



An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

CAPITAL EQUIPMENT / MATERIALS MANAGEMENT

ENQUIRY

NOTICE INVITING TENDER

Phone: +91 431 257 76 53

Email : skaruna@bheltry.co.in

spsy@bheltry.co.in

Web : www.bhel.com

TWO PART BID	Enquiry Number:	Enquiry Date:	Due date for submission of quotation:
Tender to be submitted in two Parts	2601700007	13.05.2017	19.06.2017

You are requested to quote the Enquiry number date and due date in all your correspondence. 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 should reach physically on or before 14.00 Hrs(IST) on the Date of tender opening. Tenders received after 14.00Hrs (IST) will not be considered for evaluation.

Item	Description	Quantity	(Indigenous Vendors) Matl. Will be Delivered to
10	Orbital Hot Wire Narrow Gap TIG Welding System For Pipes as per the technical specification & commercial conditions applicable(To be downloaded from web site www.bhel.com or http://tenders.gov.in)	1.00 Set.	FOR, BHEL,Stores, High Pressure Boiler Plant, Trichirappali - 620014

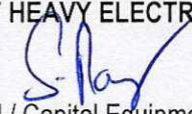
Important points to be taken care during submission of offer

- 1) Material shall be delivered to(By Indigenous vendors): As stated above.
- 2) By Foreign Vendors: CFR Chennai Seaport / Airport
- 3) Delivery required 7 months(including PDI) from the date of purchase order.
- 4) Erection & Commissioning period required 3 Weeks from the date of intimation by BHEL to vendor for deputation of their Engineers for E&C.
- 5) EMD for this Tender will be (INR) : 2,00,000.00
- 6) Compliance Forms. TRY/IMP/01 & TRY/IND/01A to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.
- 7) All updates, amendments, corrigenda, etc., (if any), for each tender will be posted only on the above websites from time to time, as and when required, until each tender is opened. There will be no publication of such updates, amendments, corrigenda, etc., through newspapers or any other media.

BHEL's General guidelines / instructions (refer MM / CE / GENL / GENL / 001 - EMD) including bank guarantee formats and list of consortium banks, commercial terms check-list 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 .

Tenders should be submitted before 14.00Hrs (IST) on the due date
Tenders will be opened online 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


DGM / Capital Equipment / MM

S.PARTHASARATHY
MANAGER
CAPITAL EQUIPMENT / MM
BHEL, TRICHY-620014.

PART - A

ORBITAL HOT WIRE NARROW GAP TIG WELDING SYSTEM FOR PIPES

SECTION – I: Qualifying Criteria

The BIDDER has to compulsorily meet the Qualification Criteria indicated in this Section I, to get qualified. Otherwise the technical offer will not be considered.

S. No.	PARTICULARS	VENDOR's RESPONSE
1..1	Only those (OEMs), who have supplied and commissioned at least ONE complete "Orbital Hot Wire Narrow Gap TIG welding system" of the offered model in the past ten years (on the date of opening of Tender). Vendor to specify.	
1.2	Only those vendors (OEMs) should quote, who have supplied and commissioned in the last 10 years (as on the original date of tender opening) at least ONE "Orbital Hot Wire Narrow Gap TIG welding system" of the offered model. EITHER (i) In at least one country other than the country of origin to establish vendor's global business activity. OR (ii) In India; and the referred machines are presently working satisfactorily for more than one year from the date of commissioning (as on the original date of tender opening). The name and contact addresses of the customers to whom the above said machine were supplied to be furnished with details.	
1.3	Vendor has to submit at least ONE PERFORMANCE CERTIFICATE for satisfactory performance of "Orbital Hot Wire Narrow Gap TIG welding system" as referred under clause 1.2 above, for a minimum period of one year from the Date of commissioning (as on the original date of tender opening) from their customers in India or in any other country outside the country of origin, supplied and commissioned in the last 10 years.	

S. No.	PARTICULARS	VENDOR's RESPONSE
1.4	Performance certificate as Original Certificate of E-mail directly from the customer may be submitted. The original certificate may be returned after verification by BHEL, if required. For obtaining the Performance certificate, a suggestive format is provided as ANNEXURE-A.	
1.5	BHEL reverse the right to verify the information provided by the Vendor for the referred machine at their referred customer's works. It shall be the responsibility of the vendor to facilitate the visit of BHEL's team at their refereed customer works. The Travel, Board, and Lodging expenses for BHEL Personnel shall be borne by BHEL. In case the information provided by vendor is found to be false / incorrect, the offer shall be rejected. BHEL reserves the right to accept or reject the OEM'S based on the assessment of their technical and financial capability.	

SECTION – II

The BIDDER/VENDOR are requested to provide the following information:-

S. No.	REQUIREMENTS	VENDOR's COMMENTS
2.1	The BIDDER / VENDOR to furnish Reference List of Customers, with complete address, details of contact person, where "Orbital Hot Wire Narrow Gap TIG welding system" have been supplied in the past.	
2.2	Specify details of "Orbital Hot Wire Narrow Gap TIG welding system" supplied to other unit of BHEL, if any (Year of commissioning with details etc).	
2.3	Details on SERVICE –AFTER-SALES Set-up in India including the Address of Agent/Service Centers In India.	
2.4	Any Additional data to supplement the manufacturing capability of the BIDDER for the subject equipment.	

SECTION – III

The BIDDER to note:

S.No.	REQUIREMENTS	VENDOR's COMPLIANCE
3.1	The BIDDER shall submit the offer in TWO PARTS - Technical [with PART A & PART B] & Commercial and Price Bid.	
3.2	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 'CONFIRMED' or 'COMPLIES' or 'YES' or 'NO-DEVIATION' or similar words in the technical comparative statement may lead to disqualification of the Technical Offer. In case of any deviations in any of the technical specifications, such deviations should be clearly specified in the comparative statement. All systems and sub systems proposed in the solution should be detailed in description with illustrations/photographs, if required	
3.3	The BIDDER shall assure a continuous support for SPARES and SERVICE for five years, from the date of commissioning of the equipment at BHEL Works.	
3.4	The Technical Offer shall be supported by Product Catalogue and Data Sheets in ORIGINAL and complete technical details / literature on the QUOTED MODELS of Hot Wire Narrow Gap TIG welding system (s).	
3.5	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 for the scope of supply.	
3.6	Earlier performance & field experience (service support) with BHEL (if any) will be a reckoning factor for the technical qualification of the OFFER. Vendor can quote of supply to BHEL units of systems of similar capability.	

ANNEXURE -A

Suggested Format of Performance Certificate

The Performance should be certified by the customer on Customer's Letter Head and submitted along with the offer.

PERFORMANCE CERTIFICATE

1.0	Name of the Machine:	
2.0	Suppliers name	
3.0	Make & Model Number of the Orbital Pipe Welding System, Powersource, Welding Head / Torch and other Major Accessories	
4.0	Month & Year of Commissioning	
5.0	Application for which the Welding System is used	
6.0	MACHINE DTAILS :	
6.1	Size of the jobs performed in the machine	
	a) Pipe thickness (minimum and maximum) in mm b) Pipe diameter (minimum and maximum) in mm c) Pipe materials	
7.0	Performance of the Machine (Please tick the appropriate option)	Satisfactory Non Satisfactory
8.0	Service after sales (Please tick the appropriate option)	Satisfactory Non Satisfactory
9.0	Other remarks (if any)	
Date :		Signature & Seal of the Authority Issuing the Performance Certificate

PART B**TECHNICAL SPECIFICATIONS FOR 'Orbital Hot Wire Narrow Gap TIG Welding System for PIPES'**

S. No	PARTICULARS AND BHEL SPECIFICATION	VENDOR'S OFFER
1.0	PURPOSE & APPLICATION	
1.1	a) The system is suitable for carrying out Orbital Hot Wire Narrow TIG welding process on thick wall pipe to pipe butt joint. b) The welding equipment is intended to weld high wall thickness pipe to pipe & pipe to end cover joints for similar & dissimilar materials. c) The welding equipment is intended to weld high wall thickness pipe to pipe butt & pipe to end cover joint using Orbital Hot Wire Narrow Gap TIG welding process in 5-G position. d) The system should be included the probable required size nickel plated guide rings (hinged type) to clamped over the pipe to be welded e) The welding equipment is intended to weld high thickness pipe to pipe butt joint by Orbital welding head using narrow gap torch travelling over the guide ring in 5-G position f) Further, the system offered shall be capable of viewing the weld droplet using camera provided with the NG torch, data acquisition system, seam tracking system, necessary electrical and mechanical spars and consumables for trouble free operation for 5 years.	

S. No.	PARTICULARS AND BHEL SPECIFICATION		VENDOR'S OFFER
2.0	WORK PIECE / JOB DETAILS		
2.1	PIPE DIMENSIONS (GENERAL)		
	a) Range of Diameter (O.D)	350 mm to 1200 mm	
	b) Range of Wall Thickness	30 mm to 200 mm	
	c) Size of the pipe can be weld	600 mm to 6000 mm	
	d) Pipe to pipe joint, Pipe to end cover joint		
2.2	MATERIAL SPECIFICATION		
	a) Inconel 617 to Inconel 617 (Similar joint) b) Grade P-91 to Grade P-91 (Similar joint) c) Inconel 617 to Grade P91 (Dis similar joint) d) Inconel 625 to Inconel 625 (Similar joint) e) Inconel 625 to Inconel 617 (Dissimilar joint) f) Inconel 625 to Grade P-91 (Dis similar joint) g) Inconel 617 to Alloy steel forging h) Inconel 617 to Alloy steel casting		
3.0	WELD JOINT DETAILS		
	a) Style of Edge preparation : Narrow Groove J style (single pass with waving & multi pass without weaving) as per Annexure -1 b) Pipe end condition : Machines in automatic end preparation machine c) Weld joint location : Length of straight portion on either side of weld joint ≥ 300 d) Preheating temperature : Max. 250 ⁰ C for P-91 material e) Weld joint testing requirement : Radiography & UT quality f) Weld quality appraisal : As per ASME Sec V		

S. No.	PARTICULARS AND BHEL SPECIFICATION	VENDOR'S OFFER
4.0	ORBITAL HOT WIRE NARROW GAP TIG WELDING SYSTEM	
4.1	Hot Wire TIG Welding Power source, controller, Remote pendent Water cooling unit	1 set
4.2	1. Orbital Narrow Gap Welding Head (Open Carriage type welding Head) equipped with torch weaving, motorized up & down cross slide, torch tilting arrangement etc. 2. Two individual set of welding torch for following thickness :- a) Conventional Torch to weld up to 40mm thickness b) Narrow Gap welding torch to weld up to 200mm thickness 3. Control cabinet with video vision coverage facility for torch, industrial PC and data acquisition system	1 set
		1 No
		1No
		1 set
4.3	Guide Rings for HWNG welding	1 Set
4.4	5 Ton Job Handling Positioner	1 set
4.5	Data Recorded system	1 set
4.6	Additional accessories, mechanical & electrical spares, interconnecting cables and hoses (min 10 m cable length)	As per the needs
4.7	Pre-dispatch inspection at vendors place	NA
4.8	Operation & Maintenance Manuals of all components and systems– Two Copies in both hard and soft forms.	3 sets
4.9	Commissioning of Equipment at BHEL Works and Performance Prove-out of the offered equipment by Supplier	Compulsorily to be included
4.10	Pre-Dispatch Inspection at Supplier's Works for Performance Prove-Out	
4.11	Guarantee	In the below given clause
4.12	General points	To be noted

S. No.	PARTICULARS AND BHEL SPECIFICATION		VENDOR'S OFFER
5.0	WELDING POWER SOURCE AND CONTROLLERS		
5.1	Type	Micro-Processor control, Programmable, Inverter type Constant current/voltage power source	
5.2	Make & Model	Vendor to specify	
5.3	Switching Frequency	Vendor to specify	
5.4	Welding Process & Polarity	Hot Wire TIG with DCEN	
5.5	Memory	Minimum 99 or more	
5.6	Equipment to have provision to transfer welding program from and to Pen drive (memory stick) through USB port	Vendor to Confirm	
5.7	Equipment to have provision of sequential programming consist of different parameters (sector wise programming facility)	Vendor to specify the maximum numbers of sectors that can be programmed	
5.8	For each program the following parameters should be programmable common to all passes. Vendor to specify/Confirm with details	Program Number	
		Number of Passes	
		At the beginning of welding /start sequence	
		a) Pre purge time	
		b) Up slope time	
		c) Wire start delay	
		d) Rotation start delay	
		At the end of welding / stop sequence:	
		a) Post purge time	
		b) Down slop time	
		c) Wire sop delay	

S. No.	PARTICULARS AND BHEL SPECIFICATION		VENDOR'S OFFER
5.0	WELDING POWER SOURCE AND CONTROLLERS		
5.9	Following parameter should be programmable for each pass Vendor to specify / Confirm with details	a) Pulsing On/Off	
		b) Oscillation On/Off	
		c) Current	
		d) Wire feed speed	
		e) Travel speed	
		f) Oscillation speed	
		g) Oscillation width	
		h) Oscillation dwell In / Out	
		i) Peak Current / Base Current	
		j) Peak time / Base time	
		k) AVC sensitivity	
		l) AVC speed	
		m) Synchronized travel speed with pulsing	
		n) Synchronized wire feed with pulsing	
5.10	It should be possible to manually override the following parameter during welding with in the pre-set range. Vendor to confirm	a) Current	
		b) Travel Speed	
		c) Wire feed speed	
		d) ACV	
		e) Oscillation speed	
		f) Oscillation amplitude	
		g) Torch cross beam self-centering	
5.11	Welding Data Entry on controller / power source	Through a dust & moisture proof membrane key pad-rugged type fitted in the cabinet / Industrial Laptop with all advanced features with installed software	
5.12	Front panel Display (In English only)	Vendor to describe	

S. No.	PARTICULARS AND BHEL SPECIFICATION		VENDOR'S OFFER
5.0	WELDING POWER SOURCE AND CONTROLLERS		
5.13	Output Current Range	5 to 600 A (D.C)	
5.14	Current Duty Cycle	450 A @ 100% dc	
5.15	Current Accuracy	± 1% of setting	
5.16	Welding voltage range	Vendor to specify	
5.17	Gas Pre-flow / Gas Post flow time	Vendor to specify	
5.18	Input power	3-pH, 50/60 Hz, 415 (±10%)	
5.19	Current pulse frequency	Vendor to specify	
5.20	Pulse current time	Vendor to specify	
5.21	Background current time	Vendor to specify	
5.22	Current up slop time	Vendor to specify	
5.23	Current down slop time	Vendor to specify	
5.24	Wire feed Start / Stop delay	Vendor to specify	
5.25	Filler wire feed speed	Vendor to specify	
5.26	Filler wire speed regulation	± 1% of setting	
5.27	Synchronization of function with current pulsing should be possible on selection	Wire feed Oscillation dwell AVC	
5.28	Torch oscillation speed	Vendor to specify	
5.29	Oscillation dwell time both right and left	Vendor to specify	
5.30	AVC function	±1% regulation	
5.31	Hot wire current & Duty Cycle	150 Amps with 100% dc	
5.32	Power / Rated Voltage	28 kVA	
5.33	Welding parameter override during welding, override to be maintained for the remaining segments.	Programmable limit (vendor to specify the range)	
5.34	Arc Starting mode	Vendor to specify	
5.35	Arc Sensing (Self Centering)	Vendor to specify	
5.36	Power source with standalone trolley with secure cylinder holder	Vendor to specify	

S. No.	PARTICULARS AND BHEL SPECIFICATION		VENDOR'S OFFER
5.0	WELDING POWER SOURCE AND CONTROLLERS		
5.37	Refrigerant type water chiller unit	Refrigerant type water chiller having minimum capacity of 0.5 T to cool the weld head and torch while welding. Vendor to provide all technical details	
5.38	Gas hose with end fittings & regulator – Gas cylinder to power source	Quick release type, Length to suit long travel on cable festoon Vendor to specify	
5.39	Fault Projection Sensors & Safety features	All safety alarms for stoppage of shielding gas, purging gas, stoppage of water or chiller unit, stoppage of wire feeding, arc strike failure etc. Vendor to specify	
5.40	EMI Interference Suppressor	Vendor to specify the detail of EMI suppression for the equipment, especially column& boom, rotator and positioners	
5.41	Data logger connectivity to PC	Vendor to confirm, the data logger output will be displayed in a PC output assembled in control cabinet.	
5.42	Remote Control Pendant	Remote pendant with high visibility screen and programmed and trim minimum parameter of current, arc voltage, frequency, travel speed, Oscillation frequency, oscillation width, programmed start and restart button, emergency stop, welding with & without arc etc.	
6.0	ORBITAL PIPE WELDING HEAD & CROSS SLIDE		
6.1	Orbital Welding Head for Hot Wire TIG welding Process	Orbital hot wire welding head equipped with cross slide, oscillation unit, wire feeder, wire spool etc. Orbital hot wire welding head to use convention welding torch to weld up to 40 mm wall thickness Orbital hot wire welding head to use the narrow gap torch to weld upto 200 wall thickness.	

S. No.	PARTICULARS AND BHEL SPECIFICATION	VENDOR'S OFFER
6.0	ORBITAL PIPE WELDING HEAD & CROSS SLIDE	
6.2	Servo Controlled Oscillation & Dwell AVC Torch Stroke length Torch adjustment capability (lead & lag adjustment) Torch adjustment capability (tilt adjustment) Forward & reverse movement Axial clearance required for welding Radial Clearance required welding Estimated weight of the welding head Stroke Speed Oscillation dwell time – In & Out independently variable Weaving width Weaving frequency Wire spool holding capability Four roll drive Synchronize pulsing of wire with pulsed welding current Wire stat delay Wire stop delay Wire feed speed regulation Slop control (slop up time & slop down time)	Vendor to specify Vendor to specify Vendor to specify the actual stroke Vendor to specify in mm/min Vendor to specify in sec Vendor to specify (vendor to provide the motor and gear ratio details)

S. No.	PARTICULARS AND BHEL SPECIFICATION		VENDOR'S OFFER
6.0	ORBITAL PIPE WELDING HEAD & CROSS SLIDE		
6.3	Number of TIG torches	a) One set of conventional TIG torch to weld up to 40 mm thickness b) One set of Narrow Gap TIG torch with oscillation electrode and wire to weld up to 200 mm thickness integrated with video monitoring camera	
6.4	Torches rating / Duty cycle a) Convention torch for welding up to 40 mm b) Narrow Gap torch to weld up to 200 mm	350 Amps @ 100 Duty Cycle	
6.5	Visual monitoring system (Camera integrated in narrow gap torch)	a) It is the monitor system during insert the torch into the welding gap and torch positioning adjustment before and during welding. b) It should help operator for monitoring the arc status and weld pool during welding and avoid arc light harmfulness. c) It also has the feature for saving the video recording during welding.	
6.6	Cooling for Torch & Body	a) Water Cooled b) The welding torch must have the thermal stability to withstand pre-heat temperature up to 350 deg C	

S. No.	PARTICULARS AND BHEL SPECIFICATION		VENDOR'S OFFER
6.0	ORBITAL PIPE WELDING HEAD & CROSS SLIDE		
6.7	Servo controlled synchronized pulsing or continuous wire feed motor	Vendor to specify	
6.8	Wire Size	The equipment to be capable of welding with wire dia 0.8, 1.0 & 1.2 mm wire diameter Vendor to confirm	
6.9	Welding torch adjustment (Manual)	Vertical, Horizontal and angular Torch lead / Lag angle adjustment, Torch Tilt In /Out Vendor to specify	
6.10	Wire spool size and specification	Vendor to specify	
6.11	Tungsten Electrode side	Ceriated tungsten electrode for diameter up to 3.2 mm	
6.12	Cable and Hose Package	Interconnecting cable length of minimum 1500 mm with quick release type. Vendor to provide the details` like length and diameter of cables	
7.0	GUIDE RING		
7.1	Suitable guide rings for following diameters a) Guide ring for outer diameter 12" b) Guide ring for outer diameter 14" c) Guide ring for outer diameter 16" d) Guide ring for outer diameter 18" e) Guide ring for outer diameter 24"	Vendor to provide the details` and tolerances	

S. No.	PARTICULARS AND BHEL SPECIFICATION	VENDOR'S OFFER
8.0	CONTROL CABINET WITH FOLLOWING	
8.1	1. The machine should be supplied with a cabinet with Industrial PC with screen and alphanumeric keyboard for programming parameter. 2. A video control unit with one screen for one camera and separate for data acquisition system.	
9.0	5 TON POSITIONER	
9.1	1. One set of 5 Ton positioner for clamping & rotating the pipe of diameter range 300 mm & above 2. The positioner has to rotate in clock wise and anti-clock wise direction controlled by both power source (automatic) & remote control (remote control) 3. The position also has the tilting facility controlled by a remote control or power source	
10.0	DATA RECODED SYSTEM	
10.1	1. Application: - The data recorder shall be capable of measuring and recording all operating variables including voltage, current, gas flow rate etc. for the entire duration. 2. Configuration: - The recorder should have sufficient channels to record the operating variables including the pre heat temperature of the valve body and sufficient provisions to take the data away for further processing. 3. Software: - Any software requirements for addressing the data recording and processing (to analyze the data in a computer in different forms) to be supplied as part of the system. 4. Input Power: - Any software requirements for addressing the data recording and processing (to analyze the data in a computer in different forms) to be supplied as part of the system.	

S. No.	PARTICULARS AND BHEL SPECIFICATION	VENDOR'S OFFER
11	MACHINE SPARES	
11.1	Itemized break-up of mechanical, electrical and electronic spares used in the machine in sufficient quantity as per recommendation of Vendors for 2 years of trouble free operation on three shift continuous running basis shall be suggested by vendor. The list to include following, in addition to other recommended spares (Unit price for each item of spare shall be offered) Vendor to confirm	Vendor to confirm
11.2	Mechanical Spars : All types of pumps, valves pressure switches, rollers, transducers, flow switches, filters, seals, O rings, water cooled hose, wire feed rollers and wire pressing rollers, fasteners, sprockets, gears, cams, bearing etc if any to be provided. Welding consumables : Nozzle, Gas cup, Gas filters, Tungsten Tip, wire liner etc to be included Electrical / Electronic: All types of printed circuit boards, relays, contractors, Proximity switches, push buttons, semiconductors, fuses, special fuses, circuit breakers, main power switch, encoders indication lams, spares for microprocessor based system, servo motors for feed drivers, power module & control cards for drives etc.	Vendor to confirm
11.3	Recommended set of spares for all attachment are to be suggested with details.	Vendor to confirm
11.4	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 became obsolete in this period, the vendor should inform BHEL sufficiently in advance and provide drawing of parts/details of spars & suppliers to enable BHEL to procure these in advance, if required	Vendor to confirm
11.5	Vendor to confirm that complete list of spares for machine and accessories, along with item part no/specification/type model, and name and address of the spare supplier shall be furnished along with documentation to be supplied with the machine.	Vendor to confirm

S. No.	PARTICULARS AND BHEL SPECIFICATION	VENDOR'S OFFER
12	EQUIPMENT INSPECTIN & ACCEPTANCE "AT VENDORS WORKS	
12.1	1. The welding equipment and Accessories, before dispatch the system, the complete pre-dispatch inspection will be carried out by the BHEL executive at the manufacturer's site which included carrying out all the functional test, welding trials & acceptance of the same 2. The welding trials shall be carried out on any standard austenitic stainless steel material of minimum thickness of 70 mm or above. 3. The minimum 2-3 numbers of continuous weld joint should be welded and pass the radiography quality as per ASME Sec IX. 4. All the materials and consumable needed for the trials shall be arranged by the vendors only 5. The welded samples have to be return to BHEL along with the equipment for conducting further tests.	Vendor to offer
13	DOCUMENTATION	
13.1	The following documents in English language should be supplied along with the machine :- Hard Copies : 3 sets :- In CD form : 1 Set 1. Operating manuals of welding power source, controller, welding head, column and boom, rotator, positioner, chilling unit, welding torches, data acquisition system etc. 2. Operation and Maintenance manual of all accessories 3. Programming manual of the machine 4. Maintenance manuals with all assembly drawing of machine assemblies. sub-assemblies with parts list 5. Electrical wiring Drawing – power & control circuits. 6. Maintenance & Interface manuals for machine control system 7. Microprocessor / complete printed circuit board schematic indication check points for electronic controls. 8. Complete list of alarm log, error code, error messages and remedies and on line fault diagnostic to be provided by the vendors, 9. Specification ratings of all bought out items	Vendor to offer

S. No.	PARTICULARS AND BHEL SPECIFICATION	VENDOR'S OFFER
13	DOCUMENTATION	
13.1	10 Catalogs', O&M manuals for all bought out items used in the machine 11 Trouble shooting chart for main and all sub-system 12 Parameter selection software, file handling and display recording. Serial and USB ports to be ensured. 13 Preventive maintenance check list for Electrical and mechanical system. Complete list of spares for machine, along with item part no/ specification/type /model and make and adders of the sub-vendor	
14	MACHINE ERACTION AND COMMISSIONING	
14.1	The manufacturer shall be responsible for the installation of the machine at the site and its subsequent start up at the site.	Vendor to confirm
14.2	All handling tools and mechanical / electrical help required for the installation and commissioning shall be provided by the BHEL.	Vendor to confirm
14.3	The required material and consumable for carry out prove out trials at site will be provided by the BHEL	Vendor to confirm
14.4	After successfully commissioning of the welding system prove out welding trials to be carried out considering actual application (specially material, diameter & thickness) Minimum 10 numbers of joint to be welded covering different wall thickness covering all range from 50 to 200 mm.	Vendor to confirm

S. No.	PARTICULARS AND BHEL SPECIFICATION		VENDOR'S OFFER
14	MACHINE ERACTION AND COMMISSIONING		
14.5	The supplier shall impart training to BHEL's machine operator and maintenance crew in operation and maintenance during commissioning of the machine at BHEL works, for 5 working days. It includes Safety, Operational of the machine PC based System & Operation, Trouble – Shooting, software application, all special features of the machine, electrical/mechanical/ electronics system etc.	Vendor to confirm	
14.6	The manufacturer shall be responsible for providing the technical assistance for the machine during commissioning & training through its welding expert only	Vendor to confirm	
14.7	Tools, Tackles, Test Mandrels, instruments and other necessary equipment required to carry out all above activities should be brought by the Vendor	Vendor to confirm	
15	GAURANTEE:		
15.1	Performance Guarantee to be given for 12 months from the date of commissioning or 18 months from the date of dispatch whichever is earlier	Vendor to confirm	

S. No.	PARTICULARS AND BHEL SPECIFICATION		VENDOR'S OFFER
16.0	GENERAL POINTS		
16.1	Machine Model Number and other related details	Vendor to provide	
16.2	Total connected Load (in kVA)	Vendor to specify	
16.3	Total weight of the machine & Accessories	Vendor to specify	
16.4	General Arrangement drawings	Vendors to provide	
16.5	Calibration certificates for all machines, meters and equipment to be provided by the vendor	Vendor to provide	
16.6	All electronic controls for integrated controller / drives that need stabilized supply shall be provided with suitable voltage stabilizer	Vendor to specify	
16.7	Civil & foundation details if any, for the equipment shall be provided 1 months before shipment of equipment	Vendor to specify	
16.8	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 machined is dispatch in container, all small loose items shall be suitably packed in boxes	Vendor to confirm	

Annexure I: Sketch for Weld Groove Design

