TECHNICAL PRE-QUALIFICATION REQUIREMENT (PQR) FOR ELECTRIC WIRE ROPE HOIST (IN CASE OF OPEN TENDER)

SL NO	Technical Pre-Qualification Requirement (PQR) for FOR ELECTRIC WIRE ROPE HOIST	Bidder's Reply with Supportive documents
1	Vendor should be a manufacturer of Crane / Hoist.	
	List of customer to whom Electric Wire rope Hoist / Underslung Cranes / EOT Cranes / Cranes of same capacity or higher supplied to silo/bunker application, FGD application, Coal fired Power plant, Industrial application, Nuclear power plant.	
	Minimum one number of Previous inspection and test report to be furnished for the same capacity or higher Capacity along with Previous purchase order of same item.	

Bidder's Seal & signed

TECHNICAL SPECIFICATION
OF
ELECTRIC WIRE ROPE HOIST (EWRH) WITH TROLLEY

Buyer(Purchaser)	:	M/s.BHEL
Application	:	Wet Limestone Flue Gas Desulphurization

Bharat Heavy Electricals Limited
Ranipet – 632 406

REV	DATE	DESCRIPTION	PREPARED	APPROVED
00	21-03-2023	Fresh Release	Jyotish Kumar Patel JYOTISH KUMAR PATEL (DM/EDC-FGD)	KESAVAN V (SDGM/EDC-FGD)

CONTENTS

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1.0. 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 ELECTRIC WIRE ROPE HOIST along with accessories 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.

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-A**. 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.

i. **Special Note: In case of variance between sections, the requirement of CUSTOMER TECHNICAL SPECIFICATION shall prevail. Customer contract specification of HOIST is provided as ANNEXURE - C to the specification & shall be referred strictly.**

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2.0 **SCOPE:**

This specification covers the design, material constructional features, manufacture, testing, inspection, packing, supervision for erection & commissioning and supply of electric wire rope 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.

2.1 **APPLICATION**

The electric wire rope hoists and trolley are meant for handling for equipment installed at Flue Gas desulfurization plant.

2.2 **SCOPE OF SUPPLY OF HOIST**

Each Electric wire rope hoists should necessarily consists of the following items:

Capacity : As per Enquiry
Trolley travel speed for electric hoists : As per Annexure-C (Customer Spec)
Hoisting speed for electric hoists : As per Annexure-C (Customer Spec)

S. No	Description	Unit	**FOR EACH ELECTRIC WIRE ROPE HOISTS**
1	EWRH 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 EWRH capacity, Height (H), Length of travel (L) & Radius (R) as per As per Annexure-D (Hoist Details) & Layout GA as per Enquiry.	ST	As Per Enquiry
2	Fuse with enclosure suitable for outdoor installation, wall mounted Per Crane	NO	1 for Each Hoist
3	Trailing flexible copper cable for power supply	MR	To suit for Each Hoist
4	Galvanized link drag chain	MR	To suit for Each Hoist
5	Cable trolley assembly	ST	To suit for Each Hoist
6	Auxiliary girder assembly for trailing cable for a cross travel length	MR	To suit for Each Hoist
7	Rain hood for Hoist motor, cross travel motor and control box per Hoist	ST	1 for Each Hoist
8	Grease gun with grease	NO	1 for Each Hoist
9	10 % lubricant	ST	1 for Each Hoist

2.3 **DESIGN & CONSTRUCTIONAL REQUIREMENTS**

Construction of Electric wire rope hoists 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-D** (Hoist Details) and **Annexure-F** (GA layout drawing).

Note: Vendor has to design Hoist Headroom as minimum as possible. The Hoist Headroom value shall be specified in Vendor technical offer itself.

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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	Electric 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 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 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 statuary regulation and safety code/standard applicable. Nothing in this specification shall relieve the vendor of his responsibility.	

4.0 **DESIGN REQUIREMENT**

The Electric wire rope hoists shall be designed and constructed in accordance with the latest revision of **IS: 3938** and shall be suitable for **Duty class 2**.

Electric wire rope 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 electro Mechanical Type brakes with asbestos lining 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

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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 equipment's 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.

5.0 FEATURES OF CONSTRUCTION (MECHANICAL SYSTEM)

5.1 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.

5.2 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.

5.3 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.

5.4 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.

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5.5 **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.

5.6 **ROTATING AND STATIONERY SHAFT**

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

5.7 **LUBRICATION**

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

5.8 **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 IS 2266.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.

5.9 **HOOK**

Swivelling 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.

5.10 **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.

5.11 **ROPE GUIDE**

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

5.12 **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.

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5.13 **LINK (DRAG) CHAIN**

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

5.14 **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.

5.15 **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.

6.0 ELECTRICAL SYSTEM

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

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

6.2 **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

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6.3 **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.

6.4 **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

6.5 **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.

6.6 **MOTOR FRAME**

The frame shall be cast and rigid.

6.7 **DIRECTION OF ROTATION**

The motors shall be designed for both directions of rotation.

6.8 **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.

6.9 **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.

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6.10 **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.

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

6.12 **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.

6.13 **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.

6.14 **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.,

6.15 **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.

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6.16 **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.

6.17 **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, EMEGENCY STOP.

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

6.18 **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.

6.19 **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**.

6.20 **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

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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.

7.0 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 MAKE OF COMPONENTS:

Vendor to incorporate their BOI Makes in their QAP.
Make of various components for projects are subject to Customer approval. No additional delivery or price implication is acceptable due to Customer comment on make of components. Mix up of make for same item is not acceptable in any enquiry.

9.0 PAINTING PROCEDURE:

For Painting of Hoist Refer **ANNEXURE-E.**

10.0 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 START UP & COMMISSIONING SPARES:

Start-up & Commissioning Spares shall be part of the main supply of the EWRH. 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.

Items/comenponets belong to a HOIST shall be send to site in a single packing as far as possible or traceable identical number mark needs to mention in sub-assembly /sub parts.

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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.

RECOMENDATED SPARE

The Bidder shall offer electrical / electronic / mechanical spares for 2 years trouble free operation of the Electric wire rope Hoists. (Unit Price along with quantity of each item of spare shall be offered in the price bid)

12.0 Price of each item is to be given separately for **SUPERVISION OF ERECTION, TESTING AND COMMISSIONING**

Erection of EWRH will be done by owner as per vendor's Erection Manual and check List.
Supervision of Erection and Commissioning of the EWRH at project site is in bidder's scope. Bidder shall include towards supervision of erection, pre-commissioning & post- commissioning check-up, start-up, testing and trial runs. TA/DA, boarding and lodging shall be borne by the bidder and shall be inclusive in supply portion.

However, refer the **ANNEXURE- B** for complete supervision of Erection, testing and Commissioning EWRH.
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.

13.0 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-A.**
3. Typical GA of HOIST with BOM for the system.
4. Rating of cross travel and hoist motor.
5. Headroom of Hoist.

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

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14.0 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.

1. General Arrangement drawing of Hoist, Cross Travel arrangement, Auxiliary Girder & Trailing cable system, Control Panel, Pendant Push button station etc.
2. Bill of materials for the Hoist, Cross travel arrangement, Auxiliary Girder System, all cables under the scope etc.
3. Calculation for Factor of safety on selection of Steel wire rope.
4. Power and Control scheme.
5. Bill of material indicating description of the item, rating, make, quantity, type reference etc., for a) Panel mounted components, b) Pendent 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.
6. Hoist mounting arrangement.
7. Gasketting and locking arrangement of Control panel.
8. Justification for a) Motor rating selected, b) Rope selected, c) VA rating of control transformer.
9. List of items mounted in the assembly and list of loose item supplied along with weight.
10. Packing drawings.
11. Data sheet for Hoist, Data sheet for Hoist & cross travel motor, Data sheet for Brake and Data sheet for trailing & pendent cable.
12. Cable schedule for hoist indicating size, termination between which equipment, Rating, quantity, make etc.
13. 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.
14. All the drawings shall be prepared in AutoCAD. After final approval the above documents shall be submitted in CD apart from hard copy.
15. The drawings and data sheets shall be submitted in soft media.pdf format, apart from 6 sets from hard copy. For BHEL approval.

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15.0 INSEPCTION:

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 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.

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

1. Dos & Don'ts during receipt, storage, erection & commissioning.
2. Instruction to be followed on receipt, storage & erection.
3. Construction details of the hoist assembly.
4. Drawing indicating various parts of EOH assembly with part numbers.
5. Recommended lubrication & maintenance schedule.
6. Cut view drawing for the Gear box assembly.
7. As built drawings, BOM, cable schedule.
8. Disposal procedure for environmental hazardous material if any.

17.0 PACKING AND FORWARDING:

The ELECTRICAL HOIST and accessories shall be properly packed 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.

Items/comenponets belong to a HOIST shall be send to site in a single packing as far as possible or traceable identical number mark needs to mention in sub-assembly /sub parts.

Bidder sign & seal:

18.0 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.

19.0 MARKING

As per IS 3938 latest.

20.0 ANNEXURES

ANNEXURE-A

LIST OF DEVIATIONS/EXCEPTIONS TO THE ENQUIRY DOCUMENT

Sl No	Clause No	Page No	Description of Deviation

Note: Enlarge the table to incorporate items

SIGNATURE OF BIDDER ----------

NAME ----------

DESIGNATION ----------

Bidder sign & seal:

ANNEXURES			**Bidders Acceptance / Comments**
ANNEXURE – A	**List of deviations / exceptions to the enquiry document**	Refer Enclosed specification.	
ANNEXURE - B	**Supervision of erection, testing and commissioning**	Refer Enclosed specification.	
ANNEXURE - C	**Customer technical specification & data sheet of HOIST**	Refer Enclosed specification.	
ANNEXURE - D	**HOIST details**	Refer Enclosed specification.	
ANNEXURE - E	**Painting of Hoist**	Refer Enclosed specification.	
ANNEXURE - F	**GA layout Drawing**	Refer Enclosed specification.	

SIGNATURE OF BIDDER ----------

NAME ----------

DESIGNATION ----------

Bidder sign & seal:

ANNEXURE-B

SUPERVISION OF ERECTION, TESTING AND COMMISSIONING

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

Erection of ELECTRIC WIRE ROPE HOIST (EWRH) will be done by owner as per vendor's Erection Manual and check List.

However, the Bidder/vendor shall make 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.

The Bidder/vendor have to make two numbers of visit for the supervision erection & commissioning, testing for **Each electric Hoist** – 1st visit for the supervision of erection & 2nd Visit for pre-commissioning & post- commissioning check-up, start-up, testing and trial runs of all the items covered under the scope of supply for each Electric Hoist

SL NO	DESCRIPTION	QUANTITY (SET)
1	SUPERVISION OF ERECTION OF ELECTRIC WIRE ROPE HOIST AS PER SPEC FGD: EWRH: TUTICORIN REV00 AT NTPL TUTICORIN SITE AS FRIST VISIT FOR EACH ELECTRIC HOIST.	As Per Enquiry.
2	SUPERVISION OF COMMISSIONING, INSPECTION AND TESTING OF ELECTRIC WIRE ROPE HOIST AS PER SPEC FGD: EWRH: TUTICORIN REV00 AT NTPL TUTICORIN SITE AS SECOND VISIT FOR EACH ELECTRIC HOIST.	As Per Enquiry.

Vendor shall quotes charges for **complete work for supervision** for erection & commissioning, testing for each Electric Hoist.

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 above supervision charges** portion for complete work for supervision for erection & commissioning, testing for each Electric Hoist.

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.

Bidder seal & signed

ANNEXURE-C
CUSTOMER SPECIFICATION

VOLUME : II-H

SECTION - II

MISCELLANEOUS HOISTS

VOLUME : II-H

SECTION-II

MISCELLANEOUS HOISTS

1.00.00 INTRODUCTION

1.01.00 The hoists will be used for erection and maintenance of various equipment in different buildings under the scope of Flue Gas Desulphurisation Plant Package of existing 2 x 500 MW Tuticorin Thermal Power Station at Tuticorin, Tamil Nadu of NLC Tamil Nadu Power Limited (NTPL).

1.02.00 Hoists are divided into two separate groups - (a) Hand operated and (b) Electric operated. The selection criteria for Electric/manual hoist have been indicated subsequently.

1.03.00 The location and number of hoists is to be finalized during detailed engineering based on selection criteria and layout arrangement. Final arrangement is subject to approval of Owner/Consultant.

1.04.00 Hoists shall be provided in all areas under the scope of this specification (except the areas covered by E.O.T. cranes) where any equipment/ component weighing 250 kg and above is installed, mobile equipment is not accessible to those areas and needs to be handled for maintenance purposes. Number of monorail beams shall be such that the centre line of the hoist and the centre line of equipment to be handled shall be not more than 500 mm.

1.05.00 Monorail hoists shall at least be provided in the areas mentioned in Annexure-I. For areas having space restriction for providing mono rails, fixed type chain pulley blocks suitably fixed on hook is acceptable The list is indicative only and not an exhaustive one.

2.00.00 CODES AND STANDARDS

The design, manufacture and testing of the equipment covered under this specification shall conform to the latest editions of the following Indian Standards:

2.01.00	IS : 3832	:	Specification for Hand Operated Chain Pulley-blocks.
2.02.00	IS : 807	:	Code of Practice for Design, Manufacture, Erection and Testing (Structural Portion) of Cranes and Hoists.
2.03.00	IS : 6216	:	Short link Chain, Grade T(8) for Pulley-blocks & other Lifting Appliances.

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2.04.00	IS : 2429 (part -I)	:	Non-calibrated Load Chain for Lifting Purposes.
2.05.00	IS : 15560	:	Point Hook with Shank up to 160 tones - Specification
2.06.00	IS : 3938	:	Specification for Electric Wire Rope Hoists.

and other Indian Standards referred to in the above standards.

3.00.00 **SCOPE OF SUPPLY AND SERVICES**

3.01.00 Scope of work includes supply of the following:

3.01.01 All drive motors and driving gears as necessary.

3.01.02 Limit switches for electrical hoist as necessary.

3.01.03 Trailing cable with all supporting fixtures as necessary for electric hoists.

3.01.04 Pendent control station with all accessories for electric hoists.

3.01.05 Lifting lug, eye bolts etc., for handling hoist parts.

3.01.06 Protection guard as specified.

3.01.07 Lifting hook block assembly for hoists.

3.02.00 For details regarding Scope of Services and works, Lead Specification Volume-IIA of this specification shall be referred.

4.00.00 **SPECIFIC PERFORMANCE REQUIREMENTS**

4.01.00 **Type**

For equipment weighing more than 250 Kg and up to less than 2000 kg with lift less than 10 M, manual hoists (With mono rail/ fixed chain pulley block type as per layout and specific indication elsewhere in this specification) shall be provided.
For equipment weighing 2000 kg and more, electric hoists shall be provided.

In both the cases if the lifting height is10 m and more, electric hoists shall be provided.

4.02.00 **Lifting capacity**

Capacity of each hoist shall be 1.2 times the maximum working load.

4.03.00 **Effort for Mechanical Hoists**

4.03.01 **Hoisting**

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Hoisting effort for hoists up to 3 tones capacity shall not be more than 20 kg.

Hoisting effort for hoists above 3 tones capacity shall not be more than 25 kg.

4.03.02 **Trolley Motion**

Effort for trolley motion for hoists upto 3 tonnes capacity shall not be more than 43 Kg.

Effort for trolley motion for hoists above 3 tones capacity shall not be more than 55 Kg.

4.03.03 For Electric operated hoist both hoisting and trolley motion shall be motor operated.

4.04.00 **Lift**

4.04.01 **Lift above operating floor**

Highest position of the hook shall be such that during operation of hoists, the vertical distance between bottom of any equipment handled and top of any permanent structure or equipment in the operating area shall be at least one metre.

4.04.02 **Approach below operating floor**

To be decided by the Bidder for safe and reliable handling of any equipment above 500 Kg below the operating floor.

4.05.00 **Length of monorail hoist**

To be decided by the Bidder depending on the floor and machine layout. The horizontal distance between the centre line of the hoist and centre line of any installed equipment in its operating shall not be more than half metre.

5.00.00 **DESIGN AND CONSTRUCTION**

5.01.00 All parts requiring replacement or lubrication shall be easily accessible without the need for dismantling of other equipment and structures.

Robust construction and ample rating merging which experience has shown to be necessary shall be ensured throughout manufacture.

5.02.00 All components of hoists of identical capacity and duty shall be interchangeable. The hoists of identical capacity and duty shall be identical in all respects unless otherwise required. The hoist design shall be such that these can be quickly removed from one monorail beam and fixed on another beam without disassembling major components.

5.03.00 All machinery and equipment included under this specification must be equipped with safety devices and clearances to comply with recognized standards and specification requirements.

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5.04.00 Cast iron parts wherever used, shall conform to IS:210 - FG 260. Also no wood or other combustible materials shall be used.

5.05.00 Defects in material like fractures, cracks, blowholes, laminations, pitting etc. are not allowed. Rectifications of any such flaw are permissible only with the approval of the Purchaser.

5.06.00 Each hoist shall be permanently and legibly stamped with the tag number, manufacturer's name, safe working load, grade of load chain (where applicable), range of lift etc.

5.07.00 Load chain (where applicable) shall be of grade T(8) as per IS:6216 and Hand chain shall be as per IS:2429 (Part-I) grade 30.

5.08.00 Wheels in trolley unit travel shall be single flanged with straight/tapper/barrel shaped tread to suit the monorail. Wheels should be preferably of forged steel construction. Material of construction for wheels of traversing block and hoist gear for hoist used in hazardous areas shall be of non-ferrous material to avoid spark during operation.

5.09.00 All gears shall be hardened and tempered steel with machine out teeth.

5.10.00 **Hoist (Manually Operated)**

5.10.01 Manually operated hoists shall be of spur gear chain pulley block type. It shall be suspended from the trolley by a hook. The design of the hoist shall conform to IS:3832 (Specification for hand operated chain pulley blocks).

The hooks and brakes of hoist shall conform to the requirements stipulated in (a) and (b) below

a) Hooks shall conform to IS:3832. The load hook shall be swiveling type fitted with a locking device.

b) The pulley blocks shall be fitted with an automatic mechanical load brake to prevent self-lowering of load in all working positions. The load brake shall also allow smooth lowering of load without serious overheating.

c) All manually operated hoists, unless stated otherwise, shall be trolley suspended type.

5.10.02 The trolley of hoists shall be manually operated.

5.10.03 The hoists shall be of Mechanism class 2 as per IS:3832.

5.11.00 **Electric Hoist**

5.11.01 Electric hoist shall be electric wire rope trolley suspended type. The design, operation, testing of electric hoist shall conform to IS:3938 (Specification for electric wire rope hoist).

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Minimum speed for hoisting shall be 3 m/min. and that of for trolley motion shall be 15 m/min.

5.11.02 Lifting hook shall conform to IS 15560 as applicable.

5.11.03 Wire rope for hoists shall conform to IS-2266.

5.11.04 Electro-mechanical brakes of fail to safety type shall be provided for hoist motion as well as per trolley motion for electrically driven trolley. Load brake shall allow smooth lowering of load and arrangement shall be such as it cannot be released accidentally. Capacity of brake and other relevant data shall conform to IS:3938.

5.11.05 The trolley of the hoists shall be electrically driven.

5.11.06 For other components of hoist such as rope, sheave, drum, bearings, gears etc. stipulations of IS: 3938 shall be followed.

5.11.07 Motor shall be rated for duty S4, CDF 40% and 150 starts per hour. Service class of motor shall be "4" as per IS: 3938. Conditions given in IS:3938 for hoist motor shall be followed over and above the specification of electric motor in Volume II-F.

In case of any contradiction of the aforesaid standard and the motor specification, the conditions, which are more stringent, shall be considered. All the motors shall be suitable for reversing, frequent starting and braking. Motors shall be provided with suitable space heating arrangement.

5.11.08 Hoist shall be designed so that remote control can be effected by means of pendant push button switch from the operating floor. Operation, arrangement etc. of pendant push button switch shall conform to IS: 3938.

5.11.09 Micro-speed attachment in hoist shall be provided if considered necessary by the Bidder.

5.11.10 The hoists shall be of mechanism class 2 as per IS-3938.

5.12.00 Ball and roller bearings of reputed make shall be used throughout.

5.13.00 Suitable lubrication system shall be provided for all gear drives.

5.14.00 **Other Electrical Items**

5.14.01 The cross conductor on monorail for power supply to the hoist shall be of festoon type flexible insulated cable conductors. All fixtures and accessories shall be provided by the Bidder for this purpose.

5.14.02 Necessary insulators, supports, clamps and all other accessories shall be provided as per standard design.

5.14.03 Each hoist shall be provided with a starter panel with protective relays.

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5.14.04 One main isolating switch shall be used to cut-off the supply to the hoist assembly.

5.14.05 One main electro-magnetic contactor together with magnetic overload relay (hand reset) for each motor circuit shall be housed in the protection panel.

5.14.06 The operation of overload relay shall interrupt the main magnetic contactor.

5.14.07 Adequate short circuit protection shall be provided for main and individual circuits.

5.14.08 415V ± 10%, 3 Phase, 4 Wire, 50 Hz ± 5%, power supply for the hoist shall be arranged through switch fuse unit mounted at standing height at a convenient location near each hoist. The above switch fuse unit and the connecting cables between switch fuse unit and the cross conductor are included within the scope of this specification.

5.14.09 Transformers to step down the voltage and rectifiers as necessary shall be provided by the Bidder.

5.14.10 All external and internal power, control and auxiliary circuit wiring of the electrical drive and accessories and panels shall be provided. The wiring shall be done with 1100 V grade PVC insulated stranded aluminium conductor cable of suitable size not less than 2.5 sq.mm nominal equivalent copper area of cross-section. All control and auxiliary circuit wiring shall be done with 1100 V grade PVC insulated, 2.5 sq.mm stranded copper conductor. Control wire terminations to the panels shall be made with compression type connectors. Multiway terminal blocks shall be furnished for terminating panel wiring and outgoing cable.

5.14.11 The hoist structure, motor frame and metal cases of all electrical equipment including metal conduit shall be effectively connected to earth. All grounding materials shall be supplied under this specification to grounding risers.

5.14.12 Single speed control shall be used for both hoist and trolley travel in each direction of motion.

5.15.00 Final painting at manufacturer's works shall be provided by the Bidder.

6.00.00 **INSPECTION AND TESTING**

6.01.00 The manufacturer shall conduct all tests required to ensure that the equipment furnished shall conform to the requirements of the specification and in compliance with the requirements of the latest edition of IS: 3832 or equivalent standards for manually operated hoists and shall be as per IS:3938 for electrically operated hoist.

6.02.00 All the mono-rail hoists shall be tested at site as per the stipulation of relevant Indian Standards.

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7.00.00 DRAWING, DATA AND INFORMATION REQUIRED

7.01.00 General arrangement drawings incorporating all dimensions information on head rooms, lift, wheel loads, hook suspension arrangement and other relevant data for all the hoists.

7.02.00 Design calculation for selection of electric motor capacities for electric hoist.

7.03.00 Complete list of location, number and capacity of hoists provided.

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ANNEXURE - D

ELECTRIC WIRE ROPE HOIST (EWRH) WITH MOTOR DRIVEN TROLLEY

PROJECT: NTPL TUTICORIN FGD PROJECT

SL NO	AREA	TYPE OF HOIST	CAPACITY OF HOIST	MINIMUM SPEED		HOIST MONORAIL BEAM BOTTOM ELEVATIONS (Hoist Monorail BEAM in BHEL Scope)	FLOOR LEVEL	TRAVEL LENGTH	PATH	MINIMUM RADIUS OF TRAVEL	HOIST MONORAIL I-BEAM (Hoist Monorail BEAM in BHEL Scope)	MAXIMIMUM HEIGHT OF BOTTOM OF MONORAIL I-BEAM TO HOIST HOOK	HEIGHT OF BOTTOM OF MONORAIL I-BEAM TO HOIST HOOK - HOIST HEAD ROOM - VENDOR TO SPECIFY	TOTAL QNTY
				HOSTING	CROSS TRAVEL									
			TON	METER PER MINUTE	METER PER MINUTE	(EL (+/-) IN METER)	(EL (+/-) IN METER)	(METER)	CURVED / STRAIGHT	(MM)	NPB / UB /ISMC/ISMB	(MM)	(MM)	(SET)
A. BOOSTER FAN AREA														
1	HOIST FOR BUF MOTOR	ELECTRIC WIRE ROPE HOIST	20	3	15	EL (+) 11.400	EL (-) 0.2	16	STRAIGHT	NA	MRB-M	2400	_____	As per Enquiry
2	HOIST FOR BUF FAN HOUSING	ELECTRIC WIRE ROPE HOIST	10	3	15	EL (+) 13.000	EL (-) 0.2	16	STRAIGHT	NA	MRB-F	2400	_____	As per Enquiry

NOTE : 1) Depending upon Hoist head room , the actual height of lift for hoist shall be arrived.

2) Vendor to specify the Hoist head Room during Tender stage.

3)For MRB-M & MRB-F ,Refer attached Monorail Beam details.

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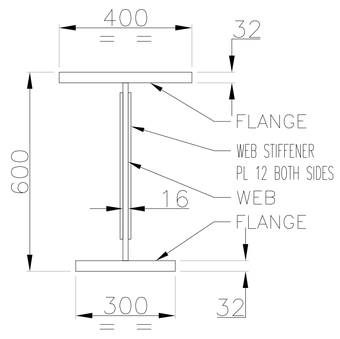
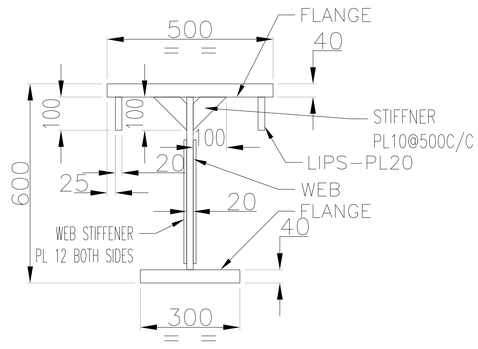
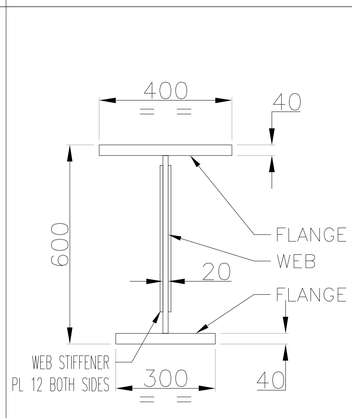
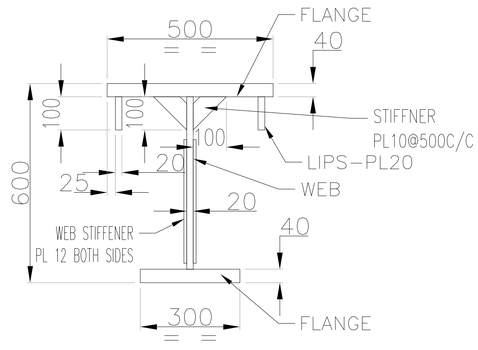
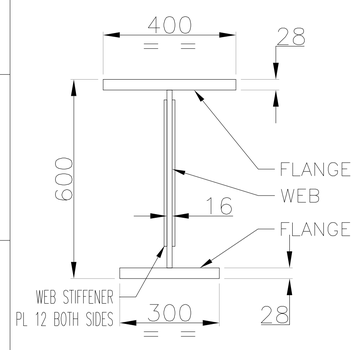
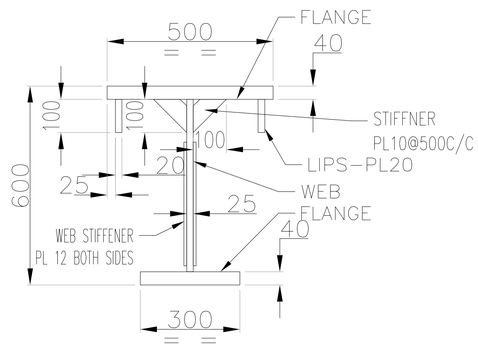
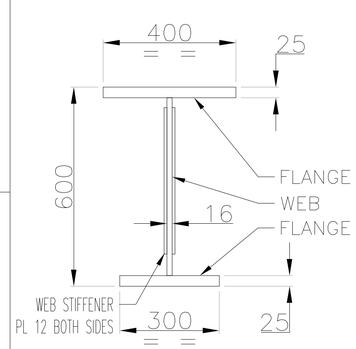
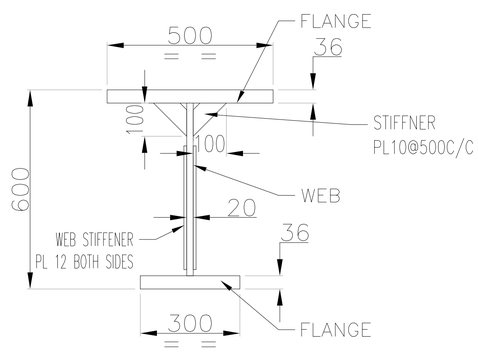
BUF HANDLING MONORAIL BEAM SIZES — 15.11.2022

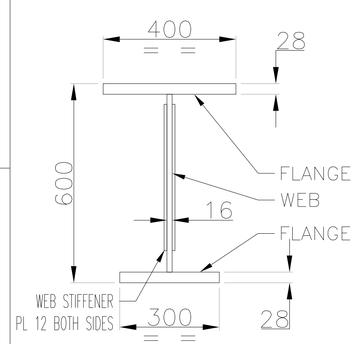
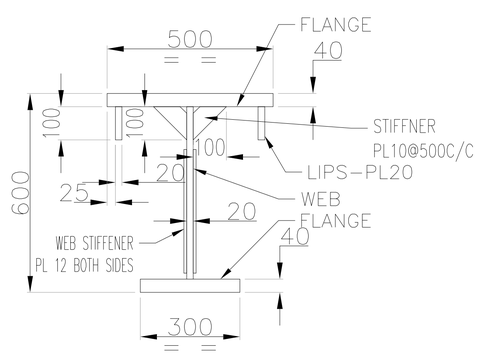
NTPC KORBA FGD – BUF HANDLING MONORAIL BEAM TRANSMITTAL

KORBA FGD UNIT	CUT NO	MRB–F CROSS SECTION	MRB–M CROSS SECTION
UNIT 4	G505	 SWL : 14 TONS	 SWL : 21 TONS
UNIT 5	G506		
UNIT 6	G507		
UNIT 7	G508		
STAGE–I	G205	 SWL : 13 TONS	 SWL : 22 TONS

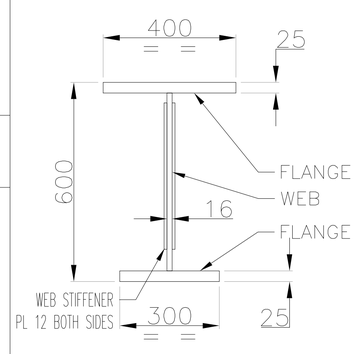
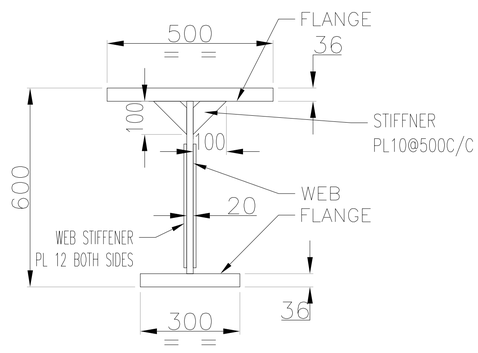
NTPC KAHALGAON FGD FGD – BUF HANDLING MONORAIL BEAM TRANSMITTAL

KAHALGAON FGD UNIT	CUT NO	MRB–F CROSS SECTION	MRB–M CROSS SECTION
UNIT 5	G512	 SWL : 10 TONS	 SWL : 20 TONS
UNIT 6	G513		
UNIT 7	G514		
STAGE–I (U1&U2)	G213	 SWL : 9 TONS	 SWL : 17.5 TONS
STAGE–I (U3&U4)	G215		

NTPC SIPAT FGD – BUF HANDLING MONORAIL BEAM TRANSMITTAL

SIPAT FGD UNIT	CUT NO	MRB–F CROSS SECTION	MRB–M CROSS SECTION
UNIT 4	G517	 SWL : 9 TONS	 SWL : 20 TONS
UNIT 5	G518		

NTPC TUTICORIN FGD – BUF HANDLING MONORAIL BEAM TRANSMITTAL

NTPL FGD UNIT	CUT NO	MRB–F CROSS SECTION	MRB–M CROSS SECTION
UNIT 1	G515	 SWL : 10 TONS	 SWL : 20 TONS
EACH BUF ARE HAVING ONE EOH EACH FOR BUF AND MOTOR HANDLING. REFER BUF GA			
UNIT 2	G516		
EACH BUF ARE HAVING ONE EOH EACH FOR BUF AND MOTOR HANDLING. REFER BUF GA			

Bidder seal & signed

ANNEXURE - E : PAINTING OF HOIST

Sl No	Description	Surface preparation	Primer/ DFT	Intermediate DFT	Finish DFT	Total DFT
12	**Atmospheric Steel Storage Tanks:** Emergency quench water tank (FW 226)- Inside surfaces Process water tank- Outside surfaces (FW 748). [Annexure I of Vol. II-B/Section-IV]	Blast cleaning to near white metal Sa 2½	Two coats of zinc phosphate primer (DFT-30 µ per coat)	NIL	Two coats synthetic enamel (DFT-35µ per coat)	130 µm (min)
		Underneath: One coat Bituminastic paint (DFT 75 µ min.)				
13	Foundation Material for scrubber (FW 281), Foundation material for Elevator (FW 282), Foundation material for RC Pump shed (FW 283), Foundation material for Tanks (FW 740), Foundation Material for Pipe racks (FW 760), FOUNDATION MATL FOR DUCT STRUC(FW280); FNDN MATL SUB PIPE RACK(FW763)- Threaded portion	Temporary rust preventive oil(Dry Type) 40µm (threaded portion); One coats of Red oxide Zinc phosphate primer, 30 µm (non threaded portion)				
14	ABSORBER SYSTEM ACCESSORIES (FW223);ABS RC PUMP NOZZLE (FW201), ABS NOZZLE(FW202,FW203); VIEWING PORTS (FW239); ELEVATOR AND ACCESSORIES(FW293); PIPE ACCESSORIES AND VALVES (FW 751,FW752,FW752,FW753, FW754,FW755,FW758); ELEVATOR M/C ROOM(FW385); ABS MISCELLANEOUS (FW307); SLURRY PUMP & ACC(FW701); WATER PUMP AND ACC(FW702); RC PUMP INLET OUTLET VALVE(FW815), HANDLING EQUIPMENT FOR FGD(FW715); TRENCH	Blast cleaning to near white metal Sa 2½	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	One coat of epoxy glass flake (high build) paint; DFT- 100µ	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	240 µm (min)

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Sl No	Description	Surface preparation	Primer/ DFT	Intermediate DFT	Finish DFT	Total DFT
	COVER PLATE(FW709); SHIM PLATE (FW711), MANHOLE DOOR(FW717), TEMPLATES-MISC(FW789),TOOLS(FW790),AIR RECEIVERS(FW798),TOOLS AND TACKLES(FW996),COMMISSIONING SPARES(FW988); Miscellaneous FGD system (FW 299); ABSORBER AGITATOR(FW241); CHAIN PULLEYS(FW713); HOISTS(FW714); VALVES, PIPING&RELATED ACC excluding fasteners(FW816 TO FW871) [Clause 7.04.01 of Vol. II-A/Section-V]		as per Type II as per ASTM D520-00; DFT- 70µ			
15	EXPANSION JOINTS(FW251);OUTLET GUIDE VANE(FW207); Duct between bypass duct inlet (FW 255), Duct between scrubber (FW 257),_DUCT BUF & ABS(FW256),_HOOK UP DUCT(FW238); (Components in Air/ Gas and under insulation)	Power tool cleaning	Two coats of Red oxide zinc phosphate primer as per IS 12744 DFT 2x30 =60µm (min)	NIL	NIL	60 µm (min)
16	Hand rail post, Bend, ERW tubes, step treads, Floor grills, Ladders(FW304,FW305, FW382,FW384,FW383,FW214)	Hot dip galvanizing to a coating weight of 610gm per sq. m (minimum) and to a coating thickness of 85 microns (minimum)				

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Sl No	Description	Surface preparation	Primer/ DFT	Intermediate DFT	Finish DFT	Total DFT

04	28/03/2021	**Customer Comment:** BHEL to revise the painting schedule as per our mail communication dated 03.03.2021. Mail from NLC ask we have already communicated to BHEL that Epoxy glass flake painting needs to be followed instead of Epoxy MIO as per contract specification. Request BHEL to update the painting schedule in line with the specification and submit for our approval. **BHEL reply:** Incorporated.

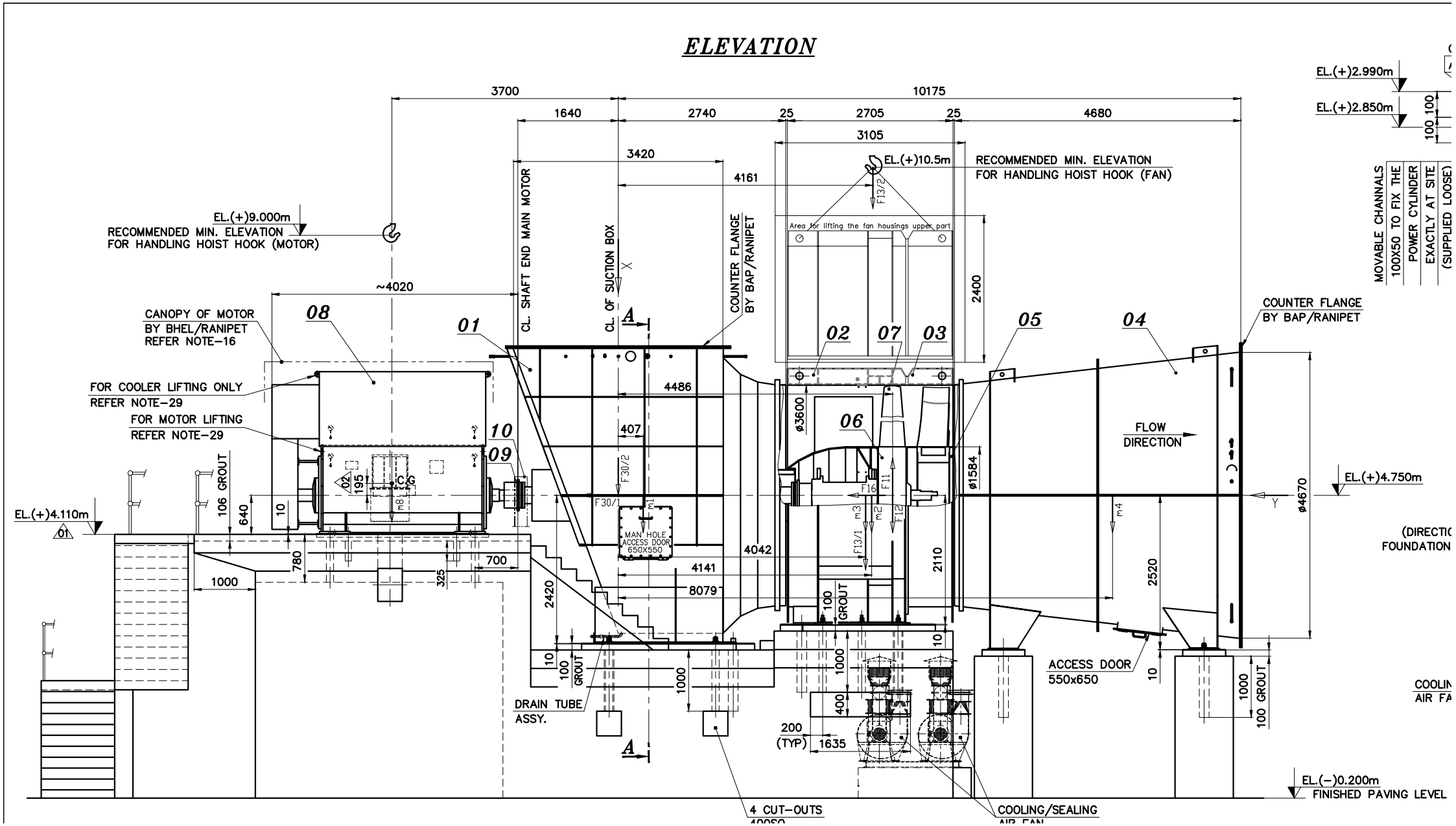
Notes

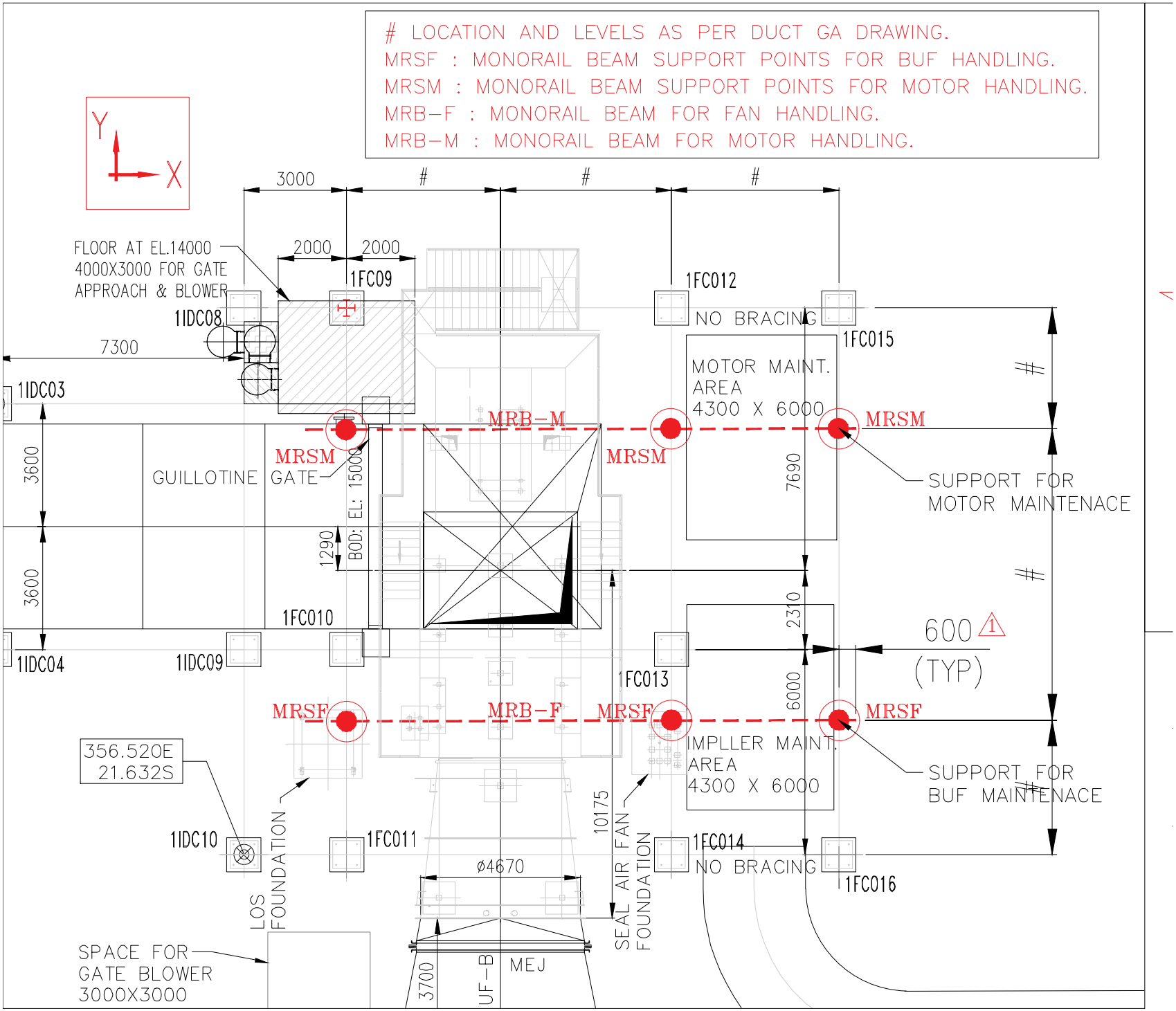
1. Painting of commissioning spares and Mandatory spares shall be as per respective items as above.
2. No painting for SS, Aluminium, non-ferrous, stainless steel and galvanized items.
3. All components covered under different Sl no. are to be painted. In case any component is left out, the same shall be deemed to be included under the relevant section.
4. For sub-assembly, wherever the plates / sheets of thickness less than or equal to 5mm and rods are used and tiny items less than 100kg, Power tool cleaning or Hand tool cleaning to SSPC- SP3/ SP2 shall be followed. Painting to be followed: Two coats of zinc phosphate primer (DFT-30 µ per coat) and Two coats synthetic enamel (DFT-20µ per coat) with total DFT 100Microns.
5. Painting of damaged surfaces will be same as the painting scheme in this specification with power tool cleaning.

Prepared by	Reviewed by	Approved by
28/03/2021	28/03/2021	28/3/2021
Abdul Ghani **Senior Engineer / QA**	**K Renjith** **Manager / QA**	**R. Arunachalam** **DGM / QA (Mechanical)**

Bidder seal & signed

ANNEXURE - F - LAYOUT GA DRAWNG





TYPICAL PLAN VIEW SHOWING BUF/MOTOR HANDLING MONORAIL BEAMS

PROJECT: NTPL Tuticorin (2 X 500 MW) FGD **(BHEL WO no: G515, G516)** **PACKAGE: EPC PACKAGE** **MAIN CONTRACTOR:** **BHEL - RANIPET** **SUB CONTRACTOR & ADDRESS:** **(To be filled by VENDOR)**	**CONTRACT QUALITY REQUIREMENTS (CQR) for ELECTRICALLY OPERATED HOISTS** **NTPL Tuticorin** **NLC Tamilnadu Power Ltd.** **(2 X 500 MW) FGD** **(BHEL WO no: G515, G516)**	**DOC.NO:** **BAP/QR/G515-G516/NTPL/ EOH: 001** **Rev NO.: 00** **PAGE : Page 1 of 1** **DATE: 01.04.2023**	**##Enquiry No:** **## Supplier Name & Address:** **##Offer reference:** **##Date:** **Contact Official Name:** **Mobile no:** **Email id:**

ITEM: ELECTRICAL ACTUATORS

01	**Quality Plan Requirement**	**1.** RQP/MQP (Manufacturing Quality Plan) is applicable for these EOH/Underslung crane and accordingly Manufacturer shall submit the QP for BHEL and ultimate customer – NTPL and its consultant DCPL review and approval in line with Customer requirements (copy attached). **2.** If any of Electrical Actuator Manufacturer who is having NTPL and its consultant DCPL approved QP/NTPC approved MQP (Manufacturing Quality Plan) / RQP (Reference Quality Plan) and having validity, the same is applicable for these Electrical Actuator for inspection subject to obtaining ultimate customer NTPL and its consultant DCPL formal approval in the event of an order. **3.** If Electrical Actuator vendor does not have MQP/RQP, they should submit a fresh MQP to BHEL/ ultimate customer –NTPL (in BHEL format) for review & approval. (copy attached).	
		Ultimate customer – NTPL and BHEL/BHEL authorized inspection agency inspection is applicable before dispatch.	
02	**Painting Requirements**	Painting requirement like paint shade and painting thickness including no of coats if any are to be ensured by supplier as per BHEL/ Ultimate Customer –NTPL and its consultant DCPL approved data sheet/drg/spec (As applicable).	
03	**Inspection Methodology**	No material shall be dispatched without BHEL or its authorized inspection agency/Ultimate customer – NTPL inspection with required CHP/MDCC clearances.	
04	**For inspection call**	To raise inspection call by BHEL/BHEL AIA inspection including for type test witnessing , vendor is requested to refer https://cqir.bhel.in for immediate response / resolution.	
05	**Packing**	Required Packing & preservation shall also to be ensured as per requirements stipulated in Engg spec / drg / data sheet to avoid any damage during transit, handling damages & storage at site.	
06	**Document Package/Dossier**	Supplier shall give Specific confirmation for Document Package in the event of an order (3 hard copies + 2 soft copies in PDF file) for onward transmission to customer and same shall contain the following with proper linkages (.) 1. Index Sheet 2. NTPL and its consultant DCPL/BHEL approved QP. 3. TCs identified by BHEL/NTPL or its authorized inspection agency for record for "CHP" and Verification portion as given in approved QAP/Data sheet/spec (As applicable). 4. Final Inspection Report by Ultimate Customer – NTPL authorized inspection agency + TC 5. Final Inspection Report by BHEL / BHEL AIA + TC 6. NTPL or its authorized inspection agency CHP/MDCC. 7. Type test reports conducted/submitted with BHEL /BHEL AIA/ NTPL or its authorized inspection agency (As applicable)	

Supplier signature with seal

6.00.00 **INSPECTION AND TESTING**

6.01.00 The Quality Plan shall indicate all the tests to be carried out in line with the relevant codes. All forgings and castings shall be subjected to ultrasonic examination. DPT/MPI shall be carried out where-ever necessary.

6.02.00 **Tests at shop**

6.02.01 The cranes shall be subject to full load and overload tests as per IS-3177. Otherwise the crane shall be subject to 'no-load' test after complete assembly and wiring.

6.02.02 The crane shall be subject to deflection test as per IS : 3177.

6.02.03 If the hoisting drum offered is of welded construction, the seams shall be fully radiographed.

6.02.04 The inspection and testing of butt welded joints shall be performed in accordance with the provisions of the relevant Indian Standards or other equivalents. But welded joints subject to direct tension shall be 100%

radiographed. All 'T' joints shall be covered with spot radiography. Should any of the spots be found defective then radiography to be extended to 100% area.

6.02.05 All electrical equipment and components thereof shall be subject to routine tests as per relevant Indian Standards. Type test certificate on any electrical equipment shall be submitted if desired by the Purchaser. Otherwise, type tests shall have to be performed on the equipment to prove the design.

6.02.06 Reports of all shop tests shall be submitted to the Purchaser/Consulting Engineer for review.

6.00.00 **INSPECTION AND TESTING**

6.01.00 The manufacturer shall conduct all tests required to ensure that the equipment furnished shall conform to the requirements of the specification and in compliance with the requirements of the latest edition of IS: 3832 or

equivalent standards for manually operated hoists and shall be as per IS:3938 for electrically operated hoist.

ANNEXURE-II: MANUFACTURING QUALITY PLAN

MFGR.'s LOGO	MANUFACTURER'S NAME AND ADDRESS	MANUFACTURING QUALITY PLAN	PROJECT : NLC TAMILNADU POWER LTD (2 X 500 MW) PACKAGE : FGD PACKAGE CONTRACT NO. : MAIN-SUPPLIER : BHEL RANIPET
		ITEM: ELECTRICAL ACTUATOR SUB-SYSTEM: QP NO.: REV. NO.: DATE: PAGE: …. OF….	

SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
										M	C	L	
1.	2.	3.	4.	5.	6.	7.	8.	9.	D*	10.			11.

LEGEND: * RECORDS, INDENTIFIED WITH "TICK" (√) WILL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION.
** **M:** MANUFACTURER/SUB-SUPPLIER
C: SUPPLIER/NOMINATED INSPECTION AGENCY, L: PURCHASER
P: PERFORM **W**: WITNESS AND **V:** VERIFICATION. AS APPROPRIATE,
CHP: PURCHASER WILL IDENTIFIED IN COLUM "N"

DOC. NO.: REV……
CAT…..

MANUFACTURER/ SUB-SUPPLIER	MAIN-SUPPLIER (BHEL)	FOR PURCHASER USE	REVIEWED BY	APPROVED BY	APPROVAL SEAL
SIGNATURE					

***(To be submitted In the company letter head by supplier)**

Form - 1

Subject: Public Procurement (Preference to Make In india)

References:

1.P-45021/2/2017-B.E-ll dated. 15th June-2017,
2.P-45021/2/2017-PP(BE-II) dated. 28th May-2018 ,
3.P-45021/2/2017-PP(BE-II) dated. 29th May-2019.
4.P-45021/2/2017-PP(BE-II) dated. 4th June-2020

We hereby declare with reference to above subject and references that M/s ----------(Tick whichever is applicable as below)

"Class-I local supplier" meeting the requirement of minimum local content equal to 50%(fifty percent) or more defined in the above government notification for the goods and services (or)

"Class-II local Supplier" meeting the requirement of local content 20% to less than 50%(fifty percent) defined in the above government notification for the goods and services

Please mention the details against the following:

Enquiry no:---------- dated. ----------

Type of Supplier (Class-I/Class-II) ……

Product:----------

Project:……..

Details of location at which local value addition will be made is as follows:

We also understand that the false declarations will be in breach of the code of Integrity under rule 175(1)(i)(h) of the General financial rules for which a bidder or its successors can be debarred for up to two years as per Rule 151(iii) of the General Financial Rules along with such other actions as may be permissible under law.

Authorized Signature M/s _____

(Signature and seal)

Place:……..

Date:……

From.

M/s_____

Address:_____

Note: For offer value INR 10 crores or more, shall be vetted/endorsed by statutory auditor or cost auditor, for the declared local content.

***(To be submitted In the company letter head by supplier)**

Form – 2

I/we are bidder from _____ (Address with country). We do not belong to any of the below category mentioned.

1. Any of entity/office/workshop of your organisation/incorporation, established in a country sharing land border with India, If yes, provide the full address of all such locations.
2. Any of subsidiary of your organisation/incorporation, established in a country sharing land border with India, If yes, provide the full address of all such locations.
3. Any of entity/office/workshop of your organisation/incorporation, controlled in a country sharing land border with India, If yes, provide the full address of all such locations.
4. Any of entity whose beneficial owner is situated in a country sharing land border with India, If yes, provide the full name, address of all such locations.
5. Any Indian Agent available, If so, Provide details of address and contacts.
6. Any employee/directors who is/are citizen of country sharing land border with India, If yes, provide the full name, employee code and address of all such locations.
7. Any of consortium/joint venture of your organisation/incorporation, established in a country sharing land border with India, If yes, provide the full address of all such locations.

Meaning of beneficial owner

1) In case of a company or limited liability partnership, beneficial owner is the natural person, who, whether acting alone or together, or through one or more judicial person, has a controlling ownership interest or who exercises control through other means.

Explanation

a) Controlling ownership interest means ownership of or entitlement to more than twenty-five percent of shares or capital or profits of the company.
b) "control" shall include the right to appoint majority of the directors or to control the management rights or shareholder's agreement or voting agreement.

2) In case or a partnership firm the beneficial owner is the natural person (s) who whether acting alone or together or through one or more judicial person, has ownership of the entitlement to more than fifteen percent of capital or profits of the partnership.
3) In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together or through one or more judicial person, has ownership of the entitlement to more than fifteen percent of the property or capital or [profits of such association or body of individual.
4) Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official.
5) In case of a trust, the identification of beneficial owner (s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust and any other natural person exercising the ultimate effective control over the trust through a chain of control of ownership.
6) An agent is a person employed to do any act for another, or to represent another in dealing with third person.

We have read the clause regarding restriction on procurement from a bidder of a country which shares a land border with India, we hereby declare that we do not belongs to any such country and are eligible to be considered. In case, any of information is found to be false, even after bid acceptance, immediate termination may happen and action will be taken as per law.

Format is being filled without altering any of the clause mentioned in the given format**

Dated: _____

Authorised Sign and stamp_____

BANK GUARANTEE FOR PERFORMANCE SECURITY

Bank Guarantee No:
Date:

To
Bharat Heavy Electricals Limited,
Boiler Auxiliaries Plant,
RANIPET -632 406,
Tamil Nadu,
INDIA

Dear Sirs,

In consideration of the **Bharat Heavy Electricals Limited** 1 (hereinafter referred to as the `Employer' which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns) incorporated under the Companies Act, 1956 and having its registered office at "**BHEL House", SIRI Fort, New Delhi- 110049** through its Unit at **Boiler Auxiliaries Plant located at Ranipet-632406, Tamil Nadu, INDIA** having awarded to _____ 2 having its registered office at _____ herein after referred to as the `Contractor/Supplier', which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns), a contract Ref No. / **PO No** _____ dated _____3. Valued at Rs_____ 4 (Rupees (In words) . _____) for _____5 (hereinafter called the `Contract') and the Contractor having agreed to provide a Contract Performance Guarantee equivalent to 10% (Ten Percent) of the said value of the Contract to the Employer for the faithful performance of the Contract.

We _____ (hereinafter referred to as the Bank), having registered/Head Office at _____ and inter alia a branch at _____ being the Guarantor under this Guarantee, hereby, irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer a maximum amount Rs _____ **(Rupees _____)** without any demur, immediately on a demand from the Employer. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding **Rs. _____ (Rupees_____)**.

We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Contractor/Supplier in any suit or proceeding pending before any Court or Tribunal relating thereto our liability under this present being absolute and unequivocal.

The payment so made by us under this Guarantee shall be a valid discharge of our liability for payment thereunder and the contractors/supplier shall have no claim against us for making such payment.

We the _____ bank further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract and that it shall continue to be enforceable till all the dues of the Employer under or by virtue of the said Contract have been fully paid andits claims satisfied or discharged.

We _____ BANK further agree with the Employer that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Contract or to extend time of performance by the said Contractor/Supplier from time to time or to postpone for any time or from time to time any of the powers exercisable by the Employer against the said Contractor/Supplier and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor/Supplier or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said Contractor/Supplier or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Contractor and notwithstanding any security or other guarantee that the Employer may have in relation to the Contractor's liabilities.

This Guarantee shall remain in force up to _____ 6 with a validity period of ____months & claim period of 3 months and shall be extended from time to time for such period as may be desired by Employer.

This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Contractor/Supplier but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms thereof.

Unless a demand or claim under this guarantee is made on us in writing on or before the _____7 we shall be discharged from all liabilities under this guarantee thereafter.

We _____BANK, lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.

Notwithstanding anything to the contrary contained hereinabove:

a) The liability of the Bank under this Guarantee shall not exceed Rs _____ (Rupees _____ Only) 8
b) This Guarantee shall be valid up to _____ 9
c) Unless the Bank is served a written claim or demand on or before _____ 10 all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank.

We _____ Bank, have power to issue this Guarantee under law and the undersigned as a duly authorized person has full powers to sign this Guarantee on behalf of the Bank.

For and on behalf of
(Name of the Bank)

Dtd :
Place of Issue:

1.NAME AND ADDRESS OF EMPLOYER i.e., Bharat Heavy Electricals Limited.
2 NAME AND ADDRESS OF VENDOR/CONTRACTOR/SUPPLIER
3.DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE
4.BG AMOUNT IN FIGURES AND WORDS
5.PROJECT/SUPPLY DETAILS
6.VALIDITY DATE with a validity of 3 months claim period.
7.DATE OF EXPIRY OF CLAIM PERIOD
8.BG AMOUNT IN FIGURES AND WORDS
9.VALIDITY DATE
10. DATE OF EXPIRY OF CLAIM PERIOD

Ple note: The Validity period wrt our conditions applicable for the Supply / Erection & condition.

Bankers, Auditors & Share Transfer Agent

Bankers
Axis Bank
Bank of Baroda
Canara Bank
Central Bank of India
CITI Bank N.A
Deutsche Bank AG
Export-Import Bank of India
HDFC Bank Limited
IDBI Bank
Indian Bank
Indian Overseas Bank
Indusind Bank
Kotak Mahindra Bank
Punjab National Bank
RBL Bank Ltd.
Standard Chartered Bank
State Bank of India
The Federal Bank Limited
Union Bank of India

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