



BHARAT HEAVY ELECTRICAL LIMITED

UNIT'S ADDRESS:

CONTACT PERSON'S NAME/DESIGN./PHONE NO./E-MAIL (FROM PURCHASE DEPT.).

Annexure-II
For vital technical parameters refer Annexure I

Enquiry No.:

Due Date :

Supplier Qtn.

No.:

Date :

GENERAL SPECIFICATION CUM COMPLIANCE CERTIFICATE OF SCOPE OF SUPPLY FOR SUPPLY, ERECTION & COMMISSIONING OF 10 TON EOT CRANE FOR FMM

NOTE:-

1. Vendor must submit complete information against Qualifying Criteria - clause no. 15. The offer meeting this clause would only be processed.
2. The "Offered" Column and where applicable, the "Deviations" & "Remarks" Column of this format shall be filled in by the Vendor and submitted along with the offer. Inadequate / incomplete, ambiguous, or unsustainable information against any of the clauses of the specifications/requirements shall be treated as non-compliance.
3. The offer and all documents enclosed with offer should be in English language only.

NAME & ADDRESS OF THE SUPPLIER :		NAME & ADDRESS OF THE INDIAN AGENT :			
TELEPHONE NOS.:		TELEPHONE NOS.:			
FAX NOS.:		FAX NOS.:			
E-MAIL ADDRESS :		E-MAIL ADDRESS :			
SCOPE: GENERAL SPECIFICATIONS FOR SUPPLY, ERECTION & COMMISSIONING OF 10 TON DOUBLE GIRDER EOT CRANES					
SNO	DESCRIPTION FOR BHEL REQUIREMENT	CONFIRMED / SPECIFIED BY	OFFERED	DEVIATIONS	REMARKS
1.0 PURPOSE :					
1.10	An electrical overhead travelling crane for general engineering application purpose.	Vendor to confirm			
2.0 SPECIFICATION:					
2.1 CRANE CONFIGURATION:					
2.1.1	The crane shall be generally of box type, double girder construction and designed for class M6 duty in accordance with IS 3177 (latest revision). The Crane would have control from Cabin & Radio Remote Control with the help of VVFD drives.	Vendor to confirm			
2.2 CONSTRUCTION:					
2.2.1	GIRDER				

2.2.2	The box girder shall have proper Camber & fabricated with MS plate / web & proper diaphragm or stiffening plates and should be robust enough to handle the loads safely as per IS 807 / IS 800. The welded joints shall be Tested. All butt joints shall be 100% X rayed on tension & 25% on compression joints.	Vender to confirm			
2.2.3	M.S. chequered plate platform shall be provided along the full length on both sides of the crane with Toe Board to comply with statutory requirement of factory act. Platform shall have clear width of 1000mm	Vender to confirm			
2.2.4	Box Girder & End carriage joints should have fit bolts only.	Vender to confirm			
2.2.5	For all bolted joints the holes are to be drilled and reamed and bolts are to be force fitted.	Vender to confirm			
2.2.6	Hand railing shall be fitted on both side of the end carriages and throughout the length of the plat form (height of 1.1 m) parallel to girder. Size of the hand rail shall be not less than 1" bore heavy gauge steel pipe. The vertical pipes to have flanges at the bottom for proper support. Suitable hand railing should be provided on CT Trolley also.	Vender to confirm			
2.2.7	All Rotating parts & Overhang parts should be suitably guarded.	Vender to confirm			
2.3	End Carriage				
2.3.1	The end carriages shall be of approved design, with L type Brackets of substantial construction and ample stiffness built up of mild steel sections securely riveted or welded together. They shall project over the run way rails and shall be so arranged that in the event of derailment the drop cannot exceed 1 inch. Proper hand railing should be provided on end carriage.	Vender to confirm			
2.3.3	Track wheels: The end carriage of the crane to be mounted on double flanged wheels of suitable diameter shall be used in accordance with IS:3177. Hardened to 305-350 BHN confirming SAE 1055/IS 1570 & shall be fitted with roller bearings. Greasing nipples should be provided and the grease be retained and dirt excluded by means of suitable seals. The wheel being machined to profile to suit the LT & CT rail. Clearance between the rails and the guiding wheels, if any, should be at least 3 mm (1/8") on either totalling 6 mm (1/4") for smooth running.	Vender to confirm			
2.4	Crab:				
2.4.1	Crab Frame: This should be built up of steel sections like Channels, T-Beam & / or fabricated plates and the upper surface of the frame should be plated all over wherever required, in order to give great lateral rigidity and maintenance facility. There should be lubrication point provided conveniently on the top for easy lubrication to all moving parts below the surface of the trolley such as balancing sheaves etc.	Vender to confirm			
2.4.2	Crab Traverse Mechanism: One No CT Motor (motor in BHEL scope) with suitable Gear Box shall be connected to Two Nos driving wheels. The Gear box driving shaft should be suitably coupled with adequate Geared coupling / pedestal / Plummer block so that facility for ease in maintenance.	Vender to confirm			
2.4.3	The wheels should be of forged EN9 or cast steel of Grade 2 as per IS duly secured to hard shaft steel axles and to run on sturdy roller bearings. The bearings to be enclosed in housing and arranged for grease lubrication and one axle should be driven by a motor through enclosed gearing.	Vender to confirm			

2.4.4	For CT DC disc brakes / EHT are required to be provided. All brakes for each motion drive of CT should operate simultaneously & adequate interlocks to be provided to ensure that all brakes are applied simultaneously.	Vendor to confirm			
2.4.5	These brake should also be operated for parking/emergency	Vendor to confirm			
2.5	Hoisting Mechanism	Vendor to confirm			
2.5.1	This shall consist of heavy duty mild steel fabricated rope drum driven by totally enclosed bearing. The drums shall be of ample diameter and sufficient length to take the full amount of rope without over lapping when the hooks are in the highest position and when hooks are in the lowest position there shall be at least two full turns of rope remaining on each drum. The method of attachment of the ropes shall be such that in the event of a rope unwinding completely, there shall be no danger of its becoming free from the drum. The drum should have right and left hand spiral grooves machine to suit the hoisting rope and would be spigotted and bolted to the final driving gear. The whole gear box should be smooth and noiseless in operation and preferably of helical gear type construction. The rope anchorage at each end should have at least two independent clamps.	Vendor to confirm			
2.5.2	The gearing should consist of heat treated alloy steel pinions and carbon steel gears, the larger gears may have forged carbon steel rims shrunk on and secured to heavy duty cast iron centres or cast steel. All gears shall have machine cut teeth & hardened to 250- 280 BHN, the high speed gears having single helical teeth, and the reminder teeth and free from noise, for smooth operation. The drum shaft and pinion shaft shall be mounted on antifriction bearings and all gearing shall be enclosed in a heavy duty cast iron gear box with jointing surfaces machined and made leak proof.	Vendor to confirm			
2.5.3	Hoist Brakes: For Hoisting DCEM brakes are required to be provided (DCEM Brake shall be in BHEL's scope). Brake drum used shall be dynamically balanced. Adequate care & arrangement to be provided for ease in maintenance. Main brakes along with additional back-up brakes are required to be provided. Brakes should be normally held 'ON' by a balance weight on spring and released only when command is given to motor.	Vendor to confirm			
2.6	Limit Switch Gear :				
2.6.1	There should be two limit switches for each hoisting and lowering motion so that in the event of failure of one the other must operate and prevent accident resulting for over hoisting and failure of one limit switch. 2nd limit switches for each hoisting motion should be gravity type.	Vendor to confirm			
2.6.2	Shunt type limit switches with single arm spring loaded should be provided on both ends of carriage for traverse long travel motion and anti-collision type limit switch should be provided for travel motion.	Vendor to confirm			
2.6.3	All limit switches should be connected only in interlock circuits	Vendor to confirm			
2.7	Rope Hook and Sheaves	Vendor to specify			

2.7.1	The factor of safety being not less than 6. Should have 6X37/36 filler construction ungalvanised wire laid 12/6 + 6/F/1 in each strand, 180 kg. sq.mm. tensile strength, right hand ordinary lay wire ropes with fibre main core tested to IS 2266.	Vendor to confirm			
2.7.2	Hooks shall be High Tensile Steel Shank Hook (Trapezoidal Section). Duty Hardened, Tempered Followed By Quenching in Oil. Hook Material & Manufacturing Shall Be Done As Per IS 3815:1977 Material Grade-3. Each Hook should Swivel freely on thrust ball bearing.	Vendor to specify			
2.7.3	Sheaves are to be of heavy duty cast iron/Cast Steels mounted on ball bearings. Properly secured with the sheaves with covers & Guards to be fitted to prevent the rope leaving the sheaves, even when the hook is lowered to rest on the ground and the ropes allowed to fall slack. The hook guard should be secured in such a manner that there should be no bolts protruding in the inner side of the hooks.	Vendor to specify			
2.8	Crane Control Panel.	Vendor to confirm			
2.8.1	It shall be of IP54 class and shall comprise of following: Incommer SFU/MCCB, AC Drive for Main Hoist/Auxiliary Hoist/Cross Travel/Long travel. Standard accessories for drives like semiconductor line fuses, Line contactor, Line commutating & output chokes, Dynamic braking chopper and resistance. Radio remote control receiver and all interfacing accessories for control of crane from cabin/RRC.	Vendor to confirm			
2.8.2	The relays and contactors should be robust design & generally in conformity with BS 587. The Remote & Master control interfacing should have perfect Zero-interlocking for safe operation of crane. All coils of contactors & relays should have RC surge suppressors.	Vendor to confirm			
2.9	AC Vector Drive:				
2.9.1	The drive must be of PWM flux vector control technology employing IGBT's for achieving near sinusoidal output voltage. It must have the following specifications: a) The drive must be rated for continuous duty and shall have overload capacity of 150% for 60 sec. b) The drive must be rated for ambient conditions of 55 degrees temperature and relative humidity of 95%. In case of deviations in these values, the drive must be adequately de-rated which shall be supported by manufacturers derating charts. c) The motor braking shall be dynamic through inbuilt/external chopper and resistance box. The capacity shall be suitable for providing 150% braking torque. d) The drive rating should be selected considering derating factor at 55 degree centigrade. The main hoist & Aux. Hoist motors shall have encoder- feedback for optimum control through VVFD.	Vendor to Confirm			

2.9.2	e) The drive must have special software designed for crane application which shall have features like anti-torque lowering, co-ordinated control of thrusters brakes etc. f) The drive must have highly dynamic & precise control with capability to generate 150% torque at zero speed. g) The drive must have static & dynamic auto-tuning facility to enable perfect optimisation of connected motor. h) The drive must have all standard protections like stall protection, single phasing, over voltage, over current, thermal protection of motor & drive etc. i) Model of Drives selected for hoisting, the same model of drives shall be used for LT & CT drive for ease of maintenance. j) Alarm & Fault resetting should be possible through remote.	Vendor to Confirm			
2.10	Control Cabin (if required as cited in Annexure -1)				
2.10.1	Opening to the cage on the platform should be approximately 750mm X 750mm (2 1/2'X2 1/2'). The cage to be of the open type suitable for use in an enclosed building. A ladder should be provided between the cage & the inspection platform of the crane. The Cabin should have adequate operator seat & suitable stand in front where he can operate Crane with the movable Pendant (Movable pendant i.e. Pendant Push Button Station suspend from cables movable across the crane through the suitable cable trolleys arrangement, T- Track mechanism, like Festoon cabling system. Overhung cables should be suitably flexible dressing so that in case of Remote failure; this pendant can be brought down to operate crane from ground level). Cabin size should be about 1525mm X 1372mm (5'-0" X 4'6"). All the cables in the cabin shall laid in tray nicely dressed and clamped.	Vendor to confirm			
2.10.2	The controllers for speed control of variable speed drives shall be (2 steps) push Button type. A warning hotter shall also be provided which should also be operable from RRC. Pendant Push button station shall have Start, Stop, Emergency Stop, Crane Light, Hotter , MH- Fast Up / Down , Slow Speed Up/ Down , AH - Fast Up / Down , Slow Speed Up/ Down , LT - Forward/ Reverse; CT - Left / Right; Pushbuttons for 2 speed for each motion . This Pushbutton should have Support Wire so that PB station load etc can be taken care by steel Core Cable/ In built support wire in cable itself . This PB station should be suitable earthed. A 5.0 kg dry chemical powder fire extinguisher with a long discharge nozzle should be provided in the operators cabin.	Vendor to confirm			
2.10.3	A revolving type cushioned seat is to be provided in the cabin for the crane operator at a suitable height.	Vendor to confirm			
2.10.4	A 60 watt lamp, one blower type heater (Convector) , one 16" sweep cabin fan (Orient / CG / Bajaj / Usha make) with guards and a suitable step down transformer should be provided in the cabin.	Vendor to confirm			
2.10.5	An inspection lamp is also to be provided with 110V plug point in the cabin.	Vendor to confirm			
2.11	Crane Bridge Lighting	Vendor to confirm			
2.11.1	Minimum Four Nos HPSV, energy efficient HPL 125 Watts flood lights with fittings should be provided with suitable guard protection below the Platform.	Vendor to confirm			

2.11.2	As the power supply will be only 415 volts, 3 phase, 3 wire, 50 cycles. Step down transformer required for 220 Volt bridge lights, cabin lights fan and for any other equipment should be supplied along with individual main switch for each, directly connected with the incoming supply and not in the crane circuit.	Vendor to confirm			
2.12	Electrical Wiring:				
2.12.1	All types of cables, connections, circuit breakers etc. required for connecting BHEL's power supply point to different parts of the crane controls / cabinets, shall be the responsibility of vendor.	Vendor to confirm			
2.12.2	All internal wiring inside control panels should be 1.5 sq.mm copper wires having PVC insulation. All copper wire terminals will be lug or either soldered Crimping type.	Vendor to confirm			
2.12.3	All electrical installation and wiring should strictly conform to IE Act and latest IEEE Rules and other standard practice as adopted by the Indian Standard Institution.	Vendor to confirm			
2.12.4	Double earthing by bare copper wire (8 SWG) shall be provided throughout the crane.	Vendor to confirm			
2.12.5	All control terminations should be ferruled such that the numbers are clearly visible from outside. Crimped terminations should be provided for control cables and as far as possible for main cables. All device reference shall be painted or labelled or engraved for identification.	Vendor to confirm			
2.12.6	The crane shall be supplied complete with all wiring & materials. The cross traverse conductors shall be drage chain IGUS make or festoon type cable trolley T track or akapp system. All internal wiring inside control panels should be copper wires PVC Insulated FR grade with ISI mark only.	Vendor to confirm			
2.12.7	All wiring shall be nicely dressed in cable Trays/ trucking. Suitable marking should also be made.	Vendor to confirm			
2.12.8	Shrouded DSL leads, complete with necessary supporting insulators, current collector, straining screws and clamp connectors etc. This DSL should have LED type Indication Bulb for each end for each phase with necessary mounting racks. The Power supply shall be fed from its extreme end.	Vendor to confirm			
2.12.9	A spare set of suitable current collector with each crane should also be provided	Vendor to confirm			
2.12.10	Main power cable from main SFU at floor level to the DSL should also be supplied and installed.	Vendor to confirm			
2.13	Miscellaneous				
2.13.1	The structural steel work in the box Girder and crab frame should be given one coat of suitable primer during fabrication. Gear boxes and similar parts to be given coat one coat of oil paint & bright parts be given coats of rust preventive paint. After erection at site the crane should be given two coats of deep orange synthetic enamel conforming to IS 5 Shade 591	Vendor to confirm			
2.13.2	The first fill of oil, grease etc. for the commissioning of the crane shall be provided by the supplier.	Vendor to confirm			
2.13.3	The tool box with standard tools shall be supplied with the crane and suitable heater and fan should be provided inside the cabin.	Vendor to confirm			
2.13.4	A list of bought out items should be furnished with name of makers & BHEL's approval obtained before placing order to ensure that they are of best quality and standard make.	Vendor to confirm			

2.13.5	Engraved indication plates for SWL, Hooks, Sheaves, Pulley etc. panel Identification, Master Controllers position marking should be preferably done wherever possible.	Vendor to confirm				
2.14	Radio Remote Controller: Individual RRC shall comprise of the following.	Vendor to confirm				
2.14.1	I) Transmitter: It shall be suitable for 2 steps control of AC drive through push buttons. The 2-steps pushbutton remote must have following functions: • Main Hoist: Up/Down, through 2 steps Pushbuttons. • Aux: Hoist: Up/Down, through 2 steps Pushbuttons. • Long Travel: Left/Right, through 2 steps Pushbuttons. • Cross Travel: Fwd/Right, through 2 steps Pushbuttons. • Hotter Operation: Normal push button. • Emergency Stop: Raised distinctive pushbutton. • Key switch: Removable unique key to disable transmitter. • Battery check facility & indicator. • Push button for drive fault rest. II) Receiver with antenna suitable for above transmitter. III) Battery charger. IV) 2 set of batteries for transmitter.	Vendor to confirm				
2.14.2	Transmitter: The transmitter shall be lightweight, rugged, reliable and made from ABS plastic. It shall be operable from Ni-Cd rechargeable battery, which shall provide minimum 72 hours of operations with full charge. It shall be supplied housed in a protective leather cover.	Vendor to confirm				
2.14.3	Receiver: It shall be supplied housed in a suitable panel and shall have antenna for receiving transmitter signals. It shall have following features:	Vendor to confirm				
2.14.4	Microprocessor based digital encoding and decoding system with immunity from spurious signals and should use 16 bits identity code unique to each RRC system.	Vendor to confirm				
2.14.5	Continuous auto checking between transmitter and receiver communication, so as to stop the complete system in case of failure at either end.	Vendor to confirm				
2.14.6	Auto checking of the commanded motion and stopping of all the motions in case of any misbehaviour either way.	Vendor to confirm				
2.14.7	System should have self-diagnostic and alphanumeric fault display.	Vendor to confirm				
2.14.8	System should confirm to national and international safety standards like IS 3771:1999 CLAUSE 14.5, BS 466 etc. & furnish details of safety & QA plan followed.	Vendor to confirm				
2.14.9	Operating range should be 100 mtrs.	Vendor to confirm				
2.14.10	The output relays for driving motion contactors shall be heavy duty, rated for 10Amps at 110VAC	Vendor to confirm				
2.15	General Conditions for RRC:	Vendor to confirm				
2.15.1	System should be able to operate in harsh environmental conditions like temp up to 55 deg C and humidity 95% max. It should be able to with stand high level of vibrations, electrical noise arising out of the movement of the crane.	Vendor to confirm				

2.15.2	Incoming supply available is 415 V, +/- 10%, 3 Phase, 3 wire (no neutral), 50 Hz.±1.5Hz	Vendor to confirm			
2.15.3	Vendor shall clearly indicate whether license is required to operate the RRC System. If required then it has to be arranged by the supplier. If not then enclose the necessary documents. However, BHEL would prefer suitable RRC operative in 335-336 MHz band up to 1mW of transmitted power, which at present does not require license.	Vendor to confirm			
2.15.4	Battery Charger: It shall be suitable for charging the Ni-Cd batteries of transmitter. It shall constant current type with auto-cut-off facility on full charge. Indication shall also be available for charging cycle and status of the battery etc.	Vendor to confirm			
2.15.5	Batteries: Batteries suitable for 72 Hrs operation of transmitter are to be supplied.	Vendor to confirm			
2.15.6	Interface Panel: The panel shall be of good quality powder coated of IP54 grade, crane duty and shall contain following accessories	Vendor to confirm			
2.15.7	Incomer Switch fuse unit (SFU).	Vendor to confirm			
2.15.8	Emergency Stop Contactor to be provided to cut power to all motors emergency conditions.	Vendor to confirm			
2.15.9	Illuminating lamps LED Type (R, Y & B) for three phase supply indication.	Vendor to confirm			
2.15.10	Suitable RC surge suppressors shall be provided across coil of each contactor/ Timer. Interlocking to be provided with existing limit switches of all the motions for safe operation of the crane.	Vendor to confirm			
2.15.11	Mounting of all the devices of the interface panel shall be designed for operation under heavy vibration on EOT cranes. Ease in maintenance aspect should be integral aspect while deciding size of panel / designing of panel.	Vendor to confirm			
2.15.12	Hooter: It shall be high output, weather resistant sounders used in fire/security applications. It shall have features like a) High Output (110 dB or more), b) Selectable tone (minimum three), c) Continuously rated etc.	Vendor to confirm			
3 ERECTION & COMMISSIONING:					
3.1	The crane is to be Erected at site by the supplier with their own labour, tools and tackles. Other Erection equipments like Mobile Crane/ winch, Sheaves/ Sheave Pulley Block, Tools & tackles etc shall be brought by the supplier on returnable basis. Other Special tools and equipment required for erection of the Crane shall be brought by the vendor on returnable basis	Vendor to confirm			
3.2	All necessary levels / other instruments and devices for testing of the Crane including cradle for load testing except the load (for which steel plates will be provided by BHEL, the maximum size of Structural steel plates would be 220mm thick x 2100mm width x 5000mm Long) should be brought by Vendor on returnable basis.	Vendor to confirm			
3.3	Commissioning-spares, required for commissioning of the crane shall be brought by the supplier on returnable basis.	Vendor to confirm			

3.4	Portion, if any, of the crane / sub- assemblies / panel or other -accessories- where paint has rubbed off or peeled during transit or erection should be repainted and merged with the original surrounding paint by the vendor. For this purpose, the vendor should supply sufficient quantity of touch-up paint of various colours of paint used.	Vendor to confirm			
3.5	Charges, duration, terms & conditions for E&C should be furnished in detail separately by vendor along with offer.	Vendor to confirm			

4 ELECTRICAL SYSTEM :

4.1	415V $\pm$ 10% 50Hz $\pm$ 1.5 Hz, 3 Phase AC (3 wire system plus ground) Power Supply Source will be provided by BHEL by means of ICTP switch at one location for erection purpose. However For Crane supply Shrouded DSL is required to be provided by supplier. Control Supply for crane shall be 110V ac . All types of cables, connections, circuit breakers, transformers, current collectors etc. required for connecting the DSL power supply from ICTP Switch, DSL, to different parts of the crane / control cabinets, shall be the responsibility of vendor.	Vendor to confirm			
4.2	Tropicalisation: All electrical / electronic equipment shall be tropicalized.	Vendor to confirm			
4.3	All electrical & electronic control cabinets & panels should be dust and vermin proof.	Vendor to confirm			
4.4	All electrical components in the cabinets should be mounted firmly on backelite plate or on DIN Rail so that there is no break in circuitry during traversing & accidental hit by adjoining Cranes or severe jerks at rail joints.	Vendor to confirm			
4.5	All electrical and electronic panels including operator's panel should be provided with fluorescent lamps for sufficient illumination and power receptacles of 220Volts, 5/15 Amp AC. All adapters/receptacles should have compatibility with Indian Standards/ equivalents.	Vendor to confirm			
4.6	All connecting Cables should be properly dressed in cable trays/ trunking with appropriate clamps. Cable for Crane lighting shall be in flexible mild steel Conduit pipe.	Vendor to confirm			
4.7	Vendor should ensure the proper earthing for the crane's electrical equipment & its peripherals.	Vendor to confirm			
5	SAFETY ARRANGEMENTS: Following safety features in addition to other standard safety features should be provided on the crane .	Vendor to confirm			
5.1	Crane should have adequate and reliable safety interlocks / devices to avoid damage to the crane, work piece and the operator due to the malfunctioning or mistakes. Crane functions should be continuously monitored and alarm / warning indications through lights/ alarms should be available.	Vendor to confirm			
5.3	A detailed list of all alarms / indications provided on Crane should be submitted by the supplier.	Vendor to confirm			
5.4	All the pipes, cables etc. on the crane should be well supported and protected.	Vendor to confirm			
5.5	All the rotating parts used on machine should be statically & dynamically balanced to avoid undue vibrations. Open gears, couplings, fans/ rotating parts should be suitably guarded.	Vendor to confirm			
5.6	A toe guard is provided so that no loose items like bolts etc. shall fall from the crane to floor during maintenance / operation.	Vendor to specify			
5.7	Safety Lights at both ends to be provided (preferably Flashing during the travel).Also 2 Nos Bull - Eye plate with painting of circular Red & white Strips are to be provided at either side of Crane).	Vendor to confirm			

5.8	Suitable Lifting arrangement like Lifting Hooks, Jacking pads , Eye Bolts etc is required for lifting of Motors, other subassemblies or heavier structures.	Vendor to confirm			
5.9	Emergency Switches should be provided at suitable locations	Vendor to confirm			
5.10	Electrical cable & signalling cables should be suitably separated.	Vendor to confirm			
5.11	DSL Guard should be provided	Vendor to confirm			
5.12	Hook Latch along with safety covers of Bottom Block should be provided	Vendor to confirm			
6	ENVIRONMENTAL PERFORMANCE OF THE CRANE :				
6.1	The Crane shall conform to following factors related to environment :	Vendor to confirm			
6.2	Maximum noise level shall be 85 dB(A) at normal load condition, 1 m away from the crane with correction factor for back ground noise, if necessary. This will be measured as per international standards like DIN 45635-16. Supplier to demonstrate compliance to noise level, if so required.	Vendor to confirm			
6.3	If any safety / environmental protection enclosure is required it should be built on the Crane by the vendor.	Vendor to confirm			
6.4	Paint of the Crane should be applied only after providing rust-preventer (primer) coat.	Vendor to confirm			
6.5	Oil / Grease should not drip/ fall from the Crane	Vendor to confirm			
7	TOOLS FOR OPERATION & MAINTENANCE :				
7.1	Necessary tools like Torque Wrench, Spanners, Keys, grease guns etc for operation and maintenance of the crane should be supplied. List of such tools should be submitted with offer .	Vendor to confirm			
8	SPARES: (Optional)				
8.1	Item wise breakup of mechanical, hydraulic, electrical and electronic spares used on the crane in sufficient quantity as per recommendation of Vendor for 2 years for trouble free operation on three shifts continuous running basis should be offered by vendor. The list to include following, in addition to other recommended spares: (Unit Price of each item of spare should be offered)	Vendor to Specify			
8.2	Mechanical & Hydraulic Spares: Thrusters or Brake, Gears, Pinions, Shafts, Wheels, Hydraulic Seals for Gear Boxes, Drum etc.	Vendor to Specify			
8.3	Electrical /Electronic Spares: Brake coils, Thruster, Current Collector system, and all types of Transmitter/ Receiver spares like PCBs relays etc other electronic spares for RRC and AC Drives.	Vendor to Specify			
8.4	Vendor to confirm that complete list of spares for the crane and its controls- along with specification / type / model, and name & address of the spare supplier shall be furnished along with documentation to be supplied with the Crane	Vendor to confirm			
9	DOCUMENTATION :				
9.1	During participation in technical Bid	Vendor to confirm			

9.1.1	G.A. Drawing	Vendor to confirm			
9.1.2	Wheel Load Diagram (Wheel Distance & Wheel Load)	Vendor to confirm			
9.1.3	Sketches showing full details of cranes with dimensions / end clearances (between centre of LT rails to column face of building), overhead clearance from LT rails, hook approach limits, lift height, Details of Web thickness baffle plates, Stiffeners ,of Girder section , End carriage (Bogies) Trolley Section etc.	Vendor to confirm			
9.1.4	Vendor to submit, along with offer, the reference list of customers where similar cranes have been supplied mentioning the customer, major specifications of the supplied Crane, Control System, Year of Supply etc	Vendor to confirm			
9.1.5	Vendor to submit appropriate Q.A. Plan.	Vendor to confirm			
9.2	After Receipt of Order: Five sets of following documents (Hard copies) in English language should be supplied along with the Crane	Vendor to confirm			
9.2.1	Calculation for Box Girder, End Carriage structural plates/ Web / Stiffener plate, Wheel Load calculation & Calculation for selection of Diameter of Wheel, Motor, Gearbox and Brake etc. 5 - sets of followings documents like G. A Drawings, Structural drawings like End-carriage, Box Girder, Assembly Drawings/ Sub-assembly Drawings, Gear Box Drawings (specially of Typical Gears having Helix Angle, Pressure Angles, Modules etc.), DSL Drawings Bracket/ Current Collector System, Hook Block, LT & CT wheel, Main Hook & Aux. Hook assembly LT machinery, Hoisting machinery, Electrical Drawings comprising Power , Control Circuits , Electronic Circuitry diagram for RRC etc. No fabrication / purchase of BO. items should be taken up before the approval of the drawings.	Vendor to confirm			
9.2.2	Operating manuals of Crane	Vendor to confirm			
9.2.3	Detailed Maintenance manual of Crane Spares- part list / concerned drawing of the spares	Vendor to confirm			
9.2.4	Maintenance, Interface & commissioning manuals for Controller & drives - 2 Sets along with drive parameterisation software.	Vendor to confirm			
9.2.5	Catalogues, O&M Manuals of all bought out items including drawings, wherever applicable.	Vendor to confirm			
9.2.6	Detailed specification of all rubber items like Oil- Seals / O- Rings etc	Vendor to confirm			
9.2.7	One Soft copy for the above requisites shall also be supplied in CD	Vendor to confirm			
9.2.8	RRC's frequency allocation license, Chemical & Proof load certificates of Hooks (Test certificates from a recognized Government Test House) , Wire Rope (Break load test Certificate having Factor of safety not less than 6 shall also be furnished) , Forgings, wheels - Chemical composition, UV test report , Weld joints X-ray Test reports, Test report of Structural material, Electrical components, Brakes, Spring Loaded Buffers etc shall also be furnished.	Vendor to confirm			
10.0	TRAINING:				
10.1	Vendor to impart training to BHEL personnel for operation & for maintenance at BHEL works for a period of 7 days after Erection, Commissioning and handing over of the Crane. Supplier should arrange for training of BHEL personnel free of cost for the offered RRC system / Drives	Vendor to confirm			

11.0 AMBIENT CONDITIONS & THERMAL STABILITY :				
11.1	Ambient Conditions: Temperature = 5 to 55 degree Celsius	Vendor to confirm		
11.1	Relative Humidity = 95% max.			
11.2	Weather conditions are tropical. Atmosphere may be dust laden during some part of the year. Crane shall be in the normal shop floor condition. Max. temperature variation is up to 25 deg Celsius in 24 hours.	Vendor to confirm		
12.0 CRANE ACCEPTANCE: (Tests/Activities to be Performed by Vendor)				
12.1	At Vendor Works: Inspection And Test			
12.1.1	Stage Inspection : BHEL Officials will stage inspect the crane for test-witness/ Physical inspection of Sub-assemblies, Gear Box, Wire Rope, Hooks, Weld test etc before closing of girder. And these stage inspection shall be carried out before painting of crane girders/ components. Supplier will furnish test certificates & guarantee for performance of these components / unit. BHEL shall inspect the Hooks proof load test at OEM's works.	Vendor to confirm		
12.1.2	Load Test : During Final inspection before dispatch, the supplier shall assemble the complete crane and arrange for its physical inspection & checking of the camber as per IS 3177, the same shall be witnessed by BHEL officials. Load test at 125% & deflection at 100% load shall be measured along with running of sub assemblies shall also be witnessed. During this relevant Test certificates by OEM of Hooks, Wire Rope, Thrusters Brakes, VVFD Drives, RRC Master Controllers, Load Cells, Limit Switches, Gear Boxes etc shall also be examined.	Vendor to confirm		
12.2	At BHEL Works: Inspection And Test	Vendor to confirm		
12.2.1	Span, Diagonal, & other dimensions shall be examined.	Vendor to confirm		
12.2.2	Load Test : Overload test at 125% shall be conducted . Deflection at 100 % load shall be measured. Operational Speed & braking for all motions shall be tested in line with relevant IS. For load test the required load will be provided by BHEL. Remote operation, interlocking, Performance of motors with current measurement & other components like Load cell etc shall be carried out. Test- Reports & other documents shall be examined/ verified, if found satisfactory , the crane shall be accepted and considered as Handed Over.	Vendor to confirm		
12.2.3	BHEL will provide load in the form Steel Steel Plates. The load test shall be performed at BHEL site for proving of the crane w.r.t technical, Safety Parameters etc the Crane shall be commissioned.	Vendor to confirm		
13	PACKING:			
13.1	Rigid packing for all End Carriages, Girders etc. . Other parts like sub- assemblies of cranes, Panel, RRC transmitter/ Panel etc shall be suitably packed so that the material reaches BHEL without any damage/loss in transit.	Vendor to confirm		
14	GENERAL : The vendor should submit the following information:			
14.1	Total connected load (KVA):	Vendor to specify		
14.2	Total weight of the Crane	Vendor to specify		

14.3	Weight of heaviest part of Crane	Vendor to specify			
14.4	Weight of the Entire Crab	Vendor to specify			
14.5	Weight of the heaviest assembly/ subassembly of the Crane	Vendor to specify			
14.6	Dimensions of largest part/ subassembly/ assembly of the crane.	Vendor to specify			
14.7	Overall Length, Width, Height for complete Crane with accessories	Vendor to specify			

15.0 QUALIFYING CRITERIA :

15.1	Only those vendors, who have manufactured, supplied and commissioned at least 2 EOT Crane of capacity 10 Ton or higher with span 17.12 m or higher in the last 10 years from the date of tender opening and the supplied crane satisfactorily working for more than 2 years after commissioning should only quote. The following information is to be submitted by the vendor about the companies where similar Cranes have been supplied. This is required from all the vendors for qualification of their offer.	Vendor to Confirm			
------	--	-------------------	--	--	--

15.2	Name of the customer / company where similar Crane or higher capacity crane(s) are installed. (Copy of Purchase Order should be furnished)	vendor to furnish			
------	---	-------------------	--	--	--

15.3	Complete postal address of the customer.	Vendor to specify			
------	--	-------------------	--	--	--

15.4	Year of commissioning. (Copy of Commissioning Report should be furnished).	Vendor to specify			
------	--	-------------------	--	--	--

15.5	Name and designation of the contact person of the customer.	Vendor to specify			
------	---	-------------------	--	--	--

15.6	Phone, FAX no. and email address of the contact person of the customer.	Vendor to specify			
------	---	-------------------	--	--	--

15.7	Performance certificate from the customers, on their letter head, regarding satisfactory performance of crane supplied to them. Issuing date of performance certificate should not be more than 1 year from tender opening date. Performance certificate should be of the same crane for which PO copies as per 15.1 and 15.2 has been furnished.	vendor to furnish			
------	---	-------------------	--	--	--

15.8	Vendor should have an average turnover of Rs. 10.91 Lakhs for last 3 consecutive financial years ending March 2019 and it should be supported by copies of annual report (Balance Sheet and Profit & Loss Account). In case of foreign bidders, business information report issued by D&B/Experian or any other credit rating agency to be submitted along with	vendor to furnish			
------	---	-------------------	--	--	--

15.9	BHEL officilas may visit vendor works or their customer works to cross-verify the credentials submitted by the bidder.	Vendor to Confirm			
------	--	-------------------	--	--	--

	The Vendors who can qualify as per Clause-15.0 may visit the site to get a first hand idea about the location, application and layout drawing. The Vendor must be very clear about the site conditions and scope of supply before submitting the tender.	Vendor to Confirm			
15.10	The successful Vendor is required to measure all necessary dimensions i.e. Span, Head Room, Clearances between rail center to existing column, Power supply system (DSL) and rail size etc., at site before starting of the crane design / manufacturing.				
15.11	EOT crane being a critical equipment and requires high standards of safety features, there is no relaxation in Qualifying conditions for MSME vendors or startups.	Vendor to note			

Technical Data of Double Girder EOT Crane To be supplied & commissioned at BHEL

Type of Crane	Double Girder EOT Crane	Span	17120mm
Capacity	10 Ton	Lift	9 Mt
Design Standard	IS:3177 (1999) & IS:807	Location	Indoor
Duty of Crane	M-6 duty	Drive type	VFD Drive
Operation	Radio Remote & Cabin Controlled	Ambient Temp.	55 deg. C
Electric power system	415 volts, 50 Hz, 3-phase and Ground, 50 Hz $\pm$ 1.5Hz	Control Voltage	110 Volt AC

For General Specification Refer Annexure II

Vendor to confirm all the below parameters:

S No.	Particular	Hoist	Cross Travel	Long Travel
1 Speed				
1.1	Main Speed	10 m/min (+10%)	12 m/min (+10%)	25 m/min (+10%)
1.2	Creep Speed	10% of main speed	-	-
1.3	Master Controller	Master Controlled - 5 steps	Master Controlled - 5 steps	Master Controlled - 5 steps
2 Motor to be provided by BHEL Bhopal i.e. in BHEL's scope				
2.1	Type	Sq. Cage (Inverter Grade)	Sq. Cage (Inverter Grade)	Sq. Cage (Inverter Grade)
2.2	Rating	minimum 25 hp	minimum 5 hp	minimum 5hp
2.3	Cycle duration Factor	60%	60%	60%
2.4	No of Starts/hr	150	150	150
2.5	Insulation	Class - "F"	Class - "F"	Class - "F"
2.6	Enclosure	TEFC	TEFC	TEFC
2.7	Ambient Temperature	55 deg. C	55 deg. C	55 deg. C
2.8	Number	01 No.	01 No.	02 No.
2.9	Make	Siemens, Marathon(Alstom), ABB, Crompton, Bharat Bijlee, Kirloskar crane duty only		
3 Gear Box				
3.1	Type	Reduction	Reduction	Reduction
3.2	Mounting	In Built	In Built	In Built
3.3	Number	1 No.	1 No.	2 No.
3.4	Make	Bonfiglioli, Shanti Gears, Elecon		
3.5	Ball & Roller Bearings	SKF/FAG/TIMKEN/RHP		
3.6	Size of Bearing	Minimum 6216 or its equivalent	Minimum 22214 or its equivalent	Minimum 22218 or its equivalent
4 Brake				
4.1	DCEM Brake	To be mounted on main hoist and shall be provided by BHEL of BCH make. The Brake panel shall be in Vendor's scope		
4.2	EHT (Thruster Brake)	Stromkraft/Speed-o- Control /EMM / Katerl/ Emco/Sibre		
4.3	Type	DCEM Brakes(BHEL's scope) and backup brake as EHT Brake	EHT Brake	EHT Brake
4.4	Brake Drum dia (in vendors scope)	minimum 400mm	minimum 200mm	minimum 200mm
5 Limit Switch				

5.1	Type	Rotary & Gravity type	Roller type	Roller type
5.2	Number	02 No.	02 No.	02 No.
5.3	Make	Stromkraft / Stromag / Speed-o- Control / BCH / Anand / Omega Heavy duty.		
6 Coupling				
6.1	Type	Geared Coupling		
6.2	Make	Fenner/ Nuteck/Elecon/Allmex		
7 Electric Controls				
7.1	Make	L&T- Yaskawa / Schenider / ABB / Allen Bradley only		
7.2	Drive	VFD (With inbuilt Crane software)		
7.3	Cables type	FR type Copper cables with ISI mark only.		
7.4	Cable make	Asian / Lapp/ Universal/ Finolex / Torrent		
7.5	Fuses Type	HRC fuses: English Electric, Semiconductor fuses		
7.6	Fuse Make	Siemens		
7.7	T.B Connectors	Wago/ Elmex		
7.8	Connectors (With surge suppressor)	Siemens		
7.9	Structural Steel	SAL/TAT/ESSAR/NIPPON/ Jindal		
7.10	MCCB/SFU	Siemens/ ABB / L&T		
7.11	Flood Light	Energy Efficient Phillips/ Bajaj/Asian make (With Protective Guard)		
7.12	Hoodler	TSS/ Schenider/ RS Components		
7.13	Push button	Siemens/ BCH make only		
7.14	Panel	Rittal/BCH		
7.15	RRC	ITOWA -Spain / Telemotive UK make only		
7.16	Load Cell	In Main Hoist		
8 Wire Rope				
8.1	Dia	18mm	--	--
8.2	Construction	(6x36) Steel Core	--	--
8.3	No of Fall	Vendor to Specify	--	--
8.4	Make	Usha Martin only	--	--
8.5	Tensile Strength	1770 kn	--	--
9 Hook Type				
9.1	Hook	Long Shank C type Hook as per IS:3815	--	--
9.2	Make of hook	Smriti Forgings/ Karan /EEK	--	--
10 Wheel				
10.1	No of Wheels	--	4 No	4 No
10.2	Dia	--	Min 320mm	Min 500mm
10.3	Material	--	EN-9	EN-9
10.4	Hardness	--	305-350 BHN	305-350 BHN
10.5	Rail Size	--	Cr 60 or higher	Available on site
11 Pulley				
11.1	Dia	24D	24D	D - Diameter of rope

12	General				
12.1	Wheel Load (Max)	--	--	Vendor To specify	
12.2	Buffer type	--	--	Spring Loaded	
12.3	DSL type	--	--	Angle type DSL system	
12.4	DSL Make	--	--	Available on site	
12.5	Platform	--	--	1 m Length-Maintenance Platform throughout crane span-both side.	
12.6	Clearance req. from Rail to Roof	2.2m	--	--	
12.7	Hook Approach (DSL side) (Indicative value)	1300 mm	Hook Approach (Cabin Side) (Indicative value)	2100 mm	
12.8	Side Clearance	400mm	--	--	
12.9	Type of End Carriage	--	--	L-Type Housing	
12.10	Inspection				
13	At Vendors / Manufacturers Work	Stage Inspections, (1 essentially before closing of girder), Load Test at 125 % load Deflection Test at 100% load			
13.1	At BHEL Works	Load Test at 125 % load Deflection Test at 100% load			
13.2	Paint	S 5: 1984; Colour Shade No. 591 of Asian / Appcolite make			
13.3	Guarantee	24 months from the date of handing over of the crane <i>Commissioning.</i>			
14	Delivery	6 months from the date of PO.			
15	Erection & Comm. period.	12 weeks from the date of receipt of E&C call from BHEL.			