

BHARAT HEAVY ELECTRICALS LIMITED  
RAMACHANDRAPURAM :: HYDERABAD - 502 032  
SPECIFICATIONS FOR 10 TONS GANTRY CRANE

*Specimen*

	DESCRIPTION	BHEL SPECIFICATION
<b>A</b>	<b>MAIN PARAMETERS</b>	
1.0	Type of Crane	Double girder gantry crane for outdoor use
1.1	Class & duty	M7 as per IS 3177-1999 or equivalent FEM or ISO standards
1.2	Main Hoist capacity	10 Tons
1.3	Span	30.0 meters
1.4	Operation Speeds (maximum)	
1.41	Main Hoist	4 meters/min
1.42	Inching Speed (Micro for main hoist)	0.4 metres/min
1.43	Long travel	30 meters/min
1.44	Cross travel	20 meters/min
1.5	Lift Height	
1.5.1	Main Hoist (above ground)	10.0 metres
1.6	Hook approach	
1.6.1	Main Hoist	DSL side 2000 mm, Opposite side 2500 mm
1.7	Size of gantry rail (Long Travel) - Rail is part of BHEL scope	CR 80 as per IS - 3443
1.8	Size of CT Rail	≥ CR-80 as per IS - 3443
<b>B</b>	<b>CONSTRUCTION/STRUCTURAL DETAILS</b>	
2.1	Main Hoist hook type	Shank Hook
2.2	Hook latches for Main hoist	Required
2.3	Hoist wire rope	6/36 or 6/37 construction as per IS:2266-1989
2.4	Number of falls Main Hoist	8
2.5	LT Drive	Twin drive with horizontal type gear box
2.6	Number of wheels for LT drive	8
2.7	Diameter of wheels for LT drive	≥ 630 mm
2.8	Number of driven wheels for LT drive	50% or more
2.9	CT Drive	With vertical gearbox
2.10	Lubrication of CT gear box	Pump / motor to be provided
2.11	Approach platform for maintenance of CT gearbox	Required
2.12	Number of wheels for CT drive	4
2.13	Diameter of wheels for CT drive	≥ 400 mm
2.14	Type of bearings for LT/CT wheels	Anti-friction
2.15	Type of mounting of LT/CT wheels	"L" type brackets

*M. V. Sasli*  
*DGM/CDC*

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Specifications of 10T Gantry Crane

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	DESCRIPTION	BHEL SPECIFICATION
2.16	Variable speed control	
2.16.1	LT Drive	Through VVVF drive
2.16.2	CT Drive	Through VVVF drive
2.16.3	MH Drive	Through VVVF drive
2.16.4	MH Drive micro speed	Through VVVF drive
2.17	Operations required through	
2.17.1	Pendant	MH, LT & CT and micro speed for MH
2.18	Number of speed steps through	
2.18.1	Pendant	Two steps
2.19	Duty cycle	40% CDF all motions
2.20	Brakes	Electro Hydraulic operated brakes are to be provided for all motions and hoists.(Totally enclosed) conforming to IP:55.
2.21	Gear Boxes for LT, CT and Hoists	Completely enclosed M.S fabricated and stress relieved split type
2.22	Couplings between motor and gearbox	Geared couplings
2.23	Couplings between gearbox and rope drum for hoists	Geared couplings
2.24	Mounting	All the gearboxes, motors, brakes, bearing pedestals etc. shall be mounted on machined surfaces
2.25	Lubrication of Crane	Centralised lubrication (with motor, pump and timer) should be provided at three areas - Two end carriages and at trolley
2.26	Toeguards	Toeguards shall be provided for all openings including for trolley
2.27	Railings	Safety hand railings of tubular construction shall be provided across full length of the bridges and end carriages, staircases and in any other places where openings have been provided.
2.28	Jacking pads	Suitable jacking pads should be provided on end carriages and crab for jacking up the crane and crab for changing track wheels

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	DESCRIPTION	BHEL SPECIFICATION
2.29	Safety Pads	Suitable reinforced safety pads should be provided under the end carriages and crab to prevent the crane from falling more than 25mm in the event of breakage of a track wheel/bogie/axle. These safety stops shall not interfere with the removal of wheels.
2.30	End buffers	Spring-loaded buffers are to be provided for long travel and cross travel.
2.31	Measurements	All components including fasteners should be in metric system only.
2.32	Locking of Parts	Bolts and screws in rotating parts shall be locked.
2.33	Painting	The cranes should be painted with two coats of Golden yellow paint confirming to IS:2932 : 2003, ISC 356 (as per IS 5) after giving primary coat. Girders and trolley frame shall be shot blasted/ Chemically treated before painting.
2.34	Plates used for fabrication	To be of rolled steel as per IS 2062 plates. Test certificates to be furnished.
2.35	End carriages	To be bogey type design with suitable balancing beam.
2.36	Butt joints	All butt joints shall be 100% X rayed both compression and tension and both flanges and Webs.
2.37	Girder	No splice joint - to be of single piece only.
2.38	Platform	Full length chequered platform shall be provided on both bridges and wherever access is necessary for operation and maintenance. The platforms shall be bolt jointed. Width of the platform shall be $\geq 750$ mm.
2.39	Trolley	To be stress relieved by thermal process after welding. Suitable shed is to be arranged over the trolley and for electrics arranged on platform. With suitable lifting beam for handling loads on the trolley.
2.40	DSL	In BHEL scope
2.41	DSL guard	To be provided
2.42	DSL maintenance cabin	To be provided at suitable height

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<b>C</b>	<b>ELECTRICAL EQUIPMENT</b>	
3.1	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
3.2	Control voltage	110 Volts AC
3.3	Power distribution to trolley	Trailing cable supported on anti-friction wheel cable
3.4	Connection to pendent	Trailing cable supported on anti-friction wheel cable
3.5	Panels	Individual panels to be provided as follows a. Protective panel - one b. MH panel - one c. CT & LT Panel - one d. Ferrules to be provided for cable connections as per circuit diagram. e. Individual isolating switch to be provided for each panel f. Input contactor should be provided in the panel for each drive g. Panels shall be of IP54 grade
3.6	Colour of panels	The panels should be powder coated. The colour of coating shall be light grey conforming to IS 2932-2003 (as per IS 5)
3.7	Mounting of panels and resistance boxes	To be mounted on supporting boxes fabricated from 'L' angles
3.8	Electrical Motors	Crane duty, one hour rated, class B or F insulation, IP55 protection, 40 % CDF, 150 starts/hour squirrel cage induction motors
3.9	Contactors	Siemens make 3 TA 22-30 Amps or equivalent rating to be provided as minimum size contactor in the power circuit
3.10	Overload relays	To be provided for all the motors.

*M. S. Arli*  
DGM/CDC



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	DESCRIPTION	BHEL SPECIFICATION
3.11	Cables	P.V.C armoured, copper multistrand conductors, minimum size 4 mm sq. in power circuit and 2.5 mm sq in control circuit. All inter connecting wiring to be done neatly through perforated trays fixed in suitable places.
3.12	Limit Switches for traverses	Limit switches to be provided for all the motions
3.13	Limit Switches for Main & Auxiliary hoists	One series limit switch with counter weight type and one rotary shunt limit switches for each hoist
3.14	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.
<b>D</b>	<b>MATERIALS</b>	
4.1	Gears	EN 9 Helical type
4.2	Hardness of Gears	225 to 280 BHN
4.3	Pinions	EN 19/EN 24 helical type
4.4	Hardness of Pinion	250 to 300 BHN
4.5	Heat treatment of gears/pinions	Hardened and tempered
4.6	Pulleys	Cast Steel IS: 1030 grade 4
4.7	Gear Box	IS: 226/IS: 2062 fabricated casing duly stress relieved
4.8	Wheels	C 55 Mn 75 / forged steel with hardness of 300-350 BHN
4.9	Rope Drum	Rolled steel plate fabricated (IS-2062) duly stress-relieved with flanges at both ends. 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 circumference joint to be done
4.10	Hooks	Made of mild steel/EN3A or wrought iron/20Mn2 to IS:6294/1971 with a hardness of 150-180 BHN and Nut to be forged from C45 material
<b>E</b>	<b>GENERAL</b>	

M. S. S. S.  
DGM/CDC

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	DESCRIPTION	BHEL SPECIFICATION
5.1	Environment	All equipment shall be tropicalised to operate in normal out side conditions of temperature 10 to 50 ° C and maximum relative humidity of 95 %.
5.2	Guarantee	Supplier shall guarantee all equipment for a period of one year from the date of commissioning at BHEL works
5.3	Oils & grease	First filling of oils and grease are in supplier's scope
5.4	Test certificates	Test certificates of all boughtout items like hooks, steel plates, wire ropes, etc and for crane (certified by "Competent person" as per as per AP Factories Rules/Acts/Laws
H	ERECTION & COMMISSIONING	
6.1	At BHEL works	Part of supplier's scope.
6.2	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.
6.3	Load test	To be done as per relevant IS standards
6.4	Test certificate for crane	Part of supplier's scope. To be inspected and certified by "Competent Person" as per AP Factories Rules/Acts/Laws before use.

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