



An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirapalli – 620014, TAMIL NADU, INDIA

MATERIALS MANAGEMENT / CAPITAL EQUIPMENT

ENQUIRY NOTICE INVITING TENDER	Phone: +91 431 257 7653 Fax : +91 431 252 0719 Email : skaruna@bheltry.co.in Web : www.bhel.com
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TWO PART BID Tender to be submitted in Two Parts	Enquiry No: 2731200003	Enquiry Date: 28.04.2012	Due date for Submission of quotation : 29.05.2012
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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.

Please note that under any circumstances both delayed offer and late offers will not be considered. Hence vendors are requested to ensure that the offer is reaching physically our office before 14.00 Hrs on the date of tender opening

Item No.	Item Description	Quantity
10	Supply of Column and Boom Type Automatic Cir-Seam Welding Machine as per the Technical Specification, & Commercial Conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in)	01 No.

<p>Important Points to be taken care during the submission of offer:-</p> <ol style="list-style-type: none">1. The delivery period required is 9 months.2. Check list to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.3. The Bidder's response column may be filled in Technical Specification (Part A and Part B) and the commercial checklist applicable.4. Guarantee for the Items to be 18 months from the date of supply or 12 months from the date of commissioning.5. Additional Details required as per Specification may please be provided with supporting documents <p>BHEL's General guidelines /instructions including bank guarantee formats and list of consortium banks, commercial terms checklist 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) Tender Enquiry reference "2731200003"</p>
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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 / MM / Capital Equipment
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PART – A

COE – TI - ATP : Column & Boom Type Automatic Cir-Seam Welding Machine : 1 No.

Page 1 of 3 (PART-A)

SECTION – I : QUALIFYING CRITERIA

The BIDDER has to compulsorily meet the following requirements to get qualified for considering the technical offer :

Sl. No.	REQUIREMENTS	BIDDER'S RESPONSE
1	<p>Only those vendors (OEMs), who have supplied and commissioned at least ONE Column & Boom Type Automatic Cir-Seam Welding Machine (similar type being offered) in the past ten years (from the date of opening of Tender) and such machine is presently working satisfactorily for more than one year after commissioning (from the date of opening of Tender) should quote.</p> <p>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 (from the date of opening of Tender).</p>	
	The vendor should submit following information where similar machine has been supplied for qualification of their offer.	
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	Along with the Technical offer, the Vendor should submit one Performance certificate from the customer for the satisfactory performance of the machine supplied to them. For obtaining the Performance certificate, a suggestive format is provided in SECTION – IV .	
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.	
2.0	DELIVERY - The bidder shall quote the best possible delivery. However the delivery shall not exceed 9 months with an additional grace period of 3 months. The additional grace period will attract a penalty which is explained in the commercial terms of the enquiry. The delivery period shall be reckoned from date of purchase order to despatch from the vendor works.	

PART – A

COE – TI - ATP : Column & Boom Type Automatic Cir-Seam Welding Machine : 1 No.

Page 2 of 3 (PART-A)

SECTION – II : The BIDDER / VENDOR is requested to provide the following information:

Sl. No.	REQUIREMENTS	VENDOR'S RESPONSE
3.0	The BIDDER/VENDOR to furnish Reference List of Customers, with full address, details of contact person, where Column & Boom Type Automatic Cir-Seam Welding Machines have been supplied in the past.	
4.0	Details of Column & Boom Type Automatic Cir-Seam Welding Machines supplied to other BHEL units, if any. (Year of commissioning, Spindle size of machine, Spindle motor power)	
5.0	Details on SERVICE-AFTER-SALES Set-Up in India including the Address of Agents / Service Centers in South India.	
6.0	Any Additional Data to supplement the manufacturing capability of the BIDDER for the subject equipment.	

SECTION – III : The BIDDER to note:

Sl. No.	PARTICULARS	VENDOR'S RESPONSE
7.0	The BIDDER / VENDOR shall submit the offer in TWO PARTS. 1. Technical Offer [with PART A & PART B] & commercial offer 2. Price Bid.	
8.0	The Technical Offer shall contain a comparative statement of Technical Specifications demanded by BHEL and Offer Details submitted by the Bidder , against each clause. A just 'CONFIRMED' or 'COMPLIED' or 'YES' or 'NO-DEVIATION' or similar words in the technical comparative statement may lead to disqualification of the Technical Offer.	
9.0	The Technical Offer shall be supported by product Catalogues & Data Sheets and also technical details of Bought-Out-Items with copies of Product Catalogue to the extent possible.	
10.0	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.	

PART – A

COE – TI - ATP : Column & Boom Type Automatic Cir-Seam Welding Machine : 1 No.

Page 3 of 3 (PART-A)

SECTION – IV

The performance certificate should be produced **on Customer's Letter Head.**

PERFORMANCE CERTIFICATE

1. Supplier of the machine	
2. Make & Model of the M/C	
3. Month & Year of Commissioning	
4. Application for which M/C is used	
5 a) Effective Traversing length of carriage (X-Axis) b) Boom effective stroke in vertical direction (Y-Axis) c) Boom effective stroke in Horizontal direction (Z-Axis) d) Travel Speed in X,Y & Z axes. e) Rotation of the vertical column of the machine f) Type of power supply for pulsed GTAW, Make & current rating g) GTAW Torch model, type, make & rating. h) Control system model, Type & make	
6. Performance of the Machine (Strike off whichever is not applicable)	Satisfactory / Good / Average / Not Satisfactory
7. Any Other remarks	
Date: _____	
Signature & Seal of the Authority issuing the Performance Certificate	

PART-B: TECHNICAL SPECIFICATION

S.No	PARTICULARS	SPECIFICATION / DESCRIPTION	BIDDER'S OFFER WITH CONFIRMATION & COMPLETE TECHNICAL DETAILS
1.0	APPLICATION	<p>a) This machine is mainly intended for welding of circumferential butt joints and longitudinal butt joints of components such as Shells & Plates of Stainless Steel & Titanium materials using Pulsed GTAW with 1 No. of GTAW welding station.</p> <p>b) Scope includes necessary Job supporting and rotational arrangements for the 'prove out components' mentioned in Annexure I-B.</p> <p>IMPORTANT NOTE:</p> <p>c) Titanium jobs will be welded with two or more passes. The first pass (root pass) will be a fusion pass without filler wire and subsequent passes will be with filler wire.</p> <p>d) Welding shall be done in Argon atmosphere. In addition to the Shielding gas through the weld torch, additional provision shall be made for providing argon through suitable chambers for argon shielding / purging at front & trailing sides of the weld zone and back purging (at ID of shells and bottom of plates).</p> <p>e) Welding of shells of various outer diameters and thicknesses as per Annexure-IA.</p> <p>f) TIG Torch has to be employed.</p> <p>g) The weld joints shall meet the quality requirements as per ASME Sec. III and ASME Sec. IX</p> <p>h) All weld joints shall be of Radiography quality welds.</p>	Bidder to confirm

PART-B: TECHNICAL SPECIFICATION

S.No	PARTICULARS	SPECIFICATION / DESCRIPTION	BIDDER'S OFFER WITH CONFIRMATION & COMPLETE TECHNICAL DETAILS
2.0	JOB DETAILS		
2.1	Cylindrical Shell Outer Diameter	530 mm *	
2.2	Shell Wall Thickness (at the weld joint)	45 mm	
2.3	Minimum Length of Job	575 mm	
2.4	Maximum Length of Job	3000 mm	
2.5	Maximum Weight of the Job	1650 Kg. *	
		* Dimensions & Weight of job holding fixtures for prove out components are to be taken into consideration by the vendor.	Bidder to confirm
3.0	MACHINE DETAILS:		
3.1	Type:	Column & Boom type - travelling on " mached floor mounted rails ".	Bidder to confirm
3.1	Mode of Longitudinal Travel of Carriage.	The wheels to be designed to match the existing floor rails at BHEL.	<i>Bidder to confirm</i>
3.2	Effective Traversing Length of Carriage (X-Axis)	3000 mm	<i>Bidder to specify / confirm</i>
3.3	Boom Effective Stroke in Vertical Direction (Y-Axis)	2000 mm	<i>Bidder to Specify / confirm</i>
3.4	Boom Effective Stroke in Horizontal Direction(Z-Axis)	1200 mm	<i>Bidder to Specify / confirm</i>
3.5	Travel speed in X and Z axes (infinitely Variable)	50 - 1700 mm/min.	<i>Bidder to confirm and give details of drive mechanism</i>

PART-B: TECHNICAL SPECIFICATION

S.No	PARTICULARS	SPECIFICATION / DESCRIPTION	BIDDER'S OFFER WITH CONFIRMATION & COMPLETE TECHNICAL DETAILS
3.6	Rotation of the vertical column of the machine about Y axis (manual)	0 to 180° (mechanized rotation is preferred)	<i>Bidder to confirm</i>
3.7	Boom vertical travel speed	Fixed speed.	<i>Bidder to specify.</i>
3.8	Speed holding accuracy : for both the Carriage & Boom	To ensure weld quality, this will be one of the parameters for weld quality. Bidder to specify the best accuracy level.	<i>Bidder to specify.</i>
3.9	Minimum Height under Boom of the Welding Machine from ground.		<i>Bidder to specify.</i>
3.10	Maximum Boom extension (from centre of column)	To suit the stroke of 1200 mm	<i>Bidder to specify.</i>
3.11	Maximum sag at the end of boom.	When the boom forwarded to the maximum stroke of 1200 mm, the sag shall not be more than 1 – 2 mm.	<i>Bidder to confirm.</i>
3.12	Vibration Level	Maximum 0.5 mm during the traverses	<i>Bidder to confirm</i>
3.13	Clamps for Boom (for vertical & horizontal movements)	Details of clamping mechanism to be furnished with offer.	<i>Bidder to confirm</i>
3.14	Clamps for Column Rotation	Details of clamping mechanism to be furnished with offer.	<i>Bidder to confirm</i>
3.15	Self-locking mechanism in case of power failure for above clamps	Apart from Brake motor mechanism, if any, this clamping mechanism should be a separate one to keep the position of the column & boom undisturbed during power-off condition.	<i>Bidder to confirm</i>
4.0	POWER SUPPLY for PULSED GTAW		
4.1	Type	Inverter Controlled (IGBT Based) - DC Welding Power Supply for Pulsed TIG with "High frequency" facility.	<i>Bidder to confirm</i>

PART-B: TECHNICAL SPECIFICATION

S.No	PARTICULARS	SPECIFICATION / DESCRIPTION	BIDDER'S OFFER WITH CONFIRMATION & COMPLETE TECHNICAL DETAILS
4.2	Make	KEMPPPI -Finland, OTC / DAIHEN CORPORATION – Japan, or any other make acceptable to BHEL	<i>Bidder to confirm</i>
4.3	Model		<i>Bidder to specify</i>
4.4	Current Rating	300 A min. at 100% Duty cycle.	<i>Bidder to confirm</i>
4.5	Duty Cycle	100%	<i>Bidder to confirm</i>
4.6	H F Unit for TIG Welding	Bidder to give Technical Details	<i>Bidder to specify</i>
4.7	Process	Automated Pulsed TIG welding process. For titanium welding – a chamber around the job, torch etc., to be provided for shielding gas. Purging at front side, trailing end and bottom side shall be provided (Refer Point No. 5.1.9)	<i>Bidder to confirm</i>
5.0	WELDING HEAD:		
5.1.0	GTAW WELDING TORCH		
5.1.1	Model		<i>Bidder to specify</i>
5.1.2	Type	Water Cooled. Standard Water Cooled Power Cables are to be used. Vendor to provide details.	<i>Bidder to specify</i>
5.1.3	Make	Binzel / Weldcraft / Tokin / Kemppi, LINCOLN or any other make acceptable to BHEL.	<i>Bidder to specify</i>
5.1.4	Rating	400 A or more @ 100% Duty Cycle	<i>Bidder to confirm</i>
5.1.5	AVC Function for TIG Welding	+/- 1% with a stroke of 10mm (minimum).	<i>Bidder to furnish Technical Details.</i>

PART-B: TECHNICAL SPECIFICATION

S.No	PARTICULARS	SPECIFICATION / DESCRIPTION	BIDDER'S OFFER WITH CONFIRMATION & COMPLETE TECHNICAL DETAILS
5.1.6	Tungsten Electrode Size	Diameter : 2.0 / 2.4 / 3.2 mm	<i>Bidder to confirm</i>
5.1.7	Fine adjustment of Welding Torch parallel to the X,Y & Z directions	X axis : Y axis : Z axis :	<i>Bidder to confirm and specify</i>
5.1.8	Tilting of Torch about Y axis (for longitudinal weld joints)	+ / - 10 Degrees	<i>Bidder to confirm and specify</i>
5.1.9	Tilting of Torch about Z axis (for circumferential weld joints)	+ / - 10 Degrees	<i>Bidder to confirm and specify</i>
5.1.10	Arrangements for Shielding, pre-Purging, Back purging & Trailing gas lines	The torch should have provision to carry gas lines for Torch Shielding gas, Pre-purging of the weld zone (before welding) and Trailing shield (for purging the welded zone to avoid oxidation immediately after welding). Back purging line shall be used for purging the rear side (bottom) of the weld zone before, during & after the welding. This line should be taken out separately (not through the torch head) from the Gas feeding Unit. High Pure Argon will be used as shielding gas. As the OD and ID of these gas lines need regular cleaning, it should be easy to dismantle, clean and put back in service. Volume & duration of Gas flow through these lines shall be controlled through the welding program.	<i>Bidder to confirm</i>
5.1.11	Torch cable Length	Welding cable size and length to be carefully selected in order to avoid any problem of wire feeding during, before or after the welding process and to nullify problems like early failure of wire liner, wire getting struck inside liners etc.	<i>Bidder to confirm</i>

PART-B: TECHNICAL SPECIFICATION

S.No	PARTICULARS	SPECIFICATION / DESCRIPTION	BIDDER'S OFFER WITH CONFIRMATION & COMPLETE TECHNICAL DETAILS
5.1.12	Threads for mounting Ceramic Nozzle	Standard threads shall be used for mounting of the ceramic nozzle.	<i>Bidder to confirm</i>
5.2.0	GTAW WIRE (COLD WIRE) FEEDER		
5.2.1	Type	Bidder to Specify type & rating	<i>Bidder to specify</i>
5.2.2	Make	AC Servo Drive - Programmable for welding using "welding programs". Electrical drives shall be of Siemens / ABB / L&T / Eurotherm and PLC of SEW / Allen Bradley / Siemens / Messung / Fanuc or any other make acceptable to BHEL. Bidder to Specify the make and rating. (Selection of motor in such a way that optimum running conditions at rated speed).	<i>Bidder to specify & provide details</i>
5.2.3	Wire size	0.8 mm, 1.2mm, 1.6 mm& 3.0 mm.	<i>Bidder to confirm</i>
5.2.4	Wire Feed Speed	0 to 500 mm/min (step less Variable)	<i>Bidder to confirm</i>
5.2.5	Feeder Motor Capacity	Bidder to Specify (Programmable. Selection of motor in such a way that optimum running conditions at rated speed).	<i>Bidder to specify</i>
5.2.6	Weight of Wire Spool	Suitable for loading 5 kg Wire Spools. Bidder to Confirm	<i>Bidder to confirm</i>
5.2.7	Mounting of Wire Spool	Wire Spool should be mounted on a separate member in such a way that it should not affect the performance of the AVC function of the Torch ie. Wire spool should not be mounted on the vertical slide of the Torch.6	<i>Bidder to confirm</i>

PART-B: TECHNICAL SPECIFICATION

S.No	PARTICULARS	SPECIFICATION / DESCRIPTION	BIDDER'S OFFER WITH CONFIRMATION & COMPLETE TECHNICAL DETAILS
5.2.8	Position of Wire feed nozzle & required movements	Wire feed nozzle also should not be mounted on the vertical slide of AVC and shall be mounted on a separate carriage which can provide adjustment of the nozzle in all the three directions w.r.t the weld Joint. Also provision shall be made to position the wire feed nozzle either vertically or at 75 degrees inclination w.r.t vertical axis and with +/- 5 degrees adjustability in both the positions.	<i>Bidder to confirm</i>
5.2.9	Wire feed sheaths, Purging & Shielding hoses	Size and length of the wire feed sheath is to be carefully selected in order to avoid any problem of wire feeding during, before or after the welding process and to nullify problems like early failure of wire liner, wire getting struck inside liners etc. Similarly size and length argon purging / shielding hoses are to be selected to meet the requirements. The wire feed sheaths, argon purging / shielding hoses should not give away any loose particles during operation to avoid creating pores in the weld metal and should have a facility to clean them every shift with alcohol and or acetone.	<i>Bidder to confirm</i>
5.2.10	Scope of Supply	Bidder to Confirm supply of complete unit with cables, gas hoses, end connectors & protective sheath	<i>Bidder to confirm</i>
6.0	ACCESSORIES		
6.1	Tungsten Grinder	Two numbers of “Tungsten grinders” suitable to grind all sizes of tungsten electrodes, identified for use on this machine, shall also be supplied. The grinding abrasive wheel, 17 nos., shall also be supplied.	<i>Bidder to confirm</i>

PART-B: TECHNICAL SPECIFICATION

S.No	PARTICULARS	SPECIFICATION / DESCRIPTION	BIDDER'S OFFER WITH CONFIRMATION & COMPLETE TECHNICAL DETAILS
6.2	Fixtures & Rotator for prove out component:	Please refer Annexure I. A Heat exchanger having eight numbers of circumferential weld joints are shown schematically. Sequence of assembly / weld joints are also given. Suitable fixtures & rotators are to be supplied to hold& rotate the shells to perform welding of circumferential joints in a sequential manner - in various stages of manufacture. Rotation shall be programmable with the wire feed rate. Suitable purging arrangements also to be supplied. Design / drawings of the fixtures, rotating arrangements& purging arrangements are to be submitted and get approvalfrom BHEL before manufacture. This arrangement shall be used to prove welding of any of the two joints(as per the choice of BHEL)and should meet the quality requirements of BHEL (Distortion free and with acceptable Radiographic Quality). Also, please refer Point No. 23.0.	<i>Bidder to confirm& Specify</i>
7.0	WATER CHILLER UNIT FOR GTAW TORCH		
7.1	Bidder to Specify the Design Parameters	a. Type – Refrigerant type water chiller b. Water Chiller Cooling Capacity (in Tons of refrigeration) c. Tank Capacity – 5 Litres or more d. Flow rate and pressure (in litres/min and kg/cm ²) e. Type of Coolant – to ensure no scale/sediment formation f. Bidder to Specify the number of Water chillers provided	Bidder to Specify
7.2	Operating Features	Cooling water flow sensor & interlocks to ensure fool-proof flow of water. Welding should stop automatically in case there is any interruption in cooling water flow.	<i>Bidder to confirm</i>
8.0	GAS FEEDING UNIT		
8.1	Make and Model	Make: Preferably Gentecor any other make acceptable to BHEL. Bidder to Specify the make and model quoted.	Bidder to confirm &Specify

PART-B: TECHNICAL SPECIFICATION

S.No	PARTICULARS	SPECIFICATION / DESCRIPTION	BIDDER'S OFFER WITH CONFIRMATION & COMPLETE TECHNICAL DETAILS
8.2	Gases to be fed	Argon	<i>Bidder to confirm</i>
8.3	Operating Features	Bidder to Specify : a) Type of gas feeding unit its Accuracy b) Flow Rate (adjustable) for Argon c) Gas Flow Rate d) Inlet Pressure e) Outlet Pressure	Bidder to Specify
8.4	Scope of Supply	Scope of Supply shall include the following: a) Gas feeding Unit, b) Gas Flow Meters, c) Regulators & Gas Solenoid Valves, d) Gas Flow Sensors and Interlocks to ensure fool-proof flow of gas. e) Gas Cups/Nozzles, f) Contact tips for 0.80 mm, 1.2 mm & 1.6 mm wires, g) Tip Adapters & Ferrules	Bidder to confirm & Specify
9.0	CONTROL SYSTEM		
9.1	Type	Industrial PLC. Bidder to Confirm.	Bidder to Confirm.
9.2	Make	Bidder to Specify the Make of the PLC Control System. Preferred make – Fanuc / Siemens / Mitsubishi/ Allen - Bradeley or Any other reputed makes acceptable to BHEL	Bidder to Specify
9.3	Model	Model (suitable and latest version, as available at the time of purchase order placement, shall be supplied).	Bidder to Specify
9.4	HMI / MDI	Bidder to Specify the Make and Model with the standard size of panel.The HMI / MDI shall not be of touch screen type.	Bidder to Specify

PART-B: TECHNICAL SPECIFICATION

S.No	PARTICULARS	SPECIFICATION / DESCRIPTION	BIDDER'S OFFER WITH CONFIRMATION & COMPLETE TECHNICAL DETAILS
9.5	Communication		Bidder to Specify.
9.6	Memory	Sufficient Memory to store and recall programmed data of minimum 170 programs.	Bidder to confirm & Specify
9.7	Technical Features	Control should include all interlocks, manual, semi auto and auto.	Bidder to Specify
9.8	Ammeters & Voltmeters	Ammeters & Voltmeters shall be of Digital Type.	Bidder to confirm
9.9	Controls / Meters	All ammeters, voltmeters, gas flow meters shall be located near the operator control station	Bidder to confirm
9.10	All controls	All controls for the hydraulic/pneumatic unit & other peripheral units should be available at the operator control station.	Bidder to confirm
9.11	Portable Data Loading Device	A portable Programmable unit loaded with licensed version of the PLC software along with the required interfacing cable with the PLC unit to be supplied.	Bidder to confirm & Specify
9.11	Programming design	<ul style="list-style-type: none"> a) A database to be provided to store programs identifiable by unique number for each weld joint of different combinations of materials / jobs sizes. b) Operator has to select only the program number, which he chooses to activate and recall the program from the database, for welding a particular joint which the operator intends to weld, for a particular sequence of welding to build up the jobs length. c) For welding a joint with new combination, programming of the parameters shall be done with a unique number and stored in the database. d) Provision to correct the original program whenever fine tuning of parameters are done to improve the quality of the joint. e) Display of all critical weld parameters – programmed and actual real time data on the screen is essential. f) Fine tuning of critical weld parameters during welding is under progress to be made possible. 	

PART-B: TECHNICAL SPECIFICATION

S.No	PARTICULARS	SPECIFICATION / DESCRIPTION	BIDDER'S OFFER WITH CONFIRMATION & COMPLETE TECHNICAL DETAILS
10.0	FAULT DIAGNOSTIC SYSTEM		
10.1		Fault diagnostic system should be provided to show the faults on the display and detailed cause, and remedy for the faults related to mechanical and electrical maintenance.	Bidder to Confirm
10.2	Help guide	Help guide should be provided to use both diagnostic systems. Bidder to Confirm	Bidder to Confirm
11.0	GTAW - Welding Programmable Data (COMMON to All passes)		
11.1		TIG Welding facility will be used for welding (fusion as well as filler pass)	Bidder to Confirm
11.2		Sector programming – Min. 8 sectors should be programmable	Bidder to Confirm
11.3		Program Number	Bidder to furnish range
11.4		Gas Pre-Flow & Post-Flow Time	Bidder to Specify
11.5		Initial Current	Bidder to Specify
11.6		Initial Current Time	Bidder to Specify
11.7		Current Up-Slope & Down-Slope Time	Bidder to Specify
11.8		Jobs Revolution Start & Stop Delay Time	Bidder to Specify
11.9		Wire Feed Start & Stop Delay Time	Bidder to Specify
11.10		AVC Delay Time	Bidder to Specify
11.11		Pulse setting	Bidder to specify
11.12		Crater Current	Bidder to Specify
11.13		Crater Current Time	Bidder to Specify

PART-B: TECHNICAL SPECIFICATION

S.No	PARTICULARS	SPECIFICATION / DESCRIPTION	BIDDER'S OFFER WITH CONFIRMATION & COMPLETE TECHNICAL DETAILS
12.0	GTAW Welding Programmable Data (For EACH PASS)		
12.1		Technical Details a) Pass Number range b) No. of sectors c) Pulse Current d) Pulse Duration e) Base Current f) Base Duration g) AVC h) Wire Feed Pulse Speed i) Wire Feed Base Speed	Bidder to furnish details
12.2		Jobs Revolution Speed	Bidder to Specify
12.3		Overlap Angle - Variable and programmable	Bidder to Specify
12.4		Overlap Speed – Variable and programmable	Bidder to Specify
13.0	GTAW Fine Adjustment of Welding Parameters (DURING WELDING)		
13.1		Fine Adjustment of Parameters while welding is in progress	Bidder to Confirm
13.2		The changes through fine adjustment made during welding may or may not be used to modify programmed data at end of welding cycle.	Bidder to Confirm
13.3		Fine adjustment must be only by knob and not by numerical inputs.	Bidder to Confirm
13.4		TIG Welding parameters	Bidder to furnish range
13.5		Pulse Current	Bidder to Specify
13.6		Base Current	Bidder to Specify
13.7		Jobs Revolution Speed	Bidder to Specify
13.8		Provision of display of wire feed rate	Bidder to Confirm
13.9		Filler Wire Feed Speed	Bidder to Specify

PART-B: TECHNICAL SPECIFICATION

S.No	PARTICULARS	SPECIFICATION / DESCRIPTION	BIDDER'S OFFER WITH CONFIRMATION & COMPLETE TECHNICAL DETAILS
14.0	LUBRICATION :		
14.1		Machine lubrication: Bidder to furnish details of the type of lubrication provided for all the movable parts in the machine.	Bidder to Confirm
14.2		All greasing points to be provided at convenient location for the operators to fill grease periodically.	Bidder to Confirm
14.3		First filling of Lubrication Oil to be supplied by the supplier. Indian equivalent shall be mentioned.	Bidder to Specify
14.4		First filling of Grease should be supplied by Bidder. Indian equivalent shall be mentioned.	Bidder to Specify
14.5		2 Nos of suitable grease guns should be supplied along with the machine.	Bidder to Confirm
15.0	IMPORTANT POINTS - ELECTRICAL , ELECTRONICS, MECHANICAL & HYDRAULIC SYSTEMS:		
15.1		415V + 10% / -10%, 50HZ +/-1.5 HZ, 3 Phase AC (3 wire system without neutral) Power Supply Source will be provided by BHEL at a single point near the machine, as per layout recommended by Vendor. All types of cables, connections, circuit breakers etc. required for connecting BHEL's power supply point to different parts of the machine/control cabinets, shall be the responsibility of vendor.	Bidder to Confirm
15.2		All electrical equipment shall be Tropical zed and shall have IP 54 degree of protection	Bidder to Confirm
15.3		All electrical control cabinets & panels should be dust and vermin proof	Bidder to Confirm
15.4		All electrical components in the cabinets should be mounted on DIN Rail	Bidder to Confirm
15.5		All electrical panels should be provided with CFL lamps for power receptacles of 230Volts, sufficient illumination and 5/15 Amp. AC switched socket shall be provided. All adapters/receptacles should have compatibility with Indian equivalents.	Bidder to Confirm
15.6		Motors shall be from M/s Siemens / ABB or other reputed make conforming to IEC Standards and acceptable to BHEL.	Bidder to Confirm

PART-B: TECHNICAL SPECIFICATION

S.No	PARTICULARS	SPECIFICATION / DESCRIPTION	BIDDER'S OFFER WITH CONFIRMATION & COMPLETE TECHNICAL DETAILS
15.7	All electrics shall be of reputed make like Siemens, L&T, BCH, Tele-mechanique.		Bidder to Confirm
15.8	Electrical drives shall be of Siemens / ABB / L&T / Eurotherm and PLC of SEW / Allen Bradley / Siemens / Messung / Fanuc		Bidder to Confirm
15.10	Vendor should ensure the proper earthing for the machine and its accessories.		Bidder to Confirm
15.11	Wiring: All electrical motors, limit switches etc, on the machine shall be wired using PVC sheathed cable running in conduits to common terminal block and are to be incorporated with numbered ferrules.		Bidder to Confirm
15.12	External wiring from / to control panel, control desk, external motors etc shall be by means of un-armoured multi-core / multi strand copper cables.		Bidder to Confirm
15.13	All cables/ hoses moving with traversing axes should be installed in cable drag chain (preferably of steel). In other places, the cables shall be routed through cable trays / hoses and they shall be properly fixed / clamped.		Bidder to Confirm
15.14	Control circuit voltage shall not exceed 24V DC / AC		Bidder to Confirm
15.15	All feedback systems & field sensors, limit switches, proximity switches, pressure switches, temperature controllers, should be for heavy duty application and wired up with flexible PVC insulated screened cables. All field elements shall have easy accessibility for maintenance.		Bidder to Confirm
15.16	All indication lamps should be provided with LED Indication Lamp.		Bidder to Confirm
15.17	All the VVVF drives shall have choke & filter unit at the input side.		Bidder to Confirm
15.18	A Suitable Servo controlled voltage stabilizer & Ultra Isolation transformer shall be supplied for the machine.The make shall be NEEL / SERVOMAX or any other make acceptable to BHEL.		Bidder to confirm & Specify.
15.19	All pneumatics shall be of Festo make and hydraulics if any shall be of Rexroth make or any other reputed make acceptable to BHEL.		Bidder to Confirm
15.20	BHEL prefer to have standard gear boxes used in the machine. Gear boxes shall be of Radicon / greaves / Bonfiglioly or any other reputed make acceptable to BHEL.		Bidder to Confirm & specify

PART-B: TECHNICAL SPECIFICATION

S.No	PARTICULARS	SPECIFICATION / DESCRIPTION	BIDDER'S OFFER WITH CONFIRMATION & COMPLETE TECHNICAL DETAILS
15.21	Pneumatics on machine, and associated equipment shall be connected by nylon and/or steel jobs to common point on machine. Fitted at the common point would be a lubricator, regulator, filter and hand wheel valve		Bidder to Confirm
15.22	BHEL supplied compressed air will be at a pressure of 60 PSI to 40 PSI only. All pneumatic systems on the machine shall be designed to operate efficiently at this air pressure. A suitable refrigerant type air drier shall be included in the system by the vendor.		Bidder to Confirm
15.23	If higher air pressure is required for efficient operation of the machine, Bidder shall include a	Air Compressor of suitable capacity in the scope of supply	Bidder to Specify
15.24	Refrigerated Air Drier to be provided to eliminate moisture content from the compressed air at the designed flow and pressure rating.		Bidder to Confirm
15.25	BHEL will provide compressed air at only one point near / on the machine. Bidder shall provide suitable filter-regulator-lubrication (FRL) unit and in addition a hand wheel valve at this point.		Bidder to Confirm
15.26	Air Conditioners with Dehumidifiers of suitable capacity to be provided for all Electrical / Electronic Panels / Cabinets including Operator's Panel considering specified ambient conditions. Make: Rittal / Warner & Finley / Advance cooling or any other reputed make acceptable to BHEL. Detailed specifications to be submitted.		Bidder to Specify
15.27	MACHINE LIGHTS : Machine Spot Lights and suitable fluorescent light or metal halide lamps to be provided for sufficient illumination in the welding zone.		Bidder to Confirm
15.28	All light fittings, consumables, adapters/receptacles should have compatibility with Indian equivalents		Bidder to Confirm
15.29	An energy meter with the following specifications shall be provided in the Main control panel. The accessories required for the energy meter shall be supplied and erected. a) Voltage (Ph to Ph, Ph to N) (Individual / Average) b) Current (I1,I2, I3)(Individual / Average) c) Frequency d) Power Factor e) Active, Reactive & Apparent Power (Individual / Average) f) % THD Display for Current & Voltage Harmonics g) Active, Reactive & Apparent Energy (Individual / Average) h) Inbuilt provision for RS 485 Communication with Modbus protocol		Bidder to confirm

PART-B: TECHNICAL SPECIFICATION

S.No	PARTICULARS	SPECIFICATION / DESCRIPTION	BIDDER'S OFFER WITH CONFIRMATION & COMPLETE TECHNICAL DETAILS
		i) Meters shall also support Minimum 2 Digital Inputs & 2 Digital Outputs and shall be able to becontrolled from Remote monitoring System.	
16.0	ENVIRONMENTAL PERFORMANCE OF THE MACHINE		
16.1	The machine shall be suitable for an ambient temperature of +45 deg C and relative humidity of 60% respectively, but both do not occur simultaneously.		Bidder to Confirm
16.2	The Bidder should ensure trouble free operation of the machine with Thermal Stability of the complete machine and accuracy requirements of BHEL components, keeping in view of ambient conditions as mentioned above.		Bidder to Confirm
16.3	The machine, including sub-systems, attachments and accessories, should be suitable for continuous operation on three shifts a day.		Bidder to Confirm
16.4	If any safety / environmental protection enclosure is required it shall be built in the machine by the Bidder.		Bidder to Confirm
16.5	Paint of the machine should be oil / coolant resistant and should not peel off		Bidder to Confirm
16.6	Maximum noise level shall be less than85 dB (A) at normal load condition, 1 M away from the machine with correction factor for back ground noise, if necessary. This will be measured as per international standards like DIN 45635-16. Vendor to demonstrate compliance to noise level, if so required.		Bidder to Confirm
17.0	SAFETY ARRANGEMENTS		
17.1	Machine shall have adequate and reliable safety interlocks / devices to avoid damage to the machine, work piece and the operator due to mistakes or the malfunctioning.		Bidder to Confirm
17.2	A detailed list of all alarms / indications provided on machine should be submitted by the Vendor.		Bidder to Confirm
17.3	All the pipes, cables etc. on the machine should be well supported and protected. These should not create any hindrance to machine operator, for effective use of machine.		Bidder to Confirm
17.4	Emergency Switches at suitable locations as per International Norms should be provided.		Bidder to Confirm

PART-B: TECHNICAL SPECIFICATION

S.No	PARTICULARS	SPECIFICATION / DESCRIPTION	BIDDER'S OFFER WITH CONFIRMATION & COMPLETE TECHNICAL DETAILS
17.5		Enclosures or protective covers shall be provided for the moving parts (either linear or rotary), as a safety measure, as per industry standards.	Bidder to Confirm
17.6		All the rotating parts used on machine should be statically & dynamically balanced to avoid undue vibrations, Noise and suitably guarded.	Bidder to Confirm
19.0	MACHINE SPARES		
19.1		Itemized break-up of Mechanical, Electrical , Electronic and Pneumatic /Hydraulic Spares used on the machine in sufficient quantity as per recommendation of BIDDER for 2 years of trouble free operation on three shifts continuous running basis should be offered by BIDDER.	Bidder to specify
19.2		Mechanical & Hydraulic Spares: Bearings, Clutches, gears and all types of Pumps, Valves, Pressure Switches / Transducers, Filters, Seals, 'O' Rings, Hydraulic Hoses, etc.	Bidder to specify
19.3		Electrical / Electronic / PLC Spares: All types of Relays, Contactors, Proximity Switches, Push Buttons, Indicating Lamps, Semiconductor Fuses, Special Fuses, Circuit Breakers, Main Power Switch, Encoders, Spares for PLC, Servo Motors for Feed Drives, Power Module & Control Cards for Main Drive as well as Feed Drives etc.	Bidder to specify
19.4		Welding Consumable spares such as Contact tips, Gas nozzles, Tip adapters, Other torch spares for at least 3 months continuous operation shall be provided.	Bidder to specify
19.5		Spare Torches, Torch cables and Wire feed conduits, Wire feed rollers may also be offered..	Bidder to specify
19.6		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 Bidder 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 confirm &specify

PART-B: TECHNICAL SPECIFICATION

S.No	PARTICULARS	SPECIFICATION / DESCRIPTION	BIDDER'S OFFER WITH CONFIRMATION & COMPLETE TECHNICAL DETAILS
19.7	Bidder 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 specify
19.8	A set of Service Tools for dismantling and assembling of machine components such as roller sets etc. may be quoted.		Bidder to specify
20.0	DOCUMENTATION :		
20.1.0	Set of Documents to be submitted along with the Offer for technical evaluation:		Bidder to Confirm
20.1.1	General Lay-out of the machine with major and critical dimensions in line with the specification		Bidder to Confirm
20.1.2	General Assembly drawing of the machine with bill of materials and critical dimensions.		Bidder to Confirm
20.1.3	General Assembly drawing of the fixtures, Rotation and purging arrangement details for the prove-out component with bill of materials and critical dimensions.		Bidder to Confirm
20.1.4	Sub-assembly / Arrangement drawings with bill of materials and critical dimensions for the following: a) Weld Head Slides (vertical& Horizontal) arrangement. b) Wire straightening roller arrangement. c) Purging arrangement d) Cooling water & chiller arrangement		Bidder to Confirm
20.1.5	List of bought out items with make and specification along with catalogues: Welding Power source, controllers, Drives, Motors, Gear boxes, Wire straightener & feeding system, Air drier, Data logger, etc.		Bidder to Confirm

PART-B: TECHNICAL SPECIFICATION

S.No	PARTICULARS	SPECIFICATION / DESCRIPTION	BIDDER'S OFFER WITH CONFIRMATION & COMPLETE TECHNICAL DETAILS
20.1.6	Hydraulic / Pneumatic Circuit with Bill of Materials (if proposed in the system)		Bidder to Confirm
20.1.7	Electrical Circuit with Bill of Materials.		Bidder to Confirm
20.1.8	Video images on CD /Hard copy of literature with photographs & drawings explaining the technical features.		Bidder to Confirm
20.2.0	Set of Documents to be submitted after placement of order for approval / verification before manufacturing:		
20.2.1	General Lay-out of the machine with major and critical dimensions in line with the specification and Preliminary Foundation drawing.		Bidder to Confirm
20.2.2	General Assembly drawing of the machine with bill of materials and critical dimensions.		Bidder to Confirm
20.2.3	General Assembly drawing of the fixtures, Rotation and purging arrangement details for the prove-out component with bill of materials and critical dimensions.		Bidder to Confirm
20.2.4	List of bought out items with make and specification along with catalogues: Welding Power source, controllers, Drives, Motors, Gear boxes, Wire straightener & feeding system, Air drier, Data logger, etc.		Bidder to Confirm
20.2.5	Hydraulic / Pneumatic Circuit with Bill of Materials (if available in the system)		Bidder to Confirm
20.2.6	Electrical Circuit with Bill of Materials.		Bidder to Confirm
20.2.7	Quality Plan		Bidder to Confirm

PART-B: TECHNICAL SPECIFICATION

S.No	PARTICULARS	SPECIFICATION / DESCRIPTION	BIDDER'S OFFER WITH CONFIRMATION & COMPLETE TECHNICAL DETAILS
20.3.0	Set of Documents to be submitted along with machine:	<p>Three sets of following documents as Hard copies and 1 set of all documents including bought out item catalogues – soft copy in CD in English Language should be supplied along with the machine (one set at the time of machine inspection).</p> <ol style="list-style-type: none"> 1. GA Drawing of the complete STBW station with jobs supporting system. 2. GA Drawing of Individual Mechanisms 3. GA & Sub-Assembly Drawings for sub-systems for maintenance purpose. 4. GA & Sub assembly drawings for Fixtures, rotation & purging arrangements. 5. Operating manuals of Machine & its PLC System 6. Programming manuals of Machine & its PLC System 7. Maintenance manuals with all drawings of machine assemblies / sub-assemblies with parts list 8. All Electrical circuit diagrams with bill of materials 9. Hydraulic circuit diagrams with bill of materials 10. Pneumatic circuit diagrams with bill of materials 11. Maintenance & Interface manuals for Machine Control System 12. Preventive Maintenance check list for Electrical and Mechanical System 13. Trouble shooting chart for Main and all sub systems 14. Detailed specification of all rubber items / hydraulic / lubrication fittings 15. PLC program print-outs with comments in English 16. PLC program and data on CD / Flash Memory Card. 17. If Hard disk kind of things is used for storing the PLC / User program, then Complete back up of hard disk on CD and clearly written Instructions (3 copies) to take back up and reloading of a new hard disk. 18. Complete list of Alarm log, Error code, error messages & remedies and on line fault diagnostics 19. Complete list of spares for machine, along with item part no /specification / type / model and make & address of the sub-Bidder. 	Bidder to Confirm

PART-B: TECHNICAL SPECIFICATION

S.No	PARTICULARS	SPECIFICATION / DESCRIPTION	BIDDER'S OFFER WITH CONFIRMATION & COMPLETE TECHNICAL DETAILS
21.0	TRAINING OF BHEL PERSONNEL:		
21.1	The supplier shall train TWO BHEL Engineers in Operation and Maintenance (Mechanical, Electrical/ Electronics and Programming) of the Machine for FIVE working days at supplier's works after the pre-dispatch inspection.		Bidder to Confirm
21.2	Bidder to clearly mention whether the training is offered free of cost or chargeable. If chargeable, the Bidder has to quote on man-day basis.		Bidder to Confirm
21.3	Airfare, board & lodging for the BHEL Engineers who will be visiting supplier's works for pre-dispatch inspection and training, shall be borne by BHEL.		Bidder to Confirm
21.4	The Supplier shall impart training to BHEL's Machine Operators and Maintenance crew in Operation and Maintenance (Mechanical, Electrical/ Electronics and PLC System) during commissioning of the Machine at BHEL works for TEN working days.		Bidder to Confirm
21.5	The supplier shall arrange training for Two BHEL maintenance personal on maintenance / troubleshooting of PLC at PLC supplier's work for not less than three working days. The travel, boarding & lodging of BHEL personal will be borne by BHEL.		Bidder to Confirm
21.6	<p>The training shall include specialized coaching in</p> <ul style="list-style-type: none"> i) Safety ii) Operation of the machine iii) PC based System & Operation, iv) Trouble-Shooting, v) Software Application vi) All special features of the machine vii) Electrical / Mechanical / Electronics systems 		Bidder to Confirm
21.7	Competent, English speaking experts shall be arranged by the Bidder during training for satisfactory & effective training of BHEL personnel		Bidder to Confirm

PART-B: TECHNICAL SPECIFICATION

S.No	PARTICULARS	SPECIFICATION / DESCRIPTION	BIDDER'S OFFER WITH CONFIRMATION & COMPLETE TECHNICAL DETAILS
22.0	INSPECTION & MACHINE ACCEPTANCE		
22.1.0	PRE-DISPATCH INSPECTION AT SUPPLIER'S WORKS:		
22.1.1	Complete Automatic cir-seam welding stations with all sub-systems and accessories shall be assembled and offered for inspection by BHEL Engineers at supplier's works.	Bidder to Confirm	
22.1.2	All systems of the machine have to be operated and demonstrated to the BHEL Engineers in proper working condition.	Bidder to Confirm	
22.1.3	Supplier has to establish parameters for radiographic quality weld joints(as shown in Annexure-I).	Bidder to Confirm	
22.1.4	All jobs, filler wire, tungsten electrode, gas etc., have to be arranged by vendor for pre-dispatch acceptance tests at vendor's works.	Bidder to Confirm	
22.1.5	Supplier has to arrange for conducting Radiography test on joints and will be evaluated as per BHEL quality standards. All the joints should pass the test.	Bidder to Confirm	
23.0	PROVE-OUT AND ACCEPTANCE AT BHEL WORKS:		
23.1	After the machine Erection is completed and Energizing the machine at BHEL works, all systems of the machine have to be operated and demonstrated in proper working condition.	Bidder to Confirm	
23.2	Prove out of two numbers of weld joints is to be performed with the use of additional accessories as mentioned in Point No. 6.2	Bidder to Confirm	
23.3	Edge prepared jobs, welding consumables; gas etc will be supplied by BHEL.	Bidder to Confirm	
23.4	Radiography test will be conducted on joints and will be evaluated as per BHEL quality standards. All the joints should pass the test.	Bidder to Confirm	
24.0	MACHINE FOUNDATION:		
24.1	Bidder shall submit the preliminary layout drawing for getting BHEL's approval within one month from the date of Letter of Intent (LOI). Complete details like static and dynamic loads etc required for foundation design shall be submitted by the Bidder within three months after getting BHEL's approval.	Bidder to Confirm	

PART-B: TECHNICAL SPECIFICATION

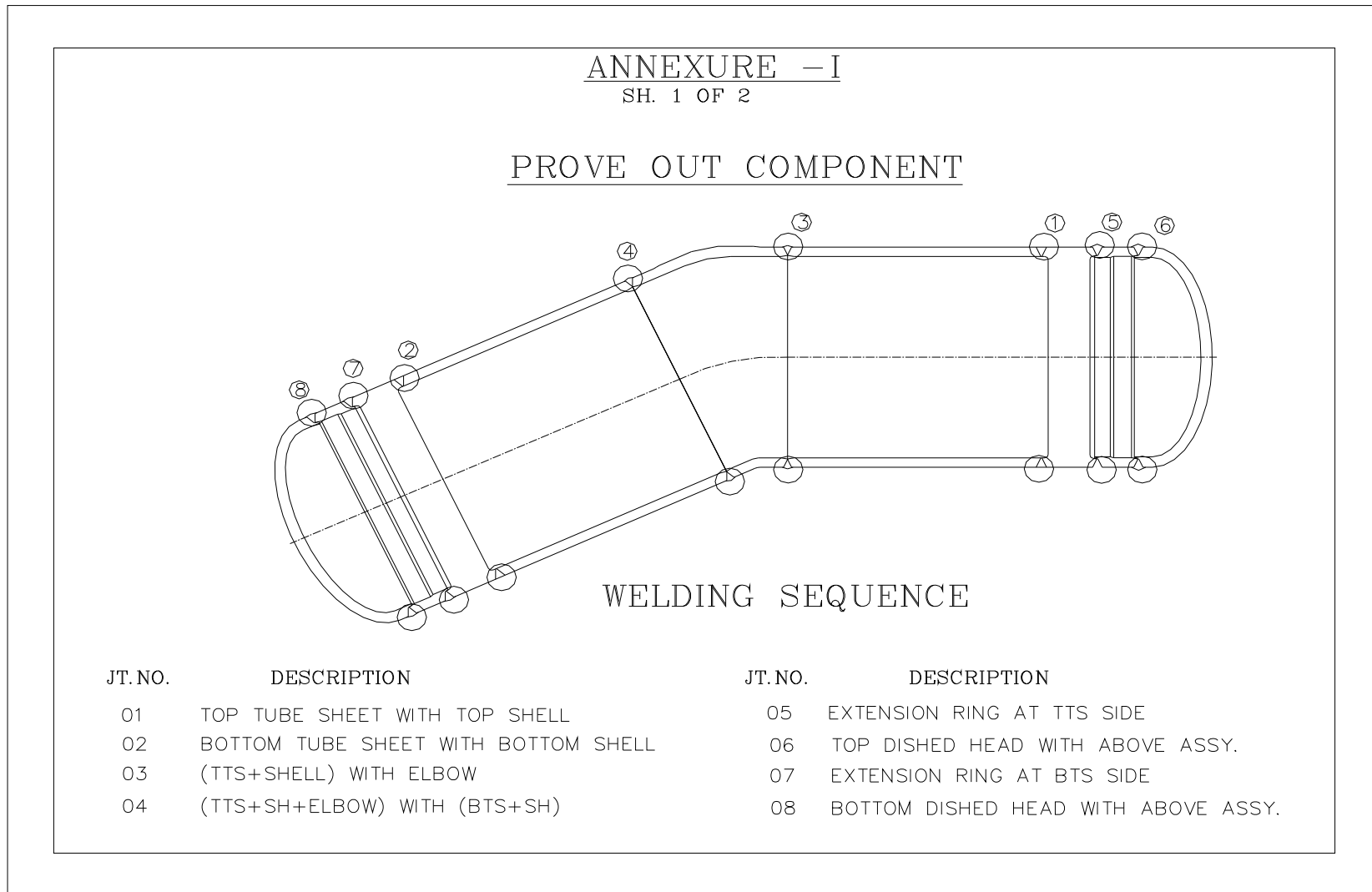
S.No	PARTICULARS	SPECIFICATION / DESCRIPTION	BIDDER'S OFFER WITH CONFIRMATION & COMPLETE TECHNICAL DETAILS
24.2	BHEL will design and construct complete foundation for the machine as per the Bidder's recommendation.		Bidder to Confirm
24.3	Complete anchoring system including foundation bolts, anchoring materials, fixators, levelling shoes, chemical for anchoring etc should be supplied.		Bidder to Specify
25.0	ERECTION & COMMISSIONING		
25.1	Supplier to take full responsibility for Supervision of the erection and for start up, testing and commissioning of machine, its controls and accessories. Supplier shall send suitable qualified Engineers for supervision of Erection and Commissioning of the machine at BHEL works. Commissioning Engineers who will be deputed to BHEL shall be English speaking or English interpreters have to be arranged by the supplier for the entire duration from start of erection till the machines are commissioned and handed over to BHEL with complete training.		Bidder to Confirm
25.2	Service requirement like power, air & water shall be provided by BHEL at only one point to be indicated by Bidder in their foundation/layout drawings. Other requirements like crane and helping personnel shall also be provided by BHEL.		Bidder to Confirm
25.3	Successful proving of BHEL components by the Bidder shall be considered as part of commissioning. All tests, as mentioned (Machine Acceptance) shall form part of the commissioning activity.		Bidder to Confirm
25.4	Commissioning spares, required for commissioning of the machine shall be supplied free of cost		Bidder to Confirm
25.6	Test Mandrels, Instruments and other necessary equipment including Laser equipment, if required, to carry out all above activities should be brought by the Bidder. One set of Test mandrels are to be supplied along with the machine.		Bidder to Confirm
25.7	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 Bidder. For this purpose, the Bidder should supply sufficient quantity of touch-up paint of various colours of paint used.		Bidder to Confirm

PART-B: TECHNICAL SPECIFICATION

S.No	PARTICULARS	SPECIFICATION / DESCRIPTION	BIDDER'S OFFER WITH CONFIRMATION & COMPLETE TECHNICAL DETAILS
26.0	MACHINE PACKING:	Sea worthy & rigid packing for all items of complete machine, PLC System, all accessories and other supplied items to avoid any damage/loss in transit. When machine is dispatched in containers, all small loose items shall be suitably packed in boxes.	Bidder to Confirm
27.0	GUARANTEE:	Performance Guarantee to be given for 12 months from the date of commissioning OR 18 months from the date of dispatch whichever is earlier.	Bidder to Confirm
28.0	GENERAL:		
28.1	Machine Model No.		Bidder to specify
28.2	Total connected load (KVA):		Bidder to specify
28.3	Total air volume in cu.m/min		Bidder to specify
28.4	Floor area required (Length, Width, Height) for complete machine & accessories		Bidder to specify
28.5	Total weight of the machine (approx)		Bidder to specify

PART-B: TECHNICAL SPECIFICATION

S.No	PARTICULARS	SPECIFICATION / DESCRIPTION	BIDDER'S OFFER WITH CONFIRMATION & COMPLETE TECHNICAL DETAILS
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PART-B: TECHNICAL SPECIFICATION

S.No	PARTICULARS	SPECIFICATION / DESCRIPTION	BIDDER'S OFFER WITH CONFIRMATION & COMPLETE TECHNICAL DETAILS
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