed of cross travel m/min (maximum)                                                   | 15                            | 15                                      | 15                             | 15                              | 15                       |
| 5                                                                                                            | Length of Long Travel<br>( in MM)                                                       | 70000                         | 112000                                  | 100000                         | 90000                           | 65000                    |
| 6                                                                                                            | Radius of travel in (MM)                                                                | 5000                          | 5000                                    | 5000                           | 5000                            | 3000                     |
| 7                                                                                                            | <b>Minimum</b> Height of Lift<br>from the floor level (MM)                              | 5950                          | 7200                                    | 5950                           | 5950                            | 5450                     |
| 8                                                                                                            | Head Room Requirement (MM)<br><b>VENDOR TO SPECIFY</b>                                  | Vendor to specify             | Vendor to specify                       | Vendor to specify              | Vendor to specify               | Vendor to specify        |
| 9                                                                                                            | Monorail Beam TOP<br>Height ( MM) from Floor                                            | 7750                          | 9000                                    | 7750                           | 7750                            | 7250                     |
| 10                                                                                                           | MONORAIL Size (in BHEL scope)<br>Vendor to confirm the beam size as per their<br>design | *NPB 600                      | *NPB 600                                | *NPB 600                       | *NPB 600                        | *NPB 600                 |

NOTE : 1) The lift shown in the table is approximate only ; depending upon head room of the hoist it may be altered.

2) \* - The above beam size is Tentative.



| <b>B</b>                                                                                                           |                                                                                         |                                      |                                              |                                             |                                        |                          |
|--------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|--------------------------------------|----------------------------------------------|---------------------------------------------|----------------------------------------|--------------------------|
| <b>Details Of EORH with Trolley for BALL MILL EQUIPMENT for NKP, Mouda and Bah-I &amp; II &amp; PANKI Project.</b> |                                                                                         |                                      |                                              |                                             |                                        |                          |
| SL NO                                                                                                              | Description                                                                             | NTPC Mouda<br>2X500MW<br>G503 & G504 | NTPC North<br>Karanpura<br>G601, G602 & G603 | NTPC Barh I<br>3X660MW<br>G604, G605 & G606 | NTPC Barh II<br>2X660MW<br>G607 & G608 | PANKI<br>1X660MW<br>R4U2 |
| <b>EOH NO-01 (Inner Hoist)</b>                                                                                     |                                                                                         |                                      |                                              |                                             |                                        |                          |
| 1                                                                                                                  | Rope Hoist capacity in Ton                                                              | 12                                   | 15                                           | 12                                          | 7.5                                    | 7.5                      |
| 2                                                                                                                  | Qty (Nos)                                                                               | 1                                    | 1                                            | 1                                           | 1                                      | 1                        |
| 3                                                                                                                  | Speed of the hoist m/min (maximum)                                                      | 6                                    | 6                                            | 6                                           | 6                                      | 6                        |
| 4                                                                                                                  | Speed of cross travel m/min (maximum)                                                   | 15                                   | 15                                           | 15                                          | 15                                     | 15                       |
| 9                                                                                                                  | Length of Long Travel<br>( in MM)                                                       | 50000                                | 55000                                        | 50000                                       | 50000                                  | 55000                    |
| 6                                                                                                                  | Radius of travel in (m)                                                                 | 3000                                 | 5000                                         | 4000                                        | 3000                                   | 3000                     |
| 7                                                                                                                  | <b>Minimum</b> Height of Lift<br>from the floor level (MM)                              | 10450                                | 13950                                        | 10450                                       | 10450                                  | 10850                    |
| 8                                                                                                                  | Head Room Requirement (MM)<br><b>VENDOR TO SPECIFY</b>                                  | Vendor to specify                    | Vendor to specify                            | Vendor to specify                           | Vendor to specify                      | Vendor to specify        |
| 5                                                                                                                  | Monorail Beam TOP<br>Height ( MM) from Floor                                            | 12250                                | 15750                                        | 12250                                       | 12250                                  | 12650                    |
| 10                                                                                                                 | MONORAIL Size (in BHEL scope)<br>Vendor to confirm the beam size as per their<br>design | *NPB 600                             | *NPB 600                                     | *NPB 600                                    | *NPB 600                               | *NPB 600                 |
| <b>EOH NO-02 (Outer Hoist)</b>                                                                                     |                                                                                         |                                      |                                              |                                             |                                        |                          |
| 1                                                                                                                  | Rope Hoist capacity in Ton                                                              | 12                                   | 20                                           | 15                                          | 15                                     | 7.5                      |
| 2                                                                                                                  | Qty (Nos)                                                                               | 1                                    | 1                                            | 1                                           | 1                                      | 1                        |
| 3                                                                                                                  | Speed of the hoist m/min (maximum)                                                      | 6                                    | 6                                            | 6                                           | 6                                      | 6                        |
| 4                                                                                                                  | Speed of cross travel m/min (maximum)                                                   | 15                                   | 15                                           | 15                                          | 15                                     | 15                       |
| 5                                                                                                                  | Length of Long Travel<br>( in MM)                                                       | 60000                                | 65000                                        | 60000                                       | 60000                                  | 65000                    |
| 6                                                                                                                  | Radius of travel in (m)                                                                 | 3000                                 | 5000                                         | 4000                                        | 3000                                   | 3000                     |
| 7                                                                                                                  | <b>Minimum</b> Height of Lift<br>from the floor level (MM)                              | 10450                                | 13950                                        | 10450                                       | 10450                                  | 10850                    |
| 8                                                                                                                  | Head Room Requirement (MM)<br><b>VENDOR TO SPECIFY</b>                                  | Vendor to specify                    | Vendor to specify                            | Vendor to specify                           | Vendor to specify                      | Vendor to specify        |
| 9                                                                                                                  | Monorail Beam TOP<br>Height ( MM) from Floor                                            | 12250                                | 15750                                        | 12250                                       | 12250                                  | 12650                    |
| 10                                                                                                                 | MONORAIL Size (in BHEL scope)<br>Vendor to confirm the beam size as per their<br>design | *NPB 600                             | *NPB 800                                     | *NPB 600                                    | *NPB 600                               | *NPB 600                 |

NOTE : 1) The lift shown in the table is approximate only ; depending upon head room of the hoist it may be altered.

2) \* - The above beam size is Tentative.

**C**

**Details Of EORH Booster fan rotor and motor for NKP, Mouda and Bah-I & II.**

| Sl no |                                                                                      | NTPC Mouda<br>2X500MW |                   |                   |                   | NTPC North Karanpura<br>3X660MW |             |          |             | NTPC Barh I<br>3X660MW |             |          |             | NTPC Barh II<br>2X660MW |             |          |             |          |             |          |             |
|-------|--------------------------------------------------------------------------------------|-----------------------|-------------------|-------------------|-------------------|---------------------------------|-------------|----------|-------------|------------------------|-------------|----------|-------------|-------------------------|-------------|----------|-------------|----------|-------------|----------|-------------|
|       |                                                                                      | G503                  |                   | G504              |                   | G601                            |             | G602     |             | G603                   |             | G604     |             | G605                    |             | G606     |             | G607     |             | G608     |             |
|       |                                                                                      | HT Motor              | FAN housing       | HT Motor          | FAN housing       | HT Motor                        | FAN housing | HT Motor | FAN housing | HT Motor               | FAN housing | HT Motor | FAN housing | HT Motor                | FAN housing | HT Motor | FAN housing | HT Motor | FAN housing | HT Motor | FAN housing |
| 1     | EOH Capacity in Tons                                                                 | 22                    | 14                | 22                | 14                | 22                              | 14          | 22       | 14          | 22                     | 14          | 24       | 14          | 24                      | 14          | 24       | 14          | 22       | 13          | 22       | 13          |
| 2     | Qty (Nos)                                                                            | 2                     | 2                 | 2                 | 2                 | 1                               | 1           | 1        | 1           | 1                      | 1           | 1        | 1           | 1                       | 1           | 1        | 1           | 1        | 1           | 1        | 1           |
| 3     | Speed of the hoist m/min (maximum)                                                   | 6                     | 6                 | 6                 | 6                 | 6                               | 6           | 6        | 6           | 6                      | 6           | 6        | 6           | 6                       | 6           | 6        | 6           | 6        | 6           | 6        | 6           |
| 4     | Speed of cross travel m/min (maximum)                                                | 15                    | 15                | 15                | 15                | 15                              | 15          | 15       | 15          | 15                     | 15          | 15       | 15          | 15                      | 15          | 15       | 15          | 15       | 15          | 15       | 15          |
| 5     | Length of Long Travel ( Bay length in MM)                                            | 16700                 | 16700             | 16700             | 16700             | 29000                           | 29000       | 29000    | 29000       | 29000                  | 29000       | 24000    | 24000       | 24000                   | 24000       | 24000    | 24000       | 29000    | 29000       | 29000    | 29000       |
| 6     | Monorail Beam TOP Elevation ( MM)                                                    | 11400                 | 14100             | 11400             | 14100             | 14400                           | 17650       | 14400    | 17650       | 14400                  | 17650       | 13500    | 15500       | 13500                   | 15500       | 13500    | 15500       | 13500    | 15500       | 13500    | 15500       |
| 7     | Head Room Requirement (MM)<br>Vendor to confirm the Head Room Feasibility            | 2100                  | 1800              | 2100              | 1800              | 2100                            | 1800        | 2100     | 1800        | 2100                   | 1800        | 2100     | 1800        | 2100                    | 1800        | 2100     | 1800        | 2100     | 1800        | 2100     | 1800        |
| 8     | Minimum Height of Lift from the floor level (MM)                                     | 9300                  | 12300             | 9300              | 12300             | 12300                           | 15850       | 12300    | 15850       | 12300                  | 15850       | 11400    | 13700       | 11400                   | 13700       | 11400    | 13700       | 11400    | 13700       | 11400    | 13700       |
| 9     | MONORAIL Size (in BH&L scope)<br>Vendor to confirm the beam size as per their design | *NPB 600 +CAPPING     | *NPB 600 +CAPPING | *NPB 600 +CAPPING | *NPB 600 +CAPPING | *MRB 2                          | MRB-1       | *MRB 2   | *MRB 2      | *MRB 2                 | *MRB 2      | *MRB 2   | *MRB 2      | *MRB 2                  | *MRB 2      | *MRB 2   | *MRB 2      | *MRB 2   | *MRB 2      | *MRB 2   | *MRB 2      |

NOTE : 1) The lift shown in the table is approximate only ; depending upon head room of the hoist it may be altered.

2) \* - The above beam size is Tentative. For MRB- 1 & 2 details, Refer attachment.(ANNEXURE-III)



**PAINING****ANNEXURE- II**

| SI No                                       | SURFACE LOCATION          | PGMA | SURFACE PREPARATION                  | PRIMER                                                                                                                         |               | FINISH                                                             |               | TOTAL DFT IN (µm min.) |
|---------------------------------------------|---------------------------|------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|---------------|--------------------------------------------------------------------|---------------|------------------------|
|                                             |                           |      |                                      | PAINT                                                                                                                          | DFT (µm min.) | PAINT                                                              | DFT (µm min.) |                        |
| NORTH KARANPURA, MOUDA, BARH I & II PROJECT |                           |      |                                      |                                                                                                                                |               |                                                                    |               |                        |
|                                             | Handling Equipment in FGD |      | Power Tool Cleaning to st3 (SSPC-SP3 | Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)<br>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                    |

**PANKI PROJECT**

|  |                                             |  |                                                                         |                                                                           |    |                                                                                                                                 |    |     |
|--|---------------------------------------------|--|-------------------------------------------------------------------------|---------------------------------------------------------------------------|----|---------------------------------------------------------------------------------------------------------------------------------|----|-----|
|  | Handling Equipment in FGD- Pulleys, Hoists& |  | Blast cleaning to Sa 2½ (Near white metal) with surface profile 35-50µm | Two coats of Epoxy Zinc phosphate primer as per IS 13238.<br>DFT-35µ/coat | 70 | Two coats of Epoxy based Polyamide cured finish paint to IS 14209<br>DFT-35µ/coat<br>Shade: Light grey<br>Shade no. 631 of IS:5 | 70 | 140 |
|--|---------------------------------------------|--|-------------------------------------------------------------------------|---------------------------------------------------------------------------|----|---------------------------------------------------------------------------------------------------------------------------------|----|-----|

**GENERAL NOTES**

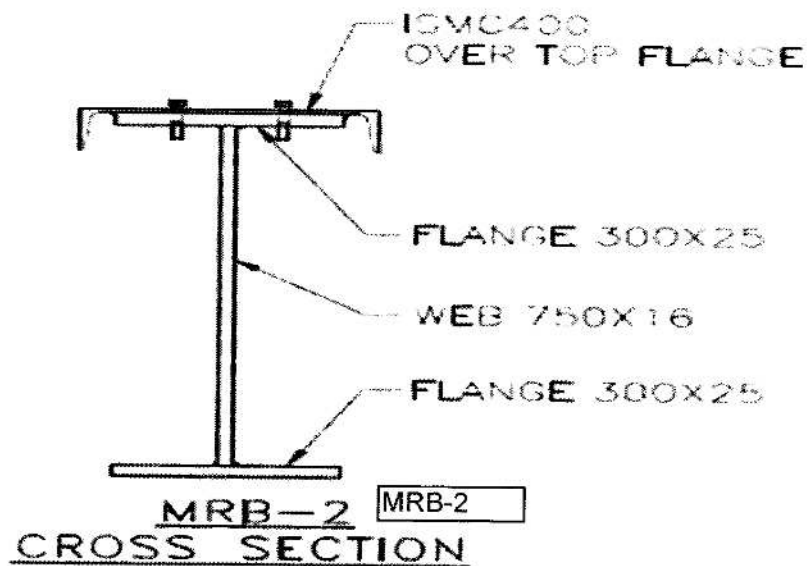
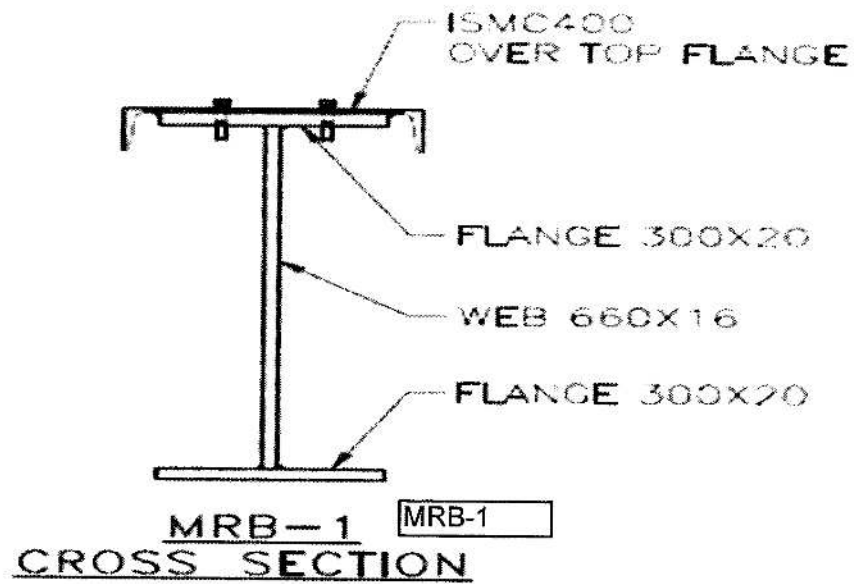
- No painting is required for Galvanized, non-ferrous & stainless steel items, except as indicated above.
- Machined items are to be applied with coat of temporary rust preventive oil
- PGMAs covered in sub-supplier (i.e., Purchased) items viz., Agitator and other sub-delivery components etc., are not indicated in the above list. However, the Painting Schedule for all items supplied by all sub-suppliers and BOI under the scope of BHEL shall be same as for main equipment covered in this document.
- In sub-assy, wherever plates / sheets of thickness less than or equal to 5mm and rods are used and for minor items - Power Tool or Hand Tool Cleaning to SSPC - SP 3 / SP 2 shall be followed and painting shall be as per sl no: 51 under FGD system.
- Ground shade/colour of finish paints and identification tag/band for equipments, piping, pipe services, supporting structures and other components is followed as per Vol. II, Chapter 7 at site.
- All components covered under different PGMAs are to be painted. In case any component is left out, the same shall be deemed to be included under the relevant section.
- All threaded and other surfaces of foundation bolts and its materials, insulation pins, Anchor channels, Sleeves shall be coated with temporary rust preventive fluid and during execution of civil works; the dried film of coating shall be removed using organic solvents.
- All steel structures shall be provided with painting as given in the specification. Further, painting system shall also meet the requirements of corrosivity category C3 (durability high) as per ISO 12944.
- Finish coat to be applied after an interval of min 10 hrs and within 6 months (after completion of intermediate coat).
- Bottom of base plate including below zero level portion marked in Supporting Columns of structures which will be embedded in concrete, those surfaces shall be prepared by manual cleaning to ST3 and provided with primer coat of chlorinated rubber based zinc phosphate primer of min. 50 µm DFT.

**Bidder seal and Sign**

### ANNEXURE-III

MONORAIL Size (in BHEL scope) for Booster Fan & Motor handling for NKP, BARH -I &II  
PROJECT

Vendor to confirm the beam size as per their design.





## ANNEXURE-IV

### UPRVUNL – PANKI

#### **SPECIAL REQUIREMENTS IN LOCAL CONTROL PANEL AND CABLES FOR PANKI PROJECT**

##### **1.0 LOCAL CONTROL PANEL:**

Control panels shall be of wall mounted control box with pendent push button controls and shall be constructed of specified gauge of steel plates (CRCA). All the cable entries shall be at the bottom of control panels

The finish colours for exterior and interior surfaces shall conform to the following shades:

a) Exterior - RAL 7032/RAL 7035.

b) Interior - Glossy white two coats/RAL 7035 with fire resistant paint

Local control panels provided shall be totally enclosed, Dust tight and Vermin proof having IP-65 protection. It shall be fabricated of 3 mm CRCA sheet.

The panel shall be provided with push buttons, indicating lamps, annunciators, indicating instruments, interlock/ deinterlock switches etc., and sufficient number of panel space heater along with thermostat and 5/15A receptacles required for the complete system

##### **2.0 CABLES:**

###### **2.1 Flexible Trailing cables:**

1100 V Grade flexible trailing cable shall be tinned copper of Class – 5 of IS –8130, heat resistant electrometric compound based on EPR insulation, inner sheath of heat resistant elastomeric compound PCP sheath, nylon cord reinforcement and heat resistant, oil resistant and flame retardant heavy duty electrometric compound FRLS CSP outer sheath.

###### **2.2 Power cables:**

1100 volt, 90 Deg.C rating, heavy duty power cables with stranded aluminium conductor, extruded XLPE insulation, extruded HRPVC, FR-LSH inner sheath, aluminium round wire armour for single core cables and galvanized steel strip/wire armour for three (3) core cables, and extruded HRPVC, FR-LSH overall sheath.

###### **2.3 Control Cables:**

1100 Volt grade, 85 deg C rating, control cables with stranded copper conductors, HRPVC Insulation, extruded HRPVC, FRLS Inner sheath, round wire/strip armour as specified elsewhere in the specification and extruded HRPVC, FRLS overall sheath. The cables shall be suitable for use in 1100V non-effectively earthed system. Control cable shall generally conform to IS 1554 latest and have ISI mark. Armour shall be GS.