

BHARAT HEAVY ELECTRICAL LIMITED, JHANSI		
	Specification No.	CRJ/9581
	Item No.	SP/CRJ/9581/1
	Location	FABRICATION SHOP
	Quantity	ONE NO.
NAME & ADDRESS OF THE SUPPLIER		
TELEPHONE NOS.		
FAX NOS.		
E-MAIL ADDRESS		

**DESIGN, MANUFACTURING, SUPPLY, ERECTION & COMMISSIONING OF 10/3 TON EOT CRANE  
COMPLYING AS PER SPECIFICATION BELOW**

<b>NOTE :</b>	
	1. VENDOR must submit complete information against clause No. 21.0 ( Qualifying condition). The offer meeting this clause would only be processed.
	2. The " Specified/to be confirmed by" Column and where applicable, the " Deviations" Column of this format shall be filled in by the Vender and submitted along with the offer. Technical details also submitted with the offer. Inadequate / incomplete, ambiguous, or unsustainable information against any of the clauses of the specification / requirements shall be treated as non - compliance.
	3. The offer and all documents enclosed with offer should be in English language only.

**SPECIFICATION CUM COMPLIANCE CERTIFICATE OF 10/3 EOT CRANE**

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATIONS
<b>1.0</b>	<b>SCOPE :</b>		
<b>1.0</b>	<b>DESIGN, MANUFACTURING, SUPPLY, ERECTION &amp; COMMISSIONING OF "EOT CRANE 10/3 TON" "SPAN 18 METERS" COMPLYING WITH SPECIFICATIONS AS BELOW:</b>	VENDER TO CONFIRM	
<b>2.0</b>	Electric Over Head crane of capacity indicated below is required for loading, unloading of unfinished and finished components from Machine Tools as well as assembly of Loco manufacturing shop. The same has to work on a prepared gantry in <b>FABRICATION SHOP</b>		
<b>3.0</b>	<b>CAPACITY AND LEADING DIMENSION</b>		
3.1	Safe Working Load - Main Hoist - 10T	VENDER TO CONFIRM	
3.2	Safe Working Load - Aux. Hoist - 3T	VENDER TO CONFIRM	
3.3	Duty as per I.S.3177/1965 (with latest ammendment) - M5	VENDER TO CONFIRM	
3.4	(a) Normal Span - 18.00 Meter ( However, actual available span & other dimensions are required to be checked by supplier before commencement of the work)	VENDER TO CONFIRM	
3.5	(b) Rail Center to Center - 16.8 Meter	VENDER TO CONFIRM	
3.6	Gantry Rail height above floor level - 12.0 Meter	VENDER TO CONFIRM	
3.7	Hook lift above floor level to be provided -11.0 Meter (However it may change depending upon actual site condition).		
3.8	Type of Hook - Shank type	VENDER TO CONFIRM	
3.9	Available head hieght above rail top - 2.8 Meter	VENDER TO CONFIRM	
3.10	Available side clearance from gantry rail center - 0.400 Meter	VENDER TO CONFIRM	
	Operation - Cabin and Radio Remote	VENDER TO CONFIRM	
3.11	<b>Location</b>		
	(1) fabrication shop, Bay Length- 204 Meter	VENDER TO CONFIRM	
3.12	Electric poweer supply - 415 Volt, 3 Phase , 50 HZ A.C.Supply	VENDER TO CONFIRM	
3.13	Gantry rail size - 105 lbs (Provided) (However it may change depending upon actual site condition).	VENDER TO CONFIRM	
3.14	<b>FULL GEARED SPEED</b>		
	(a) Main hoist Hoisting / Lowering - 6 M/Min	VENDER TO CONFIRM	
	(b) Aux. Hoist Hoisting / Lowering - 8 M/Min	VENDER TO CONFIRM	
	( c ) Cross Traverse (CT) Forward/ reverse - 20 M/Min	VENDER TO CONFIRM	
	(d) Long Travel (LT) Left / Right - 60 M/Min	VENDER TO CONFIRM	
3.15	Speed control for all motion should through VVVF (Variable Voltage Variable Frequency) drive.	VENDER TO CONFIRM	
3.16	All the speeds should be controlled in four steps from the cabin. All four steps should have gradual increase in speed from minimum to maximum. Speed specified above are maximum speeds.	VENDER TO CONFIRM	
3.17	Speed control system shall be elaborately and clearly mentioned by the tenderer in their offer. Minimum speed at various steps to be clearly mentioned.	VENDER TO CONFIRM	

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3.18	Minimum speed should not be more than 10% of maximum speed.	VENDER TO CONFIRM	
3.19	2 step speed Control shall be provided through RRC (RRC transmitter would have dual speed single push button). Ist step Speed shall be 10% of the full speed & IInd step shall be full Speed. The Command for Ist step shall enable crane to move at 10% of maximum continuously whereas IInd step would start crane from 0 to full speed.	VENDER TO CONFIRM	
3.20	Facility for the resetting of the speed shall be available in the drive.	VENDER TO CONFIRM	
3.21	DESIGN STANDARD IS – 807/2006 & 3177	VENDER TO CONFIRM	
4.0	<b>WORK PIECE MATERIAL</b>		
4.1	The crane shall be generally of box type double girder construction and to be designed for class M5 duty in accordance with BSS: 466/1960 and or IS:3177. Material shall be of tested quality as per relevant I. S.	VENDER TO CONFIRM	
4.2	<b>BRIDGE CONSTRUCTION :</b>		
4.2.1	The bridge should comprise of two main girders with two out riggers and the end carriage built up from mild steel channel with adequate diaphragms or stiffing plates. Each bridge girder shall be fabricated and dispatched without any spliced joints.	VENDER TO CONFIRM	
4.2.2	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 minimum 1000 mm.	VENDER TO CONFIRM	
4.2.3	Box Girder & End carriage joints should have fit bolts only.	VENDER TO CONFIRM	
4.2.4	For all bolted joints the holes are to be drilled and reamed and bolts are to be force fitted.	VENDER TO CONFIRM	
4.2.5	Hand railing shall be fitted on both side of the end carriages and throughout the length of the platform ( height of 1.1 m. ) parallel to girder. Size of the hand rail shall be not less than 25 mm 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	
4.2.6	All Rotating parts & Overhang parts should be suitably guarded.	VENDER TO CONFIRM	
4.3	<b>END CARRIAGE</b>		
4.3.1	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 25 mm. Proper hand railing should be provided on end carriage.	VENDER TO CONFIRM	
4.3.2	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 2 Nos ( Total 4 Nos in the Crane for LT motion ) The Wheel should be of forged steel having composition as Cr 55 Mn 75 ( EN 9 ) hardened to 300-350 BHN with minimum depth 10mm 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	
4.3.3	Twin drive system to be adopted for LT travel.	VENDER TO CONFIRM	
4.4	<b>TRAVELLING MECHANISM:</b>		
4.4.1	One wheel in each carriage is to be driven by a machine cut forged steel gears by a motor mounted on or adjacent to the carriage. Motors of both the end carriage.	VENDER TO CONFIRM	
4.4.2	<b>TRAVELLING MOTION BRAKE :</b> A thruster brake to be fitted on each individual drive of the track wheels. These brakes should be arranged to be operated from the control desk as well as remote control. The brakes to be of post type with hinged shoes, lined with good quality reinforced bonded brake lining and arranged for easy adjustment for the necessary wear on lining time to time.	VENDER TO CONFIRM	
4.4.3	An independent additional mech. / electrical operating brake is to be provided in LT motion to stop the crane immediately in case of power failure. This should also be operated from Radio remote on emergency condition.	VENDER TO CONFIRM	
4.5	<b>CRABE FRAME :</b>		
4.5.1	This should be built up of steel sections and plates like Channels , T- Beam & / or fabricated plates to proper thickness and the upper surface of the frame should be plated over wherever required in order to give great lateral rigidity and maintenance facility. There should be lubricating 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	

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S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATIONS
4.5.2	Crab Traverse Mechanism: One No CT Motor 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 maintenence is not compromised.	VENDER TO CONFIRM	
4.5.3	The wheel should be of forged steel material of approved diameters duly secured to hard shaft steel axles and to run on sturdy roller bearing of SKF make. The bearings to be enclosed in a housing and arrangement for grease lubrications should be provided. One axle should be driven by a motor through an enclosed good design harden spur gears of good quality. A thruster brake should be provided.	VENDER TO CONFIRM	
4.5.4	The cross travel gear box should be well secured at least by four bolts two on each side opposite the each other.	VENDER TO CONFIRM	
4.6	<b>HOISTING MECHANISM :</b>		
4.6.1	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 machined 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.	VENDER TO CONFIRM	
4.6.2	The gear arrangement 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 266- 300 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 gear arrangement shall be enclosed in a heavy duty cast iron gear box with jointing surfaces machined and made leak proof.	VENDER TO CONFIRM	
4.6.3	A thruster creep brake to be fitted on the high speed shaft. The brake to be of the post type with hinged shoes. Shoe must be lined with best quality reinforced bonded asbestos industrial brake lining and arranged for easy adjustment. The brake should be normally held on by a balance weight and released by a thruster in the circuit of hoist motor.	VENDER TO CONFIRM	
4.7	<b>OTHER BRAKES &amp; LIMIT SWITCHES</b>		
4.7.1	There should be heavy duty double limit switch for each hoisting and lowering motions.	VENDER TO CONFIRM	
4.7.2	Gravity type limit switch must be provided for hoisting operation in order to provide additional safety.	VENDER TO CONFIRM	
4.7.3	Series type limit switches with single arm spring loaded allen west type should be provided for traverse motion.	VENDER TO CONFIRM	
4.7.4	Anti - collision device should be provided in the LT motion (both side). The device should be so set to stop the crane at the distance of 1-2 meter. The device shall be connected only in interlock circuits.	VENDER TO CONFIRM	
4.7.5	All limit switches should be connected only in interlock circuits.	VENDER TO CONFIRM	
4.8	<b>ROPE HOOK AND SHEAVES:</b>		
4.8.1	The hoist shall have the factor of safety being not less than 6. Load should be supported on 4 falls. Wire rope should be non rotating type having 6X37/36 filler construction.	VENDER TO CONFIRM	
4.8.2	The Hooks shall be High Tensile Steel Shank Hook ( Trapezoidal Secion). Duly Hardened & Tempered. Hook Material & Manufacturing Shall Be Done As Per Is 3815:1977 Material Grade-3. The hook should Swivel freely on thrust ball bearing.		
4.8.3	Sheaves are to be of heavy duty cast iron mounted on Ball bearings. Guards to be fitted to prevent the rope leaving the sheaves, even when the hook if lowered to the rest on the ground and rope allowed falling slack. The hook guard should be secured in such a manner that there should be no bolt protruding in the inner side of the hooks.	VENDER TO CONFIRM	
4.9	<b>MOTORS:</b>		
4.9.1	The motors should be inverter grade having 'F' class insulation having S4 duty with approx.150 starts/hr and shall comply with IS: 325 according to manufacturer's standard. The winding should be suitably insulated and tropicalised. All motors should be suitable for use on 415 + 10% volts, 50 +1.5%Hz 3-Phase, 3 wire, 50 cycles AC supply. Motors shall be suitable to be controlled by VVFD Drives.	VENDER TO CONFIRM	
4.10	<b>CONTROL GEAR</b>		

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4.10.1	The control panel shall be of RITTAL/BCH make conforming to all safety standards and wiring practices. It shall be of IP54 class and shall comprise of following: Incomer SFU/MCCB, AC Drive for all motions. 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.	VENDER TO CONFIRM	
4.10.2	The relays and contactors should be robust design & generally in conformity with BS: 587. The Remote and Cabin interfacing should have perfect isolation & Limit switches for safe operation of crane. All coils of contactors & relays should have RC surge suppressors.	VENDER TO CONFIRM	
4.10.3	Suitable rating control transformer should be provided for the control of the circuit.	VENDER TO CONFIRM	
4.10.4	Isolator switch fuse unit should be capable of load breaking and mechanically robust. Isolation to be of quick brake type and it should be of GE Control (EE) make. Main Isolating switch should be mounted in the operator's cabin.	VENDER TO CONFIRM	
<b>4.11</b>	<b>AC Vector Drive:</b>		
4.11.1	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:	VENDER TO CONFIRM	
4.11.2	a) The drive must be rated for continuous duty and shall have overload capacity of 150% for 60 sec.	VENDER TO CONFIRM	
4.11.3	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.	VENDER TO CONFIRM	
4.11.4	c) The motor braking shall be dynamic through inbuilt/external chopper and resistance box. The capacity shall be suitable for providing 150% braking torque.	VENDER TO CONFIRM	
4.11.5	d) The drive rating should be selected considering derating factor at 55 degree centigrade. The main hoist motors shall have encoder- feedback for optimum control through VVFD.	VENDER TO CONFIRM	
4.11.6	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 and cabin. k) Drive Programming parameterisation software alongwith connecting cable/ adapter suitable for connecting to standard USB port of PC shall be supplied.	VENDER TO CONFIRM	
4.11.7	Operation from Cabin Operator Cabin with following switches ergonomically designed shall be provided for ease in operation. This should be interlocked & in no case control supply is available in case crane is operated with either from RRC or Cabin. Essentially Following switches be available 1) main Speed & Slow speed for each MH, CT, LT operation. 2) Control On- OFF, Light, Hooter, Switches. One Mushroom projected switch should also be provided for emergency stop. The PB station should be suitably earthed. A 5.0 kg dry chemical powder fire extinguisher with a long discharge nozzle should be provided & adequately clamped on to LT platform.	VENDER TO CONFIRM	
<b>4.12</b>	<b>CONTROL CABIN:</b>		
4.12.1	The depth of crane cabin should be limited to 2150 mm. Opening to be cage on the platform should be approximately 750 mm x 750 mm. Suitable ladder should be provided between the cage and the inspection platform of the crane. The controllers should be so positioned as to facilitate easy operation & maintenance. A warning bell (Electrically operated industrial type with 6" gong) and Fire extinguisher of 4.5 litre capacity with long discharge nozzle should be provided in operator's cabin. One more bell is to be provided sturdy conventional pendulum type made of good bell metal and to be well secured inside the cabin in a convenient position for easy operation. A revolving type cushioned seat is to be provided in the cabin for the crane operator. A 2 feet 20 watt fluorescent tube fitting, one 16" sweep cabin fan with guard should be provided.	VENDER TO CONFIRM	
4.12.2	An inspection lamp with 20 meter 3 core flexible cable is to be provided with 240 Volt plug point in the cabin.	VENDER TO CONFIRM	

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4.12.3	The total depth of control cabin should be such that it should not interfere with any other structure / semi gantry crane / machines in the entire bay. For this supplier must check all the available clearances at the side before finalizing/ designing of the crane dimension.	VENDER TO CONFIRM	
4.13	<b>Radio Remote Controller: RRC shall comprise of the following.</b>	VENDER TO CONFIRM	
4.13.1	<b>A)</b> Transmitter: It shall be suitable for 2 steps control of AC drive through push buttons. The 2-steps pushbutton remote must have following functions: • Hoist: Up/Down, through 2 steps Pushbuttons. • Long Travel: Left/Right, through 2 steps Pushbuttons. • Cross Travel: Fwd/Right, through 2 steps Push buttons. • Hooter Operation: Normal push button • Crane lights ON/OFF push button • Emergency Stop: Raised distinctive push button. • Key switch: Removable unique key to disable transmitter. • Battery check facility & indicator. • Push button for drive fault reset. <b>B)</b> Receiver with antenna suitable for above transmitter. <b>C)</b> Battery charger. <b>D)</b> 2 set of batteries for transmitter.	VENDER TO CONFIRM	
4.13.2	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.	VENDER TO CONFIRM	
4.13.3	Receiver: It shall be supplied housed in a suitable panel and shall have antenna for receiving transmitter signals. It shall have following features:	VENDER TO CONFIRM	
4.13.4	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.	VENDER TO CONFIRM	
4.13.5	Batteries: Batteries suitable for 72 Hrs operation of transmitter are to be supplied.	VENDER TO CONFIRM	
4.13.6	Interface Panel: The panel shall be of good quality powder coated of IP54 grade, crane duty and shall contain following accessories.	VENDER TO CONFIRM	
4.13.7	Microprocessor based digital encoding and decoding system with immunity from spurious signals and should use 16 bits identity code unique to each RRC system.	VENDER TO CONFIRM	
4.13.8	Continuous auto checking between transmitter and receiver communication, so as to stop the complete system in case of failure at either end.	VENDER TO CONFIRM	
4.13.9	Auto checking of the commanded motion and stopping of all the motions in case of any erratic behaviour either way.	VENDER TO CONFIRM	
4.13.10	System should have self-diagnostic and alphanumeric fault display.	VENDER TO CONFIRM	
4.13.11	System should confirm to national and international safety standards like IS 3771(latest) CLAUSE 14.5, & furnish details of safety & QA plan followed.	VENDER TO CONFIRM	
4.13.12	Operating range should be minimum 150 MTRs.	VENDER TO CONFIRM	
4.13.13	The output relays for driving motion contactors shall be heavy duty, rated for 10Amps at 110V AC.	VENDER TO CONFIRM	
4.14	<b>Crane Bridge Lighting</b>		
4.14.1	Four Nos HPSV, with energy efficient HPL 150 Watts flood lights with fittings should be provided with suitable guard protection below the Platform.	VENDER TO CONFIRM	
4.14.2	As the power supply will be only 415 volts, 3 phase, 3 wire, 50 cycles. Step down transformer required for 220 Volt bridge lights, connected with the incoming supply and not in the crane circuit. Mode Selection switch i.e Control On, Off, Mode Selection like Cabin or RRC selection switch shall be provided.	VENDER TO CONFIRM	
4.15	<b>LADDER</b>		
4.15.1	A ladder of sufficient height shall be provided to climb up the crane from operator cabin safely and to land over the platform safely. Sufficient no. of small ladders/ steps shall be provided on either side of the girder for easy climbing over the CT trolley. All ladders to be provided with guards to prevent fall.	VENDER TO CONFIRM	
4.16	<b>WIRING:</b>		
4.16.1	The crane shall be supplied complete with all wiring and materials. Collectors on the crane bridge and on the crab shall be provided where applicable.	VENDER TO CONFIRM	
4.16.2	Moveable type flexible cable with necessary trolleys and festooned system shall be provided for supply of trolley.	VENDER TO CONFIRM	
4.16.3	All wiring shall be with XLPE / PVC insulated armored/ un armored cables having copper conductor. Wire and cable should be of 1100 Volt grade.	VENDER TO CONFIRM	

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4.16.4	All electrical wiring and installation should strictly confirm to IS Act, 1910 and I.E.E. Rules. 1956 and other standard practice as adopted by the I.S.I.	VENDER TO CONFIRM	

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4.16.5	All control terminations should be ferruled such that the numbers are clearly visible from out side, crimped terminations should be provided for control cables and as far as possible for main cables. A set of suitable current collector shoe should be provided to suit the angle iron down shop leads. Details of existing down shop lead and current collector system can be checked at site before finalizing the supply of current collector system.	VENDER TO CONFIRM	
<b>4.17</b>	<b>DOWNSHOP LEAD</b>		
4.17.1	Shrouded type DSL system of 350 Amp. rating will be provided by BHEL	VENDER TO CONFIRM	
4.17.3	Suitable current collectors with cable shall be provided	VENDER TO CONFIRM	
<b>5.0</b>	<b>ELECTRICAL SYSTEM :</b>		
5.1	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. 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.	VENDER TO CONFIRM	
5.2	Tropicalisation: All electrical / electronic equipment shall be tropicalized.	VENDER TO CONFIRM	
5.3	All electrical & electronic control cabinets & panels should be dust and vermin proof.	VENDER TO CONFIRM	
5.4	All electrical components in the cabinets should be mounted firmly on Bakelite 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.	VENDER TO CONFIRM	
5.5	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	VENDER TO CONFIRM	
5.6	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.	VENDER TO CONFIRM	
5.7	Vendor should ensure the proper earthing for the crane's electrical equipment & its peripherals.	VENDER TO CONFIRM	
<b>5.8</b>	<b>AMBIENT CONDITIONS &amp; THERMAL STABILITY :</b>		
5.9	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 50 degree Celsius Relative Humidity = 95% max.	VENDER TO CONFIRM	
5.10	Weather conditions are tropical, Atmosphere may be dust laden during some part of the year. Crane shall be in the outdoor condition. Max. temperature variation is up to 25 deg Celsius in 24 hours.	VENDER TO CONFIRM	
<b>6.0</b>	<b>DUTY CYCLE Related to Drive Motor &amp; Mechanisms</b>		
<b>6.1</b>	<b>MOTOR</b>		
6.1.1	Hoists 40 % CDF	VENDER TO CONFIRM	
6.1.2	Long Travel 40 % CDF	VENDER TO CONFIRM	
6.1.3	Cross Travel 40 % CDF	VENDER TO CONFIRM	
<b>6.2</b>	<b>MOTOR RATINGS &amp; Frame Sizes</b>		
6.2.1	Hoists	VENDER TO SPECIFY	
6.2.2	Long Travel	VENDER TO SPECIFY	
6.2.3	Cross Travel	VENDER TO SPECIFY	
<b>6.3</b>	<b>HOIST ROPE DETAILS : Size and Number of Falls of Rope</b>		
6.3.1	Main Hoist	VENDER TO SPECIFY	
6.3.2	Auxiliary Hoist	VENDER TO SPECIFY	
<b>6.4</b>	<b>Runway Rail Size</b>		
6.4.1	Cross Travel (CT) :	VENDER TO SPECIFY	
6.4.2	Long Travel (LT) : The crane rail for L.T. motion is in BHEL's scope. Party has to design the wheels in consultation with BHEL.	VENDER TO CONFIRM	
<b>6.5</b>	<b>GEAR BOX Size &amp; Type:</b>		
6.5.1	Main Hoist	VENDER TO SPECIFY	

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6.5.2	Auxiliary Hoist	VENDER TO SPECIFY	
6.5.3	Cross Travel	VENDER TO SPECIFY	
6.5.4	Long Travel	VENDER TO SPECIFY	
<b>6.6</b>	<b>Wheel Size</b>		
6.6.1	Cross Travel (CT) :	VENDER TO SPECIFY	
6.6.2	Long Travel (LT) :	VENDER TO SPECIFY	
<b>6.7</b>	<b>Brake Drum Sizes</b>		
6.7.1	Main Hoist	VENDER TO SPECIFY	
6.7.2	Auxiliary Hoist	VENDER TO SPECIFY	
<b>6.8</b>	<b>OPERATIONAL FEATURES</b>		
6.8.1	Control System Frequency Converter type for all motions.	VENDER TO CONFIRM	
6.8.2	Radio Remote and Cabin Control for all motions.	VENDER TO CONFIRM	
<b>7.0</b>	<b>MAKES OF DIFFERENT COMPONENTS: Bought - Out Materials shall be of best quality, duly tested as per appropriate IS standard and of Preferred makes as below:</b>	VENDER TO CONFIRM	
7.1	Ball & Roller Bearings : SKF/FAG/TIMKEN	VENDER TO CONFIRM	
7.2	Coupling : Fenner/ ALFEX etc.make	VENDER TO CONFIRM	
7.3	Contactors : SIEMENS/L&T only	VENDER TO CONFIRM	
7.4	HRC fuses: English Electric/ L&T/ Siemens, Semiconductor fuses: Siemens/ English Electric/Bussman.	VENDER TO CONFIRM	
7.5	Thrusters: Industry syndicate / Stromkraft/Speed-o- Control/Electromag	VENDER TO CONFIRM	
7.6	Cables : Copper cables with ISI mark only. Asian / Universal/ Finolex / Torrent.	VENDER TO CONFIRM	
7.7	Gravity Limit switch / Other Limit Switches: Industry syndicate/ Stromkraft / Stromag / Speed-o-Control/ BCH- Heavy duty.	VENDER TO CONFIRM	
7.8	T.B Connectors : Elmex	VENDER TO CONFIRM	
7.9	Structural Material (Steel ): Of reputed makes like TATA/SAIL/ Jindal as per relevant Indian Standards.	VENDER TO CONFIRM	
7.10	Gear Boxes: Shanti Gears/ New Allenbery (Elecon) / Bonfiglioli. In case Crane manufacturer intends to supply their own make / Specific make of Gear Boxes & Couplings, then performance Guarantee of atleast 5 years shall be provided for those items.	VENDER TO CONFIRM	
7.11	Geared/ Semi Geared Couplings : Nutech/ Fenner / ALFEX. In case Crane manufacturer intends to supply their own make / Specific make of Gear Boxes & Couplings, then performance Guarantee of atleast 5 years shall be provided for those items.	VENDER TO CONFIRM	
7.12	Wire rope : Usha Martin make only.	VENDER TO CONFIRM	
7.13	Shrouded DSL : Copper material. Make Susheel Engg./ Stromag/ Safetrack only.	VENDER TO CONFIRM	
7.14	Paint Confirming IS 5: 1984;Colour Shade No. 591 of Asian / Appcolite/ Nerolac/ Berger make.	VENDER TO CONFIRM	
7.15	Electrical Motor : Inverter grade of either Siemens / Alstom/ ABB/ Crompton make Crane Duty as per relevant IS. 325 etc.	VENDER TO CONFIRM	
7.16	MCCB /SFU: EE/Siemens/ ABB / L&T make.	VENDER TO CONFIRM	
7.17	Flood Light : Energy Efficient (With Protective Guard) Phillips / Bajaj/ Crompton/GE make.	VENDER TO CONFIRM	
7.18	Variable Frequency Drives: Siemens/ L&T- Yaskawa / ABB/Allen Bradley only.	VENDER TO CONFIRM	
7.19	Hooter: Reputed make	VENDER TO CONFIRM	
7.20	Push buttons ( Siemens/ BCH/ L&T make only )	VENDER TO CONFIRM	
7.21	RRC : Radio Remote : Acropolis/ SNT Control make only.	VENDER TO CONFIRM	
<b>8.0</b>	<b>VENDER TO INDICATE FOLLOWING INFORMATION IN THEIR OFFER</b>		
8.1	Weight of each bridge (2 Nos.)	VENDER TO SUBMIT	



SPECIFICATION CUM COMPLIANCE CERTIFICATE OF 10/3 EOT CRANE			
S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATIONS
8.2	Weight of each carriage.( 2 Nos)	VENDER TO SUBMIT	

SPECIFICATION CUM COMPLIANCE CERTIFICATE OF 10/3 EOT CRANE			
S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATIONS
8.3	Weight of complete entire crab	VENDER TO SUBMIT	
8.4	Weight of complete assembled crane	VENDER TO SUBMIT	
8.5	No. of wheels on LT & CT, Wheel diameter and material specification.	VENDER TO SUBMIT	
8.6	Wheel Load on each wheel	VENDER TO SUBMIT	
8.7	Make Type, size of thrusters and E.M. Brakes.	VENDER TO SUBMIT	
8.8	Total connected load (KVA):	VENDER TO SUBMIT	
8.9	Weight of heaviest part of Crane.	VENDER TO SUBMIT	
8.10	Weight of the heaviest assembly/ subassembly of the Crane.	VENDER TO SUBMIT	
8.11	Dimensions of largest part/ subassembly/ assembly of the crane.	VENDER TO SUBMIT	
8.12	Overall Length, Width, Height for complete Crane with accessories.	VENDER TO SUBMIT	
9.0	<b>MAINTENANCE:</b>	VENDER TO SUBMIT	
9.1	We would stress the need of adequate maintenance facility for all gearboxes and working mechanism which shall be located above platform level and shall be easily approachable for good maintenance	VENDER TO CONFIRM	
10.0	<b>SPARES:</b>		
10.1	Itemised 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).	VENDER TO SUBMIT	
10.2	Mechanical & Hydraulic Spares: Thrusters Brake, Gears, Pinions, Shafts, Wheels, Hydraulic Seals for Gear Boxes, Drum etc.	VENDER TO SUBMIT	
10.3	Electrical /Electronic Spares: All types of Transmitter/ Receiver spares like PCBs relays etc other electronic spares for RRC and AC Drives.	VENDER TO SUBMIT	
10.4	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.	VENDER TO CONFIRM	
11.0	<b>SAFETY ARRANGEMENTS: Following safety features in addition to other standard safety features should be provided on the crane.</b>	VENDER TO CONFIRM	
11.1	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.	VENDER TO CONFIRM	
11.2	A detailed list of all alarms / indications provided on Crane should be submitted by the supplier.	VENDER TO CONFIRM	
11.3	All the pipes, cables etc. on the crane should be well supported and protected.	VENDER TO CONFIRM	
11.4	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.	VENDER TO CONFIRM	
11.5	Suitable Lifting arrangement like Lifting Hooks, Jacking pads, Eye Bolts etc is required for lifting of Motors, other subassemblies or heavier structures.	VENDER TO CONFIRM	
11.6	Emergency Switches should be provided at suitable locations.	VENDER TO CONFIRM	
11.7	Electrical cable & signalling cables should be suitably separated.	VENDER TO CONFIRM	
12.0	<b>ENVIRONMENTAL PERFORMANCE OF THE MACHINE :</b>		
12.1	The Crane shall conform to following factors related to environment:	VENDER TO CONFIRM	
12.2	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.	VENDER TO CONFIRM	
12.3	If any safety / environmental protection enclosure is required it should be built on the Crane by the vendor.	VENDER TO CONFIRM	
12.4	Paint of the Crane should be applied only after providing rust-preventer ( primer ) coat.	VENDER TO CONFIRM	
12.5	Oil / Grease should not dip/ fall from the Crane.	VENDER TO CONFIRM	
13.0	<b>ERECTION &amp; COMMISSIONING:</b>		

SPECIFICATION CUM COMPLIANCE CERTIFICATE OF 10/3 EOT CRANE			
S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATIONS
13.1	The crane is to be Erected at site by the supplier with their own labour, tools and tackles. All equipments like lifting arrangement, winch, Sheaves/ Sheave Pulley Block etc shall be brought by the supplier on returnable basis.	VENDER TO CONFIRM	
13.2	The supplier shall bring their own instruments to check Rail level / Water level etc ( on returnable basis ) for mounting / Fixing accessories for DSL . 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.	VENDER TO CONFIRM	
13.3	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 before commissioning of the crane.	VENDER TO CONFIRM	
13.4	Commissioning-spares, required for commissioning of the crane shall be brought by the supplier on returnable basis.	VENDER TO CONFIRM	
13.5	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.	VENDER TO CONFIRM	
13.6	Schedule of Erection and Commissioning shall be submitted before starting of erection work	VENDER TO CONFIRM	
13.7	Charges, duration, terms & conditions for E&C should be furnished in detail separately by vendor along with offer.	VENDER TO CONFIRM	
14.0	<b>TOOLS FOR ERECTION, OPERATION &amp; MAINTENANCE :</b>		
14.1	All equipment like Lifting arrangement, Winch, Mobile Crane, Sheave Pulley Blocks, 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. Necessary tools like Torque Wrench, Spanners, Keys, grease guns etc. for operation and maintenance of the crane should be supplied.	VENDER TO CONFIRM	
14.2	All necessary levels / other instruments and devices for testing of the Crane except Load test Blocks should be brought by Vendor on returnable basis.	VENDER TO CONFIRM	
14.3	Maintenance: Adequate maintenance accessibility shall be provided for ease in maintenance for assemblies/sub-assemblies including gear boxes / machinery / Panel / wiring/ etc.	VENDER TO CONFIRM	
15.0	<b>TRAINING:</b>		
15.1	Vendor to impart training to BHEL personnel for operation & for maintenance at BHEL works 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.	VENDER TO CONFIRM	
16.0	<b>DOCUMENTATION : Three sets of following documents (Hard copies) in English language should be supplied along with the crane.</b>	VENDER TO CONFIRM	
16.1	<b>During participation in technical Bid.</b>		
16.1.1	G.A. Drawing.	VENDER TO CONFIRM	
16.1.2	Wheel Load Diagram ( Wheel Distance & Wheel Load ).	VENDER TO CONFIRM	
16.1.3	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.	VENDER TO CONFIRM	
16.1.4	Vendor to submit appropriate Q.A. Plan.	VENDER TO CONFIRM	
16.2	<b>After Receipt of Order:</b>		

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S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATIONS
16.2.1	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. 3 - 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.) ,Bracket/ Current Collector System, Hook Block, LT & CT wheel, Main 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.	VENDER TO CONFIRM	

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S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATIONS
16.3	With the supply of crane	VENDER TO CONFIRM	
16.3.1	Operating manuals of Crane - 3 Sets.	VENDER TO CONFIRM	
16.3.2	Detailed Maintenance manual of Crane. Spares- part list / concerned drawing of the spares -3 Sets.	VENDER TO CONFIRM	
16.3.3	Maintenance, Interface & commissioning manuals for Controller & drives - 2 Sets along with drive parameterisation software.	VENDER TO CONFIRM	
16.3.4	Catalogues, O&M Manuals of all bought out items including drawings, wherever applicable.	VENDER TO CONFIRM	
16.3.5	Detailed specification of all rubber items like Oil- Seals / O- Rings etc.	VENDER TO CONFIRM	
16.3.6	One Soft copy for the above requisites shall also be supplied in CD.	VENDER TO CONFIRM	
16.3.7	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.	VENDER TO CONFIRM	
17.0	<b>CRANE ACCEPTANCE: (Tests/Activities to be Performed by Vendor)</b>		
17.1	<b>At Vendor Works: Inspection And Test.</b>		
1.7.1.1	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 may witness the Hooks proof load test at OEM's works.	VENDER TO CONFIRM	
17.1.2	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( 2005 or latest ) , 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, Limit Switches, Gear Boxes etc shall also be examined.	VENDER TO CONFIRM	
17.2	<b>At BHEL Works: Inspection And Test</b>		
17.2.1	Span, Diagonal, & other dimensions shall be examined.	VENDER TO CONFIRM	
17.2.2	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 3177( 2005 or latest ) . For load test the required load will be provided by BHEL. Remote operation, interlocking, Performance of motors with current measurement, 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.	VENDER TO CONFIRM	
17.2.3	Load Test shall be performed at BHEL site for proving of the crane w.r.t technical, Safety Parameters etc the Crane shall then only be considered commissioned & handed over.	VENDER TO CONFIRM	
18.0	<b>PACKING:</b>		
18.1	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.	VENDER TO CONFIRM	
19.0	<b>GUARANTEE : Guarantee regarding workmanship, material used, design and performance should be provided by the party for a period of 24 months from the date of successful commissioning of the Crane. In case Crane manufacturer intends to supply their own/Specific make of Gear Boxes &amp; Couplings other than of our specified make , then performance Guarantee of atleast 5 years shall be provided for those items.</b>	VENDER TO CONFIRM	
20.0	<b>MISCELLANEOUS :</b>	VENDER TO CONFIRM	
20.1	All gear boxes should have oil level indicator to show the level and condition of the oil in gear box.	VENDER TO CONFIRM	
20.2	All material used should be of the best of their respective kinds and should of the appropriate I.S. Specification & all workman ship should be of best quality.	VENDER TO CONFIRM	

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20.3	<b>PAINTING</b> : The structural steel work in the bridge and the crab frame should be given one coat of suitable primer with 25 micron of DFT (Dry film Thickness) and 48 hours of compulsory curing after painting. Final paint should be done with two coats of light orange synthetic enamel paint each with a DFT of 25 microns and intermittent curing of minimum 16 hours..	VENDER TO CONFIRM	
20.4	First fill oil, grease etc. for the commissioning of the crane shall be provided by the supplier.	VENDER TO CONFIRM	
20.5	Tool box with standard tools shall be supplied with the crane.	VENDER TO CONFIRM	
20.6	List of bought out items should be furnished with names of makers and complete literature about the items should be supplied.	VENDER TO CONFIRM	
20.12	Supplier shall inform BHEL in advance to witness assembly and load test.	VENDER TO CONFIRM	
20.13	The crane is to be erected by the supplier at site with their own labour, tools and tackles, winch. The crane is to be commissioned and tested before handing over.	VENDER TO CONFIRM	
20.14	All motions at various steps of speed shall be checked along with current being taken by respective motion motors.	VENDER TO CONFIRM	
21.0	<b>QUALIFYING CONDITIONS</b>		
21.1	Only those vendors, who have supplied and commissioned at least one EOT Crane of capacity 10 Tonnes or higher with span 26 meters or higher and the supplied crane is presently working satisfactorily for more than one year 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.	VENDER TO CONFIRM & SUBMIT DETAILS	
21.2	Name of the customer / company along with Purchase Order no. and Purchase Order date where referred crane is installed.(Copy of Purchase Order should be furnished).	VENDER TO SUBMIT	
21.3	Complete postal address of the customer.	VENDER TO SUBMIT	
21.4	Year of commissioning. (Copy of Commissioning Report should be furnished).	VENDER TO SUBMIT	
21.5	Capacity & span of the EOT Cranes supplied by party to be specified.	VENDER TO SUBMIT	
21.6	Name and designation of the contact person of the customer.	VENDER TO SUBMIT	
21.7	Phone, FAX no. and email address of the contact person of the customer.	VENDER TO SUBMIT	
21.8	Performance certificate from the customers, on their letter head, regarding satisfactory performance of machine supplied to them.	VENDER TO CONFIRM	
22.0	<b>BHEL reserves the right to verify information submitted by vendor. In case the information is found to be false / incorrect, the offer shall be rejected.</b>	VENDER TO CONFIRM	

INDER MATHUR	B.K.Manjhi
SR. MANAGER(WE&S)	SR. MANAGER (FBM)
S.J.CHAKRABORTY	R.N.JHA
DGM (WE&S)	AGM (FBM)