Bharat Heavy Electricals Limited
(High Pressure Boiler Plant)
Tiruchirappalli – 620014, TAMIL NADU, INDIA
MATERIALS MANAGEMENT / CAPITAL EQUIPMENT

An ISO 9001 Company

ENQUIRY **NOTICE INVITING TENDER**	Phone: +91 431 257 76 53 Fax : +91 431 252 00 31 Email : skaruna@bheltry.co.in Web : www.bhel.com

TWO PART BID	**Enquiry Number:** **2711500001**	**Enquiry Date:** **20.08.2015**	**Due date for submission of quotation:** **21.09.2015**

You are requested to quote the Enquiry number date and due date in all your correspondences. This is only a request for quotation and not an order.
Please note that under any circumstances both delayed offer and late offers will not be considered. Hence vendors are requested to ensure that the offer is reaching physically our office before 14.00 hrs on the Date of tender opening.

S. No	Description	Quantity
1	**10 Ton EOT Crane** as per the technical specification, general guidelines instructions & commercial conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in)	04 Nos.

IMPORTANT POINTS TO BE TAKEN CARE DURING SUBMISSION OF OFFER FAILING WHICH THE OFFER WILL NOT BE CONSIDERED FOR EVALUATION:

1. The rate of EMD for this Tender will be (INR): 2,00,000/-
2. The Vendor shall offer against the following requirement of BHEL:

Delivery Period for Supply Portion	**08 Months**
Duration for Completion of Erection & Commissioning (i.e. Delivery for Service Portion)	**02 Months**

   In case of deviation the offer will be commercially loaded as indicated in the Compliance Form.
3. The Compliance Form for Acceptance of Commercial Terms & Conditions to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.

All updates, amendments, corrigenda etc (if any) will be posted only on the above websites from time to time, as and when required, until tender is opened. There will be no publication of such updates, amendments corrigenda etc. Through newspapers or any other media.
BHEL commercial terms & conditions with Price Bid and Bank Guarantee formats can be downloaded from BHEL web site http://www.bhel.com or from the Government tender website http://tenders.gov.in (public sector units) Bharat Heavy Electricals Limited page) under Enquiry reference above.

Tenders should reach us before 14:00 hours on the due date. Tenders will be opened at 14:30 hours on the due date Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present	Yours faithfully, For **BHARAT HEAVY ELECTRICALS LIMITED** Sr. Engineer / MM / Capital Equipment

C. SARANYA
Senior Engineer
MM / Capital Equipment
BHEL / Tiruchirappalli - 620 014.

PART A

SECTION – I: QUALIFYING CRITERIA

The BIDDER (OEM**)** has to compulsorily meet the following requirements to get qualified for consideration of the technical offer for the supply of EOT CRANE

S. No	PARTICULARS	VENDOR'S RESPONSE
1.0	Only those Vendors **(OEMs)**, who have supplied and commissioned at least ONE **10** Ton or higher capacity EOT CRANE of duty class-IV, with a span of **28** Meters or more in the past 5 years & such crane should be working satisfactorily for a minimum period of one year after commissioning as on the original date of opening of this Tender are eligible to quote.	
2.0	The bidding FIRM should have 'in-house' or 'self-owned' facility for TESTING at 125 % of the rated capacity.	
3.0	The vendor should have minimum 10 years experience in the field of design and fabrication of EOT Cranes.	
4.0	Along with the Technical offer, the Vendor should enclose Two (Minimum 2) Performance certificate from the customer regarding satisfactory performance of the crane supplied to them. For obtaining the Performance certificate from the customer, a suggestive format is provided in **SECTION – IV.**	
5.0	BHEL reserves the right to verify the information provided by vendor. In case the information provided by vendor is found to be false/ incorrect, the offer shall be rejected.	

SECTION – II

The Bidder / Vendor is requested to provide the following information.

S. No.	PARTICULARS	VENDOR'S RESPONSE
6.0	The Vendor shall specify the number of Years of experience (for the firm), in the field of design, manufacture, supply and Erection & commissioning of cranes.	
7.0	Number of EOT Cranes supplied and commissioned till date.	
8.0	Number of EOT Cranes supplied and commissioned till date in the QUOTED MODEL.	
9.0	Details on SERVICE-AFTER-SALES Set-Up in India including the Addresses of Agents / Service Centers in India / Asia.	
10.0	Any Additional Data to supplement the manufacturing capability of the BIDDER for the subject crane.	
11.0	The vendor (Indian / Foreign) may visit SSTP/BHEL with prior intimation for understanding site conditions and technical requirements specified, before submitting their offer against this enquiry.	

SECTION – III

Bidder / Vendor to note:

S. No.	REQUIREMENTS	VENDOR'S RESPONSE
12.0	The BIDDER / VENDOR shall submit the offer in TWO PARTS. 1. Technical offer **(with PART A & PART B)** & Commercial offer. 2. Price Bid (One lump sum must be quoted for supply, erection and commissioning of all 4 cranes as per specification).	
13.0	The Offer shall contain a comparative statement of Technical **Specifications specified by BHEL** and **Offer Details submitted by the Bidder**, against each clause. A just 'CONFIRMED' or 'COMPLIED' or 'YES' or 'NO-DEVIATION' or similar words in the technical comparative statement may lead to disqualification of the Technical Offer. Bidders may be requested for technical discussions at SSTP/BHEL for any technical clarifications in their submitted offers.	
14.0	The Technical Offer shall be supported by Product Catalogue and Data Sheets in ORIGINAL and complete technical details of 'Bought-Out-Items' with copies of Product Catalogue and Selection Criteria	
15.0	The Commercial Offer (given with the Technical Offer) shall contain the Scope of Supply and the Un-Priced Part of the Price-Bid, for confirmation	

SECTION – IV

The Performance certificate should be produced on Customers Letter head.

PERFORMANCE CERTIFICATE

1	Supplier of the Crane		
2	Make & Model of the Crane		
3	Month & Year of Commissioning		
4	Application		
5	a. Crane Type		
	b. Crane Capacity (Metric Tons)		
	c. Crane span		
	d. Duty class		
	e.. Mechanism Group		
6	Performance of the Crane (**Tick** whichever is **applicable**)	Best in the market	
		Satisfactory	
		Good	
		Average	
		Not Satisfactory	
7	Any other remarks		
Date:		Signature & Seal of the Authority Issuing the Performance Certificate	

PART B.

TECHNICAL SPECIFICATIONS FOR 10 TON CAPACITY, 28.5 MTR SPAN DOUBLE BOX TYPE GIRDER EOT CRANES (Qty. :4 nos.)

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
1.0	**APPLICATION**	a. The subject crane is meant for the purpose of handling (within the lifting capacity of the crane) components, bar / round stocks (bloom), tubes & pipes in closed shed. b. The crane will be put to use for 365 Days continuous duty with CT, LT and Hoist movements, which may occur simultaneously (within the operating parameters specified under Clause Nos. – 3.1, 3.4 and 3.5). c. The shop floor/storage yard environment will be in ambient temperature going up to 45° C.	
2.0	**SCOPE OF SUPPLY**	Design Crane as per the Tender Specifications given under this PART-B. Quantity: 4 Nos As detailed below. A) Hydro Machine Area crane (Sketch CMM:213 ,CMM:217& End carriage CMM:214) Qty-1no B) Finishing Area crane (sketch CMM:215, CMM:217 & End carriage CMM:216)Qty-1 no C) IC Bay crane (sketch CMM:210, CMM:218& CMM:217) Qty- 1 no	A) Double box type girder, **single trolley,** double hook EOT crane with one side extended buffer.-1 no B) Double box type girder, **single trolley** double hook EOT crane with double side extended buffer.-1 no. C) Double box type girder, **double trolley** EOT

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
		D) AB Bay crane (sketch CMM:211,CMM:217 & End carriage CMM:212) Qty-1 no (2 nos. in Cold mill finishing bay,1 in IC bay, 1 in Hot mill AB bay) (2 cranes with extended spring type end buffer to avoid parking of 2 crane in cold mill on 18m concrete girder) others 2 nos. normal spring buffer type. b. Detailed design, Manufacture, Assembly and Testing before Dispatch c. Supply in major Sub-Assemblies/Modules d. Unloading the crane & its parts at SSTP/BHEL stores with mobile crane is supplier's scope. e. Moving/Transporting the unloaded crane and its parts to Erection site with truck and mobile crane is also in supplier's scope. f. Required capacity mobile crane & Transport truck to be hired locally in and around Trichy is in suppliers scope g. Erection in SSTP/BHEL is in supplier's scope. h. Commissioning and Performance Prove-Out at BHEL Works. i. Performance Guarantee for 12 months, from the date of commissioning.	crane.-1 no D) Double box type girder, **single trolley,** double hook EOT crane.-1no
3.0	**TECHNICAL SPECIFICATIONS**		# -- BHEL special requirement (need not be compared with design calculation values)
3.1	CAPACITY	Lifting Capacity	

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
3.1.1	Main Hoist	10MT Single trolley double hoist each 5T individual drive mechanism for each hook- 3 Cranes 10MT Double trolley single hook each 5T individual drive mechanism for each trolley—1 Crane	
3.2	SPAN	Wheel Centre to Wheel Centre Dimensions	
3.2.1	Long Travel (LT)	28,500 mm	
3.2.2	Cross Travel (CT)	2,600 mm for IC Bay /5000 mm for other cranes	
3.3	Height of Lift	9,000 mm	
3.4	DUTY CYCLE	Related to Drive Motor & Mechanisms	
3.4.1	Hoists	40 % CDF	
3.4.2	Long Travel	40 % CDF	
3.4.3	Cross Travel	40 % CDF	
3.5.	SPEED	Operating / Working Speed [Maximum]	
3.5.1	Hoist	15 mtrs. / minute.	
3.5.2	Cross Travel (CT)	30 mtrs. / minute.	
3.5.3	Long Travel (LT)	60 mtrs. / minute.	
3.6	MOTOR RATINGS - MIN	Electric Drive Motor Ratings & Frame sizes shall be as per IS-325 and IS -1231 and also suitable for 300 starts per hour.	
3.6.1	Main Hoist	30 KW, 225S, 6 Pole x 2 nos for each crane #	
3.6.2	Cross Travel (CT)	5.5 KW, 132S, 6 Pole x 1 no.each for 3 cranes # 5.5 KW, 132S, 6 Pole x 2 nos. for IC bay Crane #	
3.6.3	Long Travel (LT)	11 KW, 160L, 6 Pole x 2 nos for each crane. #	
3.7	GEAR BOX	Gear Box Size	
3.7.1	Main Hoist	HR 650-2 or 3 stage gear reduction, 45HP	
3.7.2	Cross Travel (CT)	VR 400-2 or 3 stage gear reduction, 7.5HP	
3.7.3	Long Travel (LT)	HR 450-2 or 3 stage gear reduction, 15HP	

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
3.8	ACCELERATION		
3.8.1	Cross Travel (CT)	300 mm / sec. sq.	
3.8.2	Long Travel (LT)	300 mm / sec. sq.	
3.9	HOIST ROPE DETAILS	Size and Number of Falls of Rope	
3.9.1	Main Hoist	Dia. 18 mm; Falls - 4 #	
3.10	CONTROL	Cabin Operation and Remote Control	
3.11	Type of Control	Master Control and Radio Remote Control	
3.12	Control Voltage	230V AC #	
3.13	Input Power Supply	415 Volts ± 10%, 50 Hz ± 3% , 3 Phase- AC	
3.14	Duty Class	Class – IV [Heavy Duty]	
3.15	Mechanism Group Classification	M 6	
3.16	DESIGN STANDARD	IS – 807 & 3177 -2006	
3.17	Runway Rail Size		
3.17.1	Cross Travel (CT)	ISR 60 Lbs./Yard - Rail by vendor	
3.17.2	Long Travel (LT)	ISR 90 Lbs./Yard (For reference only) - Rail by BHEL already existing in the bay(building)	
3.18	Wheel Size		
3.18.1	Cross Travel (CT)	Dia. 320 mm – 4 Nos for 3 cranes and 8 Nos for IC Bay crane	
3.18.2	Long Travel (LT)	Dia. 630 mm - 4 Nos for each crane	
3.19	Brake Drum Size	Brake Drum Sizes	
3.19.1	Hoist	Dia. 400 mm (BCH)	
3.19.2	Cross Travel (CT)	Dia. 200 mm (BCH)	
3.19.3	Long Travel (LT)	Dia. 250 mm (BCH)	
4.0	**MAIN FEATURES**	**Crane Operational Features**	
4.1	Control System	Smooth Start & Stop through variable speed drives for all operations.	
4.2	Cabin Control	Conventional master control for all motions	

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
4.3	Remote Control	Radio Remote Control for all motions (Microprocessor based)	
4.4	End clearance	End clearances to be fixed to suit the workshop building clearances (Refer to Sketch CMM:217 enclosed with the tender.	
4.5	Crane Operation	Through Cabin Control and Radio Remote Control with option for control selection (using three way selector switch provided at end carriage).	
4.6	Operator Cabin	Enclosed type cabin with proper ventilation. Cabin fitted with fan, light and exhaust fan located on one end of the crane.	
5.0	**STRUCTURAL FABRICATION**	**Crane Structure Constructional Details –Double girder box type construction EOT crane.**	
5.1.0	Bridge/Girder & End carriages of LT and CT	Plate formed box type Construction for Girders, and End carriages of LT and CT	
5.1.1	**Bridge girder section**	**The minimum size shall be as follows.**	
5.1.1.1	Cross section of bridge girder	Min..Girder Height (Flange inner – inner) 1480mm (minimum) Min. Girder width (web inner-inner) 452mm (Min) Top flange plate thickness – 12mm (min) Bottom flange plate thickness – 10mm (min) Web plate thickness – 8mm (min) Width of top flange and bottom flange 490mm (min) Vertical Diaphragm plate thickness-6 mm (Min) Distance between long diaphrams-1000 mm (Min) Vertical Diaphragms shall be made of solid plates only Horizontal stiffener to be provided – An ISA 50x50x6 shall be provided throughout the length of the web (for both webs) at about 1/3 rd of the bridge	

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
		height from the top.	
5.1.1.2	Camber for bridge	The crane bridge shall be cambered at the top as well as the bottom. The final camber shall be between +26mm and +30mm.	
5.1.2	Cross section of LT End carriage	Min. Height (Flange inner-inner) – 600mm (min) Min. width (Web inner-inner) – 292mm (min) Top flange plate thickness – 12mm (min) Bottom flange plate thickness – 10mm (min) Web plate thickness – 8mm (min) Width of top flange and bottom flange 350mm (min) Vertical diaphragm plate thickness – 6mm (min) Vertical diaphragms shall be made of solid plates only.	
5.1.2.1	Jacking pads	Jacking pad shall be provided between web plates of end carriage ends for removal of LT wheel.	
5.1.2.2	Wheel clearance	Minimum clearance to be maintained between rail top and bottom flange of end carriage shall be as follows 1. For Long travel – 100 mm 2. For Cross travel – 50mm	
5.2	Raw Material	Only Steel plates, tested and certified for quality by reputed inspection authorities, shall be used. Test Certificates to be produced for BHEL verification and form part of the documentation.	
5.2.1	Welding of web plate	Top flange shall be welded inside also with web plate and it shall be equal length stitch weld minimum.	
5.2.2	Welding of stiffener plate	All stiffener plates shall be inside welded both sides	

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		with top flange and web plates and it shall be equal length stitch weld minimum.	
5.3	**Welded Joints.**	**To be followed for girder fabrication.**	
5.3.1	Number of weld butt Joints allowed in web and flange plates of bridge girder.	Maximum three joints is permitted in flange and web plates of bridge girder. Splice joint is not permitted. (Girder has to be of single piece only).	
5.3.2	Welding Electrodes	a. For all Horizontal Welding E 7018/ER70S-6 (MIG) Electrode only should be used. b. For all Vertical Welding E 7048 /ER70S-6 (MIG)Electrode only should be used.	
5.3.3	Welded Joint Testing	All Butt Welded Joints (compression / tension and flanges / web joints) shall be subjected to 100% X-Ray Testing and X-Ray Films to be produced for BHEL verification and be part of the documentation.	
5.3.4	Splice joints	No bolted Splice Joint is allowed in Girder fabrication (Girder has to be of single piece only).	
5.4	Bridge / End carriage connection	Bridge to girder connection shall be reamed holes with fit bolt as per IS-3640.	
5.5	Platform on Girders	The Platforms provided on both the Girders shall be fixed through BOLTED JOINTS with fit bolt as per IS-3640 only.	
5.6.	Wheel Assembly	The Wheel Assembly coming for Cross Travel (CT) & Long Travel (LT) shall be of LIVE AXLE SYSTEM with L-Type Bearings. [Refer to BHEL Drawing No. 3-M-02R-0011993. Drawing is enclosed (as ANNEXURE -1]. Bogie type assembly shall be for LT wheels.	
5.7	NDT Examination	All welding shall be tested by NDT means [MPI,	

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
		LPI]	
5.8	Machining Operation	All mechanical mating surfaces and wheel seating areas are to be machined to the required finish.	
5.9	Surface Cleaning	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.	
5.10	Painting	The crane parts are to be painted as follows: a. One coat primer with 25 microns of DFT(Dry film thickness) and 48 hours of compulsory curing after painting.. b. Two coats of Enamel Paint –(Color- Tractor orange) each with a DFT of 25 microns and intermittent curing of minimum 16 hours.	
6.0	**MECHANICAL ELEMENTS**		
6.1	Gears	Gears in all the Stages shall be helical in design and to be of machined, lapped and hardened. All gear material must be of EN353 grade.	
6.2	Gear Box Casing	Shall be of fabricated type and stress relived by thermal heat-treatment process, prior to machining.	
6.3	Rope Drum	Shall be of fabricated type and stress relieved. The circumferential weld joints shall be tested by 100 % X-Ray for quality assurance.	
6.4	Type of Coupling	Only GEARED COUPLING to be used a. Between Electric Motor and Gear Box. (FG105,FG103, FG101)Ref sketch for size selection only. CMM 219. Bore &key way as per respective motor & gear box selection based. b. Between Gear Box and Rope Drum. Geared rope	

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
		drum coupling. c. Between Gear Box and Wheels (for LT and CT) Half gear coupling with floating shaft(Minimum floating shaft length for LT shall be 1500 mm)	
6.5	Wheels	The Wheels shall be of Forged and Wheel Tread hardened to 300/350 BHN. Wheels shall be fitted with L-Type Bearings	
6.6	Mechanical Joints	Fit Bolts as per IS 3640-1982 for all joints coming in main members and platform with reamed holes	
6.7	Pulley Dimension	Rope Pulley diameter shall be 23 times that of Rope diameter	
6.8	Hook	Hook with Hook latch shall be provided.	
6.9	Lifting eye	Lifting eye for handling the components of the cross trolley in hoist and Long travel mechanisms.	
6.10	Limit switches	Hoist shall be provided with rotary and Counter weight limit switches.	
6.11	Gear oil	Required grade oil to be supplied-vendor scope.	
6.12	Buffer	Spring loaded buffer shall be provided for crab and bogies.	
6.13.0	Tools	The following tools of makes acceptable to BHEL shall be supplied along with each crane. Vendor to clearly specify the make of each items in the offer.	
6.13.1	List of Tools (One set for 4 cranes)	1 Double end spanner - one set 2 Ring spanner - one set 3 Hammer 2 lbs - one no 4 Screw driver - one set 5 Screw spanner - one set 6 Cutting pliers - one set 7. Line tester - one no	

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
		8. Grease gun - one no	
7.0	**ELECTRICAL ELEMENTS**		
7.1	Operational Controls	The Crane shall be provided with the following controls: a. Cabin Control [Master Control] b. Radio Remote Control (Microprocessor based two-step push button	
7.2	Motor Control	Through Variable Frequency Drives. Capacity of the drive shall be one frame above the motor capacity and suitable for crane application. The drives must be having internal or external Dynamic Braking Unit connected to a Dynamic Braking Resistor (DBR).	
7.3	Control Voltage	230 V AC	
7.4	Type of Brakes – DC BCH Make	a. Main Hoist - DC Electromagnetic Brake (BCH) b. Cross Travel - DC Electromagnetic Brake (BCH) c. Long Travel - DC Electromagnetic Brake (BCH)	
7.5	Protection	All Panels, Limit-Switches and Motors shall have IP 55 protection.	
7.6	Electric Motors	Squirrel Cage Induction motor conforming to new IS12615:2011 standards, High Energy Efficient, S4 Duty, Index of Protection-IP55, Cooling- IC 411(TEFC), Insulation Class-F, 300 Starts/hour, Foot Mount (B3).	

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		All Electric Motors shall be as per IS-325 AND IS-1231 and also suitable for 300 starts per hour.	
7.7	Electric Contactors	All Contactors shall be suitable for AC3 Duty Class. The rating of all Contactors shall be at least 50% higher than the respective electric motor full load current, at the specified duty cycle. .	
7.8	Resistance (DBR)	Stainless steel punched grid resistance 40 % duty cycle or as recommended by the drive manufacturer whichever is higher.	
7.9	Long Travel Motion	Dual Drive Mechanism shall be provided for Long Travel Motion.	
7.10	Digital Weight indicator	Digital Weight indicator with appropriate transducers for indicating the actual weight being carried. Must be installed in the position where both the operator and rigger can see the Weight indicated.	
7.11.0	Illumination	a. Four numbers of 250 Watts Metal Halide lamp shall be provided under the Bridge b. All Electric Panels shall be provided with suitable illumination for visibility and troubleshooting.	
7.11.1	Controller Steps	A 4-step controller has to be provided for a. Main hoist b. Long travel c. Cross travel	
7.11.2	Frequency converter	The VVVF Drive shall be supplied with suitable DBR for all motions.	

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
7.11.3	Programming Device	A portable programmable device-2 No for uploading/downloading or modifying the parameters in the VVVF drives shall be supplied (Only 2 nos for all the four cranes).	
7.11.4	Anti-collision device	An anti-collision device of infra-red type shall be provided on both sides of the crane. The operating range shall be 3.0 meters to 10.0 meters	
7.11.5	Load cell	a. Load weighing system with LOAD CELL (Shear pin type) to be fixed / provided at the equalizer pulley. b. The display shall be of 100 mm size (JUMBO)	
7.11.6	Crab wiring	Junction box shall be avoided for wiring of crane in bridge end.	
7.12	Master Controller Steps	Sheet Steel Housing Master controllers having 7 cams with joystick handle for 4 notches for the following operations. a. Hoist 1 b. Hoist 2 c. Tandem d. Long Travel e. Cross Travel	
7.13	Radio remote control	Remote operation through hand held transmitter capable and Receiver control panel mounted on crane shall be used. Separate interposing relay shall be used for connecting to the motion control panels. Range of the radio remote shall be less than 50 m.	

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
7.14	Cables	All cables for power and control circuit must be of copper only. List of cables must be provided along with the drawing. All necessary cable glands, conduits, conduit glands, copper lugs for panels and motors must also be supplied.	
7.15	CT Wiring	Cable Drag Chain System of IGUS /KABELSCHLEPP make along with cables.	
7.16	Hoist Limit	Hoist-Counter weight with manual reset type. Hoist-Rotary Geared Type with up and down limits. C.T-Lever Type fitted in the trolley. Each hoist shall be provided with both rotary and counter weight limits	
7.17	Operator Cabin	Control on/off Push Button station, Master controllers, Industrial Gang Bell with Footswitch, Fan, light and exhaust fan, operator chair, Fire extinguisher, warning bell and emergency push button must be provided in the cabin.	
7.18	Corner Switches	4 Corner switches with enclosures must be provided at 4 corners of the crane.	
7.19	Earthing	All the bodies of electrical equipment like motor, power & control panel, resistor panel, brake panel, master controller etc. are to be effectively earthed. Separate earth cable shall be run for the trolley.	

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
7.20	**Spares Set – 1**	The following spares one set also shall be supplied (one set for 4 cranes) 1. LT wheel bearing – 2 No.. 2. CT wheel bearing – 2 No. 3. Hoist gear coupling finish bored – 2 Nos. 4. Warning bell – 2 Nos. 5. 500 M Halogen lamp – 2 Nos. 6. Limit switches – 1 No. of each variety used in the crane 7. Master controller – 1 No. 8. Main Hoist Brake drum with BCH DC brake unit – 1 No. 9. Oil seals – 1 no. of each variety used in the crane 10. 3 Ton chain pulley block with 15 Mtr. Height of lift and hand chain for 15m height– 2 Nos. 11. 20 Ton hydraulic jack remote pump type with oil filled – 2 Nos.	

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
7.21	**Spares Set – 2**	**The following spare shall be included in the offer (one set for 4 cranes)** **1. Gear Box** **a. Hoist Gearbox – 1 No.** **b. Cross Travel Gearbox -1 No.** c. **Long Travel Gearbox – 1 No**. **Motors** : - **a.** Hoist Motor – 1 no. **b.** Cross Travel Motor – 1 no. **c.** Long travel motor – 1 no. c. Wheels (wheel & axle only not wheel assembly) a. Long Travel wheel with drive axle–2 nos. b. Cross Travel wheel with drive axle–2nos. . 2. Brake drums LT Brake drum – 1 No. 3. Brake shoes a. Hoist Brake shoe with lining – 4 nos. b. Cross Travel brake shoe with lining – 4 nos. c. Long Travel brake shoe with lining – 4 nos.	
8.0	**SELECTION OF COMPONENTS**	**The make of Components or Bought-Out-Items shall be strictly as per the list given below.**	
8.1	Hoist Hooks	HERMAN MOHTTA / HERCULES / SILPA UDYOG / SMRITI FORGINGS / KARACHIWALA	
8.2	Wire Rope	USHA MARTIN / FORT WILLIAM / RA WIRE ROPE	
8.3	Variable Frequency Drive	ABB- ACS 800 /	

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
		SIEMENS-S120/ DANFOSS- FC302	
8.4	Electric Motors	SIEMENS /ABB/GEC/ALSTHOM	
8.5	DC Brake Unit	Only BCH make	
8.6	Cable Drag Chain	IGUS/KABELSCHLEPP	
8.7	Radio Remote Control	SNT-CC-403/ACROPOLIS- F24-10D	
8.8	Contactors	SIEMENS / SCHNEIDER / ABB / GE	
8.9	Over-Load-Relay	SIEMENS / SCHNEIDER / ABB / GE	
8.10	HRC Fuses	SIEMENS / SCHNEIDER / ABB / GE	
8.10.1	Rotary limit switch	SIEMENS / OMEGA / SOC / INDUSTRIAL SYNIDICATE	
8.11	Switch fuse unit	SIEMENS / SCHNEIDER / ABB / GE	
8.12.0	Molded case C.B	SIEMENS / SCHNEIDER / ABB / GE	
8.12.1	Pneumatic time delay	Only BCH make	
8.13	ON Delay Timer	SIEMENS/GEC/AREVA	
8.14	Push - Buttons	SIEMENS / SCHNEIDER / ABB	
8.15	Connectors	ELMEX / CONNECTWELL	
8.16	Couplings	WMI / FENNER / ALFEX	
8.17	Bearings	SKF / FAG / NTN	
8.18	Cables	Reputed Makes & ISI Approved	
8.19	Bridge Light Fittings	PHILIPS / GE / CROMPTON	
8.20	Load Cell	IPA or reputed make acceptable to BHEL	
8.21.0	Resistance box	OHMARK / ELECTROMAG	
8.21.1	VVVF Drives	ABB / SIEMENS/ DANFOSS	
8.22	Other Elements	Vendor to specify items & makes	
8.23	Gear boxes	ELECON/SHANTHI GEARS /RADICON/CROMPTION GREAVES	
8.24	Catalogues of bought out items	The vendor shall provide the technical catalogues of the following bought-out items after getting PO.	

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
		1. Steel wire rope 2. Crane duty electric motors 3. Gear box 4. DC Brake 5. Radio Remote 6. Limit switches 7. Load cell 8. VVVF Drive along with DBR selection chart 9. Cable Drag chain	
9.0	**DOCUMENTS / DETAILS for APPROVAL**	The following documents and details are to be submitted for BHEL Approval, prior to taking up the manufacture of the crane.	

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
9.1	Drawings and Documents	Set I a. Calculations for selection of Electric motors, Gear reducers, Brakes, couplings, etc. b. Calculations for Bridge Girder, crab, end carriage and their connections c. GA Drawing of the crane d. GA Drawing of Trolley e. GA Drawing of Individual Mechanism Set II a. Drawings of Bridge, End-carriage bogies and their connection b. Sub-Assembly and individual part drawing for wheels, Hook blocks, Gear Boxes, Gears, Hoist rope drums, Bearing number details, Oil seal details and all brake drums. c. Electrical wiring diagram with Logic circuits and Bill of Materials. d. Cable selection based on current rating. Initially set I drawings to be submitted in one lot and approval to be obtained from BHEL. Based on this, set II drawings to be submitted for approval.	

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
9.2.	**Technical Details**	a. Total Weight of the Crane including all Electrical Equipment b. Total Weight of Trolley including all Electrical Equipment c. Weight of each Bridge assembled and ready for erection with and without Mechanical and Electrical Equipment. d. Weight of each End - Carriage assembled and ready for erection e. Total Weight of Structural, Mechanical and Electrical Equipment are indicated separately also. f. Weight of Operator's Cabin together with all Equipment mounted in it.	
10.0	**INSPECTION**	The following Schedule of Stage Inspections is to be strictly adhered to, prior to dispatch from the Supplier's Works	

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
10.1	STAGE – I	a. Verification of Test Certificate for Raw Materials used for Girders, End-Carriages, Trolleys, Gear Box Casings, etc. b. Verification of X-Ray Report of Butt-Joints coming in the Girders and Random Testing on the Welds, by physical examination. c. Box Girder setting before closing of the Bottom Flanges – for inspecting the quality of welding and presence of waviness d. Trolley Frame Fabrication before setting the Mechanisms e. End – Carriage Fabrication before closing of the bottom flanges. **The following Test certificates to be produced during stage-I inspection.** 1. TC for plates used for bridge fabrication. 2. TC for plates used for End carriage fabrication. 3. TC for the steel rounds used for gear fabrication. 4. TC for plates used for gear box casing fabrication. 5. X-Ray film and report for all the Butt-Joints in the girders.	
10.2	STAGE – II	a. Inspection of Bridges and End – Carriages with Wheel Assembly and Alignment checking. b. Verification of Span & Diagonal Dimensions, Checking of Wheel Alignment, Mechanical Assemblies and Total Alignment. c. Free running of the all the Mechanisms.	

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
		d. Measurement of CAMBER in the bridges e. Full / Rated LOAD Test for bridges and trolley and Deflection test f. Deflection and Permanent set measurement g. 25% Over-Load Lifting Ability Check. **The following Test certificates to be produced during stage-II inspection.** 1. TC for hoist hooks 2. TC for Steel wire ropes. 3. TC for Heat treatment and final hardness for all gears. 4. TC for Wheel Hardness for LT and CT 5. TC for all BCH DC Brakes. 6. TC for all motors. 7. TC for all limit switches. 8. TC for all VVVF drives.	
10.3	STAGE – III [Final Inspection]	a. Measurement of CAMBER in the Bridges. b. Full / Rated Load Test and Deflection Test. c. Deflection and Permanent Set Measurement. d. 25% OVER-LOAD Lifting Ability Check.	
11.0	**CRANE ERECTION & COMMISSIONING**		
11.1	Mechanical Erection	Erection of the Crane to be done by the supplier,	
11.2	Crane Commissioning	Commissioning of the Crane and Performance Prove –Out for the Crane's Capacity and Smooth Functioning of the Crane (at BHEL Works) shall be the RESPONSIBILITY of the supplier.	

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
12.0	**O & M MANUALS**	Each Crane shall be provided with THREE Copies of Erection, Operation & Maintenance Manual hard copy as well as soft copy in CD, containing the following technical details	
12.1	Drawings & Details	a. Crane GA Drawing b. Crab Assembly Drawing c. Total Crane Wiring Schematics d. Detailed Wiring Diagrams for Sub-Systems / Panels and Bill of Materials. e. VVVF Drive's Logic circuits f. Wheel Assembly Drawings g. Bottom Block Assembly Drawing h. Gear Box Assembly and part Drawings i. Coupling Drawing and Details j. Specifications/Ratings of All Bought-Out-Items k. Warranty/Guarantee card for all bout out items l. Trouble Shooting Chart for Main and all Sub-Systems	
13.0	**PERFORMANCE GUARANTEE**	The Performance of the Total Crane and the Components / Sub-Assemblies / Bought-Out-Items shall be guaranteed for a minimum period of twelve months from the date of performance acceptance at BHEL Works or 18 months from the date of supply whichever is earlier.	