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 79 38 Fax : +91 431 252 07 19 Email : tvenkat@bheltry.co.in Web : www.bhel.com

	Enquiry Number:	**Enquiry Date:**	**Due date for submission of quotation:**
	2620900065	**26.02.2009**	**04.04.2009**
You are requested to quote the Enquiry number date and due date in all your correspondences. This is only a request for quotation and not an order			

Item	**Description**	**Quantity**	**Delivery (Item required at BHEL on)**
10	Battery Powered Transfer Car – 30 T Capacity as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in)	03 Nos.	25.09.2009

BHEL commercial terms & conditions along with technical specifications 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 "2620900065".

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 Manager / Capital Equipment / MM

TECHNICAL SPECIFICATIONS FOR BATTERY POWERED TRANSFER CAR *[CARRYING CAPACITY: 30 tonne]*

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's TECHNICAL OFFER (With Complete Details)
1.0.0	**APPLICATION**	a. The proposed Transfer Car is intended for material handling within a large and heavy fabrication industry, on steel rails embedded in the shop floor. b. The Transfer Car will be put to use for continuous duty [three shifts in a day and for all the 365 days in a year]. c. The shop floor environment will be dust prone, humid, welding fume filled and ambient temperature going up to 50° C. d. The proposed trolley will travel on rails which will have a max gap of 300mm in which perpendicular track runs at lower level	
2.0.0	**SCOPE OF SUPPLY**	a. Design and Manufacture as per BHEL Tender Specifications**.** b. Assembly and Running Test before Dispatch, at Supplier's Works. c. Supply in Modules / Sub-Assemblies Commissioning and Performance Prove-Out at BHEL Works e. Mechanical & Electrical Spares f. Performance Guarantee for 24 months, from the date of commissioning. g. Delivery –a minimum of three number of transfer cars in each lot.	
3.0.0	**TECHNICAL SPECIFICATIONS**		
3.1.0	Capacity	30,000 kgs. [30 Tons]	
3.2.0	Rail Track Gauge	1676 mm [Broad Gauge]	
3.3.0	Trolley Platform Length	10000 mm	
3.4.0	Trolley Platform Width	3000 mm	
3.5.0	Height from Rail Level	900 mm [Loading Platform Level]	
3.6.0	No of Axles	Four	
3.7.0	Wheel Tread Diameter	500 mm	
3.8.0	Motor	DC SERIES MOTOR 5 HP 1700 RPM 36V	
3.9.0	Haulage Speed	Upto 30 mtrs. / min.	

4.0.0	**CONFIGURATION & CONSTRUCTION**		
4.1.0	**BASIC DESIGN**	The transfer car shall be configured to run on BG [Broad Gauge] track with a sturdy steel structure, powered with a suitable DC motor (in conjunction with a gearbox and battery) and provided with controls, operator console, battery charger, etc., as per the details given under the following clauses.	
4.2.0	**TRANSFER CAR CARRIAGE**	a. The under frame shall be fabricated out of steel rolled beams and sections by welding. b. The top shall be covered with steel plates of adequate thickness (not less than 8 mm) to withstand load capacity of the transfer car. c. The main members shall be adequately reinforced to withstand shock loads encountered in service.	
4.2.1	**RAW MATERIAL**	a. Only steel plates, tested and certified for quality by reputed inspection authorities, shall be used. b. Test Certificates to be produced for BHEL verification and form part of the documentation.	
4.2.2	**WELDING ELECTRODES**	a. For all Horizontal Welding E 7018 Electrode only should be used. b. For all Vertical Welding E 7048 Electrode only should be used.	
4.2.3	**WELDED JOINT TESTING**	All Butt Welded Joints (if carried out/though not preferred by BHEL) shall be DP tested and records to be produced/offered for BHEL evaluation.	
4.2.4	**BOTTOM CLEARANCE**	The bottom most part of the components mounted under the trolley carriage shall have a minimum ground clearance of 100 mm.	
4.2.5	**BATTERY COMPARTMENT**	The battery compartment shall be protected from damage by means of guard plates	
4.2.6	**ATTACHMENTS**	The below listed attachments are to be compulsorily provided with the Transfer Car.	
4.2.7	**BUFFERS**	Two each of spring-loaded buffers with rubber pads shall be provided at both ends of the transfer car.	
4.2.8	**COUPLER**	Hook type couplers are to be provided at both ends, for shunting purposes.	
4.2.9	**LIFTING HOOKS**	Adequate number of lifting hooks shall be provided for transporting / lifting the transfer car by means of overhead cranes	

4.2.10	**SIDE SUPPORTS**	3 Nos. of support pockets with inside dimension of 75mm x 75 mm shall be provided on each side of the trolley to accept side-support pipes	
4.3.0	**DRIVE SYSTEM**	a. The drive shall consist of DC Series motor coupled to the totally enclosed gearbox and drive the wheel through axle-mounted heavy duty gearbox. b. The power to the motor shall be supplied from the batteries mounted on the trolley itself.	
4.3.1	**MOTOR**	a. DC Series motor of suitable capacity having adequate starting torque shall be used. b. The motor shall be totally enclosed. c. The speed control shall be through armature resistance control. Three-step speed in either direction shall be provided. d. DC magnetic brake shall be provided.	
4.3.2	**TRACTION MOTOR MAKE**	Motor make shall be of reputed make. BIDDER has to specify make and rating.	
4.3.3	**TRACK RAIL SIZE**	IRS 90 Lbs./Yard	
4.3.4	**BRAKE**	Fail safe electro-magnetic brake shall be provided for instantaneous stopping.	
4.3.5	**GEAR-BOX**	a. The gearbox casing shall be fabricated out of steel plates. b. The housing shall be stress relieved after fabrication to eliminate the internal stresses developed during welding and also to maintain the dimensional accuracy in service. c. The housing shall be of split design to facilitate easy assembly & maintenance d. The mating joint faces shall be of accurate finish, blue matched & lapped together to ensure leak proof joint. e. The gears shall be made out of alloy steel forging. f. The gear tooth size and face width shall be ample design with adequate factor of safety for severe shocks while in service during stall condition of motor as while braking under load.	
4.3.6	**WHEEL AND AXLE**	a. Forged wheels of defect free and finish machined on running tread, flange and bore shall be provided. b. The tread shall be induction hardened to 300 to 350 BHN. c. Axles shall be of forged steel.	

4.4.0	**CONTROL SYSTEM**	a. DC Motor shall be used with resistance for speed and torque control. b. The resistance value shall be selected so tat the motor delivers required torque while starting and current is kept within the permissible safe limit. c. Heavy-duty electro magnetic contactors shall be used to include and remove the resistance in the circuit. d. The control shall be by push buttons mounted in the control console. e. The driver console shall be provided with cover and lock and key to avoid unauthorized operation.	
4.4.1	**MAIN CONTROL**	Master controller with Dead-Man handle mounted at the driver's platform at one end of the trolley.	
4.4.2	**REMOTE CONTROL**	Pendant type hand held Remote Control Unit with 5 mtr. Long cable with quick-fix end connectors.	
4.5.0	**BATTERY**	a. Battery shall be accommodated in the transfer car suitably for easy maintenance, charging & replacement. b. Battery shall be Iron clad, heat sealed polypropylene classic motive power battery and assembled in steel trays duly FRP lined, including inter cell connectors, terminal take off, charging socket and harness, complete with all components, conforming to IS: 5154 of 1980 & Amendment-1.	
4.5.1	**BATTERY CHARGING**	Supplier shall charge the battery at site. Sufficient quantity of electrolyte and suitable Charger shall also be supplied along with the battery.	
4.5.2	**BATTERY POWER RATING**	36V DC, 300 AH 5 Hr rating Storage Type, Traction Duty, Lead Acid Battery	
4.5.3	**BATTERY MAKE**	Storage Battery shall be of internationally reputed make only. BIDDER has to specify make & power rating of the Battery.	
4.6.0	**BATTERY CHARGER**	Suitable for 36 V, 300 AH Lead Acid Battery. Charger shall have the following features : a. Constant current equalizing facility with auto cut-off. b. Protection for reverse battery, over current and short circuit. c. Free standing, self – compensating, and 100% automatic charging. d. Charging current and charging voltage indication. e. On delay start.	

4.6.1	**INPUT ELECTRIC POWER**	The battery charger shall be suitable for input electric supply through a 415VAC ± 10%, 50Hz ± 3% from 3 Phase, 3 Wire System. [No neutral conductor]	
4.6.2	**POWER CABLE**	10 mtr. long charging cable of adequate size, with end connectors, shall be supplied	
4.7.0	**SAFETY PROTECTIONS**	The following safety protections shall be compulsorily provided: 1. Overload Protection. 2. Short Circuit Protection. 3. Dead Man Control. 4. Key Switch. 5. Hooter. 6. Charger Isolation. 7. Reverse Interlock. 8. Over Speed Protection. 9. Emergency Stop.	
4.8.0	**SURFACE CLEANING**	All the fabricated parts shall be de-rusted and degreased (by shot blasting or chemical treatment for surface cleaning), after completion of all operations but prior to painting.	
4.9.0	**PAINTING**	The Steel fabricated parts are to be painted as follows : a. One coat of Primer with 25 microns of DFT (Dry Film Thickness) and 48 hours of compulsory curing after painting. b. Two coats of Enamel Paint (Colour – Golden Yellow) each with a DFT of 25 microns and intermittent curing of minimum 16 hours. c. The front and rear portions shall be painted yellow and black strips.	
5.0.0	**SPARES**	The BIDDER has to compulsorily list down the Mechanical, Electrical and Electronic Spares with Unit Rate, which are to be procured for three years of continuous operation of the Transfer Car with the Remote Control Unit.	
6.0.0	**DOCUMENTS/DETAILS for APPROVAL**	The following documents and details are to be submitted for BHEL Approval, prior to taking up the manufacture of the Transfer Car.	
6.1.0	Drawings and Documents	a. GA Drawing of the Transfer Car / Trolley. b. Trolley Dimensional Drawing. c. Sub-Assembly Drawing for Wheel & Axles, Gear Boxes, etc.	

		d. Calculations for Selection of Electric Motor and Gear-Box. e. Electrical Drawings. f. Schematic Drawing of Trolley Controls. g. Battery Charger Schematic Drawing. h. Total Weight of the Transfer Car including all Electrical Equipment.	
7.0.0	**O & M MANUALS**	Each Transfer Car shall be provided with a. Complete set of Tools required for Operational Maintenance, b. 3 Copies of Operation & Maintenance Manual hard copy & one soft copy in CD, [containing the following technical details, given under Clause **Sl. No. 7.1.0**]	
7.1.0	Drawings & Details	a. Trolley General Arrangement Drawing b. Assembly Drawing for Wheel & Axle, Gear-Box Assembly, etc. c. Electric Wiring Schematics d. Detailed Wiring Diagram for Sub-Systems / Control Panels e. Battery Charger Schematic Drawing. f. Specifications / Ratings of All Bought-Out Items g. Warranty / Guarantee Card for all the Bought-Out Items h. Trouble Shooting Chart for all Systems i. List of Spares – both Mechanical and Electrical	
8.0.0	**INSPECTION**	Schedule of Inspection at supplier's works: a. Verification of Test Certificate for Raw Materials used for fabrication. b. Verification of DP test Report of Butt-Joints and Random Testing of the Welds, by physical examination. c. Verification of Transfer Car Dimensions, Checking of Wheel Alignment, Mechanical Assemblies and Total Alignment. d. Speed / Traverse Motion Testing without load Schedule of Inspection at BHEL: a. Full / Rated Load Test. b. 10% OVER-LOAD Carrying Ability Check.	

9.0.0	**ERECTION & COMMISSIONING**		
9.1.0	Mechanical Erection / Assembly	Erection / Assembly of the Transfer Car has to be done by the Representative of the Supplier, at BHEL Works	
9.2.0	Commissioning	Commissioning of the Transfer Car and Performance Prove – Out for the Trolley's Capacity and Smooth Running (at BHEL Works) shall be the RESPONSIBILITY of the supplier.	
10.0.0	**PERFORMANCE GUARANTEE**	The Performance of the Transfer Car and/or the Components / Sub-Assemblies / Bought-Out-Items shall be guaranteed for a minimum period of twenty-four months from the date of performance acceptance at BHEL Works.	

GENERAL ARRANGEMENT OF TROLLEY