# Bharat Heavy Electricals Limited

**(**High Pressure Boiler Plant**)**
Tiruchirappalli – 620014, TAMIL NADU, INDIA
An ISO 9001 Company
CAPITAL PURCHASE / MATERIALS MANAGEMENT / MANUFACTURING


| **ENQUIRY** | Phone: +91 431 257 75 75<br>Fax : +91 431 252 07 19<br>Email : rrmanohar@bheltry.co.in<br>Web : www.bhel.com |
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| | **Enquiry Number:** | **Enquiry Date:** | **Due date for submission of quotation:** |
|---|---|---|---|
| | **2620700017** | **04.06.2007** | **21.08.2007** |
| Your 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 Schedule** |
|---|---|---|---|
| 10 | Hybrid Laser Welding System as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com) | 1 No. | 15.04.2008 |

**Note:**

**(1) Confirmation of acceptance for BHEL commercial terms & conditions and Price Bid formats have been posted in BHEL Corporate web site www.bhel.com under Enquiry reference "2620700017". Your offer should be based on all the above documents.**

**(2) Also, you are requested to fill in the Supplier Registration formats available in www.bhel.com (under Advancement – Supplier Registration) and send it along with your offer.**

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| Tenders should reach us before 14:00 hours on the due date<br>Tenders will be opened at 14:30 hours on the due date<br>Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present | Yours faithfully,<br>For BHARAT HEAVY ELECTRICALS LIMITED<br><br>Sr. Dy. Genl. Manager / Capital Purchase / MM / Manufacturing |

**PART A**

## QUALIFYING CRITERIA FOR THE SUPPLY OF
## LASER HYBRID WELDING SYSTEM

**SECTION – I**

The BIDDER / VENDOR has to compulsorily meet the following requirements to get Qualified for submitting an offer for **Laser Hybrid welding system**

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| **S. No.** | **REQUIREMENTS** | **Vendor's RESPONSE** |
| 1 | The BIDDER shall have a minimum of THREE Years of Continuous Experience in the field of Design, manufacture and supply of similar system. | |
| 2 | Only those vendors, who have supplied, and commissioned at least one such system for similar applications in the past five years (on the date of opening of Tender) and such system is presently working satisfactorily for more than one year after commissioning (on the date of opening of Tender), should quote. However, if such system (s) has/ had been supplied to BHEL, then such system should be presently working satisfactorily for more than six months after its commissioning and acceptance (on the date of opening of Tender). | |
| 2.1 | The vendor should submit the following information where similar system have been supplied, for qualification of their offer. | |
| 2.2 | Name and postal address of the customer / company where similar system is installed. | |
| 2.3 | Name and designation of the contact person of the customer. | |
| 2.4 | Phone, FAX no. and email address of the contact person of the customer. | |
| 2.5 | Month and Year of commissioning | |
| 2.6 | Application for which the system is supplied. | |
| 2.7 | One Performance certificate from the customers regarding satisfactory performance of system supplied to them. The certificate should be current and on the letterhead of the Customer. It should contain information regarding model / Size of system, year of commissioning and performance of M/c. | |
| 3.0 | 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 – I I

**The BIDDER is expected to give complete details against each clause in the table given below, with additional sheets those may be attached (giving clear reference number) to furnish and cover the requisite details / documents.**

| S. No | PARTICULARS | VENDOR's RESPONSE |
|---|---|---|
| 4 | Profile of the Company bringing-out the years of Experience of the BIDDER in the field of design, manufacture, integration and supply of **Laser Hybrid welding system** | |
| 5 | Number of **Laser Hybrid welding systems** supplied, installed and commissioned till date for **similar applications** (with details on system type / model, configuration, customer and quantity) | |
| 6 | YEAR of supply of latest, **Laser Hybrid welding system** for welding applications and the Technical Specifications of the System supplied [Details to be furnished] | |
| 7 | Details on the Firm's Registration and the FINANCIAL STRENGTH of the COMPANY (Balance Sheet for the last **3** years) shall be submitted with the TECHNICAL OFFER | |
| 8 | Details on International Standards / Design Process Codes followed in Design and Manufacture of the Equipment. | |
| 9 | Details on SERVICE-AFTER-SALES Set-Up in India including the Addresses of Agents / Service Centers in India. Competency & Experience of the Local Service Agency are to be provided | |
| 10 | Any Additional Data to supplement the manufacturing capability of the BIDDER for the subject equipment | |

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**The BIDDER has to comply with the following, for accepting the Technical Offer for Scrutiny by the Purchaser:**

| S. No. | REQUIREMENTS | VENDOR's RESPONSE |
|---|---|---|
| 11 | The BIDDER / VENDOR shall submit the offer in TWO PARTS-Technical [with PART A & PART B] & Commercial and Price Bid. | |
| 12 | The Technical Offer shall be supported by Product Catalogues and description. | |
| 13 | The Offer shall contain a comparative statement of Technical Specifications given by BHEL and the Offer Details submitted by the Bidder, against each clause. A mere 'CONFIRMED' or 'COMPLIES' or 'YES' or 'NO-DEVIATION' or similar words in the technical comparative statement [without any supporting technical write-ups, photos and datasheets] may lead to disqualification of the Technical Offer. | |
| 14 | The BIDDER / VENDOR shall assure a continuous support for the supply of SPARES and SERVICE for TEN Years, from the date of commissioning of equipment at BHEL Works. | |
| 15 | 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 of the inclusion of all the accessories, tooling, attachments, auxiliary parts, spares, consumables, etc. with the main and basic equipment, to meet the technical specification requirements. | |
| 16 | Soft copy if any, giving the salient features of the proposed machine with all sub-systems and auxiliaries, and /or showing live-demo of an existing and working machine of similar configuration and capacity may be provided. | |
| 17 | BIDDER has to indicate the Country of Origin for the supply of equipment. | |
| 18 | The reference List of Customers shall be accompanied with (Phone Number and E-Mail ID) of the CONTACT PERSON for cross reference by BHEL | |
| 19 | In case of preliminary qualification of the offer, on technical grounds, the BIDDER may be called for a detailed technical discussion on the original technical offer at BHEL Works, with a sufficient notice period. | |

## PART-B
## SPECIFICATION FOR LASER HYBRID WELDING SYSTEM

**Laser – MIG hybrid welding system** consists of laser source, chiller, beam delivery, MIG/MAG hybrid welding head, MIG/MAG digital power source with wire feeder and torch, Real time laser vision seam tracking; CNC controlled work table and high accuracy welding robot.

All the above subsystems are to be integrated as a single workstation to carryout laser-MIG hybrid welding;

| SL. NO. | ITEM | DETAILED SPECIFICATION | BIDDER'S OFFER (WITH COMPLETE TECHNICAL DETAILS) |
|---|---|---|---|
| **1.0** | **Laser unit** | Nd: YAG, Laser preferable<br>Excitation mode: Diode pumping | |
| **1.1** | **Laser power source with beam delivery system** | Capacity: 4000watts;<br>Mode: Continuous Wave (CW);<br>Beam quality: 25mm* mrad minimum;<br>Ether net interface and remote diagnostics;<br>Provision for periodic software up-gradation;<br>Provision for laser parameter recording and storage;<br>Suitable Pilot laser;<br>Suitable beam delivery using 600micron FOC;<br>Length of FOC - 15meters; | |
| **1.2** | **Chiller unit** | Water / water chiller unit with input and out put ports and hoses for working in a tropical climate; Max. temperature at working location: 40ºC; | |
| **2.0** | **Laser Hybrid welding head** | Hybrid head for laser and MIG/MAG welding suitable for Robot mounting;<br>Cross jet/Air knife for optical protection;<br>Integral CCD camera with cross hair generator;<br>AR coated cover slides<br>AR coated Lenses for four different focal lengths varying from 80 to 300mm. | |
| **3.0** | **MIG/MAG power source & wire feeder** | Digitally programmable power supply;<br>With remote welding parameter control facility;<br>Output welding current - 500 A @ 60% duty cycle; | |

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| | | Robot mountable wire feeder for feeding 1.0/1.2/1.6mm solid wires;<br>Welding torch - 500A @ 60% duty cycle. | |
| **4.0** | **Seam tracking system** | Real time integrated laser vision seam tracking suitable for guiding hybrid laser welding robot;<br>Height control / AVC;<br>Provision for pre-process and post-process inspection; | |
| **5.0** | **Welding Robot for hybrid head movement** | High-precision Robot particularly suitable for laser applications:<br>Pay load: 30 kg<br>Supplementary load: 35 kg<br>Max. Reach : 2000 mm<br>Number of axes: 6<br>Repeatability : <±0,1 mm<br>Mounting position: Floor<br>Necessary teach pendant and remote control;<br>Anti collision sensor for safe operation; | |
| **6.0** | **PLC/CNC based control with interface for work piece movement** | Integrated Robotic control for the operation of:<br>i) Laser source<br>ii) Digital MIG/MAG power source<br>iii) CNC work table<br>iv) High precision Welding robot<br>v) Provision for additional switches to operate peripheral devices like water cooling, fume recovery, shielding gas supply, compressed air, remote on /off, emergency off<br>vi) USB interface for data collection | |
| **7.0** | **Safety accessories and manuals** | Laser safety goggles –1.06µm, 10nos.;<br>Laser safety curtains: app.2x3m – 6nos;<br>Hard and soft copies of:<br>i) Operating, trouble shooting and maintenance manuals for all the subsystems<br>System Integration manual | |

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| **8.0** | **Service conditions:** | 1. Available 3 phase 4 wire at 415volt and 50Hz<br>2. Inlet water temperature for cooling of chiller: 30ºC<br>3. Shielding gases like Ar, CO2 available from cylinders<br>4. Compressed air available at 4 to 7bar pressure | 5. |
| **9.0** | **Optional items** | 1. CNC work table with Linear movement, X= 4000mm; Load: 250kg; Universal Rotary Positioner – 25kg capacity<br>2. Fume recovery system.<br>3. Spares for 2 year trouble free operation for the following:<br>a. Laser power source, Laser optics and FOC<br>b. MIG power source, wire feeder and torch<br>c. Robot and integrated control panel<br>4. Spare welding torch<br>5. Voltage Stabilizer for laser power source. | 6. |
| **10.0** | **Inspection** | The supplier to offer for inspection of the system before dispatch at his works | |
| **11.0** | **Training** | The supplier to offer one week training at his works for operation and maintenance of the Laser hybrid welding system for two engineers | |
| **12.0** | **Commissioning** | The supplier to commission the equipment at WRI and demonstrate Laser hybrid welding. Commissioning of the Equipment shall be the RESPONSIBILITY of the Supplier. | |
| **13.0** | **Manuals** | To supply 3 sets of hardcopy in English and soft copy of the various manuals for welding robot, hybrid head, laser system and controls.<br><br>**The operating manual**:<br>• Operating manuals of Machine & CNC system with machine specifications, detailed operating instructions | |

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| | | for machine operation, setting of machine parameters, precautions, and machine safety details.<br>• Programming Manuals of Machine & CNC system<br><br>**The maintenance and trouble shooting manual**:<br><br>• Detailed Maintenance manual of the total & sub systems with all drawings of assemblies/sub-assemblies/parts, Electrical Wiring Drawings (Power & Control Circuits), Complete Printed Circuit Board Schematics indicating checkpoints (Test Points) for Electronic Controls. All Assembly/ Sub Assembly Drawings shall be supplied with the part list.<br>• On-Line Fault Diagnostics to be provided.<br>• Maintenance, Interface & commissioning manuals for CNC system & drives<br>• Catalogues, O&M Manuals of all bought out items including drawings, wherever applicable.<br>• Detailed specification of all wear items and hydraulic / lube fittings<br>• PLC program printouts with comments in English.<br>• PLC program on CD, NC data & PLC data on CD<br>• Complete back up of hard disk on CD and clear written Instructions to take back up and reloading of a new hard disk.<br>• The vendor shall submit complete Master List of parts used in the system.<br>• One additional set of all the above documentation on CD | |
| **14.0** | **PERFORMANCE GUARANTEE** | The Performance of the Total Equipment shall be guaranteed for a minimum period of twelve | |

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| | | months from the date of commissioning at BHEL Works. | |
| **15.0** | **GENERAL POINTS** | | |
| **15.1** | Make and Model of the machine to be mentioned. Detailed catalogs of the machine to be sent with the offer. | | |
| **15.2** | Complete description of all systems & sub-systems shall form part of the technical bid | | |
| **15.3** | A schematic diagram showing the layout of the machine & associated systems with salient dimensions shall be submitted along with the offer. | | |
| **15.4** | The operating sequence of the machine with broad outline of various operations involved should be furnished with the offer. | | |
| **15.5** | Standards for Design, Manufacture and testing of the machine shall be in accordance with internationally accepted standards | | |

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| **15.6** | Total weight of the Machine & Sub-Systems. Weight of the heaviest part of the machine | | |
| **15.7** | Total connected load KVA | | |
| **15.8** | Painting of machine and Electrical panel | RAL6011 Apple green (Polyurethane paint) | |
| **15.9** | Floor area required (Length x width x height) for complete machine and accessories | | |
| **15.10** | Spares required for 2 years trouble free operation | | |