



**Boiler Auxiliaries Plant,
Bharat Heavy Electricals Limited,
Ranipet - 632406, Tamilnadu, INDIA.**

Enq_2780375E

Dt_15.06.2018

Specification cum Compliance Certificate for 5 TON SINGLE GIRDER, EOT CRANE

Note:-

1. 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.

2. The offer and all documents enclosed with offer should be in English language only.

Name & Address of the supplier:	Name & Address of the Indian Agent:
Telephone No.	Telephone No.
Fax No.	Fax No.
e-mail :	e-mail :

SCOPE: SUPPLY, ERECTION & COMMISSIONING OF 5 TON SINGLE GIRDER, EOT CRANE COMPLYING WITH SPECIFICATION AS BELOW

SNO	DESCRIPTION (BHEL'S Requirement)	Vendor Acceptance	Remarks
1.0.0	APPLICATION:		
1.1.0	The subject crane is meant for the purpose of handling small to medium components.		
1.2.0	The crane will be put to use for 365 Days' continuous duty with CT, LT and Hoist movements, which may occur simultaneously.		
1.3.0	The shop floor environment will be dust prone, humid, welding fume filled and ambient temperature going up to 45 to 50 ° C.		
2.0.0	SCOPE OF SUPPLY:		
2.1.0	Design, manufacture, supply, erection & commissioning of SINGLE GIRDER, Electrically Overhead Traveling Cranes		
3.0.0	TECHNICAL SPECIFICATIONS:		
3.1.0	Capacity: 5 Tons		
3.2.0	SPAN (Wheel Centre to Wheel Centre Dimension): 15200 mm		
3.3.0	Height of Lift: 6250 mm		
3.4.0	Bay Length: (Length of long travel) : 22500mm		
3.5.0	DUTY CYCLE: (Related to Drive Motor & Mechanisms)		
3.5.1	Hoists - 40% CDF		
3.5.2	Long Travel - 40% CDF		
3.5.3	Cross Travel - 40% CDF		
3.6.0	SPEED: (Operating / Working Speed - Maximum]		
3.6.1	Hoist - 6 mtrs / min		
3.6.2	Cross Travel (CT) - 20 mtrs / min		
3.6.3	Long Travel (LT) - 30 mtrs / min		
3.7.0	MOTOR DETAILS: like capacity of motor, Frame size, make, type and No. of poles etc.		

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3.7.1	Hoist Motor		
3.7.2	Cross Travel (CT) Motor		
3.7.3	Long Travel (LT) Motor		
3.8.0	GEAR BOX SIZES:		
3.8.1	Hoist		
3.8.2	Cross Travel (CT)		
3.8.3	Long Travel (LT)		
3.9.0	Acceleration:		
3.9.1	Cross Travel (CT) - 300 mm / sec.sq		
3.9.2	Long Travel (LT) - 300 mm / sec.sq		
3.10.0	Hoist Rope Details: Dia 12mm : Falls - 4		
3.11.0	CONTROL (Both Pendent Operation and Remote control)		
3.12.0	Control Voltage: Shall be 110V AC		
3.13.0	Input Power Supply: Shall be 415 $\pm$ 10% Volts, 50 $\pm$ 3% Hz,3 Phase- AC.		
3.14.0	Duty Class: Class – 3 [Indoor Service]		
3.15.0	Mechanism Group Classification: M6		
3.16.0	Design Standard: The crane design standard as per IS – 807 & 3177 / 1999.		
3.17.0	Runway Rail Size: BHEL will provide & lay LT rail of 105 Lbs/ yard.		
3.18.0	Wheel Sizes:		
3.18.1	Cross Travel (CT)		
3.18.2	Long Travel (LT) - <i>Shall be matched with the above rails.</i>		
3.19.0	Brake Details / Sizes:		
3.19.1	Hoist		
3.19.2	Cross Travel (CT)		
3.19.3	Long Travel (LT)		
4.0.0	MAIN FEATURES (Crane Operational Features):		
4.1.0	Control System: Frequency Converter type (VVVFD) for all motions. Details to be provided.		
4.2.0	Remote Control: Radio Remote for all motions - Details to be submitted.		
4.3.0	End Clearance: End clearance to be fixed to suit the workshop building clearances as per the enclosed tender drawing <i>TE-SKT-4-0226</i> . Vendor to submit the drawing		
4.4.0	Crane Operation: Through Push button control and Radio Remote control with option for control selection.		
5.0.0	STRUCTURAL FABRICATION (Constructional Details):		
5.1.0	Bridge/Girder: Shall be of single girder box type construction.		
5.2.0	Raw Material: Only steel plates tested and certified for quality by reputed inspection authorities, shall be used. Test Certificates shall be submitted.		
5.3.0	Welded Joints (To be followed for Girder fabrication):		
5.3.1	Number of Joints allowed: For span up to 23 metres - 2 joints max.		

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5.3.2	Welding Electrodes for all Horizontal Welding E 7018 Electrode only should be used.		
5.3.3	Welding Electrodes for all Vertical Welding E 7048 Electrode only should be used.		
5.4.0	Welded Joint Testing: All Butt Welded Joints (both compression/ tension and flanges / web joints) shall be subjected to 100% X-Ray Testing and X-Ray Films to be produced for BHEL evaluation and form part of the documentation.		
5.5.0	Splice Joints: No splice joint is allowed in Girder Fabrication. [Girder shall be of single piece only].		
5.6.0	Platform : The Platform shall be provided on one side for full length & to be fixed through bolted joints only.		
5.7.0	Wheel Assembly:		
5.7.1	The Wheel Assemblies of Cross Travel (CT) and Long Travel (LT) shall be of Live Axle System with L-Type Bearings is preferred. Details to be submitted by the vendor.		
5.8.0	Heat Treatment & NDT Examination:		
5.8.1	The Trolleys shall be stress relieved, if necessary, by thermal heat-treatment process after welding & NDT. All welding shall be tested by NDT means [MPI, LPI & RT] after stress relieving operation. Necessary Certificates shall be submitted.		
5.9.0	Machining Operation:		
5.9.1	All mechanical mating surfaces and wheel seating areas are to be machined to the required finish and protected.		
5.10.0	Surface Cleaning:		
5.10.1	Both the Girders and the Trolleys are to be shot blasted or chemically treated for surface cleaning, after completion of all operations but prior to painting. Necessary Certificates shall be submitted.		
5.11.0	Painting Instructions:		
5.11.1	One coat of Primer with 25 micron DFT (Dry Film Thickness) and 48 hours of compulsory curing after painting.		
5.11.2	Two coats of Enamel Paint (Colour – Golden Yellow) each with a DFT of 25 micron and intermittent curing of 16 hours.		
6.0.0	MECHANICAL ELEMENTS:		
6.1.0	Gears: Gears in all the Stages shall be helical in design and to be of machined, lapped and hardened		
6.2.0	Gear Box Casing: Shall be of fabricated type and stress relieved by thermal heat-treatment process, prior to machining.		
6.3.0	Rope Drum: Shall be of fabricated type and stress relieved. The circumferential weld joints shall be tested by 100 % X-Ray quality.		
6.4.0	Type of Coupling: Only Geared Couplings to be used for a) Between Electric Motor and Gear Box, b) Between Gear Box and Rope Drum and c) Between Gear Box and Trolley Wheels.		
6.5.0	Wheels: Shall be of forged and Wheel Tread hardened to 300-350 BHN . Wheels shall be fitted with L-Type Bearings		

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6.6.0	Mechanical Joints: Fit Bolts (as per IS 3640 –1982) for all joints coming in main members.		
6.7.0	Pulley Dimension: Rope Pulley diameter shall be 23 times that of Rope diameter.		
6.8.0	Lifting Hook: Hooks shall be of C-type as per IS 15560 and provided with safety latch.		
6.9.0	Lubrication:		
6.9.1	Suitable lubrication system shall be provided for gear box, all rotating parts wherever applicable. Details of the same to be furnished.		
6.10.0	Bumpers (End Stoppers):		
6.10.1	Bumpers of adequate size shall be provided both in CT & LT to stop the crane in the event of an overshoot by the operation.		
6.11.0	Maintenance Platform :		
6.11.1	A full length maintenance / service platform of load carrying capacity approx. 250 Kgs. of sufficient width shall be provided for maintenance. A hand rail and toe guard shall also be provided. All foot-walk and platform shall have anti-skid grating for decking.		
6.12.0	Guards: Suitable guards shall be provided for all rotating parts like couplings, wheels etc..		
7.0.0	ELECTRICAL ELEMENTS:		
7.1.0	Operational Controls: The Crane shall be controlled both Pendent push button Station with 11 push buttons (ON,OFF,EMERGENCY STOP,LEFT,RIGHT,FORWARD,REVERSE,HOIST,LOWER,BELL,LIGHTS), mounted on a suitable M.S.Box and Radio Remote Control (Micro processor based two step push button type) with all controls as in push button.		
7.2.0	The Crane Control Voltage shall be 110 V AC		
7.3.0	Protection: All Panels, Limit-Switches and Motors shall have IP 54 protection.		
7.4.0	Motors: All Electric Motors shall be as per IS-325 and IS-1231.		
7.5.0	Electric Contactors: All Panels shall have SIEMENS/L&T/GE contactors suitable for Crane operations.		
7.6.0	Contactors Rating: The rating of all Contactors shall be at least 50% higher than the respective electric motor full load current, at the specified duty cycle.		
7.7.0	Long Travel Motion: A Dual Drive Mechanism shall be provided for LT (Long Travel) Motion.		
7.8.0	Illumination:		
7.8.1	2Nos. of 400 Watts HPMV Lamps & fittings shall be provided under the Platform and 1 No. shall be provided under CT Trolley. Fittings shall be of non-integral type. (Total lights 3 Nos.)		
7.8.2	All Electric Panels shall be provided with suitable illumination for visibility and trouble shooting.		
7.9.0	Controller Steps: A 5-Step Controller shall be provided for a) Hoist, b) Long Travel and c) Cross Travel.		

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7.10.0	Frequency Converter: VVVF Drive shall be provided with suitable DBR for all motions		
7.11.0	Crab wiring: Junction box shall be provided for wiring of crab and in bridge end.		
7.12.0	Limits: Each hoist shall be provided with both rotary and counter weight limits. Limit switches shall be provided for both CT & LT.		
7.13.0	DSL & Current Collector System:		
7.13.1	Already Copper shrouded DSL is available in bay		
7.13.2	Current collection system suitable for the above DSL shall be offered along with the crane.		
7.14.0	Spares :		
7.14.1	The vendor shall offer electrical/ electronic / mechanical spares for 2 years trouble free operation of the crane as per the list enclosed. (Unit Price of each item of spare should be offered in the price bid)		
8.0.0	MAKES OF BOUGHT OUT ITEMS: (Shall be as per the list given below)		
8.1.0	Hoist Hook: Herman Mohтта/Hercules/Silpa Udyog/Smriti Forgings/ Karachiwala		
8.2.0	Wire Rope: Usha Martin / Fort William /AARADHYA		
8.3.0	Electric Motors: GE/Bhrat Bijlee/Siemens/KEC/ABB/Crompton		
8.4.0	DISC Brake / AC Brakes		
8.5.0	Thruster Brake Unit: Electromag / Speed-O-Control / Omega		
8.6.0	Radio Remote Control: Telecrane / SNT Controls / Electromag		
8.7.0	Limit Switches (Gravity Type): Siemens / EMM / BCH / SOC/SKC		
8.8.0	Contactors: Siemens / L&T / GE		
8.9.0	Over - Load Relay: Siemens / L&T / GE		
8.10.0	HRC Fuses: Siemens / L&T / GE		
8.11.0	Rotary limit switch: Siemens/Omega/SOC		
8.12.0	Switch fuse unit: Siemens / L & T / GE		
8.13.0	Molded Case C.B: Siemens / L & T / GE		
8.14.0	Push - Buttons: Siemens / L & T / BCH		
8.15.0	Couplings: WMI / Fenner / ALFEX		
8.16.0	Bearings: SKF / FAG only		
8.17.0	Cables: Reputed Makes & ISI Approved		
8.18.0	Bridge Light Fittings: Philips/GE/Crompton		
8.19.0	VVVF Drives: ABB / Siemens / L&T		
8.20.0	Other Elements: Vendor to specify the item and makes.		
9.0.0	DOCUMENTS/DETAILS for APPROVAL: The following documents / details shall be submitted to BHEL for Approval within 20 days of PO placement , prior to taking up the manufacture of the crane.		
9.1.0	Drawings / Documents:		
9.1.1	GA Drawing of the Crane.		

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9.1.2	GA Drawing of Crab with Trolley.		
9.1.3	GA Drawing of Individual Mechanisms.		
9.1.4	Drawings of Bridge, End-Carriage, Leg and their connections.		
9.1.5	Sub-Assembly Drawing for Wheels, Hook Blocks, Gear Boxes & Hoist Drums.		
9.1.6	Calculations for Selection of Electric Motors, Gear Reducers, Brakes, Couplings, etc.		
9.1.7	Calculations for Bridge Girder, Crab, End - Carriage and their connections.		
9.1.8	Wiring Diagram with Logic Circuits.		
9.1.9	Cable Selection based on current rating.		
9.2.0	Technical Details:		
9.2.1	Total Weight of the Crane including all Electrical Equipments.		
9.2.2	Total Weight of Trolley including all Electrical Equipments.		
9.2.3	Weight of each Bridge assembled and ready for erection with and without Mechanical and Electrical Equipment.		
9.2.4	Weight of each End - Carriage: In assembled and ready for erection condition.		
9.2.5	Total Weight of Structural, Mechanical and Electrical Equipments. (To be indicated separately)		
10.0.0	INSPECTION: The following Schedule of Stage Inspections shall be strictly adhered to, prior to dispatch from the Supplier's Works.		
10.1.0	STAGE-I Inspection:		
10.1.1	Verification of Test Certificate for Raw Materials used for Girders, End-Carriages, Trolleys, Gear Box Casings, etc.		
10.1.2	Verification of X-Ray Report of Butt-Joints coming in the Girders and Random Testing on the Welds, by physical examination.		
10.1.3	Box Girder setting before closing of the Bottom Flanges – for inspecting the quality of welding and presence of waviness.		
10.1.4	Trolley Frame Fabrication before setting the Mechanisms.		
10.1.5	End – Carriage Fabrication.		
10.2.0	STAGE- II Inspection:		
10.2.1	Inspection of Bridges and End – Carriages with Wheel Assembly and Alignment checking		
10.2.2	Verification of Span & Diagonal Dimensions, Checking of Wheel Alignment, Mechanical Assemblies and Total Alignment.		
10.2.3	Free running of the all the Mechanisms.		
10.3.0	STAGE- III (Final Inspection):		
10.3.1	Measurement of CAMBER in the Bridges.		
10.3.2	Full / Rated Load Test and Deflection Test.		
10.3.3	Deflection and Permanent Set Measurement.		
10.3.4	25% OVER-LOAD Lifting Ability Check.		

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11.0.0	CRANE ERECTION & COMMISSIONING:		
11.1.0	Unloading & Erection: For unloading the consignment, erection & commissioning, BHEL will provide mobile crane at free of cost. However, the vendor shall erect the crane at BHEL works. Necessary tools & equipments required for erection shall be brought by the supplier. Only welding machine, Gas cutting set, electrical power and welding consumables will be provided by BHEL at free of cost.		
11.2.0	Crane Commissioning: Prove –Out for the Crane's Capacity and Smooth Functioning of the Crane (at BHEL Works) shall be the RESPONSIBILITY of the supplier.		
11.3.0	All safety equipments like safety boot, safety belt, helmet, gloves, goggles etc. required for erection personnel shall be brought by the vendor.		
12.0.0	O & M MANUALS: 5 Copies of Erection, Operation & Maintenance Manual, containing the following technical drawings & details shall be submitted.		
12.1.0	Drawings & Details:		
12.1.1	Crane GA Drawing		
12.1.2	Crab Assembly Drawing		
12.1.3	Total Crane Wiring Schematics		
12.1.4	Detailed Wiring Diagrams for Sub-Systems / Panels		
12.1.5	Wheel Assembly Drawings		
12.1.6	Bottom Block Assembly Drawing		
12.1.7	Gear Box Assembly Drawings		
12.1.8	Coupling Drawing and Details		
12.1.9	Detailed part drawings with full dimensions and materials for all gear boxes, brake units etc., shall be submitted.		
12.1.10	Specifications/Ratings of All Bought-Out-Items		
12.1.11	Warranty / Guarantee Card for all Bought-Out-Items.		
12.1.12	Trouble Shooting Chart for Main and all Sub-Systems		
13.0.0	PERFORMANCE GUARANTEE:		
13.1.0	The Performance of the Total Crane and / or the Components / Sub-Assemblies / Bought-Out-Items shall be guaranteed for a minimum period of 24 months from the date of Commissioning of the crane at BHEL Works.		



Item Annexure

Sl no	Material Code	Item Description	Quantity (No)	Quoted/Not Quoted
1	IM8295500800	Supply and Erection and Commissioning of EOT Crane Single Girder -5 MT	01	

Pre-Qualification Criteria

PQR Criteria	Proof Submitted/Not Submitted
Suppliers who have supplied at least 1 No. of 5 Ton EOT crane of Similar or higher range in the last 5 years (On the Date of Opening of tender) are eligible to quote. Proof must be submitted along with technical bid.	

Signature and Office Seal of Vendor