

Public Tender No.TMPL/PUR/012/577/016

Item: EOT Crane

TECHNICAL SPECIFICATIONS

MECHANICAL

Scope of work – Design, engineering, fabrication, manufacturing, painting, testing, supply, unloading at site, erection and commissioning of one number each of double girder type EOT Crane having capacities of 7.5 MT & 12.0 MT respectively with rail, rail fixing arrangement, DSL suitable for indoor shed, electrical etc., as per enclosed specification and data sheets. Apart from the enclosed specification bidders shall also supply all other materials required for satisfactory and safe operation of the cranes.

Technical specifications:

Sl. No.	Specifications	Crane-1	Crane-2	
1	Crane Type: Double girder box type EOT crane, Duty: Class-II, with hand operated pendant controls for long travel, cross travel, hoisting and lowering (including creep) conforming to IS 3177 & 807.			
2	Safe Working Load	7.5 MT	12.0 MT	
3*	Span (Centre distance between rails of crane gantry)	13750 mm	13750 mm	
4*	Height of rail top from ground level	7900 mm	7900 mm	
5*	Length of crane gantry	72250 mm	72250 mm	
6	Location of crane (Repair & maintenance workshop i.e RM Shop- 2 bays)	Indoor	Indoor	
7	Speeds:			
	(i) Long travel	20 m/min.	20 m/min.	
	(ii) Cross travel	10 m/min.	10 m/min.	
	(iii) Hoist	03 m/min.	03 m/min.	
	(iv) Creep – Suitable creep speed to be provided for slow hoisting and lowering.			
*Exact dimension will be finalized at the time of order				
Crane 1: Overhead crane for RM Shop Electrical Bay				
Crane 2: Overhead crane for RM Shop Mechanical Bay				

General design features:

1. All technical features of the cranes shall be as per applicable BIS Codes.
- 2 The size and span of the crane shall be guided by the bay width shown in the tentative tender drawing.

Design shall provide adequate space for maintenance. Crane maintenance platform having adequate space shall be provided with access ladder. All structural members of the crane shall be approachable easily for periodic maintenance.

Generally, welded joints shall be used. Where, bolted joint is essential, machined H.T. bolts shall be used and bolts holes shall be drilled with minimum clearance. Minimum number of bolts shall be two in any connection. All the welds in the load carrying members shall be checked radio graphically. All welding shall be carried out as per IS-1181. The joints shall be designed to resist minimum 150% of the design load and shall not be less than 70% of the material strength at that joint.

3. Type of main girder: The crane shall have double girder. The bridge girder shall be box section type, fabricated out of rolled MS Plates. Breathing holes and drain holes shall be provided. Wherever practicable, maintenance access inside the box girder shall be provided.

The construction shall be rigid and all movements shall be smooth and non-jerky. Welds must be ultrasonically & radio graphically tested.

The crane girder should be properly braced to resist vertical/lateral/ torsional strain.

For girders, the following values of maximum span to depth ratio shall be governing:

Plate girders	-	18
Lattice girders	-	12

Test certificate of main girder should be furnished along with the crane.

- 4 Wire Rope: Make: USHA MARTIN, conforming to IS 2266, having a factor of safety of not less than 6. **Test certificate for rope from USHA MARTIN should be furnished along with the crane.**

- 5 Crane Hook: Made of forged steel, shank type conforming to IS 3815, supported on heavy duty thrust/ball bearings with spring loaded safety latch. The hook shall rotate freely on the bearings. Sheaves of the hook block shall be encased in an oil tight cover permitting generous lubrication of wire ropes and sheaves. **Manufacturer's Test Certificate of the hook with the load test details is to be furnished.**

6. Pulleys & Sheaves: Made of cast steel as per IS 1030 – 1962.

7. Wire Rope drums: Rope drums shall be fabricated or cast steel, properly stress relieved with factor of safety as per IS 3938 to withstand bending, compression and other stresses. Length of the drum should be sufficient to accommodate the complete length of lift in one layer and three dead turns at each anchor end and one spare groove at other end.

8. Brake: Double shoe brakes hinged type, brake drum of forged steel, completely machined, hardness-36-43 HRC. Brake levers, hinge pins etc shall be of hardened steel. Hoist-Electromagnetic and hydraulic thruster brakes, CT <- hydraulic thruster brakes
9. Couplings: All coupling should be of gear/flexible type, preferably of same size.
10. Bearings: All bearings used should be heavy-duty antifriction bearings of reputed make, preferably SKF/FAG make. Provisions shall be kept for service lubrication of all bearings. All bearings shall be enclosed in dust/oil tight housing. Suitable drip pans shall be provided to collect oil and grease, which may drop from operating parts. All drip pans shall be accessible for cleaning.
11. Long travel drive: End carriage mounted, having two wheels on each side, one driving & other driven. The transmission shaft diameter and length of each segment shall be preferably same.
12. Wheels: All the wheels used for LT, CT etc. should be of Forged/Cast steel hardened to BHN 250. Drive wheels shall be double flanged and taper tread type. Wheels shall be fixed to the shaft securely by shrink fitting. Wheel bearings shall be self-aligning heavy-duty antifriction type.
13. Gear Boxes: Only helical gears shall be used. Gear tooth form and rating shall be as recommended in IS-3681 and 4460. Only antifriction type bearings shall be used.
14. Radio remote control (RRC) & Cabin Control: Radio Remote control conforming to IS along with the following features should be provided. Preferred make is STROMAG Engineers Mumbai.
Technical requirement: The transmitter should be hand held Push Button Type. The Crane should be operative either through Radio Remote Control or Through Cabin Control at a time. Cabin control and Radio Remote control should be interlocked and change over system should be manual located at the entry of the cabin. There should be common push button for under bridge lights. Operating range should be 50 meters approx for Radio Remote. Isolation transformer and surge suppressor for the receiver supply to be provided. The wiring should be cables, should be ferruled, numbered and the same should appear on electrical drawings. Three sets of long life Nickel Cadmium batteries for the transmitter along with a battery charger are to be provided.
15. Rails: Rails for long and cross travel, shall be as per IS-3443. Gap between successive rails shall be less than 2mm. Rail end stops of proper design shall be provided on both ends of runway rails. For long travel, square bar of 50 mm will be preferred.
16. Platforms: To be made of anti-skid M.S. chequered plates. Toe guards & hand rails to be provided. Design shall provide adequate space for maintenance with access ladder. All structural members of the crane shall be approachable easily for periodic maintenance.

17. Safety Devices: The crane is to be provided with all safety devices such as buffers for LT & CT, wheel stops. Limit switches to be provided for LT & CT. Electrical inter-locking should be provided. Suitable safety device is to be provided to prevent over hoisting & over lowering. All moving/rotating components shall be properly guarded.

18. Painting: The crane should be painted with two coats of red oxide primer followed by two coats of golden yellow synthetic enamel. The handrails & toe guards are to be painted as per standard color codes.

19. General:

- a. The Tenderer should furnish all the above details as per IS 3177, Clause-2, as required for EOT cranes.
- b. The Tenderer shall supply suitable rails required for long travels as well as CT (cross travel).
- c. The tenderer shall furnish full details of bearings, couplings, drives, hoisting rope etc.
- d. The Tenderer shall supply one set of spare brake shoe and one set of spare gear couplings of each size used duly machined as standard supply.
- e. The Tenderer should specify the headroom and side clearances required and they are advised to check the suitability of the existing clearances at site as per their design so that they can make modifications in design, if required. **The Tenderer are in their own interest requested to check up the existing structure and dimensions at our site prior to quoting for their crane design suitability.**
- f. Inspection: The customer should make the crane available for inspection at appropriate stage at the manufacturer's works before dispatch. The supplier should give advance intimation for inspection in writing. However final physical inspection shall be done on receipt of goods at out site and the report thereof shall be binding on the successful bidder.
- g. The final taking over of the crane shall be done only after successful load test as per norms. The supplier shall make complete arrangement for carrying out the load tests.
- h. Guarantee: The crane, complete in all respects including complete electrical must be guaranteed for trouble free performance for 12 months from the date of commissioning.
- i. Population List: The Tenderer should furnish the list of customers to whom they have supplied similar cranes in the last five years giving the contact person's name, telephone numbers and addresses of the customers, capacity of crane, date of commissioning, with copies of purchase orders and certificate of performance from the customers.

ELECTRICAL

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UCIL will provide power at a single point, where the crane will be installed. All other items required to manufacture, installation & commissioning the crane, will be within the bidders scope. The Bidder should indicate the rating of TP / TPN SFU / MCCB / RCBO to be provided by UCIL at power takeoff point for the Crane.

The following point also may be noted:

1. Motors:
Hoist motors : Slip-ring type
CT motor : Sq. cage type
LT motor : Sq. case type
General specification of motor:
V: 415 \pm 10%, Hz = 50 Hz
Degree of protection : IP 55
Type : TEFC
Insulation Class : B/F
Mounting : Horizontal
Duty : Suitable for crane
2. Brake: Thruster Brakes should be provided.
3. Motors should be adequately designed with sufficient safety margin against overloading 100% overloading will be preferred (Crane duty motors).
4. DSL shall be shrouded bus bar type i.e. insulated bus bar cover with PVC insulation. DSL supply & installation will be also within the bidder's scope. DSL shall be suitable for outdoor duty in open shed with lamps for phase supply indication on either side. The material of the Bus Bars of DSL should be Tinned Copper.
5. For each motion limit switches to be provided.
6. Over load protection, under voltage trip, single-phase preventer, tippole switch with back up fuse to be provided for each motor.
7. Visual 3 phase indicator at the end of LT buffer to be provided.
8. Control wiring should be done by 1100 volt grade, 2.5 sq. mm. size, PVC insulated, stranded copper conductor (ISI approved). Power cable – 1100V grade, PVC insulated, stranded, copper conductor of suitable size to be used (ISI).
9. Electric interlock: An isolator fitted with crane bridge, so that the crane cannot be operated from the floor while maintenance work is being carried out.
10. The following components selection table should be used.

Motor rating	Switch rating (min)	Contractor rating (min)	Cable Size
0-5.5 kw	25 A	25 A	3 C x 2.5 cu
5.6-11 kw	63 A	32 A	3 C - 10
11.1 – 22 kw	63 A	63 A	3 C - 25
22.1 – 45 kw	160 A	125 A	3 C - 50

11. The LT Motor (Squirrel Cage Induction Motor) should be controlled by ABB / SCHNEIDER Make VFD).
12. Flat Type Festoon Cables should be used.
13. The Control Panel should be mounted on Long Travel only (NOT ON CROSS TRAVEL). The Control Panel should be mounted at DSL END to avoid long length of Incoming Cable to be taken to the panel over festoon arrangement, if the Panel is in the centre of the LT.
14. All the cables from Limit Switches should be terminated in a sufficiently sized vertically mounted Junction Box on Long Travel from where cables to be taken to the Panel. 10@ Spare Terminal should be provided in the Junction Box.
15. A Small Platform should be provided below Long Travel with safety railings at DSL end for working on DSL.
16. Platform with railings should be provided along the Long Travel.
17. The Control Voltage should be 110V AC.
18. Remote Control and Plug in Type Pendant Control with sufficient length of cable should be provided along with Cabin Control.
19. The resistances for Hoist Motor (Slip ring type) should be suitably rated.
20. The terminal Blocks should have spare terminals (10%).

Selection of fuse and thermal O/L relays to be coordinated with motor rating by Tenderer.

The following vendor list is to be followed:

Motor	: Crompton/ ABB / Siemens
Contactors	: Siemens/L&T/ABB
Fuse	: L T / Siemens / ABB.
Control cable	: FINOLEX/GLOSTER/CCI/NICCO/UNIVERSAL (UNISTAR)
Switch, O/L relay	: L & T / ABB / SIEMENS. (Independent mounting type)
Brake	: Electromag /Speedo-control/ Stormcraft
Safety switch/Limit switch	: L&T/Siemens
Power cable	: FORTGLOSTER/CCI/NICCO.

Single Phasing Preventor for: Siemens / L& T
Each motor

ANNEXURE-1C

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A. List of essential spares to be supplied along with the crane:

- | | |
|---|------------------------|
| 1. Spare brake shoe | One full set |
| 2. Couplings | One set of each type |
| 3. Coupling bolts | One set of each Type |
| 4. Rubber buses / spiders
for each type of coupling | One set for each size. |
| 5. Bus Bar Holding insulators | 24 Nos. |
| 6. Bus Bar jointing clamps with
screws / bolts, nuts and washers | 24 Nos. |

B. List of optional spares required for Five year trouble free operation:

List along with price of each item is to be submitted by the Tenderer.

C. List of Insurance Spares if any:

List along with price of each item is to be submitted by the Tenderer.