



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 7529 Fax : +91 431 257 6826 Email : anaga@bheltry.co.in Web : www.bhel.com |
| NOTICE INVITING TENDER | |

| | | | |
|-------------------------------------|------------------------|----------------------|--|
| TWO PART BID | Enquiry Number: | Enquiry Date: | Due date for submission of quotation: |
| Tender to be submitted in two Parts | 2851400042 | 15.09.2014 | 17.10.2014 |

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 | 30 / 10T 32 M Span Gantry Crane with double girders as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in) | 2.00 Nos |

Important points to be taken care during submission of offer

1. Material shall be delivered to
Indigenous Vendors:
FOR, BHEL, Stores
Power Equipment Fabrication Plant
Bharat Heavy Electricals Limited
Mundipar – 441 804, Taluka: Sakoli, District: Bhandara, Maharashtra State
2. Delivery required 10 months from the date of purchase order.
3. Erection and Commissioning period required 2 Months from the date of intimation by BHEL.
4. EMD for this Tender will be (INR) : 2,00,000.00
5. Compliance Form No: BND/IND/06 to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.
6. 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 (refer **MM / CE / GENL / 001-EMD**) including bank guarantee formats and list of consortium banks, commercial terms check-list 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 "2851400042".

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. Manager / Capital Equipment / MM

PART A

SECTION-I: -QUALIFING CRITERIA

The BIDDER/VENDOR (OEM) has to compulsorily meet the following requirements to get qualified for consideration of the technical offer for the SUPPLY OF 30/10 T 32m span GANTRY CRANE

| S. No. | PARTICULARS | VENDOR'S RESPONSE |
|--------|---|-------------------|
| 1.0 | The vendor should have minimum 10 years experience in design, fabrication and supply of EOT/ Gantry cranes. | |
| 2.0 | Only those Bidder/vendor (OEM), who have supplied and commissioned at least ONE 30 Ton or higher capacity GANTRY cranes of class-3 with minimum span of 32 Mtr or higher in the past five years and such cranes are presently working satisfactorily for more than one year after commissioning (on the date of opening of Tender), should quote. | |
| 3.0 | Vendor to submit Performance certificates along with their offer from minimum two different customers for Satisfactory performance of 30T or higher capacity Gantry crane of class-3 with span of 32m or higher, supplied in last 10 years and are presently working satisfactorily for more than one year after commissioning (as on the date of opening of Tender). Suggestive format is given in the annexure. | |
| 4.0 | The bidding FIRM should have 'in-house' or 'self-owned' facility for FABRICATION and TESTING at 125 % of the rated capacity | |
| 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 vendors are requested to provide the following details

| S. No. | PARTICULARS | VENDOR'S RESPONSE |
|---------------|---|--------------------------|
| 6.0 | Number of Years of Experience of the BIDDER/ VENDOR (OEM) in the field of design, manufacture, supply, erection & commissioning of cranes | |
| 7.0 | Number of cranes supplied, installed and commissioned till date | |
| 8.0 | Number of cranes supplied, installed and commissioned till date in the QUOTED MODEL- 30 Ton or higher capacity gantry crane. | |
| 9.0 | Number of cranes supplied, installed and commissioned till date for the following category of CUSTOMERS a) Power Utility Boiler Manufacturer b) Equipment Supplier for Process Industries [Heavy Engineering Companies] c) Research Establishments | |
| 10.0 | Details on SERVICE-AFTER-SALES Set-Up in India including the Addresses of Agents / Service Centre in India and Asia | |
| 11.0 | Any Additional Data to supplement the manufacturing capability of the BIDDER for the subject equipment. | |

SECTION – III

Bidder / Vendor (OEM) to note the following

| S.No. | REQUIREMENTS | VENDOR'S RESPONSE |
|--------------|--|--------------------------|
| 12.0 | The BIDDER / VENDOR shall submit the offer in TWO PARTS - Technical [with PART A & PART B] & Commercial and Price Bid. | |
| 13.0 | The Offer shall contain a comparative statement of Technical Specifications given by BHEL and the Offer Details submitted by the Bidder, against each clause. Where details are required, a mere 'CONFIRMED' or 'COMPLIES' or 'YES' or 'NO-DEVIATION' or similar words in the technical comparative statement may lead to disqualification of the Technical Offer. | |
| 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 | |
| 16.0 | BIDDER has to indicate the Country of Origin for the supply of equipment. | |

PERFORMANCE CERTIFICATE

(On Customer's Letter Head)

1. Supplier of the Equipment :

2. Make & Model of the Equipment :

3. Month & Year of Commissioning :

4. Application :

5.
 - a) Crane Type:

 - b) Crane Capacity (Metric Tonnes):

 - c) Crane span :

 - d) Mechanism class :

6. Performance of the Equipment : Satisfactory /
(Strike off whichever is not applicable) Good /
Average /
Not Satisfactory

7. Any other remarks:

Date:

Signature & Seal of the Authority
Issuing the Performance Certificate

PART B.**TECHNICAL SPECIFICATIONS FOR 30/10T 32 M SPAN GANTRY CRANE WITH DOUBLE GIRDERS**

| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR'S TECHNICAL OFFER (With Complete Details) |
|-------|------------------------|--|--|
| 1.0.0 | APPLICATION | <ul style="list-style-type: none"> a) The subject crane is meant for the purpose of handling small to large (within the lifting capacity of the crane) components, bundles of steel sections and sheets & plates [13 Mtr. Long max.] in a large steel storage yard. 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 storage yard environment will be open out door area and ambient temperature going up to 50 ° C. | |
| 2.0.0 | SCOPE OF SUPPLY | <ul style="list-style-type: none"> a) Design as per Tender Specifications b) Detailed Design and Manufacture as per Tender Specification c) Complete Assembly and Testing before Despatch d) Supply in Modules / Sub-Assemblies e) Unloading of all crane parts & materials at the erection site. (At BHEL Sakoli, Bhandara / Maharashtra) f) Storage of all unloaded materials at site and protect from rain and theft g) Erection / installation, wiring / cabling of the total crane at site h) Commissioning and Performance Prove-Out at BHEL Works (Sakoli, Bhandara, Maharashtra) | |

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|-------|---|---|--|
| 2.1.0 | Scope of supply includes | j) Performance Guarantee for 12 months, from the date of commissioning. a. Unloading of crane parts (For unloading and erection of the crane components- mobile crane, manpower, lifting tackles and necessary packing materials shall be the scope of the crane supplier.) b. Necessary crane parts /materials are to be covered for rain protection up to erection. (For rain water protection necessary polythene sheet / tarpaulin shall be the scope the crane supplier.) c. Necessary persons to be allotted for keeping unloaded materials safe up to erection and commissioning. | |
| 3.1.0 | CAPACITY | Lifting Capacity | |
| 3.1.1 | Main Hoist | 30 Metric Tonnes | |
| 3.1.2 | Auxiliary Hoist | 10 Metric Tonnes | |
| 3.2.0 | SPAN | Wheel Centre to Wheel Centre Dimensions | |
| 3.2.1 | Long Travel (LT) | 32,000 mm | |
| 3.2.2 | Cross Travel (CT) | 3,500 mm | |
| 3.2.3 | Long Travel (LT) Wheel Base | 8,600 mm | |
| 3.2.4 | Distance between Centre of LT Wheel Boggles (at Leg Bottom) | 6,900 mm (Minimum) | |
| 3.2.5 | Cross Travel (CT) | 3,500 mm | |

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| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR'S TECHNICAL OFFER (With Complete Details) |
|-------|------------------------------|---|--|
| 3.3.0 | wheel base Height of Lift | 10,000 mm [Effective Height of Lift for both the HOISTS] | |
| 3.4.0 | DUTY CYCLE | Related to Drive Motor & Mechanisms | |
| 3.4.1 | Main Hoist | S4 - 40 % CDF | |
| 3.4.2 | Aux hoist | S4 - 40 % CDF | |
| 3.4.3 | Long Travel | S4 - 40 % CDF | |
| 3.4.4 | Cross Travel | S4 - 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 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 Drive Motor Ratings & Frame Sizes | |
| 3.6.1 | Main Hoist | 55 kW , Frame Size – 280 M / 6 Pole S4 - 40% CDF | |
| 3.6.2 | Auxiliary Hoist | 35 kW , Frame Size – 250 M / 6 Pole S4 - 40% CDF | |
| 3.6.3 | Cross Travel (CT) | 11 kW , Frame Size – 180 L / 6 Pole S4 - 40% CDF | |
| 3.6.4 | Long Travel (LT) | 4 x 18.5 kW , Frame Size – 225 S / 6 Pole S4 - 40% CDF | |
| 3.6.5 | Motor type | All motors shall be of 6 poles, slip ring induction type with 300 starts per hour rating. | |
| 3.7.0 | GEAR BOX | Gear Box Size(Input and output center distance) /No of stages of gear reduction / HP rating | |
| 3.7.1 | Main Hoist | HR 750 / 2 or 3 stage gear reduction / 90 HP | |
| 3.7.2 | Auxiliary Hoist | HR 650 / 2 or 3 stage gear reduction / 60 HP | |

PART B.**TECHNICAL SPECIFICATIONS FOR 30/10T 32 M SPAN GANTRY CRANE WITH DOUBLE GIRDERS**

| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR'S TECHNICAL OFFER (With Complete Details) |
|--------|--------------------------------|--|--|
| 3.7.3 | Cross Travel (CT) | VR 500 / 2 or 3 stage gear reduction / 20 HP | |
| 3.7.4 | Long Travel (LT) | VR 650- 4 nos(Four corner drive with bogie arrangement)/ 2 or 3 stage gear reduction/ 50HP | |
| 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 N/mm ² . | |
| 3.9.1 | Main Hoist | Dia. 22 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 ± 10% Volts, 50 ± 3% Hz, 3 Phase- AC | |
| 3.14.0 | Duty Class | Class – 3 [Outdoor Service] | |
| 3.15.0 | Mechanism Group Classification | M 6 | |
| 3.16.0 | DESIGN STANDARD | IS – 807/2006 & IS-3177/1999 | |
| 3.17.0 | Runway Rail Size | | |
| 3.17.1 | Cross Travel (CT) | ISR 90 Lbs./Yard | |
| 3.17.2 | Long Travel (LT) | CR 80 (For reference only - not supplier scope) | |
| 3.18.0 | Wheel Size | | |
| 3.18.1 | Cross Travel (CT) | Dia. 400 mm – 4 Nos | |
| 3.18.2 | Long Travel (LT) | Dia. 630 mm - 8 Nos. (Four corner drive with wheel-bogie arrangement) | |
| 3.19.0 | Brake Drum Size | Hoist Brake Drum Sizes | |
| 3.19.1 | Main Hoist | Dia. 400 mm – 1 No | |

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| 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. 200 mm - 1 No | |
| 3.19.4 | Long Travel (LT) | Dia. 300 mm - 4 nos hydraulic thruster brake with 34kg hydraulic thruster | |
| 3.19.5 | Parking brake (LT) | Dia. 300 mm - 4 nos DCEM brake | |
| 4.0.0 | MAIN FEATURES | Crane Operational Features | |
| 4.1.0 | Control System | Conventional master control for all motions | |
| 4.2.0 | Remote Control | Radio Remote Control for all motions (Microprocessor based) | |
| 4.3.0 | Crane Operation | Through Cabin Control and Radio Remote Control with option for control selection | |
| 4.4.0 | Operator Cabin | Totally enclosed out door type cabin with fan, light and exhaust fan located on one end of the crane. The following items shall be provided in the cabin. <ol style="list-style-type: none"> 1. Operator chair, 2. Light, 3. Fan, 4. Warning bell, 5. Fire extinguisher, 6. Remote Indication lamp 7. Push button station – with the following buttons <ol style="list-style-type: none"> a. OFF Push Button - Mushroom Head [Plastic] Stay put- colour in RED. b. ON Push Button - Illuminated [GREEN colour 110Vac BA9 Filament Lamp] Flush type | |

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| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR'S TECHNICAL OFFER (With Complete Details) |
|-------|------------------------------------|---|--|
| | | Push button[Plastic] c. BELL pushbutton – Projecting Head[Plastic] Push Button actuator [BLACK Colour] d. BRIDGE LIGHT ON/OFF switch - 2-Position 8. Fire Extinguisher 9. A rubber mat shall be provided at the floor of the cabin. | |
| 5.0.0 | STRUCTURAL FABRICATION | Crane Structure Constructional Details | |
| 5.1.0 | Bridge / Leg / End carriage /Bogie | Plate formed Box type Construction only. | |
| 5.2.0 | Bridge girder section | The minimum size shall be as follows | |
| 5.2.1 | Cross section of bridge girder | Girder Height (Flange inner- inner) – 1800mm (Minimum) Girder width (Web inner- inner) – 580 mm (Minimum) Top flange plate thickness – 16 mm (Minimum) Bottom flange plate thickness – 12 mm (Minimum) Web plate thickness – 10 mm (Minimum) Width of top flange and bottom flange – 620 mm (Minimum) Vertical diaphragm plate thickness – 8 mm (Minimum) Distance between long diaphragms – 1300 mm (Maximum) Vertical Diaphragms shall be made of solid plates only | |

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| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR'S TECHNICAL OFFER (With Complete Details) |
|-------|---|--|--|
| | | Horizontal Stiffener to be provided- Two ISA 65x65x6 shall be provided throughout the length of the web (for both webs) at about 1/3rd and 1/2nd of the bridge height from the top. Suitable short diaphragms shall be provided The above thickness are including corrosion allowance | |
| 5.2.2 | Camber for bridge | The Crane Bridge shall be cambered at the top as well as the bottom. The final camber shall be between +30mm and +34mm. | |
| 5.2.3 | Cross section of LT End carriage/ wheel bogie | Height (Flange inner- inner) – 660 mm (Minimum) Min. width (Web inner- inner) – 290mm (Minimum) Top flange plate thickness – 16 mm (Minimum) Bottom flange plate thickness – 12 mm (Minimum) Web plate thickness – 10 mm (Minimum) Width of Top flange and bottom flange – 380 mm (Minimum) Vertical diaphragm plate thickness – 6 mm (Minimum) Vertical Diaphragms shall be made of solid plates only The above thickness are including corrosion allowance | |
| 5.2.4 | Jacking pads | Jacking pad shall be provided on web plates of bogie on both sides directly below the pin center for removal of LT wheel. | |
| 5.2.5 | Wheel Clearance | Minimum clearance to be maintained between rail top and bottom flange of end carriage shall be as | |

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| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR'S TECHNICAL OFFER (With Complete Details) |
|---------|--|---|--|
| 5.2.6 | Gear Box clearance | follows 1.For Long travel – 100 MM 2.For Cross travel – 50 MM | |
| 5.3.0 | Raw Material | The lowest point of LT gearbox shall be at least 50mm above the LT rail top. IS:2062. 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. | |
| 5.4.0 | Welded Joints | To be followed for Bridge Fabrication Maximum 4 joints only. (Joint at the center of the span shall be avoided.) | |
| 5.4.1 | Number of Joints allowed in web & flange plate of girder | | |
| 5.4.1.1 | Corrosion allowance | Cranes working in outdoors are in corrosive condition and a corrosion allowance of 2 mm shall be added to the thickness of the members required to resist all calculable stress and the minimum thickness of all the main members shall be not less than 10 mm. | |
| 5.4.2 | 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. | |
| 5.4.3 | Welded Joint Testing | All Butt Welded Joints (both compression / tension and flanges / web joints) shall be subjected to 100% X-Ray Testing and X-Ray Films to be produced for BHEL verification and form | |

PART B.**TECHNICAL SPECIFICATIONS FOR 30/10T 32 M SPAN GANTRY CRANE WITH DOUBLE GIRDERS**

| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR'S TECHNICAL OFFER (With Complete Details) |
|-------|-----------------------------|--|--|
| 5.4.4 | Welding of web plate | part of the documentation. Top flange shall be welded inside also with web plate and it shall be equal length stitch weld of minimum 100 mm length. | |
| 5.4.5 | Welding of stiffener plate. | All stiffener plates shall be inside welded both sides with top flange and web plates and it shall be equal length stitch weld of minimum 100 mm length. | |
| 5.5.0 | Splice Joints | NO BOLTED SPLICE JOINT IS ALLOWED IN GIRDER FABRICATION [Girder has to be of SINGLE PIECE only to the total length]. | |
| 5.6.0 | Leg connection | Leg to bridge connection shall be designed for double shear (vertical inside and outside splice plates for web and flange with fit bolts as per IS-3640) on one end of the bridge and pin connection on the other. Minimum Leg Hinge Pin diameter – 100 mm (Between bridge and Leg) In between leg and bogies a horizontal box (like end carriage) member to be provided. LT bogie shall have pin connection with the horizontal box (like end carriage) member. Minimum Bogie Pin diameter – 80 mm (Between End carriage and Bogie) | |
| 5.7.0 | Platform on Girders | The Platforms shall be provided on both the Girders to full length of the bridge and shall be fixed through BOLTED JOINTS with fit bolt as per IS-3640 only. The platform width shall be as | |

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| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR'S TECHNICAL OFFER (With Complete Details) |
|--------|----------------------------------|--|--|
| 5.8.0 | Wheel Assembly | <p>follows.</p> <ol style="list-style-type: none"> 1. Drive bridge – 1500 mm (minimum) 2. Non-drive bridge – 1000 mm (minimum) Suitable platforms shall be provided connecting the bridges on both ends | |
| 5.9.0 | Heat Treatment & NDT Examination | <p>The Wheel Assembly coming for Cross Travel (CT) & Long Travel (LT) shall be of LIVE AXLE SYSTEM with L-Type Bearing housings and shall be as per BHEL drawing No. 3-M-02R-0011993. (Drawing is enclosed)</p> <p>The Trolleys shall be Stress Relieved if required after welding and NDT examinations. All welding shall be tested by NDT means [MPI, LPI & RT] after Stress Relieving operation.</p> | |
| 5.10.0 | Machining Operation | <p>All mechanical mating surfaces and wheel seating areas are to be machined to the required finish and protected.</p> | |
| 5.11.0 | Surface Cleaning | <p>Girders, legs, end carriages and the Trolleys are to be thoroughly cleaned after completion of all operations but prior to painting.</p> | |
| 5.12.0 | Painting | <p>The crane parts are to be painted as follows</p> | |
| 5.12.1 | Painting of Gantry Crane | <p>The crane parts are to be painted as follows :</p> <ol style="list-style-type: none"> a. During Stage-I inspection the inside of the girder, Legs, Bogies, end carriage, CT End carriage etc. shall be painted with one coat of red oxide before closing. This shall be verified during inspection b. During Stage-II inspection, the crane shall be | |

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| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR'S TECHNICAL OFFER (With Complete Details) |
|----------------------------|---------------------|---|--|
| | | <p>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.</p> <p>After the crane erection is complete, the crane has to be painted as follows</p> <ul style="list-style-type: none"> • Touch-up painting of Primer wherever necessary • Two coats of Enamel Paint (Color – Golden Yellow) each with a DFT of 25 microns and intermittent curing of minimum 16 hours. | |
| 5.12.3 | Paint & labor | All paints and labor etc. for painting at site also shall be the scope of the crane supplier. | |
| MECHANICAL ELEMENTS | | | |
| 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 | Gear & thruster oil | Required grade lubrication oil & thruster oil should be supplied to the required quantity. | |
| 6.4.0 | Rope Drum | Shall be of fabricated type and stress relieved. The circumferential weld joints shall be tested by 100 % X-Ray for quality assurance. Or seamless pipe to suit | |

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| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR'S TECHNICAL OFFER (With Complete Details) |
|--------------|---------------------------|--|--|
| 6.4.1 | Main hoist rope drum size | 500 mm diameter (at the bottom of the grove) the requirement. | |
| 6.4.2 | Aux. hoist rope drum size | 400 mm diameter (at the bottom of the grove) | |
| 6.4.3 | Rope drums Placing | Shall be at the middle of the CT gauge 3500 mm | |
| 6.4.4 | Flange in rope drum | Rope drums shall be provided with minimum 100mm height flange at both ends to prevent rope slip. | |
| 6.4.5 | Placing of CT gear box | The cross travel gearbox shall be located at the center of the CT span 3500 mm | |
| 6.5.0 | Type of Coupling | Between Motor and Gear Box- Full gear coupling Between Gear Box and Rope Drum- Geared rope drum coupling Between Gear Box and Wheels <ul style="list-style-type: none"> • In LT – Full Gear coupling • In CT – Half gear coupling with floating shaft | |
| 6.6.0 | 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. | |
| 6.7.0 | Mechanical Joints | Fit Bolts as per IS 3640-1982 for all joints coming in main members and platform with reamed holes | |
| 6.8.0 | Pulley Dimension | The size of pulleys shall be as follows | |
| 6.8.1 | Main Hoist Pulley size | Bottom block and top return pulleys - 500 mm. (at the bottom of the grove) | |

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| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR'S TECHNICAL OFFER (With Complete Details) |
|--------|----------------------------|--|--|
| 6.8.2 | Main Hoist eq. Pulley size | 320 mm with antifriction bearing. (at the bottom of the grove) | |
| 6.8.3 | Aux hoist Pulleys | Bottom block pulley 400 mm (at the bottom of the grove) | |
| 6.8.4 | Aux. Hoist eq. pulley | 250 mm with antifriction bearing. (at the bottom of the grove) | |
| 6.9.0 | Hook Latch | Hook latch shall be provided for both hooks | |
| 6.10.0 | Wind Clamp | Wind clamp shall be provided in all four corners as per BHEL drawing no- 3M02G0014981 (Drawing is enclosed) | |
| 6.11.0 | Roof Covering | Single Roof cover shall be provide for crab trolley and long travel mechanisms | |
| 6.12.0 | Lifting Beam | Lifting beam with suitable chain block shall be provided for handling the components of the trolley in hoist and cross travel mechanisms in one end of the bridges. | |
| 6.13.0 | Buffer | Spring loaded buffer shall be provided for crab and bogies. | |
| 6.14.0 | Tools | The following tools of makes acceptable to BHEL shall be supplied along with each crane Vendor to clearly specify the makes of each items in the offer | |
| 6.14.1 | List of Tools | <ol style="list-style-type: none"> 1. Double end spanner -one set 2. Ring spanner -one set 3. Hammer 2lbs -one no 4. Hammer 5lbs -one no 5. Screw driver -one set | |

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| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR'S TECHNICAL OFFER (With Complete Details) |
|-------|----------------------------|---|--|
| 7.0.0 | ELECTRICAL ELEMENTS | | |
| 7.1.0 | Operational Controls | The Crane shall be provided with the following controls- a. Cabin Control [Master Control] b. Radio Remote Control [2 step Push Button Type] | |
| 7.2.0 | Control Voltage | 110 V AC | |
| 7.3.0 | Type of Brakes | a. Main Hoist - DCEM Brake b. Auxiliary Hoist - DCEM Brake c. Cross Travel – Thruster Brake with 34 kgs thruster. d. Long Travel – Thruster Brake with 34 kgs thruster. e. Parking brake - DCEM brake All the DCEM brakes and its control panel shall be of BCH make only. | |
| 7.4.0 | Protection | All Panels, Limit-Switches and Motors shall have IP 54 protection. (OUTDOOR SERVICE) | |

PART B.**TECHNICAL SPECIFICATIONS FOR 30/10T 32 M SPAN GANTRY CRANE WITH DOUBLE GIRDERS**

| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR'S TECHNICAL OFFER (With Complete Details) |
|--------|---------------------|---|--|
| 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. | |
| 7.6.0 | Electric Contactors | All Panels shall have only SIEMENS Contactors and shall be suitable for AC3 Duty Class. All contactors of rated amps more than 45A shall be provided with surge arrestors. | |
| 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. | |
| 7.8.0 | Resistance | Stainless steel punched grid resistance with continuous rating | |
| 7.9.0 | Long Travel Motion | A Four corner Drive Mechanism shall be provided for Long Travel Motion. | |
| 7.10.0 | Illumination | <ul style="list-style-type: none"> a. Two numbers of 1000 Watts Halogen Lamps shall be provided on the Bridge connecting members. b. All Electric Panels shall be provided with suitable illumination for visibility and trouble shooting. | |
| 7.11.0 | Controller Steps | <ul style="list-style-type: none"> A 4-Step Controller has to be provided with two neutral inter lock has to be provided for <ul style="list-style-type: none"> a. Main Hoist b. Auxiliary Hoist c. Long Travel d. Cross Travel Note: Cam discs should be made of metal / Bakelite only. | |
| 7.12.0 | Wiring | Wiring shall be done without junction box on crab and bridge end. | |

PART B.**TECHNICAL SPECIFICATIONS FOR 30/10T 32 M SPAN GANTRY CRANE WITH DOUBLE GIRDERS**

| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR'S TECHNICAL OFFER (With Complete Details) |
|--------|--|--|--|
| 7.13.0 | Hoist Limit | Each hoist shall be provided with both rotary and counter weight limits. | |
| 7.14.0 | Load Cell | a. Load Weighing System (with tolerance +/- 50 kg) with LOAD CELL (shear pin type) to be fixed / provided at the equalizer pulley of main hoist. b. The remote display shall be of 100 mm size (JUMBO) | |
| 7.15.0 | CT Cabling | Festoon cable/ Trailing cable system shall be used for CT motion. | |
| 7.16.0 | Electric Cables and recommended current rating | All the cables used in the crane shall be insulated flexible flat copper cables as per IS:1554 (Part-I)-1964 and the current rating shall be as per IS: 3961 (Part-II)-1967 | |
| 7.17.0 | Spares Set -1 | The following spares one set also shall be supplied (one set for 2 cranes) <ol style="list-style-type: none"> 1. LT wheel bearing – 2 No 2. CT wheel Bearing – 2 No 3. 34 kg thruster for brake – 2 Nos 4. Warning bell – 2 No 5. 500 W Halogen lamp – 2 Nos 6. Limit switches – 1 No of each variety used in the crane 7. Master controller – 1 No 8. Oil Seals- 1 No of each variety used in the crane 9. Cable trolleys- 12 nos 10. Main contactor spare coil -2 nos 11. Rotor contactors -4 nos | |

PART B.**TECHNICAL SPECIFICATIONS FOR 30/10T 32 M SPAN GANTRY CRANE WITH DOUBLE GIRDERS**

| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR'S TECHNICAL OFFER (With Complete Details) |
|--------|--------------------------------|---|--|
| 7.17.1 | Spares Set -2 | 12. Rectifiers for AH, MH brake panel – each 2 nos 13. Two number 2 NO + 2 NC auxiliary contactors for all the contactors above 50 Amps For 2 Gantry Cranes, the following spare shall be included in the offer (one set for 2 cranes) <u>1.Brake drums</u> a. Main Hoist Brake drum – 1 No b. Aux. hoist brake drum-1 no <u>2.Brake Shoes</u> a. Main Hoist Brake shoe with lining----- 2 nos b. Aux. hoist brake shoe with lining----- 2 nos c. Cross Travel brake shoe with lining---- 2 nos d. Long Travel brake shoe with lining-----2 nos for EHT brake e. Long Travel brake shoe with lining – 2 nos for DCEM Brake | |
| 8.0.0 | SELECTION of 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 / SMIRTI FORGINGS / KARACHIWALA | |
| 8.2.0 | Wire Rope | USHA MARTIN / FORT WILLIAM / RA WIRE ROPE/ BHARAT WIRE ROPES | |
| 8.3.0 | Electric Motors | GEC / BHARAT BILEE / SIEMENS / KEC/ MARATHON | |
| 8.4.0 | DC Brake Unit | Only BCH make | |
| 8.5.0 | Radio Remote Control | Only TELECRANE make (F24-10D)/ Ittowa make (winner) | |

PART B.**TECHNICAL SPECIFICATIONS FOR 30/10T 32 M SPAN GANTRY CRANE WITH DOUBLE GIRDERS**

| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR'S TECHNICAL OFFER (With Complete Details) |
|--------------|------------------------------------|--|---|
| 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 | HRC Fuses | GE/ENGLISH ELECTRIC / L&T /SIEMENS | |
| 8.11.0 | Rotary limit switch | SIEMENS / OMEGA / SOC / INDUSTRIAL SYNDICATE | |
| 8.12.0 | Switch fuse unit | L&T / SIEMENS / GEC | |
| 8.13.0 | Moulded case C.B | SIEMENS / L&T | |
| 8.14.0 | Pneumatic Time Delay | Only BCH make | |
| 8.15.0 | Push - Buttons | SIEMENS / L&T /AIRON | |
| 8.16.0 | Connectors | Only ELMAX make or reputed make with IS approved which is acceptable to BHEL | |
| 8.17.0 | Couplings | WMI / FENNER / ALFEX | |
| 8.18.0 | Bearings | SKF / NBC / ZKL | |
| 8.19.0 | Cables | Reputed Makes & ISI Approved acceptable by BHEL | |
| 8.20.0 | Bridge Light Fittings | PHILIPS / GE / CROMPTON | |
| 8.21.0 | Load cell | IPA make or reputed make with IS approved and acceptable to BHEL | |
| 8.22.0 | Resistance box | OHMARK / BCH only. | |
| 8.23.0 | Gear boxes | ELECON / SHANTHI GEARS / RADICON / CROMPTON GREAVES | |
| 8.24.0 | 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 | |

PART B.**TECHNICAL SPECIFICATIONS FOR 30/10T 32 M SPAN GANTRY CRANE WITH DOUBLE GIRDERS**

| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR'S TECHNICAL OFFER (With Complete Details) |
|-------|--|--|--|
| 9.0.0 | DOCUMENTS/ DETAILS for APPROVAL | <ol style="list-style-type: none"> 2. Crane duty electric motors 3. Gearbox 4. DC Brake 5. Thruster Brake 6. Radio Remote 7. Limit Switches 8. Load cell | |
| 9.1.0 | Drawings and Documents | <p>The following documents and details are to be submitted for BHEL Approval, prior to taking up the manufacture of the crane.</p> <p>SET-1</p> <ol style="list-style-type: none"> a. Calculations for selection of motors, gear reducers, brakes, couplings, etc. b. Calculations for bridge girder, legs, bogies, crab, end carriage and their connections. c. GA Drawing of the Crane. d. GA Drawing of Crab / Trolley assembly. e. GA Drawing of Individual Mechanisms. <p>SET-2</p> <ol style="list-style-type: none"> a. Drawings of Bridge, legs, End-Carriage, bogies and their connections. b. Sub-Assembly Drawings for Wheels, Hook Blocks, Gear Boxes, all brake drums & Hoist rope Drums. c. Wiring Diagram with Logic Circuits. d. Cable Selection based on Current Rating. and schedule with quantity. <p>Initially SET-1 to be submitted in one lot and after</p> | |

PART B.**TECHNICAL SPECIFICATIONS FOR 30/10T 32 M SPAN GANTRY CRANE WITH DOUBLE GIRDERS**

| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR'S TECHNICAL OFFER (With Complete Details) |
|--------|-------------------|---|--|
| | | approval SET-2 drawings to be submitted for approval. | |
| 9.2.0 | 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. 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 Supplier's Works | |
| 10.1.0 | 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 | |

PART B.**TECHNICAL SPECIFICATIONS FOR 30/10T 32 M SPAN GANTRY CRANE WITH DOUBLE GIRDERS**

| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR'S TECHNICAL OFFER (With Complete Details) |
|--------|----------------------------------|---|--|
| 10.2.0 | STAGE – II [Final Inspection] | <p>Mechanisms</p> <p>e. End – Carriage, bogies and legs Fabrication before closing with its flange plate to check its internal welding.</p> <p>The following Test certificates to be produced during Stage-I Inspection</p> <p>a. TC for plates used for bridge fabrication</p> <p>b. TC for plates used for Legs, End carriage (bogie) fabrication</p> <p>c. TC for the steel rounds used for Gear fabrication.</p> <p>d. TC for plates used for Gearbox casing fabrication.</p> <p>e. X-Ray film and report for all the Butt-Joints in the girders.</p> | |
| | | <p>a. Inspection of Bridges and End – Carriages/ bogies with Wheel Assembly and Alignment checking.</p> <p>b. Verification of Span & Diagonal Dimensions, Checking of Wheel Alignment, Mechanical Assemblies and Total Alignment.</p> <p>c. Free running of the all the Mechanisms.</p> <p>d. Measurement of CAMBER in the Bridges.</p> <p>e. Full / Rated Load Test and Deflection Test.</p> <p>f. Deflection and Permanent Set Measurement.</p> <p>g. 25% OVER-LOAD Lifting Ability Check.</p> <p><u>The following Test Certificates to be produced during Stage-II / Final Inspection.</u></p> | |

PART B.**TECHNICAL SPECIFICATIONS FOR 30/10T 32 M SPAN GANTRY CRANE WITH DOUBLE GIRDERS**

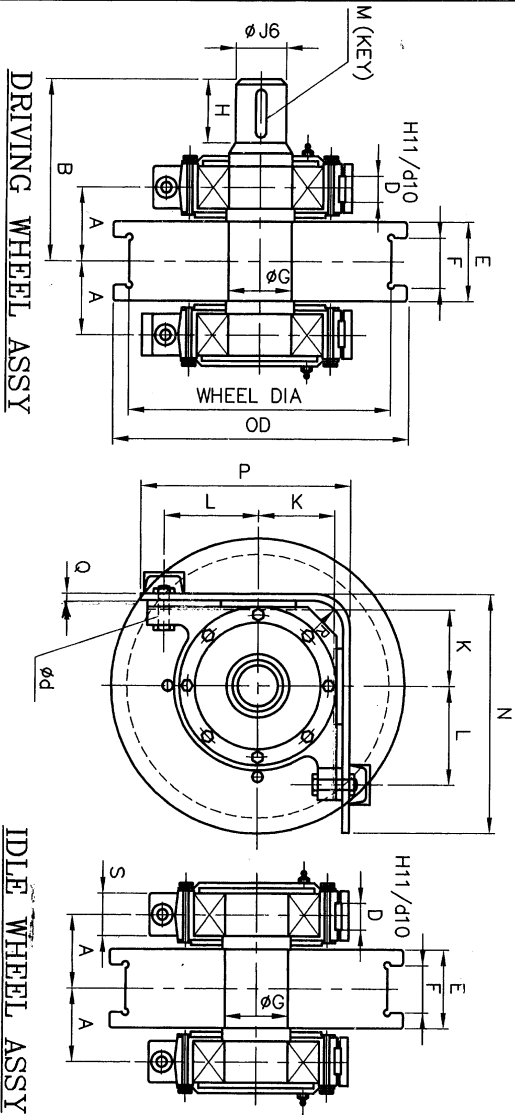
| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR'S TECHNICAL OFFER (With Complete Details) |
|--------|---|---|--|
| | | <ol style="list-style-type: none"> 1. TC for all Hoist Hooks 2. TC for Steel Wire ropes 3. TC for Heat treatment and final hardness for all gears. 4. TC for Wheel Hardness for LT and CT 5. TC for all thruster brakes 6. TC for all DCEM Brakes 7. TC for all motors 8. TC for all limit switches | |
| 11.0.0 | CRANE ERECTION & COMMISSIONING | | |
| 11.1.0 | Unloading of all crane parts (like Girders, end carriage, CT assembly, etc. | Unloading of all crane components at BHEL site, Bhandara- Maharashtra shall be the scope of the supplier. Required mobile crane, manpower, lifting tackles etc. shall be the scope of supplier. | |
| 11.2.0 | Crane Erection | Erection & wiring of the Crane at BHEL Bhandara manufacturing site is the scope of the crane supplier. | |
| 11.3.0 | Crane Commissioning | Commissioning of the Crane and Performance Prove –Out for the Crane’s Capacity and Smooth Functioning of the Crane (at BHEL Works) also shall be the RESPONSIBILITY of the supplier. The test load and required lifting tackles for commissioning shall be the scope of the supplier. | |
| 11.4.0 | Statutory Clearance | It shall be the Crane supplier’s responsibility to ensure the presence of competent authority at the time of testing and obtaining the clearance and acceptance certificate from the concerned authority. Necessary fees/ expenditure as required shall be | |

PART B.**TECHNICAL SPECIFICATIONS FOR 30/10T 32 M SPAN GANTRY CRANE WITH DOUBLE GIRDERS**

| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR'S TECHNICAL OFFER (With Complete Details) |
|--------|------------------------------|---|--|
| 12.0.0 | O & M MANUALS | borne by the crane supplier. 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. | |
| 12.1.0 | Drawings & Details | <ul style="list-style-type: none"> a. Crane GA Drawing b. Crab Assembly Drawing c. Total Crane Wiring Schematics d. Detailed Wiring Diagrams for Sub-Systems / Panels e. Wheel Assembly Drawings f. Bottom Block Assembly Drawing g. Gear Box Assembly Drawings h. Coupling Drawing and Details i. Specifications/Ratings of All Bought-Out-Items j. Warranty / Guarantee Card for all Bought-Out-Items k. Trouble Shooting Chart for Main and all Sub-Systems | |
| 13.0.0 | PERFORMANCE GUARANTEE | <p>The Performance of the Total Crane and/or 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.</p> | |

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 | ØG | H | ØJ | K | L | ØL | 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 | | 90-105 Lbs/Vd 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 | | 60/75/90 & 105 Lbs/Vd CR-80 | 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 | | 90 Lbs/Vd 105 Lbs/Vd 75 / 90 & 105 Lbs/Vd 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 | 50 SQBAR 60 Lbs/Vd 75 Lbs/Vd CR-80 | 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 | | 50 SQBAR 60 Lbs/Vd 75 Lbs/Vd CR-80 | 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 | 50 SQBAR 60 / 90 & 105 Lbs/Vd CR-80 | 105 | 250 | 32 | 125 | 85 | 61 | 65 | 55 | 76 | 100 | 17 | 16x10x55 | 254 | 249 | 12 | 60 | 40 | 102 | 22212 60x110x28 | 66.00 63.00 |
| 1 | 200/230 | 30 Lbs/Vd 50 SQBAR 60 Lbs/Vd CR-80 | 95 | 220 | 32 | 100 | 67 | 46 | 55 | 40 | 71 | 95 | 17 | 12x8x45 | 239 | 232 | 12 | 65 | 40 | 101 | 22309 45x100x36 | 51.00 50.00 |



MATERIAL :- SHAFT - 45CB/IS:1283,
WHEEL - 55CB/IS:15317,
TREAD PORTION WHEEL HARDNESS 500 TO 550 (BHN)

| | | | | | |
|---------------------------|----------|--------------------|-----------------|--------------------|----------|
| DESCRIPTION | MATERIAL | STANDARD | NET WT. IN KGS. | DRAWING No. | ITEM No. |
| REFERENCE: | | COMPONENT CODE: 29 | | EQUIPMENT CODE: 00 | |
| SCALE | CHECKED | APPROVED | DATE | DCN REF | DATE |
| DRAWN | | | | | |
| MACHINE: CRANE WHEEL ASSY | | | | | |

STANDARD CRANE WHEEL ASSY

3-M-02R-11993

REV.