



An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

CAPITAL EQUIPMENT / MATERIALS MANAGEMENT

ENQUIRY	Phone: +91 431 257 7360
NOTICE INVITING TENDER	Email : ajayasalkar@bheltry.co.in
	: vijayak@bheltry.co.in
	Website : www.bhel.com

TWO PART BID	Enquiry Number:	Enquiry Date:	Due date for submission of quotation:
Tender to be submitted in two Parts	2601800013	13.06.2018	06.07.2018

You are requested to quote the Enquiry number date and due date in all your correspondence. This is only a request for quotation and not an order.

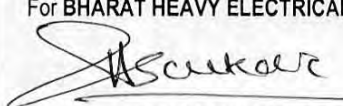
Please note that under any circumstances both delayed offer and late offers will not be considered. Hence vendors are requested to ensure that the offer is reaching physically our office before 14.00 hrs on the Date of tender opening.

Item	Description	Quantity
10	20T/10T 28.65M Span Electrically Operated Over Head Travelling Crane with Double Girder as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com and https://eprocure.gov.in	1 No.

Important points to be taken care during submission of offer

1. Delivery terms shall be FOR BHEL Stores, PPPU, Thirumayam .
2. Compliance Form No: TRY/IND/06 to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.
3. Delivery period required is 5 months from the date of Purchase Order.
4. Erection and commissioning shall be done at BHEL Thirumayam by the supplier.
5. Time period required for Erection and Commissioning shall be 1 month from the date of intimation by BHEL
6. EMD applicable.
7. All updates, amendments, corrigenda, etc., (if any), for each tender will be posted only on the above websites from time to time, as and when required, until each tender is opened. There will be no publication of such updates, amendments, corrigenda, etc., through newspapers or any other media.

BHEL's General guidelines / instructions compliance form and technical specification can be downloaded from BHEL web site <http://www.bhel.com> and <https://eprocure.gov.in> (public sector units > Bharat Heavy Electricals Limited page) under Enquiry reference "2601800013".

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  AJAY V. ASALKAR Sr. MANAGER Sr. Manager / Capital Equipment / MM BHEL, Tiruchirappalli - 620 014
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PART A.: QUALIFYING CRITERIA

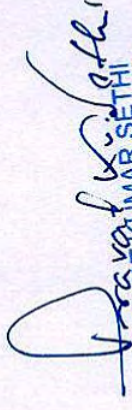
The BIDDER (OEM) has to compulsorily meet the following requirements to get qualified for consideration of the technical offer for the supply of EOT CRANE

S. No.	PARTICULARS	VENDOR's RESPONSE
1.0	Only those Vendors (OEMs), who have supplied and commissioned at least ONE 20 Ton or higher capacity EOT CRANE of Duty class-III, with a span of 28 Meters & 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 vendor should have minimum 5 years' experience in the field of design and fabrication of EOT Cranes.	
3.0	Along with the Technical offer, the Vendor should enclose Two 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.	
4.0	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.	
5.0	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.	
6.0	Number of EOT Cranes supplied and commissioned till date.	
7.0	Any Additional Data to supplement the manufacturing capability of the BIDDER for the subject crane.	

Pravat Kumar Sethi
PRAVAT KUMAR SETHI

Sr. Engineer / M & S - MMO /
 Planning / Systems / Transport
 PPPU - BHEL
 THIRUMAYAM - 622 507.

8.0	The vendor may visit BHEL Thirumayam Plant with prior intimation for understanding site conditions and technical requirements specified, before submitting their offer against this enquiry.	
9.0	The BIDDER / VENDOR shall submit the offer in TWO PARTS. 1. Technical offer (with PART A & PART B) & Commercial offer. 2. Price Bid	
10.0	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 BHEL Thirumayam Plant for any technical clarifications in their submitted offers.	
11.0	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	


PRAVAT KUMAR SETHI
 Sr. Engineer / M & S - MMO /
 Planning / Systems / Transport
 PpPU - BHEL
THIRUMAYAM-622 507.

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		
6	e.. Mechanism Group		
	Performance of the Crane (Tick whichever is applicable)	Best in the market	
		Satisfactory	
		Good	
		Average	
7	Any other remarks	Not Satisfactory	
Signature & Seal of the Authority Issuing the Performance Certificate			
Date:			

PART B

**TECHNICAL SPECIFICATIONS FOR 20T/10T 28.65 M SPAN ELECTRICALLY OPERATED
OVER-HEAD TRAVELLING [E O T] CRANE WITH DOUBLE GIRDER**

S. No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
1.0.0	APPLICATION	a) The subject crane is meant for the purpose of handling small to large (within the lifting capacity of the crane) components, in a heavy and large steel fabrication shop floor. b) The crane will be put to use for continuous duty with CT, LT and Hoist movements, which may occur simultaneously (within the operating parameters specified under Clause Nos. - 3.1.0, 3.4.0 and 3.5.0). c) The shop floor environment will be dust prone, humid, welding fume filled and ambient temperature going up to 45 °C.	
2.0.0	SCOPE OF SUPPLY	a. Design as per Tender Specifications b. Detailed Design and Manufacture as per BHEL Specifications c. Complete Assembly and Testing before Dispatch at <u>Supplier Works</u> d. Supply in Modules / Sub-Assemblies e. Complete Erection and wiring/cabing of the EOT Crane f. Commissioning and Performance Prove-Out of the EOT crane at BHEL, Trichy. g. Performance Guarantee for 12 months, from the date of commissioning.	
3.0.0	TECHNICAL SPECIFICATIONS		
3.1.0	CAPACITY	Lifting Capacity	
3.1.1	Main Hoist	20 Metric Tonnes	
3.1.2	Auxiliary Hoist	10 Metric Tonnes	

Pravath Kumar SETHI
PRAVATH KUMAR SETHI

Sr. Engineer / M & S -MMO /
 Planning / Systems / Transport
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S. No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
3.2.0	SPAN	Wheel Centre to Wheel Centre Dimensions (Rail Centre to Rail Centre)	
3.2.1	Long Travel (LT)	28,650 mm	
3.2.2	Cross Travel (CT) Wheel gauge	3,500 mm	
3.3.0	Height of Lift	9,000 mm	
3.3.1	LT wheel base	[Effective Height of Lift for both the HOISTS] 6000 mm Minimum	
3.3.2	CT wheel base	3500 mm Minimum	
3.4.0	DUTY CYCLE	Related to Drive Motor & Mechanisms	
3.4.1	Hoists	40 % CDF	
3.4.2	Long Travel	40 % CDF	
3.4.1	Cross Travel	40 % CDF	
3.5.0	SPEED	Operating / Working Speed [Maximum]	
3.5.1	Main Hoist	7.5 mtrs. /minute.	
3.5.2	Auxiliary Hoist	15.0 mtrs./minute.	
3.5.3	Cross Travel (CT)	30.0 mtrs./minute.	
3.5.4	Long Travel (LT)	60.0 mtrs./minute.	
3.6.0	MOTOR RATINGS	Electric Motor Ratings & Frame Sizes	
3.6.1	Main Hoist	Min.35 kW ; Frame Size - 250 M	
3.6.2	Auxiliary Hoist	Min.35 kW ; Frame Size - 250 M	
3.6.3	Cross Travel (CT)	Min. 7.5 kW ; Frame Size - 132 M	
3.6.4	Long Travel (LT)	Min. 2 x 18 kW ; Frame Size - 200 L	
3.6.5	Motor type	All motors shall be of 6 pole, sq. cage induction motors with 300 starts per hour rating and shall be of S4 duty cycle suitable for VVVF Drive starting, running, braking	
3.7.0	GEAR BOX	Gear Box Size(Input and output center distance) /No of stages of gear reduction / HP rating	

Praat K. Sathi
PRAVAT KUMAR SETHI

Sr. Engineer / M & S - MMIO /
Planning Systems / Transport

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S. No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S TECHNICAL OFFER (With Complete Details)
3.7.1	Main Hoist	HR 650 / 2 or 3 stage gear reduction / 70 HP	
3.7.2	Auxiliary Hoist	HR 650 / 2 or 3 stage gear reduction / 70 HP	
3.7.3	Cross Travel (CT)	VR 400 / 2 or 3 stage gear reduction / 12 HP	
3.7.4	Long Travel (LT)	HR 400 / 2 or 3 stage gear reduction / 30 HP	
3.7.5	All gearbox casing	Steel fabricated type and stress relieved.	
3.8.0	ACCELERATION		
3.8.1	Cross Travel (CT)	300 mm / sec. sq.	
3.8.2	Long Travel (LT)	300 mm / sec. sq.	
3.9.0	HOIST ROPE DETAILS	Construction: 6x37 or 6x36; Fiber core; Tensile strength 1770 kg/mm sq.	
3.9.1	Main Hoist	Dia. 18 mm ; Falls - 8	
3.9.2	Auxiliary Hoist	Dia. 18 mm ; Falls - 4	
3.10.0	CONTROL	Cabin Operation and Remote Control	
3.11.0	Type of Control	Master Control and Radio Remote Control	
3.12.0	Control Voltage	110 V AC	
3.13.0	Input Power Supply	415 Volts with $\pm 10\%$ fluctuation , 50 Hz with $\pm 3\%$ fluctuation, 3 Phase- AC	
3.14.0	Duty Class	Class - 3 [Indoor Service]	
3.15.0	Mechanism Group	M 6	
3.16.0	DESIGN STANDARD	IS - 807 & 3177 / 2006	
3.17.0	Runway Rail Size		
3.17.1	Cross Travel (CT)	ISR 60 Lbs./Yard	
3.17.2	Long Travel (LT)	C R 80 (For reference only - not supplier scope)	
3.18.0	Wheel Size		
3.18.1	Cross Travel (CT)	Dia. 320 mm - 4 nos	
3.18.2	Long Travel (LT)	Dia. 630 mm - 4 nos	
3.19.0	Brake Drum Size		
3.19.1	Main Hoist	Dia. 300 mm - 1 no	

David L. Sethi

PRAVAT KUMAR SETHI

Sr. Engineer / M & S -MMO /
Planning Systems / Transport

CHIEF

THIRTY-SEVEN 507.

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**TECHNICAL SPECIFICATIONS FOR 20T/10T 28.65 M SPAN ELECTRICALLY OPERATED
OVER-HEAD TRAVELLING [E O T] CRANE WITH DOUBLE GIRDER**

S. No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S TECHNICAL OFFER (With Complete Details)
3.19.2	Auxiliary Hoist	Dia. 300 mm - 1 no	
3.19.3	Cross Travel (CT)	Dia. 160 mm - 1 No	
3.19.4	Long Travel (LT)	Dia. 200 mm - 2 Nos	
4.0.0	MAIN FEATURES	Crane Operational Features	
4.1.0	Control System	Frequency Converter type for all motions (with VVVF drive)	
4.2.0	Remote Control	Radio Remote Control for all motions	
4.3.0	End Clearance	End Clearances to be fixed to suit the workshop building clearances [Refer Drawing No. M&S: PD: 07:110 - Drawing enclosed with the tender as ANNEXURE-1.]	
4.4.0	Crane Operation	Through Cabin Control and Radio Remote Control with option for control selection (using 3 way selector switch provided at end carriage)	
5.0.0	STRUCTURAL FABRICATION	Crane Structure Constructional Details	
5.1.0	Bridge / Girder & End carriages of LT and CT	Plate formed Box type Construction for Girders, End carriages of LT and CT	
5.1.1	Bridge Girder Section	The minimum size shall be as follows	

Pravath Kumar SETHI
PRAVATH KUMAR SETHI

Sr. Engineer / M & S- MMO /
 Planning / Systems / Transport
 P.O. BHEL

THIRUMAYAM 22 507.

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S. No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
5.1.1.1	Cross section of Bridge Girder	Min. Girder Height (Flange inner- inner) – 1560mm (Minimum) Min. Girder width (Web inner- inner) – 512mm (Minimum) Top flange plate thickness – 16 mm (Minimum) Bottom flange plate thickness – 12 mm (Minimum) Web plate thickness – 8 mm (Minimum) Width of top flange and bottom flange – 570 mm (Minimum) Vertical diaphragm plate thickness – 6 mm (Minimum) Distance between long diaphragms – 1200 mm (Maximum) 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 1/3rd of the bridge height from the top. The Crane Bridge shall be cambered at the top as well as the bottom. The final camber shall be between +26mm and +30mm.	
5.1.1.2	Camber for bridge		
5.1.2	Cross section of LT End carriage	Min. Height (Flange inner- inner) – 630 mm (Minimum) Min. width (Web inner- inner) – 292mm (Minimum) Top flange plate thickness – 12mm (Minimum) Bottom flange plate thickness – 10 mm	


PRAVAT KUMAR SETHI
 Sr. Engineer & S - MMO /
 Planning / Safety & Transport
 PPPT

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S. No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S TECHNICAL OFFER (With Complete Details)
		(Minimum) Web plate thickness - 8 mm (Minimum) Width of Top flange and bottom flange - 350 mm (Minimum) Vertical diaphragm plate thickness - 6 mm (Minimum) 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 - 50 MM	
5.2.0	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.	
5.3.0	Welded Joints	To be followed for Girder Fabrication	
5.3.1	Number of butt welded joints allowed in web and flange plates of bridge girder.	Max Three joints only. (Joint at the center of the span shall be avoided.)	
5.3.2	Welding between Web plate and Top flange	Full welding shall be done on the outside between web plates and top flange. On the inside equal stitch welding of 100mm to be	


PRAVAT KUMAR SETHI
 Sr. Engineer / M & S - MMO /
 Planning Systems / Transport
 E.O.T. BHEL
 THIRUMAYAM - 507.

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S. No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S TECHNICAL OFFER (With Complete Details)
5.3.3	Welding of Vertical diaphragms	done between web plate and top flange. The vertical diaphragms shall be equal stitch welded to the top flange and both the webs. The length of stitch welding shall be 100mm.	
5.3.4	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.	
5.3.5	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 and its reports are to be produced for BHEL verification and form part of the documentation.	
5.4.0	Splice Joints	NO bolted SPLICE JOINT IS ALLOWED IN GIRDER FABRICATION [Girder has to be of SINGLE PIECE only to the total length of the span 28650 mm].	
5.5.0	Platform on Girders	The Platforms provided on both the Girders shall be for full length and fixed through BOLTED JOINTS only. The width of the platform shall be as follows 1. Drive Bridge - 1500 mm 2. Non-drive bridge - 1000 mm	
5.6.0	Wheel Assembly	The Wheel Assembly coming for Cross Travel (CT) & Long Travel (LT) shall be of LIVE AXLE SYSTEM with L-Type Bearings and shall be as per the BHEL Drawing No. 3-M-02R-0011993 . [Drawing is enclosed and given as ANNEXURE 2].	

David K. Senthil
DAVID K. SETHI

Sr. Engineer, M & S - MMO /
Planning, Systems / Transport

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S. No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S TECHNICAL OFFER (With Complete Details)
5.7.0	Heat Treatment & NDT Examination	The Trolleys shall be Stress Relieved after welding and NDT examinations if required. All welding's shall be tested by NDT means [MPI, LPI & RT] after Stress Relieving operation.	
5.8.0	Machining Operation	All mechanical mating surfaces and wheel seating areas are to be machined to the required finish and protected	
5.9.0	Surface Cleaning	Both the Girders and the Trolleys are to be thoroughly cleaned after completion of all operations but prior to painting.	
5.10.0	Painting	The crane parts are to be painted as follows	
5.10.1	At supplier works	During Stage-I inspection the inside of the girder/end carriage shall be painted with one coat of red oxide before closing. This shall be verified during inspection.	
5.10.2	At supplier works	During Stage-II inspection, the crane shall be painted with One coat of Primer with 25 microns of DFT (Dry Film Thickness) and 48 hours of compulsory curing after painting. The crane shall be dispatched with one coat of Primer only.	
5.10.3	At Erection Site	After the crane erection is complete, the crane has to be painted as follows a. Touch-up painting of Primer wherever necessary b. Two coats of Enamel Paint (Color - Tractor Orange) each with a DFT of 25 microns and intermittent curing of minimum 16 hours.	
5.10.4	Paint & labor	All paints and labor etc. for painting at site also	

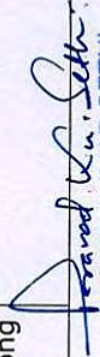

PRAVEEN KUMAR SETHI
 Sr. Engineer
 Planning Section
 EPTO

S-MMO /
 Transport

THIRUMAYAM - 022 507.

**TECHNICAL SPECIFICATIONS FOR 20T/10T 28.65 M SPAN ELECTRICALLY OPERATED
OVER-HEAD TRAVELLING [E O T] CRANE WITH DOUBLE GIRDER**

S. No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S TECHNICAL OFFER (With Complete Details)
6.0.0	MECHANICAL ELEMENTS	shall be the scope of the crane supplier.	
6.1.0	Gears	Gears in all the Stages shall be helical in design and to be of machined, lapped and hardened if necessary. Required test certificates shall be produced for BHEL verification and shall part of documentation.	
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 for quality assurance.	
6.3.1	MH rope drum size	400 mm diameter (at the bottom of the grove)	
6.3.2	AH rope drum size	400 mm diameter (at the bottom of the grove)	
6.3.3	MH & AH rope drums shall be	Shall be at the at middle of the CT gauge 3500mm	
6.3.4	Flange in rope drum	MH & AH rope drums shall be provided with minimum 100mm height flange at both ends to prevent rope slip.	
6.4.0	Type of Coupling	a. Between Motor and Gear Box- Full gear coupling b. Between Gear Box and Rope Drum- Geared rope drum coupling/ spline shaft c. Between Gear Box and Wheels(For LT and CT)- Half gear coupling with floating shaft (Minimum floating shaft length for Long Travel shall be 1500 mm)	


PRAVAT KUMAR SETHI
 Sr. Engineer / M & S - MMO /
 Planning / Systems / Transport
 PPU - BHEL
 THIRUMAYAM - 622 507.

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S. No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
6.4.1	Placing of CT gear box	The cross travel gearbox shall be located at the center of the CT span 3500 mm	
6.5.0	Wheels	The Wheels shall be of Forged and Wheel Tread hardened to 300/350 BHN. Wheels shall be fitted with L-Type Bearings. Test certificates for wheel tread hardness shall be produced for BHEL verification and shall part of documentation.	
6.6.0	Mechanical Joints	Fit Bolts shall be as per IS 3640-1982 for all joints coming in main members & platform supports.	
6.7.0	Pulley size	Pulley sizes shall be as follows	
6.7.1	MH & AH Pulley	Bottom block and top return pulleys - 400 mm. (at the bottom of the grove)	
6.7.2	MH & AH eq. pulley	250 mm with antifriction bearing. (at the bottom of the grove)	
6.8.0	Hook latch	Hook latch shall be provided for MH & AH hooks	
6.9.0	Gear & thruster oil	Appropriate grade oil should be supplied for all gearboxes and thruster brakes to the required quantity.	
6.10.0	Buffer	Spring loaded buffer shall be provided for LT and CT end carriages as per standard.	
6.11.0	Tools	The following tools of makes acceptable to BHEL shall be supplied along with each crane. Vendor to clearly specify the make of each item in the offer	
6.11.1	List of Tools	1. Double end spanner -one set 2. Ring spanner -one set 3. Hammer 2lbs -one no 4. Hammer 5lbs -one no	


PRAVAT KUMAR SETHI
 Sr. Engineer / M & S - MMO /
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 PPPU - BHEL
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S. No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S TECHNICAL OFFER (With Complete Details)
		5. Screw driver -one set 6. Screw spanner -one set 7. Cutting pliers -one set 8. Line tester -one no 9. 3T chain block - one no 10. 20 T Hydraulic Jack (Remote type) - one no 11. Grease gun (5 kg capacity) -one no 12. Socket Wrench - one set 13. Torque wrench - one set 14. Tong Tester (Reputed make) -one no. 15. DAYTON make 46 Pcs Socket and Bit Set-one set. 16. Multi meter (Reputed make) - 1 No 17. Electrician's backpack for carrying tools including screw driver set, Allen key set, cutting pliers, tester, multimeter, tong testers etc. 18. Rubber Mallet for adjusting the current collector.	
7.0.0	ELECTRICAL ELEMENTS		
7.1.0	Operational Controls	1. It is preferred to have separate panels for each movement. 2. Enough space should be provided on the platform for opening the panel doors comfortably. The Crane shall be provided with the following controls: a. Cabin Control [Master Control] b. Radio Remote Control [Microprocessor]	


PRAVAT KUMAR SETHI
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S. No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S TECHNICAL OFFER (With Complete Details)
7.2.0	Control Voltage	based Two Step Push Button Type]	
7.3.0	Type of Brakes	110 V AC a. Main Hoist - DC Brake with panel b. Auxiliary Hoist - DC Brake with panel c. Cross Travel - Thruster brake d. Long Travel - Thruster brake	
7.4.0	Protection	All Panels, Limit-Switches and Motors shall have IP 54 protection.	
7.5.0	Electric Motors	All Electric Motors shall be as per IS-325 and IS-1231 and also suitable for 300 starts per hour. Test certificates shall be produced for BHEL verification and form part of documentation.	
7.6.0	Electric Contactors	All Panels shall have only SIEMENS / L&T Contactors and shall be suitable for AC3 Duty Class. The coil voltage of all the contactors shall be 110 V. Suitable surge suppressors shall be provided for all contactors.	
7.7.0	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.	
7.7.1	VVVF drive	Rating of VVVF drive shall be at least 25% higher than the respective electric motor rating at the specified duty cycle.	
7.8.0	Long Travel Motion	Dual Drive Mechanism shall be provided for LT (Long Travel) Motion.	
7.9.0	Illumination	a. Four numbers of 200 Watts LED Flood	

Pravat Kumar SETHI

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Sr. Engineer / M & S - MMO
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S. No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
		Lights shall be provided in end carriage between bridges. (Each side 2 nos) b. All Electric Panels shall be provided with suitable illumination for visibility and trouble shooting.	
7.10.0	Controller Steps	A 4-Step Controller has to be provided for a. Main Hoist b. Auxiliary Hoist c. Long Travel d. Cross Travel Note: Cam discs should be made of metal / Bakelite only.	
7.11.0	Frequency Converter	The VVVF Drive shall be supplied with suitable DBR for all motions. The duty cycle of all the DBRs shall be 40%.	
7.12.0	Portable programmable device	A portable programmable device (1 No) for uploading/downloading or modifying the parameters in the VVVF Drives shall be supplied with each crane.	
7.13.0	Under Voltage Relay	An Under voltage relay shall be provided on the output of control transformer.	
7.14.0	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.	
7.15.0	Load Cell	a. For main hoist, load Weighing System (with tolerance +/- 50 kg) with LOAD CELL (shear pin type) to be fixed / provided at	

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**TECHNICAL SPECIFICATIONS FOR 20T/10T 28.65 M SPAN ELECTRICALLY OPERATED
OVER-HEAD TRAVELLING [E O T] CRANE WITH DOUBLE GIRDER**

S. No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S TECHNICAL OFFER (With Complete Details)
		the equalizer pulley. b. The remote display shall be of 100 mm size (JUMBO)	
7.15.1	Overload Prevention System	The crane shall be supplied with an overload prevention system that senses the load through the load cell and if the load is above the Safe Working Load, the hoist motion shall be tripped.	
7.16.0	Crab wiring	Crab shall be fully wired.	
7.17.0	Limit Switches	The crane shall be provided with the following limit switches. 1. Hoist Limit- Each hoist shall be provided with both rotary and counter weight limits. 2. CT Limit – Lever type limit switch 3. LT Limit – Lever type limit switch	
7.18.0	Moulded Case Circuit Breaker	MCCBs shall be provided for Protective panel, Hoist, Long Travel and Cross travel motions.	
7.19.0	Cabin	The following items shall be provided in the cabin. 1. Operator chair, - 2. Light, 3. Fan, 4. Warning bell, 5. Fire extinguisher, 6. Remote Indication lamp and 7. Push button station – with the following buttons a. OFF Push Button - Mushroom Head [Plastic] Stay put- colour in RED. b. ON Push Button - Illuminated	

Praavath Kumar SETHI

PRAVAT KUMAR SETHI
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Planning / Systems / Transport
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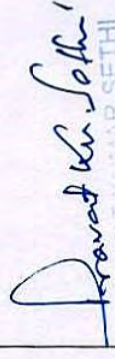
PART B

**TECHNICAL SPECIFICATIONS FOR 20T/10T 28.65 M SPAN ELECTRICALLY OPERATED
OVER-HEAD TRAVELLING [E O T] CRANE WITH DOUBLE GIRDER**

S. No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
		[GREEN colour 110Vac BA9 Filament Lamp] Flush type Push button[Plastic] c. BELL pushbutton - Projecting Head[Plastic] Push Button actuator [BLACK Colour] d. BRIDGE LIGHT ON/OFF switch - 2- Position Selector switch[Plastic] e. Each Push buttons and switch should have Legend Plate with Inscription of START, STOP, BELL & LIGHT ON/OFF marked clearly. 8. A rubber insulation mat shall be provided at the floor of the cabin. 9. Two nos of switch-pin sockets shall be provided in the cabin	
7.20.0	CT Cabling	Drag chain with cable system shall be used for CT motion. For Drag chain the make and specification to be submitted with offer with specific details of prevention of wear of chain due to chain sliding.	
7.21.0	Electric Cables and recommended current rating	All the cables used in the crane shall be insulated flexible copper cables as per IS:1554 (Part-I)-1964 and the current rating shall be as per IS: 3961 (Part-II)- 1967	
7.22.0	Compulsory Spares	The following spares shall be compulsorily supplied along with each crane. Vendor to clearly specify the makes of each item in the offer 1. LT wheel bearing - 4 no	 PRAVAT KUMAR SETHI Sr. Engineer / M & S- MMO / Planning / Systems / Transport PPPU - BHEL THIRUMAYAM - 622 507.

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**TECHNICAL SPECIFICATIONS FOR 20T/10T 28.65 M SPAN ELECTRICALLY OPERATED
OVER-HEAD TRAVELLING [E O T] CRANE WITH DOUBLE GIRDER**

S. No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S TECHNICAL OFFER (With Complete Details)
		2. CT wheel Bearing – 4 no 3. Thrusters for brakes – 4 nos 4. Warning bell – 1 No 5. 200 W LED lamp – 4 Nos 6. Limit switches – 1 No of each variety used in the crane 7. Master controller – 1 No 8. Main Hoist Brake drum – 1 No 9. Oil Seal kit & Gasket- 2 Sets of each variety used in the crane 10. Cable drag chain – one set of mounting end plates and links equivalent to one meter length. 11. LT Wheel – 2 Nos. 12. VVFD for LT Movement, CT Movement, Main Hoist, Auxiliary Hoist – 1 No each type 13.	
7.23.0	Spares Price list for reference	Vendor to indicate the price of following spares for reference only. 1. Gearbox- a. Main Hoist Gearbox- 1 No b. Cross Travel Gearbox – 1 No c. Long Travel Gearbox – 1 No 2. Motors- a. Main Hoist Motor- 1 No b. Cross Travel Motor – 1 No c. Long Travel Motor – 1 No 3. Wheels	 PRAVAT KUMAR SETHI Sr. Engineer / M & S-MMO/ Planning / Systems / Transport PPPU - BHEL THIRUMAYAM - 622 507.

**TECHNICAL SPECIFICATIONS FOR 20T/10T 28.65 M SPAN ELECTRICALLY OPERATED
OVER-HEAD TRAVELLING [E O T] CRANE WITH DOUBLE GIRDER**

S. No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S TECHNICAL OFFER (With Complete Details)
		a. Long Travel wheel – 1 Nos b. Cross Travel wheel – 1 Nos 4. Brake drums a. Main Hoist Brake drum – 1 No b. Aux Hoist Brake drum – 1 No	
8.0.0	SELECTION of BOI and COMPONENTS	The makes of Components or Bought-Out-Items shall be strictly as per the list given below.	
8.1.0	Hoist Hooks	HERMAN MOHTTA / HERCULES / SILPA UDYOG / SMRITI FORGINGS / KARACHIWALA	
8.2.0	Wire Rope	USHA MARTIN / FORT WILLIAM / RA WIRE ROPE	
8.3.0	Electric Motors	GEC / BHARAT BIJLEE / SIEMENS / KEC / ALSTHOM	
8.4.0	DC Brake Unit	Only BCH make Brake Unit and BCH make Brake Panel	
8.5.0	Radio Remote Control	Tele crane make(F24-10D) / Ittowa make (winner)	
8.6.0	Thruster Brake Unit	ELECTROMAG / SPEED-O-CONTROL / OMEGA	
8.7.0	Limit Switch (Gravity Type)	SIEMENS / INDUSTRIAL SYNDICATE / BCH / SKC / SOC	
8.8.0	Contactors	SIEMENS / L&T	
8.9.0	Over-Load-Relay	SIEMENS / L&T (THERMAL TYPE)	
8.10.0	Under voltage relay	SIEMENS / L&T	
8.11.0	HRC Fuses	GE / L&T / SIEMENS	
8.12.0	Rotary limit switch	SIEMENS / OMEGA / SOC / INDUSTRIAL SYNDICATE	
8.13.0	Switch fuse unit	L&T / SIEMENS / GEC	
8.14.0	Moulded case C.B	SIEMENS / L&T	
8.15.0	Cable drag chain	IGUS / CABLE SCHLEPP/ TSUBAKIMOTO/	

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Pravathula. S. S. MNO /
Sr. Engineer / Planning / Systems / Transport

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OVER-HEAD TRAVELLING [E O T] CRANE WITH DOUBLE GIRDER**

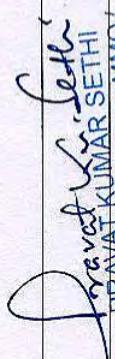
S. No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
		GORTAC	
8.16.0	Push - Buttons	SIEMENS / L&T / AIRON	
8.17.0	Connectors	ELMAX make or reputed make with IS approved and acceptable BHEL.	
8.18.0	Couplings	WMI / FENNER / ALFEX	
8.19.0	Bearings	SKF / NBC / ZKL	
8.20.0	Cables	Reputed Makes & IS Approved acceptable by BHEL.	
8.21.0	Bridge Light Fittings	PHILIPS / GE / CROMPTON	
8.22.0	Load Cell	IPA make or reputed make with IS approved and acceptable to BHEL	
8.24.0	VVVF Drives	FUJI / MITSUBISHI / YASKAWA Note: The supplied drive model shall be suitable for crane applications.	
8.25.0	Gear boxes	ELECON / SHANTHI GEARS / RADICON / CROMTON GREAVES	
8.26.0	Catalogues of brought out items	The vendor shall provide the Technical catalogues of the following bought-out items along with the offer. 1. Steel Wire rope 2. Crane duty electric motors 3. Gearbox 4. DC Brake with panel 5. Thruster Brake 6. Radio Remote 7. Limit Switches 8. Load cell 9. VVVF Drive along with DBR selection chart.	

Pravat Kumar SETHI
PRAVAT KUMAR SETHI

Sr. Engineer / M & S - MMO /
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**TECHNICAL SPECIFICATIONS FOR 20T/10T 28.65 M SPAN ELECTRICALLY OPERATED
OVER-HEAD TRAVELLING [E O T] CRANE WITH DOUBLE GIRDER**

S. No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S TECHNICAL OFFER (With Complete Details)
9.0.0	DOCUMENTS/ DETAILS for APPROVAL	10. Cable drag chain The following documents and details are to be submitted for BHEL Approval, prior to taking up the manufacture of the crane.	
9.1.0	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 Mechanisms. Set II: a. Drawings of Bridge, End-Carriage and their connection. b. Sub-Assembly Drawing for Wheels, Hook Blocks, Gear Boxes, Hoist rope drums and all brake Drums. c. Wiring Diagram with Logic Circuits with bill of materials. d. Cable Selection based on Current Rating and cable schedule. 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.	
9.2.0	Technical Details	a. Total Weight of the Crane including all Electrical Equipment.	 PRAVAT KUMAR SETHI Sr. Engineer / M & S - MMOT/ Planning / Systems / Transport PPPU - BHEL THIRUMAYAM - 622 507

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**TECHNICAL SPECIFICATIONS FOR 20T/10T 28.65 M SPAN ELECTRICALLY OPERATED
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S. No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S TECHNICAL OFFER (With Complete Details)
		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 End-carriage assembled and ready for erection. e. Total Weight of Structural, Mechanical and electrical Equipment and indicated separately also. f. Weight of Operator's Cabin together with all Equipment mounted in it.	
10.0.0	INSPECTION	The following schedule of stage inspections is to be strictly adhered to, prior to dispatch from the suppliers works.	
10.1.0	STAGE - I	a. Verification of Test Certificate for Raw Materials used for Girders, End-Carriages, Trolley, Gear Box Casings, etc. b. Verification of X-Ray Report of Butt-Joints 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	


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S. No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S TECHNICAL OFFER (With Complete Details)
		during Stage-I Inspection - TC for plates used for bridge fabrication - TC for plates used for End carriage fabrication - TC for the steel rounds used for Gear fabrication. - TC for plates used for Gearbox casing fabrication. - X-Ray film and report for all the Butt-Joints in the girders.	
10.2.0	STAGE - II/ FINAL	- Inspection of Bridges, End-Carriages and platform fabrication. - Verification of Span & Diagonal Dimensions, Checking of Wheel Alignment, Mechanical Assemblies and Total Alignment. - Free running of all the Mechanisms. - Measurement of CAMBER in the Bridges. - Complete assembly of the crane and free-running of all mechanisms - Full / Rated Load Test for bridges and trolley and Deflection Test - Deflection and Permanent Set Measurement. 25% OVER-LOAD Lifting Ability Check. The following Test Certificates to be produced during Stage-II Inspection. - TC for all Hoist Hooks - TC for Steel Wire ropes	

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S. No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
		3. TC for Heat treatment and final hardness for all gears. 4. TC for Wheel Hardness for LT and CT 5. TC for all thruster brakes 6. TC for all DCEM Brakes 7. TC for all motors 8. TC for all limit switches 9. TC for all VVVF Drives.	
11.0.0	CRANE ERECTION & COMMISSIONING (including shrouded conductor)		
11.1.0	Crane Erection & Cabling	Complete crane erection/installation, wiring/cabling of the various components at BHEL shall be the scope of the supplier	
11.2.0	Crane Commissioning	Commissioning of the Crane and Performance Prove -Out for 125% of Crane's Capacity and Smooth Functioning of the Crane (at BHEL Works) shall be the RESPONSIBILITY of the supplier.	
12.0.0	O & M MANUALS	Each Crane shall be provided with the following 1. Complete set of tools required for maintenance, 2. VFD Programming & Maintenance manual and Technical Information catalogue of VFD 3. Data Sheet containing the Program data loaded in the VFD units. 4. Manual for the Load cell calibration and trouble shooting THREE Copies of Erection, Operation & Maintenance Manual hard copy and soft copy in	 PRAVAT KUMAR SETHI Sr. Engineer / M & S-MMO / Planning / Systems / Transport PPU - BHEL THIRUMAYAM - 622 507

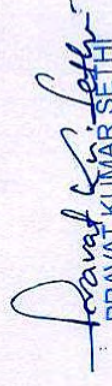
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**TECHNICAL SPECIFICATIONS FOR 20T/10T 28.65 M SPAN ELECTRICALLY OPERATED
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S. No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S TECHNICAL OFFER (With Complete Details)
12.1.0	Drawings & Details	CD, containing the following technical details a. Crane GA Drawing. b. Crab Assembly Drawing. c. Total Crane Wiring Schematics. d. Detailed Wiring Diagrams for Sub-Systems /Panels e. VVVF Drive's Logic Circuits f. Wheel Assembly Drawings g. Bottom Block Assembly Drawing h. Gear Box Assembly Drawings i. Coupling Drawing and Details j. Specifications/Ratings of All Bought-Out Items k. Warranty/Guarantee Card for all Bought Out-items l. Trouble Shooting Chart for all Systems	
13.0.0	TRAINING	The Supplier shall arrange training for four BHEL persons at VVVF Drive OEM's works free of cost on programming, operation, maintenance and trouble shooting of the offered drive. The training period shall not be less than three days. All the costs incurred for the training shall be the scope of the supplier. The travelling, boarding and lodging expenses of BHEL persons will be borne by BHEL.	
14.0.0	PERFORMANCE GUARANTEE	The Performance of the Total Crane and/or the Components / Sub-Assemblies / Bought-Out-Items shall be guaranteed for a minimum period of 12 months from the date of performance acceptance at BHEL Works or 18 months from	 PRAVAT KUMAR SETHI Sr. Engineer / M & S - MMO / Planning / Systems / Transport PPPU - BHEL Page 23 of 24 THIRUMAYAM - 622 507.

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OVER-HEAD TRAVELLING [E O T] CRANE WITH DOUBLE GIRDER**

S. No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S TECHNICAL OFFER (With Complete Details)
		the date of supply whichever is earlier.	

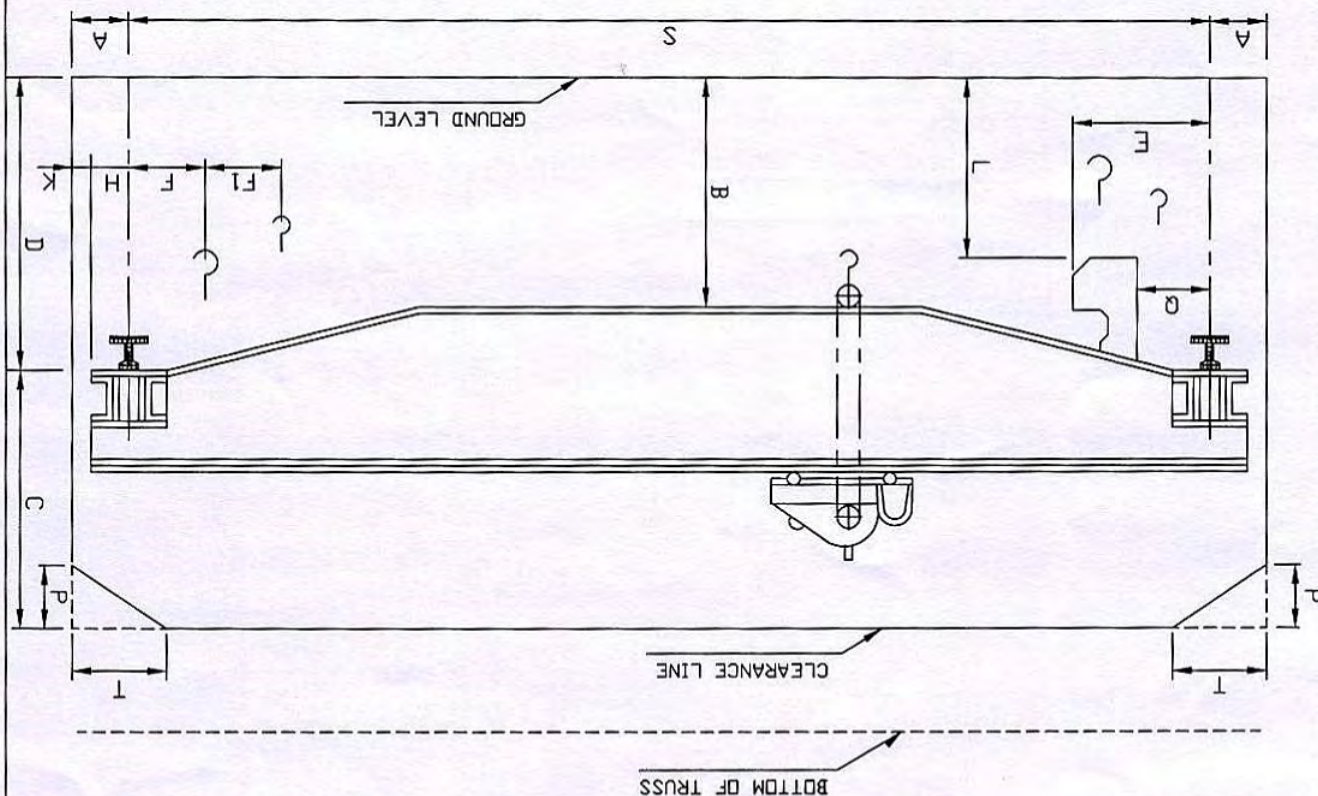

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CLEARANCE DIAGRAM	M&S: PD: 07: 110
FOR E.O.T. CRANE	

CLEARANCE DIAGRAM
FOR E.O.T. CRANE

DRAWN:

	S	28650					20/10T×28650 8 M. LIFT
	D	8000					
	C	3000 MAX.					
	A	300					
	K	100 MIN.					
	T	1875					
	P	1250					
	B						
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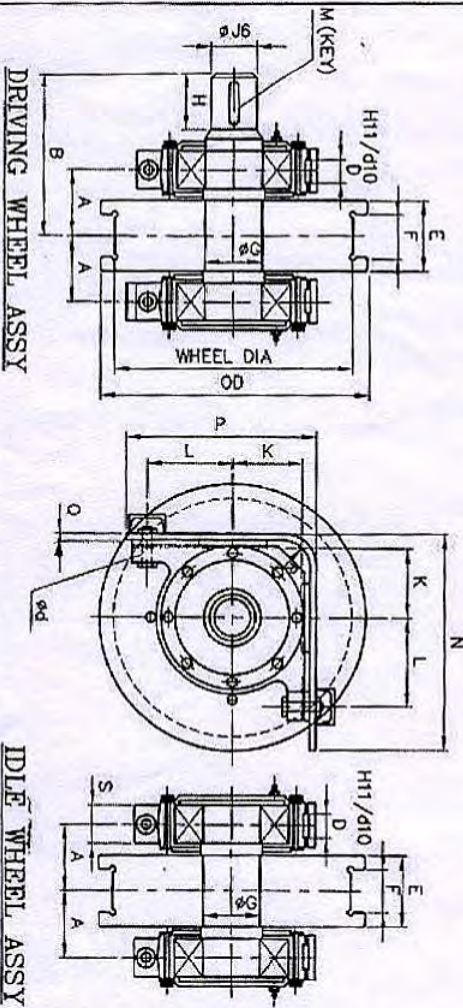


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ALL DIMENSIONS ARE IN MM

SL. No.	O.D. (WHEEL DIA) IN MM	RAIL SIZE	DIMENSIONS																COUPLING No.	SKF BRG No. & BRG. SIZE	TOTAL WEIGHT IN KG. FOR DRIVE & IDLE		
			A	B	D	E	F	G	H	I	J	K	L	Ød	M (KEY)	N	P	Q	S	R			
16	800/850	CR-100 CR-120	190	450	80	210	150	152	140	130	212	255	32	32x18x130	687	588	20	150	80	107	22330 150x320x108	870.00 845.00	
15		CR-80	168	420	80	180	110	152	125	110	212	255	32	28x16x115	687	588	20	150	80	106	22330 150x320x108	796.00 775.00	
14		CR-100 CR-120	190	450	80	210	150	152	140	130	212	255	32	32x18x130	642	588	20	150	80	107	22330 150x320x108	808.00 784.00	
13	710/750	CR-100 CR-120	180	420	71	210	150	132	125	110	180	224	32	28x16x115	607	517	20	130	80	106	22326 130x280x93	728.50 711.50	
12		CR-80	180	400	71	180	110	132	125	110	180	224	32	28x16x115	607	517	20	130	80	106	22326 130x280x93	653.00 636.00	
11	630/680	CR-80/CR-100 & CR-120	180	420	71	210	150	132	125	110	180	224	32	28x16x115	567	517	20	130	80	106	22326 130x280x93	629.00 611.50	
10		CR-105 LRV/76 CR-80	150	365	60	180	105	111	110	90	160	190	26	25x14x100	547	462	20	120	60	105	22322 110x240x80	448.00 434.50	
9		CR-80 CR-100	160	375	60	180	125	111	110	90	160	190	26	22x14x100	482	462	20	120	60	105	22322 110x240x80	253.00 245.50	
8	500/550	CR-80	150	360	50	180	125	91	105	80	125	160	26	22x14x90	445	395	20	100	50	104	22318 90x190x64	389.00 378.00	
7		CR-75/90 & 100 LRV/76	150	360	50	180	105	91	105	80	125	160	26	22x14x90	445	395	20	100	50	104	22318 90x190x64	301.00 294.00	
6	400/450	CR-80 CR-100	150	360	50	180	125	91	105	80	125	160	26	22x14x90	395	395	20	100	50	104	22318 90x190x64	253.00 245.50	
5		CR-105 LRV/76 CR-80	145	315	40	180	105	76	85	70	112	140	22	20x12x75	375	345	16	90	50	103	22315 75x160x55	197.00 192.00	
4	320/370	CR-80 CR-100	145	315	40	180	105	76	85	70	112	140	22	20x12x75	345	345	16	90	50	103	22315 75x160x55	162.00 157.00	
3		CR-80 CR-100	112.5	260	40	125	85	61	65	55	85	112	17	16x10x55	312	287	16	80	50	102	22312 60x130x46	118.50 118.00	
2	250/280	CR-80 CR-100	105	250	32	125	85	61	65	55	76	100	17	16x10x55	254	249	12	60	40	102	22312 60x110x28	66.00 63.00	
1	200/230	CR-80 CR-100	95	220	32	100	67	46	55	40	71	95	17	12x8x45	239	232	12	65	40	101	22309 45x100x36	51.00 50.00	

DIMENSIONS



MATERIAL :-

SHAFT - 45C8 / IS:1283.
WHEEL - 55C8 / IS:1515.
TREAD PORTION WHEEL HARDNESS 500 TO 550 (BHN)

REVISION	DESCRIPTION	MATERIAL	STANDARD	NET WT. IN KGS.	DRAWING No.	ITEM No.
1	DRIVING WHEEL ASSY	45C8	IS:1283	118.50	00	00
2	IDLE WHEEL ASSY	55C8	IS:1515	66.00	00	00
3	CRANE WHEEL ASSY	55C8	IS:1515	63.00	00	00
4	CRANE WHEEL ASSY	55C8	IS:1515	51.00	00	00
5	CRANE WHEEL ASSY	55C8	IS:1515	50.00	00	00



STANDARD
CRANE WHEEL ASSY

3-M-02R-11993

REV.