Technical Specifications for 15 Ton Double Grider EOT Crane With HOIST- Wire Ropes

IIT Tirupati is establishing Innovative Bridge Engineering Laboratory and invites reputed crane manufacturers to bid for supply, installation, and commissioning of two numbers of 15-Ton Double Girder Electric Overhead Traveling (EOT) Crane.

Compliance statements must be provided separately with Technical Bid. Vendors should add reference page numbers in their quote and catalogues for each specification point to justify the claim

Special notes:

Quantity: Specifications apply to **two (2) identical 15-ton cranes**; bid pricing must reflect both units.

Section -I General Specifications

Note:

1. The equipment should meet necessary local and national administration requirements with regard to safety of people. Necessary certificates for SWL must be provided validated by a competent body.
2. The vendor must visit the site prior to bidding to evaluate and verify crane installation feasibility.
3. The crane placement and commissioning shall be safely ensured which is under the scope of the vendor. Please note that the roof of the structure is in place. *A sectional and plan view of the structure is attached in annexure for reference only.
4. IIT Tirupati may request a load test at site and full functionality demonstration on successful completion of the works and within the stipulated period to be mentioned by IIT Tirupati.
5. The standard references were made with respect to Indian standards (IS). Equivalent DIN Standards or FEM Standards are also acceptable.
6. Only OEMs and their authorized resellers are permitted.

1.1 SUPPLY, ERECTION & COMMISSIONING AND JOB PROVING OF TWO NOS OF EOT CRANE 15T WITH SPECIFICATIONS AS BELOW:

S. No.	Parameter	Specification
1.0	**APPLICATIONS**	
1.1	Crane Purpose	The subject crane is meant for the purpose of handling medium to heavy components/ structural elements.
1.2	Environmental Operating Conditions	The crane will operate in a harsh shop floor environment characterized by high dust, humidity, welding fumes, and ambient temperatures reaching a maximum of 55°C under tropical weather conditions, without any temperature-controlled enclosure. It must deliver minimal sound levels preferably 70 dB and maintain an attractive aesthetic appearance suitable for normal shop floor use.
2.0	**SCOPE AND QUANTITY OF SUPPLY**	
2.1	Design, manufacturing, supply, erection & commissioning	Two units of 15-ton double girder EOT cranes, classified as M5 duty class (Class II), designed for indoor use, featuring anti-collision sensors for safe inter-crane spacing, complete with load

		testing and job proving via floor-operated pendant control. The supply shall also be inclusive of girder, rail, hoisting system, electrical and control system along with various safety and protection devices along with standard accessories etc.,. The above shall be supplied for the operation of two nos of 15 tons EOT cranes.
2.2	Quantity Required	2 Nos
3.0	**GENERAL REQUIREMENTS FOR EACH 15-TON CRANE**	
3.1	Safe Working Load (SWL)	15 Tones per crane
3.2	Span (CT)	19.05 meters*****
3.3	Bay Length	25.2 meters*****
3.4	Column C/C Distance	5.05 meters*****
3.5	Height of Lift	8.01 meters*****
3.6	Crane Location	8.296m (from floor to crane bottom)
3.7	Class of Duty	M5, Class II (IS 3177:2020)
3.8	Crane Type	Double Girder EOT Crane
3.9	**Important notes to vendor:** * Shall be verified by the vendor for actual site measurement before bidding. **Shall confirm to Design Standards** IS 3177:2020 - Code of Practice for Design of Overhead Traveling Cranes IS 807:2006 - Code of Practice for Design, Erection, and Testing of Cranes IS 800:2007 - General Construction in Steel Code of Practice Relevant DIN/FEM Standards as applicable appropriately.	
4.0	**MOTION DESIRED**	
4.1	Spanning the complete room (leaving edge margins)	Refer to drawing
5.0	**HOISTING SYSTEM SPECIFICATIONS FOR EACH 15-TON CRANE As per IS3938 (Latest version)**	
5.1	Safe Hoisting Capacity	15 Tonnes
5.2	Hoisting Speed	3 and 1.3 m/min (2 speeds) or better variable speeds with VFD is required
5.3	Motor Details	i. ≥11 kW, Squirrel Cage, TEFC, Class F Insulation (Preferred 15 kW) ii. Squirrel cage induction crane duty motors, totally enclosed, fan cooled, insulation Class-F & confirming to relevant latest IS:325, and IS-123 standards, S4 duty, minimum of150 starts per hour and 40% CDF. Vendor to provide other details like No. of motors, capacity of motor,

		frame size, make, type and No. of poles etc.,.
5.4	Wire Rope	Steel core confirming to IS 2266:2024 shall be duly complied to safe working load. Mention Wire rope Dia No. of fall & construction, minimum factors of safety & tensile strength (1960 N/mm² for wire rope) and adherence as per ISO: 4309:1990.
5.5	Rope Drum	Seamless Pipe (ASTM A106 Gr B)
5.6	Geared Brake Motor	Standard makes from reputed companies. (ex: Radicon/Bonfiglioli Siemens, ABB, SEW-Eurodrive) subject to approval by IIT Tirupati
5.7	Brake Type	In-built Electromagnetic DC Disc Brake (Compatible)
5.8	Hook	Both end approach, single shank swiveling in accordance with IS 15560:2005. standard made by reputed company (ex: EEK/Smriti Forgings Demag / Terex, Kito, Crosby).
6.0	**LIMIT SWITCHES FOR EACH 15-TON CRANE**	
6.1	Safety Limit Switches	i. Rotary limit switch + Gravity limit switch. ii. All crane motions require limit switches, including rotary and counterweight-type adjustable shunt switches on hoists for over-hoisting and over-lowering protection. iii. Dedicated limit switches must be provided for both CT and LT, with two-way lever types for bidirectional control in each direction.
7.0	**CROSS TRAVEL (CT) SYSTEM FOR EACH 15-TON CRANE**	
7.1	Speed	20 and 5 m/min (2 speeds) or better variable speeds with VFD is to be provided
7.2	Motor details	i. ≥0.55 kW × 2 Nos. ii. Squirrel cage induction crane duty motors, totally enclosed, fan cooled, insulation Class-F & confirming to relevant latest IS:325, and IS-123 standards, S4 duty, minimum of150 starts per hour and 40% CDF. vendor to provide other details like No. of motors, capacity of motor, frame size, make, type and No. of poles etc.
7.3	Wheels	i. Drawing showing the dimensions and the details of the wheels shall be provided by the vendor along with the bid. ii. The wheels of the trolley at the end carriages shall be forged steel CN55 and MN75 (EN-9) duly spin hardened to 300 BHN materials. Double flanged straight thread type fitted with anti-friction bearings with L type bearings housing for the ease of maintenance.
7.4	Cable system	Appropriate Festoon cable system
7.5	Bearings	Standard makes from reputed company. (ex: FAG /Timken /NSK /NTN /SKF)
8.0	**LONG TRAVEL (LT) SYSTEM FOR EACH 15-TON CRANE**	
8.1	Speed	20 and 5 m/min (2 speeds) or better variable speeds with VFD

		is to be provided
8.2	Motor Details	i. ≥1.1 kW × 2 Nos. ii. Squirrel cage induction crane duty motors, totally enclosed, fan cooled, insulation Class-F & confirming to relevant latest IS:325, and IS-123 standards, S4 duty, minimum of150 starts per hour and 40% CDF. vendor to provide other details like No. of motors, capacity of motor, frame size, make, type and No. of poles etc.
8.3	Wheels	i. Drawing showing the dimensions and the details of the wheels shall be provided by the vendor along with the bid. ii. The wheels of the trolley at the end carriages shall be forged steel CN55 and MN75 (EN-9) duly spin hardened to 300 BHN materials. Double flanged straight thread type fitted with anti-friction bearings with L type bearings housing for the ease of maintenance.
8.4	LT Rail	i. As per latest ISCR CR65, CR 80 ii. Drawing showing the dimensions and the details of the LT rail shall be provided by the vendor along with the bid.
8.5	DSL System	i. The details of DSL to be provided by vendor for CT & LT are in the scope of vendor. ii. Shrouded bus bar, current rating: 100/200 Amps, Aluminium conductor, insulated cover for safety, individual pole with PVC/FRP insulation
9.0	**ELECTRICAL AND CONTROL SYSTEM FOR EACH 15-TON CRANE**	
9.1	Operation	Through pendant push button + radio remote control and also on floor control shall be of reputed make with push button for on, off, up, down, forward, reverse, left, right & emergency stop with option for control selection. Control voltage for pendants and remote control should be maximum 48 Volts.
9.2	Pendant Make	Die cast aluminum (or) hard unbreakable plastic with emergency switch
9.3	Input Power Supply	At supply voltage of 415V ±5%, 3Ph, 50Hz / 110V 1Ph Control is required
9.4	Control Voltage	i. Shall be 48 V AC maximum or appropriate ii. It can be 110 V also however OEM has to ensure that the pendants are shock proof and comply with all safety standards.
9.5	Protection	All Panels, Limit-Switches and Motors shall have IP 54 protection.
9.6	Type & Details of Brakes for all Motions	i. Backup breaks are mandatory. Conical rotor type or "fail to safe" action type electromagnetic shoe / disc brakes type to be provided to hold the mechanism in

		any position instantaneously as soon as the power supply is 'OFF' either accidentally or intentionally for all motions
9.7	Electric Contactors:	Shall have SIEMENS / L&T / GE (reputed Electrical OEMS) or manufactured by Crane OEMS, contactors suitable for Crane operations. Crane duty AC-4 ratings.
9.8	Wiring:	All the panel wiring should be done by using standard multi core copper highly flexible, double insulated cables and of butyl rubber.
10.0	**STRUCTURAL SPECIFICATIONS FOR GIRDER & END CARRIAGES**	
10.1	Girder Specifications	i. Box girder design for 19.05 m span ii. Maximum Deflection: Span/900 mm or lesser iii. Materials shall be compliant as mentioned below: • Beams/Channels/Angles: IS 808-2021 • MS Plates: IS 2062:2021 End Carriages: Complete with LT motors & accessories iv. Drawing showing the dimensions and the details of the girder shall be provided by the vendor along with the bid.
10.2	Total Crane Weight	< 11,650 kg (Approx.) Design for minimum feasible weight using optimized materials (IS 2062:2021), without compromising M5 Class II duty or deflection limits (Span/900 max.).
11.0	**SAFETY & PROTECTION DEVICES FOR EACH 15-TON CRANE**	
11.1	Safety & Protection Devices	i. Overload Limit Device: Considered ii. Anti-Collision Device: Standard makes from reputed companies. (ex: Autonics/Omron/Keyence) subject to approval by IIT iii. Tirupati iv. Limit Switches: Hoist: Rotary + Gravity type CT/LT: Two-way lever type : Standard makes from reputed companies. (ex: Telemecaniqu/ Siemens / Honeywell) subject to approval by IIT Tirupati Emergency Stop: Pendant + Radio Remote v. Buffers: Rubber buffers all corners vi. Alarm & Hooter: 90 dB + Flasher (ex: Suraj/Ahuja /patlite)
12.0	**PAINTING & FINISH FOR EACH 15-TON CRANE**	
12.1	Painting& Finish	i. Painting scheme drawing with proposed colour codes needs approval from IIT Tirupati before application. This ensures aesthetic/institutional alignment for the laboratory. ii. The complete setup should be sand blasted and coated with minimum one coat of primer and two coat of final finish PU(Polyurethane) paint with a shade of 80 to 90 DFT.
13.0	**MISCELLANEOUS REQUIREMENTS**	
13.1	Crane Erection parameters:	i. *The crane placement and commissioning shall be carried out safely are the full responsibility and scope of the vendor. Note that the roof of the structure is already placed.

		ii. Site visits may be performed before submission of the bid. Submission of a site inspection report along with the bid document is optional; however, if provided, it will be considered during technical evaluation. iii. **Sectional and plan view of the structure is attached in annexure for reference only.*
13.2	Replacement of Defective Equipment:	If any of the equipment supplied by the supplier is found to be substandard, refurbished, UN-merchantable or not in accordance with the description/specification or otherwise faulty, the IIT Tirupati will have the right to reject the equipment or its part. The prices of such equipment shall be refunded by the supplier of 18% interest if such payments for such equipment have already been made. All damaged or unapproved goods shall be returned at suppliers cost and risk and the incidental expenses incurred thereon will be recovered from the supplier. Defective parts in equipment, if found before installation and/or during warranty period, shall be replaced within 30 days on receipt of the intimation from this office at the cost and risk of supplier including all other charges. In case supplier fails to replace the above item as per above terms & conditions, IIT Tirupati C may consider 'Debarring' the supplier and any other remedies, as deemed fit by IIT Tirupati.
13.3	Drawings /Documents Required:	The Vendor shall provide the following drawing / data along with the bid ● GA drawing of the crane (for approval) ● GA drawing of hoist /trolley (for approval) ● Crane erection method ● QAP for manufacturing & erection shall be submitted for approval ● GA drawing of individual mechanisms (for approval). ● Drawings of girds, end-carriage, leg and their connections. ● Sub-assembly drawing for wheels, gear boxes & hoist. ● Calculations for selection of electric motors, gears, brakes, couplings, wheels, wire rope etc. ● design calculations for bridge girder, crab etc. ● Wiring diagram with logic circuits and bill of material (for approval) ● Cable selection based on current rating. Complete details of BOI including technical specifications & catalogue shall be part of O&M manual.
13.4	Inspection and Tests	i. The compliance of the equipment with the requirements mentioned in technical specifications and elsewhere in tender documents should be verifiable with supporting documents like OEM's manual, certification from OEM etc. The certificate should be valid. ii. The tests demonstrate the satisfactory operation of an integrated system covering the full range of facilities of the equipment.

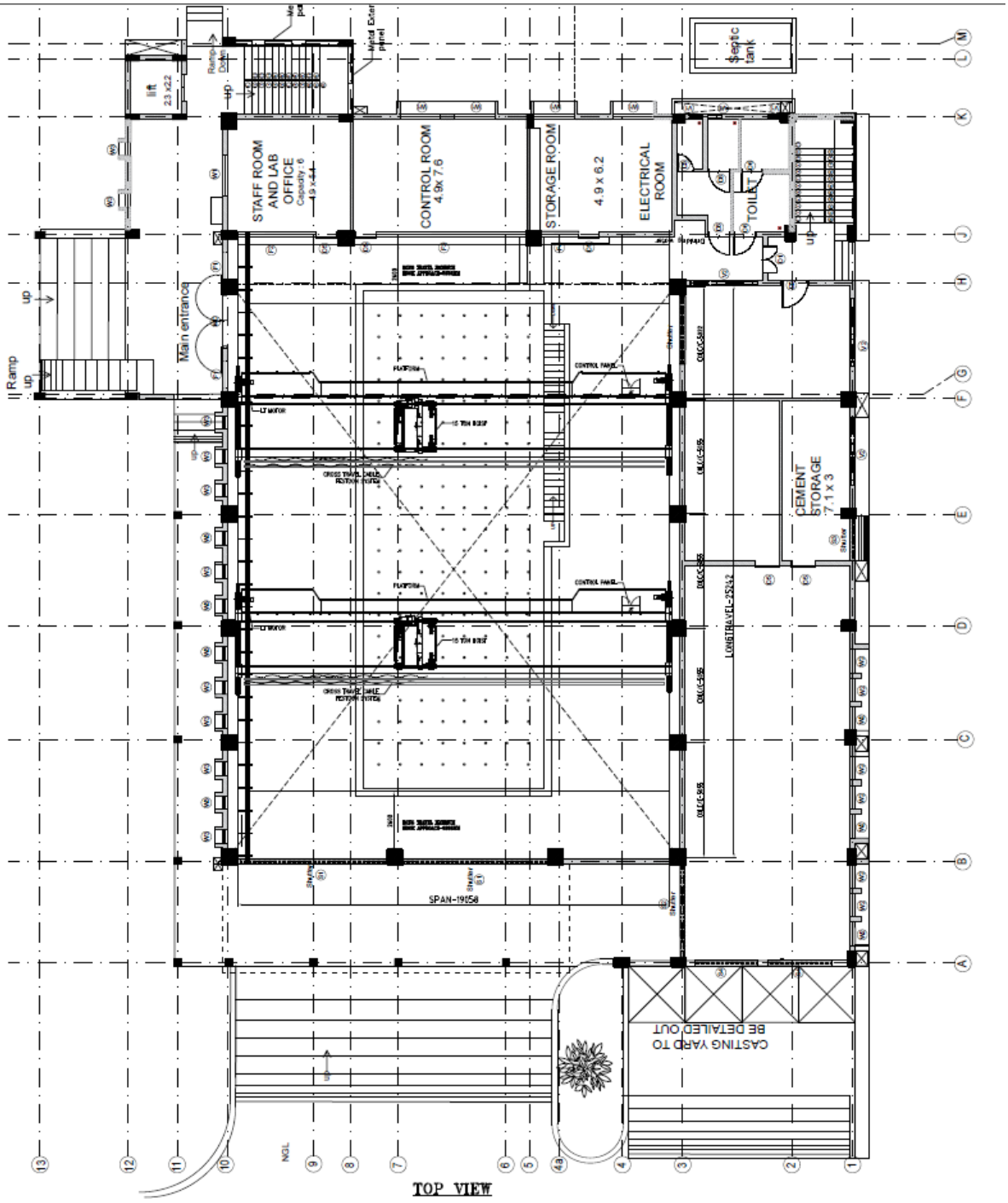
		iii. The acceptance tests for supplied goods shall be carried out at IIT Tirupati by the supplier with the participation of concerned personnel from IIT Tirupati. iv. In case of the acceptance tests are not concluded to the satisfaction of IIT Tirupati the supplier shall repair or replace, at the supplier's cost, the whole or any part of the equipment as may be necessary for conclusion of the acceptance tests to the satisfaction of IIT Tirupati within the reasonable period agreed IIT Tirupati. Demonstration of performance of the equipment should be done after such repair / replacement for acceptance of IIT Tirupati. v. IIT Tirupati reserves the right to accept the delivered items with deviations, provided the supplier agrees to rectify the deviations within an acceptable time period. Regarding the acceptance date, decision of IIT Tirupati would be final. vi. The supplier shall provide necessary consumables till the completion of acceptance testing, without any additional cost. vii. All parts and equipment should be brand new and unused. Refurbished items shall not be supplied. viii. The equipment shall be robust for academic/industrial use and shall have to produce results with accuracy, as determined reasonably by IIT Tirupati. ix. IIT Tirupati reserves the right to carry out a pre-dispatch inspection.
13.5	Inspection Schedule	The following schedule of inspections shall be strictly adhered to, prior to dispatch from the supplier's works, witnessed by competent authority of IIT Tirupati campus. Stage / pre-dispatch inspection shall be carried out according to these drawings only. ● Inspection of bridges and end – carriages with wheel assembly and alignment checking. ● Verification of span & diagonal dimensions, checking of wheel alignment, mechanical assemblies and total alignment. ● Free running of all the mechanisms. ● Full / rated load Test and deflection Test needs to be done within 6 months from commissioning date. ● Measurement of CAMBER in the bridges. ● Deflection and permanent Set measurement. 25% over-load lifting ability check. IIT Tirupati reserves the right to carry out a pre-dispatch inspection.
13.6	Material Verification:	All structural materials (MS plates, beams, channels, angles, wire ropes, etc.) will be cross-verified by IIT Tirupati lab testing at key manufacturing stages (e.g., plate rolling, beam fabrication, rope supply). Vendor to provide test samples (size/quantity as per IIT Tirupati request) and advance notice (minimum 15 days) for

		inspections at their works. Tests include Chemical composition, tensile strength, yield strength, elongation, impact (Charpy V-notch), and NDT (ultrasonic where applicable), per relevant IS standards.
13.7	Loading/Unloading at Site	Vendor scope encompasses all mobile cranes of sufficient capacity, ladder/scaffolding arrangements, lifeline/safety harness systems, forklifts/scissor lifts as needed, permits, operators, and full safety compliance.
13.8	Crane Commissioning:	Prove out for the Crane's Capacity and Smooth Functioning of the Crane (at IIT Tirupati Campus) shall be the responsibility of the supplier. Final Load testing as per latest IS at 125% of rated load shall be conducted at site. Acceptance of Crane by competent person as approved by Govt. of India must be done by Vendor and certificate is to be submitted. All safety equipment like safety boots, safety belts, helmets, gloves, loader, goggles etc. required for erection personnel shall be brought by the vendor.
13.9	Other Instructions	i. In the design of the crane, all safety regulations as applicable under provision of factory act, Indian electricity rules etc. as prevailing in the country (site of installation) shall be taken into consideration by the Vendor. ii. All nuts should have a chuck nut / locking nut / suitable locking arrangement to eliminate loosening. iii. Rope Guide: Precision machined rope guide nut to suit rope drum grooves and moving over the drum like a nut to be provided to prevent overlapping / loosening of rope over drum. iv. Anti-friction Ball/Roller/Needle bearing. Grease nipples to be provided wherever required. Bushings are not acceptable. v. Any component / part damaged during erection and commissioning or job proving to be replaced by supplier free of cost.
14.0	**MAINTENANCE TOOLS MUST BE INCLUDED IN THE SUPPLY AND SHOULD BE SUBMITTED WITH THE OFFER**	
14.1	Maintenance Requirements	i. All cables should be properly covered and protected. ii. Technical offer must have 3 view GA drawings with complete details of parts / components, clearances, hook approaches, wheel loads, Wheelbase, Crab, Total crane weight, motor rating, frame size, Brake drum dia. Thruster rating, Gearbox details for all the motions. iii. TC / GC in respect of Crane & BOI to be submitted by the supplier. iv. Supplier must submit point wise reply to specifications, deviations if any must be separately submitted with reasons

		for each. v. The successful vendor is required to measure all necessary dimensions i.e. Span, Head Room, Clearances between rail center to existing column and rail size etc. at site before starting submission of quotation / tender. vi. Lighting: Minimum 200 lux at working areas first fill lubricants (oil splash system + grease nipples for wheels/bearings) and bulbs included mandatory maintenance schedule in O&M manual. (vendor scope). vii. Trouble shooting chart for main and all sub-systems. Training for 3 operators (1 week minimum).
15.0	**PERFORMANCE GUARANTEE:**	
15.1	Warranty / Guarantee for all Items.	i. Warranty / guarantee card for all bought-out-Items. ii. The performance of the total crane and / or the components / sub-assemblies / bought out Items shall be guaranteed for a minimum period of 30 months from the date of acceptance of the crane at IIT Tirupati campus. iii. Post-Warranty AMC: 3 years, minimum 2 visits per year + unlimited breakdown calls. Pricing to be quoted separately in price bid. Same response time commitments as warranty period. Vendor to maintain 15-year minimum spares availability (OEM commitment).
16.0	**DELIVERY SCHEDULE**	
16.1	Expected Delivery	i. Submission of GA Drawings (post-site visit): Within 7 days Drawing Approval by IIT Tirupati: Within 14 days ii. Delivery at Site: Within 14 weeks after PO iii. Commissioning & SAT: Within 2 weeks after delivery
17.0	**COMPLIANCE STATEMENT**	
17.1	Compliance Statement	All vendors need to provide compliance for each, and every point mentioned above and if found the points were missed out, then IIT Tirupati has the liberty to disqualify the vendor. To ensure comprehensive vendor quotations for the two no's of 15-ton EOT crane tender, explicitly mandate additional data beyond basic compliance in the technical bid. This prevents ambiguities and aids evaluation for IIT Tirupati's structural testing facility.

Annexure A: Reference Drawings

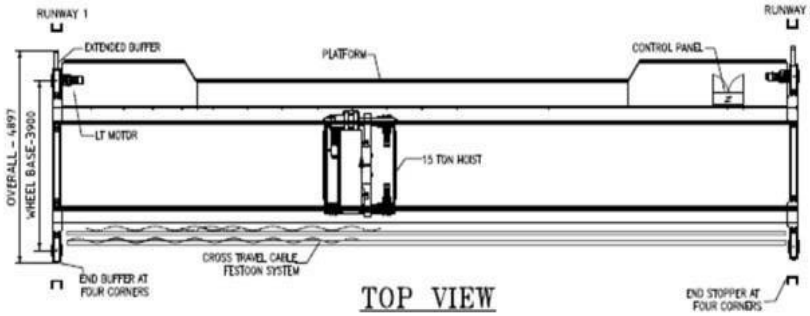
This annexure provides essential layout drawings for crane installation at IIT Tirupati structural engineering lab, including site plans, column positions, rail alignments, and headroom details. Vendors must review these prior to site visit and bid submission for compliance verification.



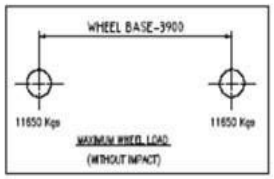
NOTE:

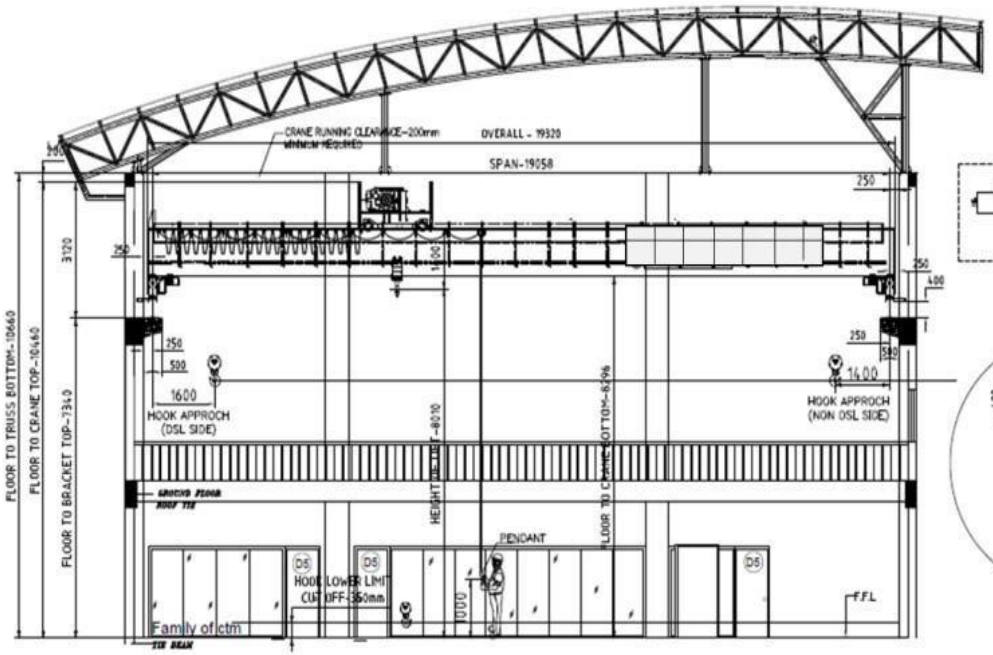
1) ALL KIND CIVIL OF WORKS, WELDING POWER – CUSTOMER SCOPE".
2) THE CRANE WHEEL & RAIL PATH MUST BE FREE FROM ANY OBSTRUCTION FOR SAFE AND TROUBLE FREE WORKS OF CRANE.
3) THIS FORMS THE MASTER DOCUMENT FOR ALL SUBSEQUENT DISCUSSIONS.
4) K2 CRANES RESERVES THE RIGHTS TO ALTER ANY DIMENSIONS WITHOUT PRIOR INTIMATION DUE TO PROCESS/PRODUCT IMPROVEMENTS.

NOTE5: INCOMING POWER CABLE WITH ISOLATOR UP TO DSL POINT IS CUSTOMER SCOPE. (REQ.63A MCCB 3 POLE WITH EARTH.)
NOTE6: INCOMING POWER CABLE SIZE DETAIL–4CX16Sq.mm–COPPER (CUSTOMER SCOPE)
NOTE7: POWER CONSUMPTION DETAIL OF CRANE : 18.3KW (OR) 44Amps

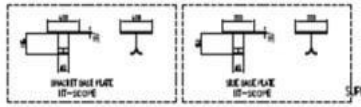


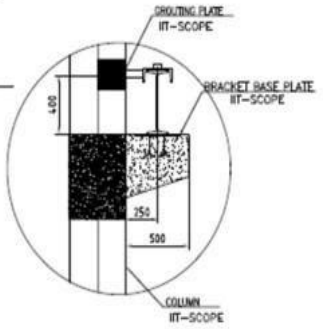
TOP VIEW

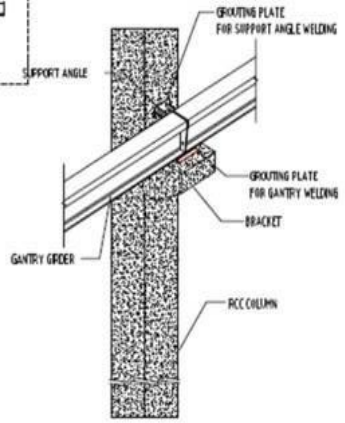




FRONT VIEW







ISOMETRIC VIEW

QUANTITY–2NO'S