



An ISO 9001  
Company

## Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

MATERIALS MANAGEMENT / CAPITAL EQUIPMENT

### ENQUIRY

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Web : [www.bhel.com](http://www.bhel.com)

	Enquiry Number:	Enquiry Date:	Due date for submission of quotation:
	2620900078	20.03.2009	20.04.2009

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	Orbital Tube Welding Machine as per the technical specification & commercial conditions applicable (to be downloaded from web site <a href="http://www.bhel.com">www.bhel.com</a> or <a href="http://tenders.gov.in">http://tenders.gov.in</a> )	1 No.	31.01.2010

**BHEL commercial terms & conditions with Price Bid and Bank Guarantee formats 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 “2620900078”.**

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 / MM / Capital Equipment

**PART A****QUALIFYING CRITERIA FOR THE SUPPLY OF ORBITAL TUBE WELDING MACHINE****SECTION – I : QUALIFYING CRITERIA**

The BIDDER has to compulsorily meet the following requirements to get qualified for considering the technical offer for the ORBITAL TUBE WELDING MACHINE.

<b>S. No</b>	<b>REQUIREMENTS</b>	<b>VENDOR's RESPONSE</b>
<b>1.0</b>	Only those vendors who have supplied and commissioned at least ONE ORBITAL TUBE WELDING MACHINE in the past ten years (on the date of opening of Tender) and such machine is presently working satisfactorily for more than one year after commissioning (on the date of opening of Tender) should quote. However, if such machine had already been supplied to BHEL, then that machine should be presently working satisfactorily for more than six months after its commissioning and acceptance (on the date of opening of Tender).	
<b>The vendor should submit following information where similar machine has been supplied for qualification of their offer.</b>		
1.1	Name and postal address of the customer or company where similar machine is installed.	
1.2	Name and designation of the contact person of the customer.	
1.3	Phone, FAX no and email address of the contact person of the customer.	
1.4	Month and Year of commissioning of the machine.	
1.5	Application for which the machine is supplied	
1.6	Performance certificate from the customer regarding satisfactory performance of machine supplied to them.	
1.7	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 : COMPANY PROFILE:**

<b>S.No</b>	<b>PARTICULARS</b>	<b>VENDOR's RESPONSE</b>
2.0	Number of years of Experience of the Bidder/Vendor in the field of Design, Manufacture & supply of Orbital Tube Welding Machine.	
3.0	Details on the Codes/Standards of Machine Design and Manufacture.	
4.0	Details of Quality System (with Stages of Internal Inspection) followed for the Machine Building and Testing of Capacity.	
5.0	Any additional data to supplement the manufacturing capability of the BIDDER for the subject equipment.	

**SECTION – III : BID / OFFER FORMATS**

<b>S.No.</b>	<b>PARICULARS</b>	<b>VENDOR's RESPONSE</b>
6.0	The Bidder shall submit the offer in TWO PARTS – Technical (with <b>PART A &amp; PART B</b> ) & Commercial and Price Bid.	
7.0	The Offer shall contain a comparative statement of Technical Specifications given by BHEL and the Offer Details submitted by the Bidder, against each Clause. A just 'YES' or 'CONFIRMED' or 'NO-DEVIATION' or 'COMPLIES' or 'ACCEPTED' or similar words in the technical comparative statement may lead to disqualification of the Technical Offer.	
8.0	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 (if applicable).	
9.0	The Commercial 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, auxiliary parts, spares, consumables, etc. with the main and basic equipment, to meet the technical specification requirements.	
10.0	Earlier performance /field experience (including service support) if any, with BHEL for the Vendor's Equipment Service, will be reckoning factor for the technical qualification of the Offer.	

**PERFORMANCE CERTIFICATE – (SAMPLE FORMAT)**  
**(On Customer's Letter Head)**

1. Supplier of the Equipment/Machine :
2. Make & Model of the Equipment :
3. Month & Year of Commissioning :
4. Application for which Machine is used :
5.
  - a. Equipment Serial Number :
  - b. Power Source Rating :
  - c. Orbital welding-tube range :
  - d. Other Specifications (optional) :
6. Performance of the Machine (with reasons for recommendation) :

Best in the market/  
Satisfactory/  
Good/  
Average/  
Not Satisfactory
7. Any other Remarks :

Date :

Signature & Seal of the Authority  
Issuing the Performance Certificate

PART B			
TECHNICAL SPECIFICATION for AUTOMATIC ORBITAL TUBE WELDING MACHINE			
S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER
1.0.0	PURPOSE & APPLICATION		
1.1.0	a. The welding machine is intended to build up tube, by butt joining 2 straight tubes .		BIDDER is expected to give technical write up on welding machine design, construction and operational features to bring out the capability of the proposed equipment, to meet the BHEL specification requirements
	ANNEXURE – 1 & 2 give typical joint details for tube build-up.		
	b. The portable mechanised orbital TIG welding machine is expected to carry out the following operations :		
	1. Butt welding of tubes by automatic orbital welding process		
	2. Weld data logging and report generation		
2.0.0	JOB DETAILS		
2.1.0	Tube I & process	OD17 x 2 mm Stainless Steel tube welding with 0.8/1 mm wire.	
	Tube II & process	OD18 x 2.5 mm Titanium tube-Fusion pass and then welding with 0.8/1 mm wire.	
2.2.0	WELD JOINT DETAILS		
	a. Style of Edge Preparation	As given in ANNEXURE 1&2	
	b. Tube End Condition	Edge prepared in lathe .	
	c. Weld Joint Location	Length of straight portion on either side of weld joint ≥ 300 mm.	
	d. Production Process	Fusion pass if required and then Automatic single/ multi pass orbital welding.	
	d. Weldment Testing Modes :	Radiography and / or Ultrasonic Testing	
	e. Weld Quality Appraisal	As per ASME Section I, V, VIII Division 1 & 2 for Radiography Test and 100 % RT, Helium & Hydro tests.	
3.0.0	WELDING MACHINE CONFIGURATION		
3.1.0	Each Welding Machine shall consist of the following equipment & facilities :		Bidder to confirm
	Main Manipulator / Structure for Machine Handling - 1 No.		
	Welding Machine with Controls,Power source , Data Recording Unit & Water Cooling system - 1 No.		
	Tube Butt Joint Fit-Up Fixture / Clamping Unit - 1 No.		
	Inter-connecting Cables and Hoses - 1 Set		
	Consumables required - 1 Set		
	Operating and Service Tool Kit - 1 Set		
	External Data Storage & Retrieval System - 1 Set		

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER
	External Weld Bead Inspection System - 1 No.		
<b>3.2.0</b>	<b>MAIN MANIPULATOR / STRUCTURE</b>		
<b>3.2.1</b>	Purpose	Both the tubes are to be kept stationary and weld head should rotate around the joint. Manipulator/structure is required to hold the orbital welding head, job holding fixture / clamping unit, etc. envisaged for the easy positioning and handling of the sub-systems required to carry-out tube butt welding. The structure shall be fixed on the ground.	Bidder to provide details
<b>3.2.2</b>	Design features	a. Axes & Length of movement b. Facilities (like Spring Balancers) for holding Welding Head, Weld Control Pendant, Clamping Fixture, etc. c. Weight Carrying Capacity. d. Clamping mechanism for tube butt-joints without tack weld and to facilitate automatic orbital welding. e. Schematic Diagram of the offered structure or manipulator, to carry-out the welding operations. f. Tube centering mechanism if any.	Bidder to provide details
<b>4.0.0</b>	<b>ORBITAL WELDING HEAD AND CONTROL SYSTEM</b>		
<b>4.1.0</b>	<b>POWER SOURCE</b>		
<b>4.1.1</b>	Type	Micro-processor controlled, Programmable, Inverter type	Bidder to confirm
<b>4.1.2</b>	Make & Model	Polysoude /Esab /Lincoln/ Miller or any other reputed make acceptable to BHEL	Bidder to confirm
<b>4.1.3</b>	Switching Frequency		Bidder to specify
<b>4.1.4</b>	Welding Process	Pulsed GTAW, DC Straight Polarity	Bidder to confirm
<b>4.1.5</b>	Memory	99 Welding Programs minimum	Bidder to confirm
<b>4.1.6</b>	Multiple Parameter Values within a program ( for sectoral programming )	Number of programmable levels	Bidder to specify
<b>4.1.7</b>	Welding Data Entry	Through a 'dust & moisture proof' Membrane Key Pad	Bidder to confirm
<b>4.1.8</b>	Front Panel Display (in English)		Bidder to describe
<b>4.1.9</b>	Output Current Range	4 to 400 A D.C.250 A @ 100% duty cycle, 400A at 35% duty cycle.	Bidder to confirm
<b>4.1.10</b>	Current Accuracy	±1% of setting	Bidder to confirm

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4.1.11	Welding Voltage Range	5 to 30 V DC (250A to 400A)	Bidder to confirm
4.1.12	Gas Pre-flow / Gas Post-flow Time& Feature	0 to 99 sec. Gas pre-flow, post-flow in the chamber shall be controlled by program.	Bidder to confirm
4.1.13	Current Pulse Frequency	0.05 to 50 pulses / sec	Bidder to confirm
4.1.14	Pulse Current Time	0.01 to 10 sec	Bidder to confirm
4.1.15	Background Current Time	0.01 to 10 sec	Bidder to confirm
4.1.16	Current Up-slope / Down-slope Time required during welding	0 to 45 sec	Bidder to confirm
4.1.17	Time setting for each current level required during welding	0 to 45 sec	Bidder to confirm
4.1.18	Rotation Start / Stop Delay required during welding	0 to 45 sec	Bidder to confirm
4.1.19	Wire Feed Start / Stop Delay required during welding	0 to 45 sec	Bidder to confirm
4.1.20	Torch Rotation Speed & variation	0 to 250mm/min $\pm 1\%$ of setting	Bidder to confirm
4.1.22	Filler Wire Feed & Speed		Bidder to Specify
4.1.23	Filler Wire Feed & Speed variation	$\pm 1\%$ of setting	Bidder to confirm
4.1.24	Torch Oscillation Speed		Bidder to Specify
4. 1.25	Oscillation Dwell Time at both ends (independently adjustable)		Bidder to specify
4.1.26	AVC Function	$\pm 1\%$ variation	Bidder to confirm
4.1.27	Programming increments for welding current & time	0.1 Amp. / 0.1 Sec.	Bidder to confirm
4.1.28	Welding parameter override during welding	Programmable limits	Bidder to specify range
4.1.29	High Frequency Unit	For arc starting	Bidder to confirm
4.1.30	Water Cooling Unit for Torch	Built-in and of suitable capacity for the weld head and torch	
4.1.31	Gas hose with end fittings – Gas cylinder to power source	Length to suit long travel on cable festoon	
4.1.32	Gas Flow Setting	Gas flow meter with gas solenoid operating push button switch for presetting gas flow rate, provided on the Front Panel	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER
4.1.33	Fault Protection Sensors	For gas & cooling water flow	
4.1.34	Arc Sensing	Means & modes for arc initiation and sensing	Bidder to specify
4.1.35	Welding Speed Selection	Automatic calculation and setting of rpm based on tube outside diameter & welding speed	
4.1.36	Data Logger	For continuous logging, monitoring & retrieval for each weld.	Bidder to provide details.
4.1.37	Maximum No.Data Log Files in Memory		Bidder to specify
4.1.38	Chart recorder/printer	Built-in or provided as Optional attachment	Bidder to confirm
4.1.39	Safety Lock	Key lockable switch – Programming / Operation / Lock	Bidder to specify
4.1.40	EMI Interference Suppressor	Bidder to specify the details for EMI suppression in input supply line	Bidder to specify
4.1.41	Data transfer	USB port for Data Transfer & 2 Nos. of 2 GB pen drive.	Bidder to specify
5.0	<b>WELDING HEAD</b>		
5.1.1	Type	Low profile tube orbital welding head of rugged construction	
5.1.2	Rating	250 A 100% duty cycle	Bidder to confirm
5.1.3	Recirculating water cooling system	Complete details of cooling system with layout, giving flow, pressure, pump make and specification to be provided along with offer.	Bidder to confirm
5.1.4	Purging Gas Chamber	To be used with the head.	Bidder to provide details
5.1.5	Clamping Ring, Mounting on Tube	For easy mounting / dismounting of head	Bidder to specify
5.1.6	Servo controlled Oscillation & Dwell Stroke Length ( 20mm), Speed Dwell Time.		Bidder to specify
5.1.7	Servo Controlled AVC	10mm stroke	Bidder to specify
5.1.8	Servo Controlled Rotation Motor	Speed 0 to 250mm/min	
5.1.9	Cross Seam Adjustment		Bidder to specify range
5.1.10	Servo Controlled Synchronized Pulsed or Continuous Wire Feed Motor (on board)		Bidder to specify
5.1.11	Wire Size	0.8, 0.9 & 1.0mm	
5.1.12	Wire Nozzle Adjustment (Manual)	Vertical, horizontal & angular	
5.1.13	Lead / Lag adjustment	± 15°	



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5.1.14	Tilt In / Out	$\pm 10^\circ$	
5.1.15	Wire Nozzle and its mounting arrangement	Shall be capable of withstanding the high temperatures without loosening	
5.1.16	Wire Spool Carriers	Low Profile, head mounted	
5.1.17	Miniature Wire Spools	Weight	Bidder to specify
5.1.18	Tungsten Electrode Size	Ceriated Tungsten Electrode Size 2.0mm and 2.4mm	
5.1.19	Tungsten Tip included angle	15 Deg. to 30 Deg.	
5.1.20	Cable and Hose Package	The cable and hose package for the welding head shall be adequately sheathed with heat and abrasion resistant material. It shall withstand repeated winding / rewinding while in operation	Bidder to confirm
5.1.21	Number of Coiling Required	The welding head and cable winding shall be suitable for continuous operation for 4 passes on the tube without interruption	Bidder to confirm
5.1.22	Thermal Stability	a. All the metallic and non-metallic components of the welding head shall withstand the intense heat radiation during welding	Bidder to specify
		b. Minimum arcing hours / number of joints before replacement	
5.2.0	<b>REMOTE OPERATOR PENDANT</b>		
5.2.1	Features	Pendant shall contain the following controls :	Bidder to confirm
		a. Selector Switch: Weld / Setting	
		b. Welding Program Access & Selection	
		c. Gas purge switch for gas flow setting	
		d. Inching operation for head rotation & wire feed	
		e. Welding current up/down (manual override)	
		f. Sequence Start / Stop	
		g. Emergency stop	
		h. Display of welding parameters	
6.0.0	<b>ELECTRICAL &amp; ELECTRONICS SYSTEMS</b>		
6.1.0	415V $\pm 10\%$ , 50HZ $\pm 3$ Hz, 3 Phase AC [3 wire system without neutral] power supply will be provided by BHEL at a single point near the machine, as per layout recommended by Vendor.		Bidder to confirm
6.2.0	Tropicalization: All electrical / electronic equipment shall be tropicalized.		Bidder to confirm
6.3.0	All electrical & electronic control cabinets & panels should be dust and vermin proof		Bidder to confirm

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER
6.4.0	All electrical components in the cabinets should be mounted on DIN Rail		Bidder to confirm
6.5.0	Control circuit voltage shall not exceed 110 V.		Bidder to confirm
6.6.0	All Electric enclosures shall have IP 54 protection		Bidder to confirm
6.7.0	All electrical and electronic panels including operator's panel should be provided with fluorescent lamps for sufficient illumination and power receptacles of 220 V, 5/15 Amp AC. All adapters /receptacles should have compatibility with Indian equivalents.		Bidder to confirm
6.8.0	Drive motors		Bidder to specify & provide details.
6.9.0	All the cable drag chain / cable trays required for laying of cables should be included in the offer.		Bidder to confirm
6.10.0	Vendor should ensure the proper earthing for the machine and its peripherals.		Bidder to confirm
6.11.0	Fault diagnostics and remedies.		Bidder to provide details.
6.12.0	All solenoid valves should have light indicating solenoids.		Bidder to confirm
7.0.0	<b>DATA ANALYSIS SYSTEM</b>		
7.1.0	External Data Storage & Retrieval System	Reputed make LAPTOP Computer 2 GB RAM,160GB hard disc Windows XP Intel Board, Processor DVD with Read/write & USB port. 1 No.	Bidder to Provide Details &with separate break-up
7.2.0	External Weld Bead Inspection System	Reputed make 8.1 Mega Pixel Digital Camera with Accessories (for picturisation of welds and cross sections) - 1 No.	Bidder to Provide Details &with separate break-up
8.0.0	<b>IN-BUILT SAFETY ARRANGEMENTS</b>		
8.1.0	Following safety features in addition to other standard safety features should be provided on the machine:		Bidder to confirm
8.1.1	A detailed list of all alarms / indications provided on machine should be submitted by the Vendor.		Bidder to specify
8.1.2	All the pipes, cables etc. on the machine should be well supported and protected. These should not create any hindrance to machine operator's movement for effective use of machine.		Bidder to confirm
8.1.3	Machine should have adequate and reliable safety interlocks / devices to avoid damage to the machine, work piece and the operator due to the malfunctioning or mistakes.		Bidder to specify
8.1.4	All the rotating parts used on machine should be statically & dynamically balanced to avoid undue vibrations and suitably guarded.		Bidder to confirm
8.1.5	Emergency Switches at suitable locations as per International Norms should be provided.		Bidder to confirm
9.0.0	<b>MACHINE LEVELLING &amp; ANCHORING SYSTEM</b>		Bidder to confirm
9.1.0	Complete anchoring system including foundation bolts, anchoring materials, fixators, levelling shoes etc should be supplied		Bidder to confirm

S.No.	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER
<b>10.0.0</b>	<b>TOOLS FOR ERECTION, OPERATION &amp; MAINTENANCE</b>	
<b>10.1.0</b>	The Vendor shall bring special tools and equipment required for erection of the machine. Necessary tools like Spanners, Keys etc. for operation and maintenance of the machine should be supplied. List of such tools should be submitted with offer	Bidder to confirm
<b>11.0.0</b>	<b>MACHINE SPARES</b>	Bidder to confirm
<b>11.1.0</b>	Itemized break-up of mechanical, electrical and electronic spares used in the machine in sufficient quantity as per recommendation of Vendor for 2 years of trouble free operation shall be offered by vendor. The list is to include following, in addition to other recommended spares: (Unit Price for each item of spare shall be offered)	Bidder to confirm
<b>11.1.1</b>	<b>Mechanical Spares:</b> Coolant Pump, Valves, Pressure Switches, Transducers, Flow Switches, Filters, Seals.	Bidder to specify
<b>11.1.2</b>	Tube Butt Joint Fit-Up Fixture / Job Clamping Unit - 1 No.	Bidder to specify
<b>11.1.3</b>	Inter-connecting Hose - 1 Set	Bidder to specify
<b>11.1.4</b>	<b>Electrical / Electronic Spares:</b> All types of Printed Circuit Boards, Proximity Switches, Special Fuses, Encoders, Power Module & Control Cards for Drives,miniature motors	Bidder to specify
<b>11.1.5</b>	All types of spares for total machine and accessories shall be available for at least ten years after supply of the machine. If machine or control is likely to become obsolete in this period, the vendor should inform BHEL sufficiently in advance and provide drawings of parts / details of spares & suppliers to enable BHEL to procure these in advance, if required	Bidder to specify
<b>11.1.6</b>	Vendor to confirm that complete list of spares for machine and accessories, along with item part no / specification / type / model, and name & address of the spare supplier shall be furnished along with documentation to be supplied with the machine	Bidder to confirm
<b>12.0.0</b>	<b>MACHINE DOCUMENTATION</b>	Bidder to confirm
<b>12.1.0</b>	O & M Manuals: a. THREE Copies of the Operation & Maintenance Manual (details as given in 12.3.0) to be given in Hard Bound Paper Copies with ONE copy in pen drive.	Bidder to confirm
<b>12.2.0</b>	b. One Hard Copy of O & M Manual as per clause 12.3.0 shall be submitted at the time of INSPECTION of the Orbital Welding Machine by BHEL Officials, at the Supplier's Works. to check the sufficiency of documents provided. If any additional details are required, it should be submitted.	Bidder to confirm
<b>12.3.0</b>	Documents and Technical Details	Bidder to confirm
	a. Write-up on the Operation and maintenance of the machine.	
	b. Complete specification of the machine.	

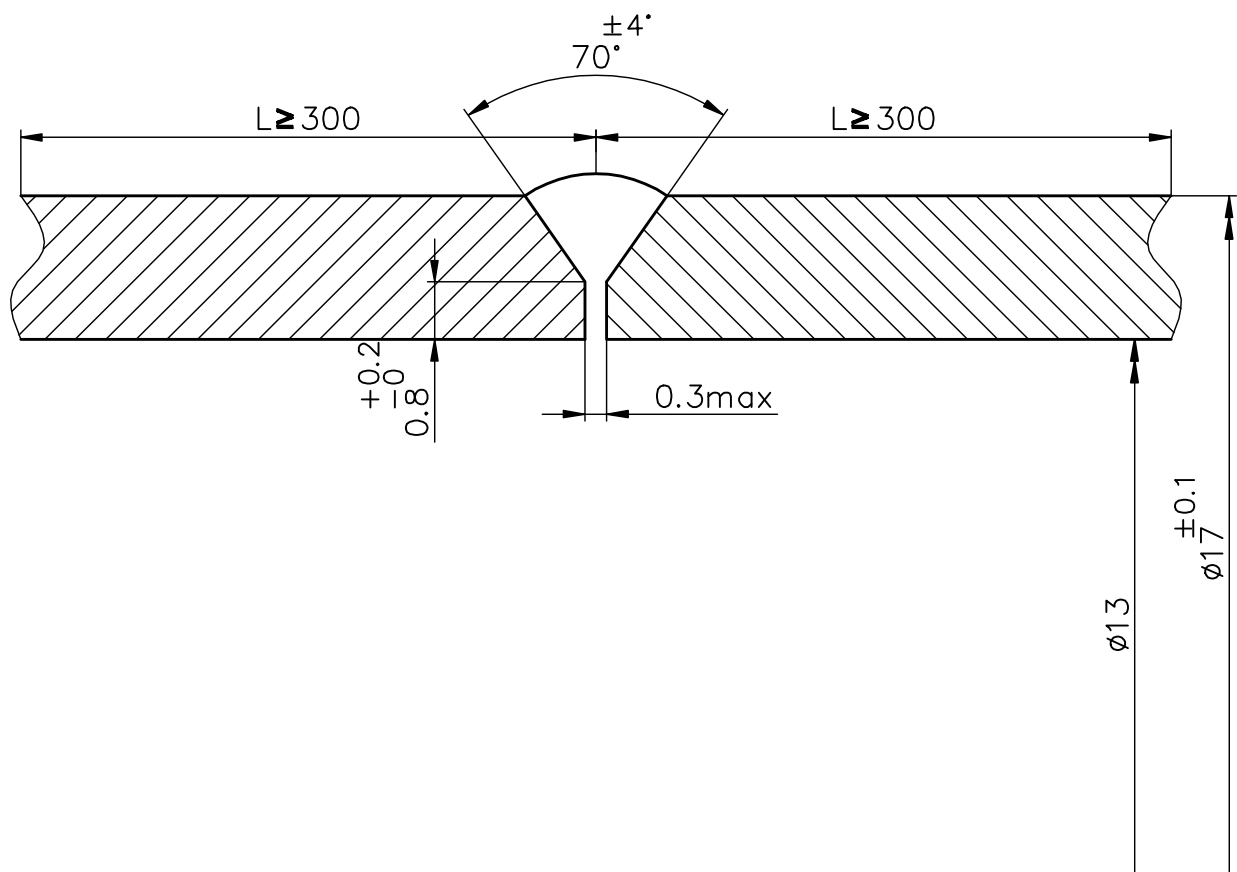
S.No.	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER
	c. Preventive maintenance Check list.	
	d. GA Drawing of the Orbital Welding machine.	
	e. GA Drawing of Individual Sub-Systems and Mechanisms with major dimensions and weights.	
	f. Sub-Assembly Drawings with cross sectional details and major/critical dimensions for all sub systems maintenance purpose.	
	g. Component drawings with complete dimension & material specification for all wearing components. List of wearing components to be submitted during drawing approval.	
	h. Electrical Wiring Drawings – Power & Control Circuits with BOM	
	i. Complete Printed Circuit Board Schematics indicating check points (Test Points) for Electronic Controls in CD.	
	j. Alarm Log, Error Code, Error Messages & Remedies to be provided.	
	k. Specifications/Ratings and catalogues of All Bought-Out Items.	
	l. Warranty / Guarantee Card for all Bought-Out Items.	
	m. Trouble Shooting Chart for Main and all Sub-Systems.	
	n. Machine related PC Details – Machine Operating Softwares, Parameters Selection Software, File Handling, and Display Recording. CD Read and Write unit, Serial and USB Ports to be ensured.	
	o. Total weight of the Machine & Sub-Systems.	
<b>13.0.0</b>	<b>TRAINING</b>	
<b>13.1.0</b>	The Vendor shall provide free training to maximum of four BHEL's Engineers in Operation and Maintenance (Mechanical, Electrical/ Electronics and PLC System) of the Machine at Vendor's works, for not less than 2 working days.	Bidder to confirm
<b>13.1.1</b>	Airfare, boarding & lodging for the BHEL Trainees shall be borne by BHEL.	Bidder to confirm
<b>13.1.2</b>	The Vendor shall impart training to BHEL's Machine Operators and Maintenance crew in Maintenance after the commissioning of the Machine at BHEL works for not less than 4 working days	Bidder to confirm
<b>13.1.3</b>	Competent, English speaking experts shall be arranged by the vendor during training for satisfactory & effective training of BHEL personnel	Bidder to confirm
<b>14.0.0</b>	<b>MACHINE ERECTION &amp; COMMISSIONING</b>	
<b>14.1.0</b>	Vendor to take full responsibility for supervision of the erection, start up, test the machine, its control & all types of other supplied equipment, carrying out welding of test pieces etc. Service requirement like power, air & water shall be provided by BHEL at only one point to be indicated by Vendor in their layout drawings. Other requirements like crane and helping personnel shall also be provided by BHEL	Details of these requirements should be informed by Bidder in advance

S.No.	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER
14.2.0	Successful proving of BHEL requirements by the Vendor shall be considered as part of commissioning.	Bidder to confirm
14.2.1	Tools, Tackles, Test Mandrels, instruments and other necessary equipment required to carry out all above activities should be brought by the Vendor.	Bidder to confirm
14.2.2	Commissioning spares, required for commissioning of the machine within stipulated time, shall be brought by the vendor on returnable basis.	Bidder to confirm
14.2.3	Portion, if any, of the machine, accessories and other supplied items where paint has rubbed off or peeled during transit or erection should be repainted and merged with the original surrounding paint by the vendor. For this purpose, the Vendor shall supply sufficient quantity of touch-up paint of various colours of paint used.	Bidder to confirm
14.2.4	Charges, terms & conditions for E&C shall be given (in detail) separately by Vendor along with offer.	Bidder to confirm
15.0.0	<b>AMBIENT CONDITIONS &amp; THERMAL STABILITY</b>	Bidder to confirm
15.1.0	The Orbital Welding Station with all sub-systems shall be suitable for operation in an ambient temperature of 25 to 50°C and with a Relative Humidity of 90% (both higher values do not occur simultaneously).	Bidder to confirm
15.1.1	Weather conditions are tropical, Atmosphere may be dust laden. Machine shall be kept in the normal shop floor condition . The ENTIRE EQUIPMENT shall be TROPICALISED in Design and CONSTRUCTION. [The offered machine shall be suitable for the above and details of provisions on the machine for the same are to be furnished by Bidder]	Bidder to confirm
15.1.2	The machine, including attachments and accessories, should be suitable for 24 hrs. Continuous operation to its full capacity for 24 hour a day and 7 days a week throughout.	Bidder to confirm
16.0.0	<b>MACHINE PERFORMANCE PROVE-OUT</b>	Bidder to confirm
16.1.0	a. Prove-out trials of the welding operation on tubes as specified in Clause 2.1.0 to be done at the supplier's works and at BHEL and mutually agreed.	Bidder to confirm
17.0.0	<b>MACHINE PACKING</b>	Bidder to confirm
17.1.0	Sea worthy & rigid packing for all items of complete machine, control system, all accessories and other supplied items to avoid any damage/loss in transit. When machine is despatched in containers, all small loose items shall be suitably packed in boxes.	Bidder to confirm
18.0.0	<b>GUARANTEE TERMS</b>	Bidder to confirm
18.1.0	Performance Guarantee for a minimum period of 12 months (for the machine in total and sub-systems or bought-out items in particular) from the date of acceptance of the machine.	Bidder to confirm

S.No.	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER
<b>19.0.0</b>	<b>GENERAL POINTS</b>	
<b>19.1.0</b>	Machine Model Number and other related details	Bidder to provide
<b>19.1.1</b>	Total Connected Load (in kVA)	Bidder to specify
<b>19.1.2</b>	Floor area required (Length, Width, Height) for complete machine & accessories	Bidder to specify
<b>19.1.3</b>	Painting of Machine/Electrical Panels: Apple green IS-5/1994 (shade: ISC No. 281)	Bidder to confirm
<b>19.1.4</b>	Total Weight of the Machine & Accessories	Bidder to specify
<b>19.1.5</b>	Bidder shall submit General Arrangement drawing with major/critical dimensions for getting BHEL's concurrence before manufacture.	

**Enclosures:** ANNEXURE – 1 & ANNEXURE-2

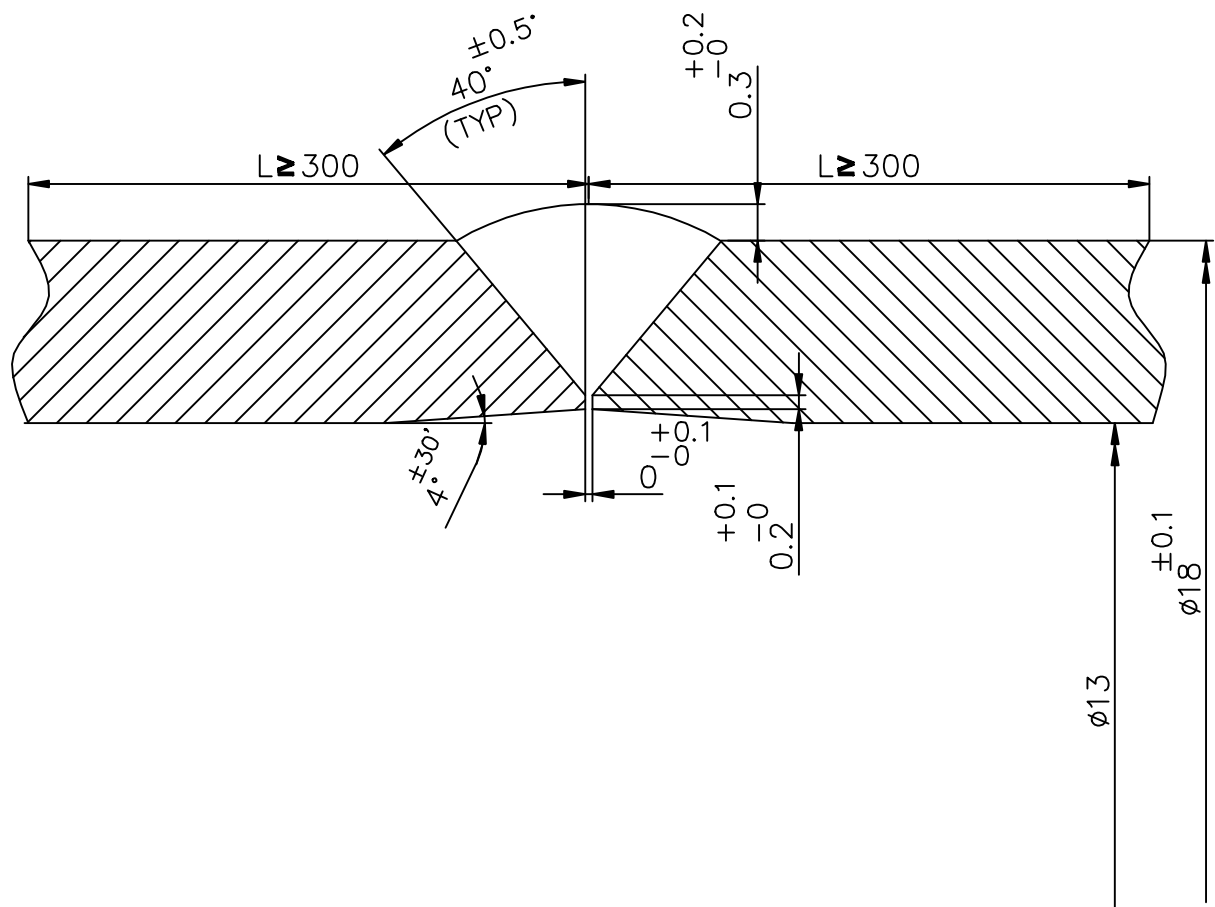
# ANNEXURE-1



TYPICAL TUBE BUTT JOINT EP STYLE

MATERIAL: STAINLESS STEEL

## ANNEXURE-2



TYPICAL TUBE BUTT JOINT EP STYLE

MATERIAL: TITANIUM