

BHARAT HEAVY ELECTRICALS LIMITED
RAMACHANDRAPURAM :: HYDERABAD - 502 032
SPECIFICATIONS FOR 5 TON SEMI GANTRY CRANE

	DESCRIPTION	BHEL SPECIFICATION	SUPPLIER OFFER	DEVIATIONS/COMMENTS
A	MAIN PARAMETERS			
1.10	Type of Crane	Double girder Box Type Semi Gantry Crane as per IS 3177	Vendor to confirm	
1.11	Class & duty	M5 as per IS 3177-1999	Vendor to confirm	
1.12	Main Hoist capacity	5 Tonnes	Vendor to confirm	
1.13	Span	12.5 metres	Vendor to confirm	
1.14	Lift Height	6.0 meters	Vendor to confirm	
1.15	Working clearance distance from centre of gantry rail to nearest obstruction (sideways)	300 mm	Vendor to confirm	
1.16	Operation Speeds (maximum)			
	Main Hoist	4 meters/minute	Vendor to confirm	
	Inching Speed for Main Hoist	0.4 metres/minute	Vendor to confirm	
1.17	Lift Height			
	Main Hoist (above ground)	6 metres	Vendor to confirm	
1.18	Main Hoist (below ground)	Nil	Vendor to confirm	
1.19	Hook approach			
	Main Hoist	DSL side 1500 mm, Opposite side 1000 mm	Vendor to confirm	
1.20	LT wheel load in tonnes	Indicate	Vendor to specify	
1.21	Number of trolleys	One	Vendor to confirm	
1.22	Width of Crane	Supplier to indicate actual value in meters	Vendor to specify	
1.23	Location of Crane in BHEL	Semi Gantry Crane for 70 Shop AB Bay (New Bay Norht side)		
B	CONSTRUCTION/STRUCTURAL DETAILS			
	Hoist			
2.10	Hoist hook type	Shank hook	Vendor to confirm	
2.11	Hook latch for hoist	Required	Vendor to confirm	
2.12	Hoist wire ropes	6/36 construction as per IS:2266-1989	Vendor to confirm	
2.13	Number of falls of Hoist wire rope	4	Vendor to confirm	
2.14	Hoist gearbox	Required		
2.15	LT			
2.16	Long travel speed	20 meters/minute	Vendor to confirm	
2.17	LT Drive	Twin corner drive with horizontal type gear box	Vendor to confirm	
2.18	Lubrication of LT gear box	Recirculating type with pump mechanism	Vendor to confirm	
2.19	Number of wheels for LT drive	4	Vendor to confirm	
2.20	Diameter of wheels for LT drive	> = 400 mm	Vendor to confirm	
2.21	Number of driven wheels for LT drive	50% or more	Vendor to confirm	
2.22	Size of gantry rail (Long Travel)	45 Kg/m (Rail is part of BHEL scope)	Vendor to comment	
2.23	CT			
2.24	Cross travel speed	10 meters/minute	Vendor to confirm	

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2.25	CT Drive	With vertical gearbox	Vendor to confirm	
2.26	Lubrication of CT gear box	Splash lubrication	Vendor to confirm	
2.27	Number of wheels for CT drive	4	Vendor to confirm	
2.28	Diameter of wheels for CT drive	> = 200 mm	Vendor to confirm	
2.29	Size of CT Rail	40 mm square bar	Vendor to confirm	
2.30	Platform for approach for maintenance of CT gearbox	Required	Vendor to confirm	
2.31	OTHERS			
2.32	Type of bearings for LT/CT wheels	Anti-friction, Spherical roller bearings	Vendor to confirm	
2.33	Type of mounting of LT/CT wheels	"L" type brackets	Vendor to confirm	
2.34	LT, CT and Hoist drive	Squirrel cage Induction motors with VVFDs	Vendor to confirm	
2.35	Operations required through Pendant	Hoist, LT & CT and Inching speed for Hoist. The pendant shall be fixed on one leg	Vendor to confirm	
2.36	Number of speed steps	Two steps (10% and 100%)	Vendor to confirm	
2.37	Duty cycle	40% CDF all motions	Vendor to confirm	
2.38	Brakes	Electro hydraulic thruster brakes are to be provided for all motions. Totally enclosed and conforming to IP 55	Vendor to confirm	
2.39	Gear Boxes	Completely enclosed M.S fabricated and stress relieved split type	Vendor to confirm	
2.40	Couplings between motor and gearbox	Geared couplings	Vendor to confirm	
2.41	Couplings between gearbox and rope drum for hoists	Geared couplings	Vendor to confirm	
2.42	Mounting	Gear boxes, motors, brakes, bearing pedestals, etc. shall be mounted on machined surfaces	Vendor to confirm	
2.43	Lubrication of Crane	Lubrication points with nipples to be provided for LT, CT wheel bearings and Hoist drum bearings	Vendor to confirm	
2.44	Toe guards	Toe guards shall be provided wherever required	Vendor to confirm	
2.45	Railings	Safety hand railings of tubular construction shall be provided across full length of the bridges and end carriages and in any other places where openings have been provided.	Vendor to confirm	
2.46	Jacking pads	Suitable jacking pads should be provided on end carriages for jacking up the crane for changing track wheels	Vendor to confirm	

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2.47	Safety Pads	Suitable reinforced safety pads should be provided under the end carriages to prevent the crane from falling more than 25mm in the event of breakage of a track wheel/axle. These safety stops shall not interfere with the removal of wheels	Vendor to confirm	
2.48	End buffers	Spring-loaded buffers are to be provided for long travel	Vendor to confirm	
2.49	Measurements	All components including fasteners should be in metric system only	Vendor to confirm	
2.50	Painting	The crane should be painted with two coats of deep Orange paint conforming to IS 2932 : 2003, ISC No 591 (as per IS 5) after giving primary coat. Girders shall be shot blasted/ Chemically treated before painting.	Vendor to confirm	
2.51	Plates used for fabrication	To be of rolled steel as per IS 2062 plates. Test certificates to be furnished	Vendor to confirm	
2.52	End carriages	as per manufacturers design	Vendor to confirm	
2.53	Butt joints	All butt joints shall be 100% X rayed both compression and tension and both flanges and Webs	Vendor to confirm	
2.54	Girder	No splice joint – to be of single piece only. No of weldable joints along the total length of the girder should not exceed three	Vendor to confirm	
2.55	Platform	Full length chequered platform shall be provided on both bridges and wherever access is necessary for operation and maintenance. The platform on one side of the bridge shall be 1000 mm and on the other side shall be 750 mm. Festooning arrangement for CT cables shall be on the 750 mm side platform	Vendor to confirm	
2.56	Trolley	To be stress relieved by thermal process after welding. With suitable lifting beam for handling loads on the trolley.	Vendor to confirm	
2.57	DSL	In BHEL scope	Vendor to comment	
2.58	DSL guard	To be provided	Vendor to confirm	
C	ELECTRICAL EQUIPMENT			
3.10	Power Supply at DSL	415 volts $\pm$ 10 %, 3 phase, 50, $\pm$ 2 Hz, 4 wires, one conductor earthed. Isolator switch to be provided to isolate the total supply to the crane	Vendor to confirm	
3.11	Control voltage	110 Volts AC	Vendor to confirm	

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3.12	Power distribution to trolley	Trailing cable supported on anti-friction cable trolleys	Vendor to confirm	
3.13	Connection to pendent	Trailing cable supported on anti-friction cable trolleys	Vendor to confirm	
3.14	Panels	a. The panels shall be painted with grey color as per IS 2932:2003 b. Ferrules to be provided for cable connections as per circuit diagram. c. Seperate isolating switch / breaker should be provided for control circuit	Vendor to confirm	
3.15	Colour of panels	The panels should be powder coated. The colour of coating shall be light grey conforming to IS 2932-2003 (as pe IS 5)	Vendor to confirm	
3.16	Mounting of panels and resistance boxes	To be mounted on supporting boxes fabricated from 'L' angles	Vendor to confirm	
3.17	Electrical Motors	Crane duty, one hour rated, class B or F insulation, IP55 protection, 40 % CDF, 150 starts/hour squirrel cage induction motors	Vendor to confirm	
3.18	Contactors	Siemens make 3 TF series contactors of suitable rating to be provided in the power circuit	Vendor to confirm	
3.19	Cables	P.V.C armoured, copper multistrand conductors, minimum size 2.5 mm sq. in power circuit and 1.5 mm sq in control circuit. All inter connecting wiring to be done neatly through perforated trays fixed in suitable places.	Vendor to confirm	
3.20	Limit Switches for traverses	Limit switches to be provided for all the motions	Vendor to confirm	
3.21	Limit Switches for Main hoist	One series limit switch with counter weight type and one rotary shunt limit switches for hoist	Vendor to confirm	
3.22	Earthing	Double earthing are to be provided for all the electrical equipment. A common electrical earthing bus bars to be installed on the cranes covering the entire span and trolley etc.	Vendor to confirm	
3.23	Bridge lights	Two numbers of bridge lights to be provided at the corners for one bridge	Vendor to confirm	
D	MATERIALS			
4.10	Gears	EN 9 Helical type	Vendor to confirm	
4.11	Hardness of Gears	225 to 280 BHN	Vendor to confirm	
4.12	Pinions	EN 19/EN 24 helical type	Vendor to confirm	
4.13	Hardness of Pinion	250 to 300 BHN	Vendor to confirm	
4.14	Heat treatment of gears/pinions	Hardened and tempered	Vendor to confirm	
4.15	Pulleys	Cast Steel IS: 1030 grade 4	Vendor to confirm	

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4.16	Gear Box	IS: 226/IS: 2062 fabricated casing duly stress relieved	Vendor to confirm	
4.17	Wheels	C 55 Mn 75 / forged steel with hardness of 300-350 BHN	Vendor to confirm	
4.18	Rope Drum	Rolled steel plate fabricated (IS-2062) duly stress-relieved with flanges at both ends or seamless steel pipe (as per ASTM 106 GR A or B). Rope drum to be machine grooved in hoisting direction. Dia of drum/rope ratio to be as per IS: 3177-1999. 100% X-ray quality welding for <u>circumference joint to be done</u>	Vendor to confirm	
4.19	Makes of other bought out components	To be as per annexure M&S/Cranes/Makes Rev 00 dated 21/03/2009	Vendor to confirm	
E	GENERAL			
5.10	Environment	All equipment shall be tropicalised to operate in normal shop floor conditions of temperature 10 to 40 ° C and maximum relative humidity of 95 %.	Vendor to confirm	
5.11	Guarantee	Supplier shall guarantee all equipment for a period of 24 months from the date of commissioning	Vendor to confirm	
5.12	Manufacturer's reference list	The manufacturer should have manufactured, at least three Semi Gantry/Gantry/EOT Cranes of 5 tons or higher capacity and with span ≥ 12.5 meters (of Class M5 or higher as per IS 3177/1999 or equivalent), in the last 5 years as on date of enquiry. List of these cranes to be furnished with names of contact persons, telephone and FAX nos. and e-mail IDs. The supplier should furnish copies of the purchase orders and commissioning reports / performance certificates issued by the customers as documentary proof of the above. Note: The Cranes should have been supplied to engineering industries or steel mills. Cranes supplied to irrigation projects will not be considered	Vendor to confirm	
F	DOCUMENTATION			
6.10	List of documents to be submitted with offer (offer will be rejected unless these are submitted)	Point-wise clarifications to all points of this specification including deviations, if any	Vendor to confirm	
6.11		Sketches showing full details of crane with dimensions / end clearances (between centre of LT rails to column face of building), overhead clearance from LT rails	Vendor to confirm	

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6.12	Total weight of crane in Tonnes	Indicate	Vendor to specify	
6.13	Weight of crane girder in Tonnes	Indicate	Vendor to specify	
6.14	List of drawings/documents for approval before manufacture of crane. Note: It is the responsibility of the supplier to get the drawings/documents approved. No extension of delivery will be accepted in case of any delay in submission/approval of drawings	General Arrangement (GA) drawing of crane	Vendor to confirm	
6.15		GA Drawing of individual mechanism	Vendor to confirm	
6.16		Drawings of bridges, end carriage, and their connections	Vendor to confirm	
6.17		Calculation for selection of motor, gearbox and brake	Vendor to confirm	
6.18		Calculation for bridge girder, end carriage and selection of wheels	Vendor to confirm	
6.19		Total weight of structural, mechanical and electrical equipment separately	Vendor to specify	
6.20	List of drawings/documents to be submitted	Test certificates of all boughtout items	Vendor to confirm	
6.21	at the time of inspection of crane	Drawings of all wheels	Vendor to confirm	
G	TESTING/INSPECTION			
7.10	During manufacture	Will be checked/inspected by BHEL/third party appointed by BHEL	Vendor to confirm	
7.11	After manufacture	Will be checked/inspected by BHEL/third party appointed by BHEL. The crane will be checked for all functions and operations.	Vendor to confirm	
7.12	Crane span	Check of Crane span and diagonal - 10Kg pull should be applied while checking	Vendor to confirm	
7.13	Clearance for despatch	The equipment shall be despatched only after testing/inspection at supplier's works and on written clearance from BHEL	Vendor to confirm	
H	ERECTION & COMMISSIONING			
8.10	At BHEL works	Part of supplier's scope.	Vendor to confirm	
8.11	Material (lifting equipment, lifting tackles, etc) required during erection and commissioning	Part of supplier's scope. All lifting machines/tackles to be inspected and certified by "Competent Person" as per AP Factories Rules/Acts/Laws before use.	Vendor to confirm	
8.12	Load test	To be done as per IS 3177 standard. Load will be provided by BHEL	Vendor to confirm	
8.13	Test certificate for crane	Part of supplier's scope. To be inspected and certified by "Competent Person" as per Telangana Factories Rules/Acts/Laws before use.	Vendor to confirm	

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8.14	Manuals and Drgs.	1) Manuals - Hard copies(2 sets) and soft copy to be provided. 2) Drawings (Mechanical and Electrical circuit diagram) - Hard copies (A3 size, Two sets) and soft copy to be provided.	Vendor to confirm	