

TECHNICAL SPECIFICATION FOR 300/80 T EOT CRANE

SPEC NO. TRX/CMX/CRN01
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BHARAT HEAVY ELECTRICAL LIMITED

UNIT'S ADDRESS:

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

Enquiry No. :

Due Date :

Supplier Qtn. No.:

Date :



GENERAL SPECIFICATION CUM COMPLIANCE CERTIFICATE OF SCOPE OF SUPPLY FOR SUPPLY, ERECTION & COMMISSIONING OF 300/80 TON EOT CRANE FOR TRM

NOTE:-

1. Vendor must submit complete information against clause no. 14.0 (Qualifying Condition). The offer meeting this clause would only be processed.
2. Vendor to furnish the offer using this standard template of the specification. While furnishing the offer, no change is to be made in the first three columns (i.e. 'S.NO.', 'DESCRIPTION FOR BHEL REQUIREMENT' & 'SPECIFIED / TO BE CONFIRMED BY VENDOR'). Only 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.
4. Vendor should confirm/clarify/specify pointwise (all the points) as per specification and provide original technical leaflet, technical details, photograph, scope of supply etc. at the first instance.

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 :

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SCOPE: SUPPLY, ERECTION & COMMISSIONING OF 1 No - 300/80 TON EOT CRANE, 23.067m SPAN, 16.5 m H.O.L., GANTARY BAY LENGTH 250M COMPLYING WITH SPECIFICATIONS AS BELOW AND TECHNICAL SPECIFICATION AS PER ANNEXURE-A.

S. NO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY VENDOR	OFFERED	DEVIATIONS	REMARKS
1.0	PURPOSE : 300/80 MT EOT Crane.				
1.1	Purpose: 1No electric overhead traveling cranes of 300/80 MT (safe working load) for general engineering application purpose. All the Hooks shall have common crab i.e one trolley with 300T, 80T hook machinery. The Main Hook 300 MT would have calliper brake at Load end (Drum) ie Calliper brake mechanism .	Vender to confirm			
2.0	SPECIFICATION:				
2.1	CRANE CONFIGURATION:				
2.1.1	1 No electrical overhead traveling crane of 300/80 MT (safe working load) capacity for general engineering application purpose. All the Hooks shall have common crab i.e one trolley with 300T, 80T hook machinery. The Main Hook 300 MT would have Calliper brake at Load end (Drum side) ie Calliper brake mechanism. The crane shall be of box type, double girder construction and designed for class M4 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	DETAILS OF RAIL, SPAN etc:				
2.2.1	Maximum wheel load : Approx tonnes .	Vender to specify			
2.2.2	Distance between wheel Centers of end carriage: Max.(approx) mm.	Vender to specify			
2.2.3	Minimum side clearance from gantry rail centers (available max 350mm from Rail centre) mm	Vender to specify			
2.2.4	Crab track centers mm (approx.)	Vender to specify			
2.2.5	Overall width Over Buffers. mm (approx.)	Vender to specify			
2.2.6	Overall width Over Buffers mm (approx.)	Vender to specify			
2.2.7	CT Power Supply System : Cable Drag Chain system.	Vender to specify			
2.2.8	End Stoooper for Gantry Rail to be Provided by the supplier for EOT Crane both-side of Crane (Total 4 Nos.)	Vender to confirm			
2.2.9	Existing rail size : 52 kg/meter	Vender to confirm			

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S. NO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY VENDOR	OFFERED	DEVIATIONS	REMARKS
	CONSTRUCTION:				
	2.3 GIRDER (Bogie type construction):				
2.3.1	The crane shall be generally of box type, double girder construction and to be designed for class M4 duty in accordance with IS 3177 (latest revision).	Vender to confirm			
2.3.2	The box girder should 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			
2.3.3	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			
2.3.4	Box Girder & End carriage joints should have fit bolts only.	Vender to confirm			
2.3.5	For all bolted joints the holes are to be drilled and reamed and bolts are to be force fitted.	Vender to confirm			
2.3.6	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			
2.3.7	All Rotating parts & Overhang parts should be suitably guarded.	Vender to confirm			
	2.4 End Carriage (Bogie type construction):				
2.4.1	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			
2.4.2	The end carriages of the crane are to be mounted on double flanged wheels of approved diameter in accordance with IS:3177. Number of wheels on each side of the crane shall be 8 Nos (Total 16 Nos in the Crane for LT motion) The Wheel should be of forged steel having composition as C55 Mn 75 (EN 9) hardened to 250-280 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.	Vender to confirm			

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S. NO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY VENDOR	OFFERED	DEVIATIONS	REMARKS
2.4.3	Track wheels: The double flanged wheels of suitable diameter shall be used in accordance with IS:3177. The Wheel should be of forged steel having composition as C55 Mn 75 (EN 9) hardened to 250-280 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 totaling 6 mm (1/4") for smooth running.	Vender to confirm			
2.4.4	Traveling Motion Brake: For LT EHT brakes are required to be provided. All brakes for each motion drive of LT should operate simultaneously and adequate interlocks are to be provided to ensure that all brakes are applied simultaneously.	Vender to confirm			
2.5	Crab :				
2.5.1	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 allover 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			
2.5.2	Crab Traverse Mechanism: Two / One No CT Motor shall be connected to one controller but the rotor circuits would be entirely independent to avoid synchronization and permit the slight variation of speed, necessary to let the crane run freely on a track which deviates slightly from perfect straightness.	Vender to confirm			
2.5.3	The wheels should be of forged or cast steel 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			
2.5.4	For CT EHT brakes are required to be provided. All brakes for each motion drive of LT should operate simultaneously and adequate interlocks are to be provided to ensure that all brakes are applied simultaneously.	Vender to confirm			
2.5.5	These brake should also be operated for parking/emergency.	Vender to confirm			
2.6	Hoisting Mechanism :	Vender to confirm			

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2.6.1	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 complete helical gear type construction. The rope anchorage at each end should have at least two independent clamps. The sizes of wire rope shall be selected depending on load from either 26mm/ 32mm / 36mm nominal diameter preferably.	Vender to confirm			
2.6.2	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.	Vender to confirm			
2.6.3	Hoist Brakes : For Hoisting ie 300MT , 80 MT should be of DCEM brakes are required to be provided. 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. Additional Calliper Brake is required to be provided on flange(s) of Rope Drum so that in case of any eventuality Calliper brakes would act & stop the loaded Rope Drum for 300 MT.	Vender to confirm			
2.7	Limit Switch Gear :				
2.7.1	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.	Vender to confirm			
2.7.2	Shunt type limit switches with single arm spring loaded should be provided on both ends of carriage for traverse long travel motion and anticollision type limit switch should be provided for travel motion.	Vender to confirm			
2.7.3	All limit switches should be connected only in interlock circuits.	Vender to confirm			

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S. NO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY VENDOR	OFFERED	DEVIATIONS	REMARKS
2.8	Rope Hook and Sheaves :	Vendor to specify			
2.8.1	The 300/80 Ton loads should be supported on sufficient Nos of falls of steel wire rope, the factor of safety being not less than 6.	Vendor to confirm			
2.8.2	The 300 ton hook should be the forged Ramshorn type Hook as per IS 5749 & material should confirm to 20Mn2 class IS 4637 class 2 (IS 1875). 80 MT shall be High Tensile Steel Shank Hook(Trapezoidal Section). Duly 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. Hooks shall be proof load tested for minimum 125% of SWL. Spring loaded Safety latch to be provided on the hook.	Vendor to specify			
2.8.3	Sheaves are to be of heavy duty cast iron 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			
2.9	Crane Control Panel :	Vendor to confirm			
2.9.1	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 communicating & 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			
2.9.2	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			
2.10	AC Vector Drive :				

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S. NO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY VENDOR	OFFERED	DEVIATIONS	REMARKS
2.10.1	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. e) The drive must have special software designed for crane application which shall have features like anti-torque lowering, co-ordinated control of thruster 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			
2.11	Control Cabin (Indoor Operation) :	Vendor to specify			
2.11.1	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 controllers(Joy stick) should be so positioned as to facilitate easy operation and maintenance Cab. 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			
2.11.2	The controllers for speed control of variable speed drives shall be (5 steps) joystick type. A warning hooter shall also be provided which should also be operable from RRC. A 5.0 kg dry chemical powder fire extinguisher with a long discharge nozzle should be provided in the operators cabin.	Vendor to confirm			
2.11.3	A revolving type cushioned seat is to be provided in the cabin for the crane operator at a suitable height.	Vendor to confirm			

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2.11.4	A 60 watt lamp, one blower type heater (Convector) , one 16" sweep cabin fan with guards and a suitable step down transformer should be provided in the cabin.	Vendor to confirm			
2.11.5	An inspection lamp is also to be provided with 110V plug point in the cabin.	Vendor to confirm			
2.12	Crane Bridge Lighting :	Vendor to confirm			
2.12.1	Sixteen Nos energy efficient 150 Watts (minimum) LED flood lights with fittings should be provided with suitable guard for protection below the Platform with hinge type system for easy maintenance.	Vendor to confirm			
2.12.2	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			
2.13	Electrical Wiring :	Vendor to confirm			
2.13.1	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			
2.13.2	All internal wiring inside control panels should be 2.5 sq.mm copper wires having PVC insulation. All copper wire terminals will be lug of either soldered Crimping type.	Vendor to confirm			
2.13.3	All electrical installation and wiring should strictly conform to IE Act and latest IEE Rules and other standard practice as adopted by the Indian Standard Institution.	Vendor to confirm			
2.13.4	Double earthing by bare copper wire (8 SWG) shall be provided throughout the crane.	Vendor to confirm			
2.13.5	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			
2.13.6	The crane shall be supplied complete with all wiring & materials. All internal wiring inside control panels should be copper wires PVC insulated FR grade with ISI mark only.	Vendor to confirm			
2.13.7	All wiring shall be nicely dressed in cable Trays/ trunking . Suitable marking should also be made.	Vendor to confirm			
2.14	Miscellaneous :				

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2.14.1	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			
2.14.2	The first fill of oil, grease etc. for the commissioning of the crane shall be provided by the supplier.	Vendor to confirm			
2.14.3	The tool box with standard tools shall be supplied with the crane and suitable heater should be provided inside the cabin.	Vendor to confirm			
2.14.4	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			
2.14.5	Engraved Indication plates for SWL, Hooks, Sheaves, Pulley etc, panel Identification, Master Controllers position marking should be preferably done wherever possible.	Vendor to confirm			
2.15	Radio Remote Controller : Individual RRC shall comprise of the following.	Vendor to confirm			
2.15.1	I) Transmitter: It shall be suitable for 2 steps control of AC drive through push buttons. The 2-steps push button remote must have following functions: • Main Hoist: Up/Down, through 2 steps push button • Aux. Hoist: Up/Down, through 2 steps push button. • Long Travel: Left/Right, through 2 steps push button. • Cross Travel: Fwd/Right, through 2 steps push button. • Hooter Operation: Normal push button • Crane Bridge Light 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 reset. II) Receiver with antenna suitable for above transmitter. III) Battery charger. IV) 2 set of batteries for transmitter.	Vendor to confirm			
2.15.2	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			

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S. NO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY VENDOR	OFFERED	DEVIATIONS	REMARKS
2.15.3	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			
2.15.3.1	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			
2.15.3.2	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			
2.15.3.3	Auto checking of the commanded motion and stopping of all the motions in case of any misbehavior either way.	Vendor to confirm			
2.15.3.4	System should have self-diagnostic and alphanumeric fault display.	Vendor to confirm			
2.15.3.5	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			
2.15.3.6	Operating range should be 100 mtrs.	Vendor to confirm			
2.15.4	The output relays for driving motion contactors shall be heavy duty, rated for 10Amps at 110VAC.	Vendor to confirm			
2.16	General Conditions for RRC :	Vendor to confirm			
2.16.1	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			
2.16.2	Incoming supply available is 415 V, +/- 10%, 3 Phase, 3 wire (no neutral), 50 Hz.±1.5Hz	Vendor to confirm			
2.16.3	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 upto 1mW of transmitted power, which does not require license.	Vendor to confirm			
2.16.4	Battery Charger: It shall be suitable for charging the Ni-Cd batteries of transmitter. It shall constant current type with auto-cutoff facility on full charge. Indication shall also be available for charging cycle and status of the battery.	Vendor to confirm			
2.16.5	Batteries: Batteries suitable for 72 Hrs operation of transmitter are to be supplied.	Vendor to confirm			
2.16.6	Interface Panel: The panel shall be of good quality powder coated of IP54 grade, crane duty and shall contain following accessories	Vendor to confirm			
2.16.7	Incomer Switch fuse unit (SFU).	Vendor to confirm			

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2.16.8	Emergency Stop Contactor to be provided to cut power to all motors emergency conditions.	Vendor to confirm			
2.16.9	Illuminating lamps LED Type (R, Y & B) for three phase supply indication.	Vendor to confirm			
2.16.10	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			
2.16.11	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			
2.16.12	Hooster: 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			
3.0	ERECTION & COMMISSIONING :	Vendor to confirm			
3.1	The crane is to be Erected at site by the supplier with their own labour, tools and tackles, other equipments like winch, Sheaves/ Sheave Pulley Block etc shall be brought by the supplier on returnable basis. Lifting Hook is available at the apex of Truss of Block for lifting of Crane, Mobile crane, if required shall be arranged by BHEL.	Vendor to confirm			
3.2	The supplier shall however bring their own Cradle along with Chain / Slings & other lifting tackles (on returnable basis) for conducting load test at BHEL site. BHEL will provide load in the form of Steel Plates. The load test shall be performed at BHEL site for proving of the crane w.r.t technical, Safety Parameters etc.	Vendor to confirm			
3.3	Various tests like gradual loading, overload at 125%, Deflection test at 100% load, Braking, Operational Speeds etc. shall be conducted after proving of the crane w.r.t technical, Safety Parameters etc.	Vendor to confirm			
3.4	Commissioning-spares, required for commissioning of the crane shall be brought by the supplier on returnable basis.	Vendor to confirm			
3.5	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			
3.6	Schedule of Erection and Commissioning shall be submitted with the offer.	Vendor to specify			
3.7	Charges, duration, terms & conditions for E&C should be furnished in detail separately by vendor along with offer.	Vendor to confirm			

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4.0	ELECTRICAL SYSTEM :				
4.1	415V ± 10% 50Hz ± 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 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 equivalents.	Vendor to confirm			
4.6	All cables including cross-traverse conductor shall be shrouded DSL . 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			
5.0	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, workpiece 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			
5.2	A detailed list of all alarms / indications provided on Crane should be submitted by the supplier.	Vendor to confirm			
5.3	All the pipes, cables etc. on the crane should be well supported and protected.	Vendor to confirm			
5.4	All the rotating parts used on machine should be statically & dynamically balanced to avoid undue vibrations. Open gears, couplings, fans/ rotating parts should be provided with suitably guarded.	Vendor to confirm			

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5.5	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 to be provided).	Vendor to confirm			
5.6	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			
5.7	Emergency Switches should be provided at suitable locations.	Vendor to confirm			
5.8	Electrical cable & signalling cables should be suitably seperated.	Vendor to confirm			
5.9	DSL Guard should be provided.	Vendor to confirm			
5.10	Hook Guard should be provided.	Vendor to confirm			
6.0	ENVIRONMENTAL PERFORMANCE OF THE MACHINE :	Vendor to confirm			
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 applylied only after providing rust-preventor (primer) coat.	Vendor to confirm			
6.5	Oil / Grease should not dip/ fall from the Crane.	Vendor to confirm			
7.0	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 furnish the list of tools			
7.2	Maintenance: Adequate maintenance facility shall be provided for ease in maintenance for assmeblies/sub-assemblies including gear boxes / machinery / Panel / wiring/ etc.	Vendor to confirm			
8.0	DOCUMENTATION : Five sets of following documents (Hard copies) in English language should be supplied along with the machine.	Vendor to confirm			
8.1	During participatuion in technical Bid.	Vendor to confirm			
8.1.1	G.A. Drawing.	Vendor to confirm			

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S. NO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY VENDOR	OFFERED	DEVIATIONS	REMARKS
8.1.2	Wheel Load Diagram (Wheel Distance & Wheel Load).	Vendor to confirm			
8.1.3	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 (Boggies) Trolley Section etc.	Vendor to confirm			
8.1.4	Vendor to submit appropriate Q.A. Plan .	Vendor to confirm			
8.2	After Receipt of Order :	Vendor to confirm			
8.2.1	Calculation for Box Girder, End Carriage structural plates/ Web / Stiffner 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			
8.2.2	Operating manuals of Crane - 5 Sets.	Vendor to confirm			
8.2.3	Detailed Maintenance manual of Crane. Spares- part list / concerned drawing of the spares - 5 Sets.	Vendor to confirm			
8.2.4	Maintenance, Interface & commissioning manuals for Controller & drives - 2 Sets.	Vendor to confirm			
8.2.5	Catalogues, O&M Manuals of all bought out items including drawings, wherever applicable.	Vendor to confirm			
8.2.6	Detailed specification of all rubber items like Oil- Seals / O- Rings etc.	Vendor to confirm			
8.2.7	One Soft copy for the above requisities shall also be supplied in CD.	Vendor to confirm			
8.2.8	RRC's frequency allocation license (if required) Chemical & Proof load certificates of Hooks (Test cer tificates 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 componets, Brakes, Spring Loaded Buffers etc shall also be furnished.	Vendor to confirm			
9.0	TRAINING :				

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S. NO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY VENDOR	OFFERED	DEVIATIONS	REMARKS
9.1	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 maintenance.	Vendor to confirm			
10.0	AMBIENT CONDITIONS & THERMAL STABILITY :				
10.1	Total Crane including Controller system and all supplied items should work trouble free and efficiently under following operating conditions: Power Supply Voltage: 415 V $\pm$ 10%, 50 Hz, $\pm$ 1.5Hz No. of phases = 3 (3 Wire plus Ground) Ambient Conditions: Temperature = 5 to 55 degree celsius Relative Humidity = 95% max.	Vendor to confirm			
10.2	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			
11.0	CRANE ACCEPTANCE : (Tests/Activities to be Performed by Vendor)				
11.1	At Vendor Works : Inspection And Test.				
11.1.1	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			
11.1.2	No 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. No load test run of sub assemblies shall also be witnessed. During this relevant Test certificates by OEM of Hooks, Wire Rope, Thruster Brakes, VVFD Drives, RRC Master Controllers, Limit Switches, Gear Boxes etc shall also be examined.	Vendor to confirm			
11.2	At BHEL Works : Inspection And Test	Vendor to confirm			
11.2.1	Span, Diagonal, & other dimensions shall be examined.	Vendor to confirm			

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S. NO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY VENDOR	OFFERED	DEVIATIONS	REMARKS
11.2.2	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			
11.2.3	The supplier shall however bring their own Cradle along with Chain / Slings & other lifting tackles (on returnable basis) for conducting load test at BHEL site. BHEL will provide load in the form 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			
11.2.4	Prove-Out for the Crane's Capacity and Smooth Functioning of the Crane (at BHEL Works) shall be the RESPONSIBILITY of the supplier. Final Load testing as per IS at 125% of rated load shall be conducted at site & acceptance of Crane by competent person as per Government norms has to be done by Vendor and certificate is to submitted. All expenses shall be borne by the Vendor.	Vendor to confirm			
12.0	PACKING :				
12.1	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			
13.0	GENERAL : The vendor should submit the following information:	Vendor to confirm			
13.1	Total connected load (KVA):	Vendor to specify			
13.2	Total weight of the Crane.	Vendor to specify			
13.3	Weight of heaviest part of Crane.	Vendor to specify			
13.4	Weight of the Entire Crab.	Vendor to specify			
13.5	Weight of the heaviest assembly / subassembly of the Crane.	Vendor to specify			
13.6	Dimensions of largest part/ subassembly/ assembly of the crane.	Vendor to specify			
13.7	Overall Length, Width, Height for complete Crane with accessories.	Vendor to specify			
13.8	Dimensions of largest part/ subassembly/ assembly of the crane.	Vendor to specify			
14.0	QUALIFYING CONDITIONS :				

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S. NO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY VENDOR	OFFERED	DEVIATIONS	REMARKS
14.1	Only those vendors, who have manufactured, supplied and commissioned at least 2 EOT Crane of capacity 300 Ton or higher with span 23m 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			
14.2	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			
14.3	Complete postal address of the customer.	Vendor to specify			
14.4	Year of commissioning. (Copy of Commissioning Report should be furnished).	Vendor to specify			
14.5	Name and designation of the contact person of the customer.	Vendor to specify			
14.6	Phone, FAX no. and email address of the contact person of the customer.	Vendor to specify			
14.7	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 14. 1 and 14.2 has been furnished.	vendor to furnish			
14.8	Vendor should have an average turnover of Rs. 20 million for last 3 consecutive financial years ending March 2019 and it should be supported by copies of annual report (Balance Sheet and Profit & Loos Account). In case of foreign bidders, business infromation report issued by D&B/Experian or any other credit rating agency to be submitted along with offer.	vendor to furnish			
14.9	BHEL officilas may visit vendor works or their customer works to cross-verify the credentials submitted by the bidder. . The Vendors who can qualify as per Clause-14.0 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			
14.10	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.	Vendor to Confirm			
14.11	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		1 No. Double Girder EOT Crane		Span		23.067 Mtr
Capacity		300/80 Ton		Lift		16.5 Mtr
Design Standard		IS:3177 (1999) & IS:807		Location		Indoor
Duty of Crane		M-4		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.±1.5Hz		Control Voltage		110Volt ac
Vendor to confirm all the below parameters:						
S. No.	Particular	Main Hoist	Aux. Hoist	Cross Travel	Long Travel	
1 Speed						
1.1	Main Speed	1.5 / 0.15 m/min (± 10%)	5 / 0.5 m/min (± 10%)	15/1.5 m/min. (± 10%)	25/2.5 m/min (± 10%)	
1.2	Creep Speed	10% of main speed	10% of main speed	--	--	
1.3	Master Controller	5 Steps	5 Steps	5 Steps	5 Steps	
2 Motor						
2.1	Type	Sq. Cage (Invertor Grade)	Sq. Cage (Invertor Grade)	Sq. Cage (Invertor Grade)	Sq. Cage (Invertor Grade)	
2.2	Rating	minimum 107 kw	minimum 95 kw	minimum 15 kw	minimum 10 kw	
2.3	Cycle duration Factor	60%	60%	60%	60%	
2.4	No of Starts / Hr	150	150	150	150	
2.5	Insulation	Class - "F"	Class - "F"	Class - "F"	Class - "F"	
2.6	Ambient Temperature	55 deg. C	55 deg. C	55 deg. C	55 deg. C	
2.7	Number	01 No.	01 No.	01 No.	4 No.	
2.8	Make	Siemens, Alstom (marathon), ABB, Crompton crane duty only				
3 Gear Box						
3.1	Type	Reduction	Reduction	Reduction	Reduction	
3.2	Mounting	In Built	In Built	In Built	In Built	
3.3	Number	1 No.	1 No.	01 No.	4 No.	
3.4	Make	Bonfiglioli, Shanti Gears, Elecon, Mukund, Unique, WMI, Fafeco, Demag				
3.5	Ball & Roller Bearings	SKF / FAG / TATA / TIMKEN / RHP				
4 Brake						
4.1	DCEM Brake Make	BCH				
4.2	EHT (Thruster Brake)	Stromkraft/Speed-o- Control /EMM / Kateel/ Emco/Sibre				
4.3	Type	DCEM Brakes and backup also as DCEM Brake	DCEM Brakes and backup also as DCEM Brake	EHT Brake	EHT Brake	

S. No.	Particular	Main Hoist	Aux. Hoist	Cross Travel	Long Travel
4.4	Brake Drum	Dia minimum 400	Dia minimum 400	Dia minimum 200	Dia minimum 200
4.5	Calliper Brake	Calliper brake for Main hoist		--	
4.6	Calliper Brake	Bubenzler Bremsen- Emco or Svendborg, Denmark Make, Sibre Make only	--	--	--
5	Limit Switch				
5.1	Type	Rotary & Gravity type	Rotary & Gravity type	Roller type	Roller type
5.2	Number	01 nos + 01 nos	01 nos + 01 nos	02 No.	04 No.
5.3	Make	Stromkraft / Stromag / Speed-o- Control / BCH / Omega / Galvi / Sibre / Emco Heavy duty.			
6	Coupling				
6.1	Type	Geared Coupling			
6.2	Make	Fenner/ Nuteck/ Elecon/ Allmex			
7	Electric Controls				
7.1	Drive	VFD (With inbuilt Crane software); Make L&T- Yaskawa / Schneider / Mitsubishi / ABB/Siemens only			
7.2	Encoder (Main Hoist & Auxh Hoist)	Heidenhain			
7.3	Cables type	FR type Copper cables with ISI mark only.			
7.4	Cable make	Asian / Lapp/ Universal/ Finolex / Torrent / IGUS / Helu			
7.5	Drag Chain	IGUS make			
7.6	Fuses Type	HRC fuses: English Electric, Semiconductor fuses			
7.7	Fuse Make	Siemens			
7.8	T.B Connectors	Wago/ Elmex			
7.9	Contactors	Siemens			
7.10	Structural Steel	SAIL / TATA / Jindal			
7.11	MCCB/SFU	Siemens/ ABB / L&T			
7.12	Flood Light (LED type)	Energy Efficient Phillips / Bajaj / Asian make (With Protective Guard)			
7.13	Hooter	Schneider/ TSS / RS Components			
7.14	Push button	Siemens/ BCH/ L&T make only			
7.15	Panel	Rittal/BCH			
7.16	RRC	ITOWA -Spain / Telemotive UK make only			
7.17	Load Cell	In Main Hoist minimum 200 mm display size	In Auxiliary Hoist minimum 200 mm display size	--	--
8	Wire Rope				
8.1	Preferable Diameter	26, 32, 36 mm	22, 26, 32, 36 mm	--	--
8.2	Construction	(6x36) Steel Core	(6x36) Steel Core	--	--

S. No.	Particular	Main Hoist	Aux. Hoist	Cross Travel	Long Travel
8.3	No of Fall	Vendor to Specify	Vendor to Specify	--	--
8.4	Make	Usha Martin only	Usha Martin only	--	--
8.5	Tensile Strength	1770 kn	1770 kn	--	--
9 Hook Type					
9.1	Hook	Ramshorn Hook	Single Shank Hook (long shank)	--	--
10 Wheel					
10.1	No of Wheels	--	--	8 No	16 No
10.2	Dia	--	--	Min 500mm	Min 500mm
10.3	Material	--	--	EN-9	EN-9
10.4	Hardness	--	--	305-350 BHN	305-350 BHN
10.5	Rail Size	--	--	Vendor to specify	52 kg rail available on site
11 Pulley					
11.1	Dia	minimum 24D	minimum 24D	minimum 24D	D - Diameter of rope
12 General					
12.1	Wheel Load (Max)	--	--	Vendor To specify	Vendor To specify (permissible maximum wheel load without impact should be 46 T)
12.2	Buffer type	--	--	--	Spring Loaded
12.3	DSL type	--	--	--	Copper Shrouded DSL of capacity 400 Amp available on site, DSL arm on crane shall be provided by manufacturer
12.4	DSL Make	--	--	--	Anand make DSL available on site
12.5	Platform	--	--	--	1 m Length Maintenance Platform
12.6	Clearance req. from Rail to Roof	4.5 m	--	--	--
12.7	Hook Approach (DSL side) (Indicative value)	Vendor to Specify	--	Hook Approach (Non- DSL side) (Indicative value)	Vendor To specify
12.8	Type of End Carriage	--	--	--	L-Type Housing
12.9	Wheel base of crane	--	--	Vendor to specify	As existing column span is 7.62 m, crane is to be designed to keep the load on 2 columns, hence minimum 15.25 metres to be maintained
12.1	Paint	IS 5: 1984; Colour Shade No. 591 of Asian / Appcolite make			
13	Guarantee	24 months from the date of commissioning of crane			
14	Delivery period	5 months from the date of approved drawings. All drawings should be sent together in a lot within 28 days from the date of LOI/PO, whichever			
15	Erection & Comm. period.	12 weeks from the date of clearance of site. & intimation from BHEL for Erc			