



An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

MATERIALS MANAGEMENT / CAPITAL EQUIPMENT

ENQUIRY

Phone: +91 431 257 70 49

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Web : www.bhel.com

	Enquiry Number:	Enquiry Date:	Due date for submission of quotation:
	2620900080	30.03.2009	30.04.2009

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	Tube to Tube sheet welding Machine as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in)	1 No.	30.01.2010

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 “2620900080”.

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 TUBE TO TUBESHEET 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 TUBE TO TUBESHEET WELDING MACHINE.

S. No	REQUIREMENTS	VENDOR's RESPONSE
1.0	<p>Only those vendors who have supplied and commissioned at least ONE TUBE TO TUBESHEET 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.</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 (on 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	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:

S.No	PARTICULARS	VENDOR's RESPONSE
2.0	Number of years of Experience of the Bidder/Vendor in the field of Design, Manufacture & supply of Tube to tubesheet 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

S.No.	PARICULARS	VENDOR's RESPONSE
6.0	The Bidder shall submit the offer in TWO PARTS – Technical (with PART A & PART 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. Tube to tubesheet welding M/c- Range supplied :
 - d. Other Specifications (optional) :
6. Performance of the Machine :

Best in the market/
Satisfactory/
Good/
Average/
Not Satisfactory

(with reasons for recommendation)
7. Any other Remarks :

Date :

Signature & Seal of the Authority
Issuing the Performance Certificate

PART-B

TECHNICAL SPECIFICATIONS FOR TUBE TO TUBESHEET WELDING MACHINE

S No	FEATURES	BHEL SPECIFICATION		BIDDER'S OFFER
1.0.0	PURPOSE & APPLICATION			
1.1.0	JOB NATURE:	a. The proposed welding machine shall be suitable for welding tube to tubesheet joints in Heat Exchangers as shown in Annexure-1,1A & 2. b. The tube to tubesheet welding shall be done by pulsed TIG welding process with filler wire, by the use of a semi-automatic welding gun.		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
1.2.0	JOB DETAILS:	ANNEXURE I, 1A	ANNEXURE 2	
	Tube OD x 't' (mm)	14.0 x 1.5	19 x 1.1	
	Tolerance on 't'	±10%	±10%	
	Tube Material	Titanium	Incoloy	
	Tubesheet material	Titanium	Inconel	
	Tube Hole Diameter (mm)	14.18 -0/+0.05	19.22 -0/+0.13	
WELD JOINT DETAILS :				
a. Style of Edge Preparation	As given in ANNEXURE 1,1A & 2 .			
b. Tube End Condition	Edge prepared by special tool having form profile .			
c. Production Process	Fusion pass if required and then Automatic single/ multi pass orbital welding.Welding head is to be suitable for either Vertical or Horizontal position during welding.			
d. Weldment Testing	Radiography / LPI,Helium & Hydro tests.			
e. Weld Quality Appraisal	As per ASME Section I, V, VIII Division 1 & 2 for Radiography Test and 100 % RT.			
2.0.0	WELDING MACHINE CONFIGURATION:			
2.1.1	The offered welding machine shall have the configuration as per BHEL Specification	a. Welding machine with Power source,control unit,data recording unit & water cooling system- 1 No. b. Tube to Tubesheet Welding Head -1 No. c. Welding Head Positioning & Handling Unit - 1No. d. Weld Head locator (ID of the tube to be taken as location) - 1 No. each, for both sizes. e. Shielding Gas hood during titanium welding- 1 No. f. Consumables required - 1 set.		Bidder to confirm

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		g. Operating and Service Tool Kit - 1 Set. h. Interconnecting Cables and Hoses-1 set. i.External Data Storage & Retrieval System - 1 set. j.External Weld Bead Inspection System - 1 No.	
3.0.0	POWER SOURCE SPECIFICATIONS:		
3.1.0	Type	Microprocessor controlled programmable (inverter based) pulsed GTAW Welding Power source-DC straight polarity.	Bidder to specify
3.2.0	Make	Polysoude/Esab/Lincoln/Miller or any other reputed make acceptable to BHEL.	Bidder to confirm
3.3.0	Output Current Rating	200 Amps. At 100 % duty cycle (Minimum)	Bidder to confirm
3.4.0	Operating Current	3 to 200 Amps with stepless variation	Bidder to confirm
3.5.0	Open Circuit Voltage	60 Volts(Min.)	Bidder to confirm
3.6.0	Switching Frequency		Bidder to specify
3.7.0	Memory	99 Welding Programs minimum	Bidder to specify
3.8.0	TIG Arc Ignition	By means of an in-built high frequency unit	Bidder to confirm
3.9.0	Power Input	415 V +/- 10% ,3 Ø 3 wire system, 50 Hz	
3.10.0	Current Accuracy	±1% of setting	Bidder to confirm
3.11.0	Welding Voltage Range	5 to 30 V DC	Bidder to confirm
3.12.0	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
3.13.0	Current Pulse Frequency	0.05 to 50 pulses / sec	Bidder to confirm
3.14.0	Pulse Current Time	0.01 to 10 sec	Bidder to confirm
3.15.0	Background Current Time	0.01 to 10 sec	Bidder to confirm
3.16.0	Current Up-slope / Down-slope Time required during welding	0 to 45 secs	Bidder to confirm
3.17.0	Time setting for each current level required during welding	0 to 45 secs	Bidder to confirm
3.18.0	Rotation Start / Stop Delay required during welding	0 to 45 secs	Bidder to confirm
3.19.0	Wire Feed Start / Stop Delay required during welding	0 to 45 secs	Bidder to confirm

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3.20.0	Torch Rotation Speed & variation		Bidder to specify
3.21.0	Filler Wire Feed & Speed		Bidder to specify
3.22.0	Filler Wire Feed & Speed variation	± 1 % of setting	Bidder to confirm
3.23.0	Torch Oscillation Speed		Bidder to specify
3.24.0	Oscillation Dwell Time at both ends (independently adjustable)		Bidder to specify
3.25.0	AVC Function	± 1 % of setting	Bidder to confirm
3.26.0	Programming increments for welding current & time parameters	0.1 amps / 0.1 sec	Bidder to confirm
3.27.0	Ambient Condition	Temperature range 0°C to 45° C	
		Humidity 85% (maximum)	
		Both not occurring simultaneously	
3.28.0	Auto-Tripping	Tripping facility by means of an automatic circuit breaker, in case of electrical short circuit, overloading, over-heating, single phase protection.	Bidder to confirm
3.29.0	POWER SOURCE FEATURES:		
3.29.1	Display Unit	A digital display unit to indicate all the working parameters (viz., voltage, current, pulsing time, wire feed, speed, etc.)	Bidder to confirm
3.29.2	a.Gas Flow Setting	Gas flow meter with gas solenoid operating push button switch for presetting gas flow rate, provided on the Front Panel	Bidder to confirm
	b.Gas hose with end fittings – Gas cylinder to power source	Length to suit long travel on cable festoon	Bidder to confirm
3.29.3	Water Cooling Unit for Torch	Built-in and of suitable capacity for the weld head and torch	Bidder to confirm
3.29.4	Arc Sensing	Means & modes for arc initiation and sensing	Bidder to specify
3.29.5	Arc Voltage Control function	± 1 % variation	Bidder to confirm
4.0.0	WELD PROGRAMMING UNIT:		
4.1.0	Type	A microprocessor based weld program control unit with digital display unit, key-board, etc., and provided with the option of remote function control through a Remote Operator's Pendant.	
4.2.0	Programming Level	A multi-level programming capability.	Bidder to confirm

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4 . 3.0	Weld Report Generation	Weld Programming Unit to facilitate easy output generation and on-line plotting of wave form through the external Chart Recorder.	Bidder to confirm
4.4. 0	Program Processing & Integration	Facility for integrating an external PC (Computer) to the Weld Programming Unit, through an Off-Line Programming software to facilitate editing and storing of weld programs.	Bidder to confirm
4.5.0	Auto-diagnostic System	Built-in fault check for system status	Bidder to confirm
4.6.0	Weld programming	Parameters like pre-gas / post-flow, start / end current, up and down slope, etc. have to be set individually for each program	
4.7.0	Sectoral Programming	Possibility for setting welding current, voltage, rotation speed, wire speed, pulsing time, etc. for each sector. (one weld cycle has to be split into a minimum of 6 sectors).	Bidder to confirm
4.8.0	Dry Run	Before welding, a test run has to be performed by using the simulation operation mode	Bidder to confirm
4.9.0	Safety Lock	Key lockable switch-Programming/operation/lock	Bidder to confirm
4.10.0	Data transfer	USB port for Data Transfer & 2 Nos. of 2 GB pen drive.	Bidder to confirm
5.0.0	REMOTE CONTROL UNIT:		
5.1.0	Type	Compact, light weight & hand-held remote function unit connected to the power source / programming unit with 15 m long control cable with protective sheathing & quick-fix end connectors.	
5.2.0	Display Unit	Liquid Crystal Display Screen	
5.3.0	Process / Selection Control	Push-buttons to select/control welding program	
		weld cycle start and weld cycle stop	
		emergency stop	
		manual movement control for torch position	
		manual control for wire feeder	
		manual control of start of down slope	
		gas and water flow control	
		real time modification of welding parameters	Bidder to confirm
5.4.0	Operating Voltage	The remote control unit shall function on a low voltage (less than 110 volts).	Bidder to confirm

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6.0.0	TUBE to TUBESHEET WELDING HEAD:		
6.1.0	Type	Tube to Tubesheet Welding Head	
6.2.0	Application -Joint Design	The Welding Head design shall be suitable for welding the tube to tubesheet joints with Extended, Flush and Recessed tube ends.	
6.3.0	Weld Orientation	All (Vertical & Horizontal Gravity Positions)	
6.4.0	Tubesheet Hole Pitch	Pattern : Triangular 28mm/26mm/18mm.	
6.5.0	Electrode Angle		Bidder to specify
6.6.0	Head Rotation speed	0.1 to 10.0 rpm	
6.7.0	Wire Feed Speed		Bidder to specify
6.8.0	Wire Spool Size		Bidder to specify
6.9.0	Current Rating	200 Amps. Continuous Duty	Bidder to confirm
6.10.0	Torch/Wire Nozzle Adjustment	3 - Axis Adjustment	Bidder to confirm
6.11.0	AVC Control	To be provided with Arc Voltage Control	Bidder to confirm
6.12.0	AVC Stroke	10 mm.minimum	Bidder to confirm
6.13.0	Torch to Work-piece Distance	Provision for adjusting distance between torch and work-piece during welding	Bidder to confirm
6.14.0	Wire Spool & Feeder Location	Wire Spool & Wire Feeder shall be integral with the welding head.	Bidder to specify
6.15.0	Cable Length&Type		Bidder to specify
6.16.0	Tungsten Electrode	Tungsten Electrode 1.6/ 2.0/2.4 mm dia.	
6.17.0	Wire Size	0.8 mm Titanium / 0.6 mm Inconel	Bidder to confirm & give details.
6.18.0	Application	To position the Tube-to-Tubesheet Welding Head, concentric to the tube-to-tubesheet joint to be welded in Vertical/Horizontal position	
6.19.0	Locator/Collet Assembly	To form part of the supply and shall be suitable for Tube Size : 14.0 mm (OD) x 1.5 mm (t) & 19.0 mm(OD)x 1.1 mm(t) with 10% tolerance on wall thickness & weld protrusion as indicated in Annexure drawings.	Bidder to confirm
7.0	ELECTRICAL & ELECTRONICS SYSTEM :		
7.1.0	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.		
7.2.0	Tropicalization: All electrical / electronic equipment shall be tropicalized.		Bidder to confirm
7.3.0	All electrical & electronic control cabinets & panels should be dust and vermin proof		Bidder to confirm
7.4.0	All electrical components in the cabinets should be mounted on DIN Rail		Bidder to confirm

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7.5.0	Control circuit voltage shall not exceed 110 V.		Bidder to confirm
7.6.0	All Electric enclosures shall have IP 54 protection		Bidder to confirm
7.7.0	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
7.8.0	Drive motors		Bidder to specify& provide details.
7.9.0	All the cable drag chain / cable trays required for laying of cables should be included in the offer.		Bidder to confirm
7.10.0	Vendor should ensure the proper earthing for the machine and its peripherals.		Bidder to confirm
7.11.0	Fault diagnostics and remedies.		Bidder to confirm
7.12.0	All solenoid valves should have light indicating solenoids.		Bidder to confirm
8.0	DATA ANALYSIS SYSTEM :		
8.1.0	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
8.2.0	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
9.0	IN-BUILT SAFETY ARRANGEMENTS:		
9.1.0	Following safety features in addition to other standard safety features should be provided on the machine:		Bidder to confirm
9.2.0	A detailed list of all alarms / indications provided on machine should be submitted by the Vendor.		Bidder to confirm
9.3.0	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
9.4.0	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 confirm
9.5.0	Emergency Switches at suitable locations as per International Norms should be provided.		Bidder to confirm
9.6.0	Tungsten Electrode Grinder		Bidder to give as optional with separate quote.
10.0	MACHINE LEVELLING & ANCHORING SYSTEM		
10.1.0	Complete anchoring system including foundation bolts, anchoring materials, fixators, levelling shoes etc , if any, should be supplied.		Bidder to confirm
10.2.0	TOOLS FOR ERECTION, OPERATION & MAINTENANCE:		

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10.3.0	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
11.0.0	MACHINE SPARES :		
11.1.0	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)		
11.2.0	Mechanical Spares: Coolant Pump, Valves, Pressure Switches, Transducers, Flow Switches, Filters, Seals.		
11.3.0	Tube ID locators 5 No. in each size		
11.4.0	Inter-connecting Hose - 1 Set		
11.5.0	Electrical / Electronic Spares: All types of Printed Circuit Boards, Proximity Switches, Encoders, Power Module & Control Cards for Drives,miniature motors		
11.6.0	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		Vendor to confirm
11.7.0	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		Vendor to confirm
12.0.0	MACHINE DOCUMENTATION:		
12.1.0	O & M Manuals:	a. THREE Copies of the Operation & Maintenance Manual to be given in Hard Bound Paper Copies with ONE copy in pen drive. b. One Hard Copy of O & M Manual as per clause 12.2.0 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.	Vendor to confirm
12.2.0	Documents and Technical Details		Vendor to confirm
	a. Write-up on the Operation and maintenance of the machine.		
	b. Complete specification of the machine.		
	c. Preventive maintenance Check list.		
	d. GA Drawing of the tube to tubesheet 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.		

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	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.	
	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.	
13.0.0	TRAINING:	Bidder to confirm
13.1.0	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.	
13.2.0	Airfare, boarding & lodging for the BHEL Trainees shall be borne by BHEL.	
13.3.0	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	
13.4.0	Competent, English speaking experts shall be arranged by the vendor during training for satisfactory & effective training of BHEL personnel	
14.0.0	MACHINE ERECTION & COMMISSIONING :	Bidder to confirm
14.1.0		
	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	
14.2.0	Successful proving of BHEL requirements by the Vendor shall be considered as part of commissioning.	
14.3.0	Tools, Tackles, Test Mandrels, instruments and other necessary equipment required to carry out all above activities should be brought by the Vendor.	
14.4.0	Commissioning spares, required for commissioning of the machine within stipulated time, shall be brought by the vendor on returnable basis.	
14.5.0	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.	

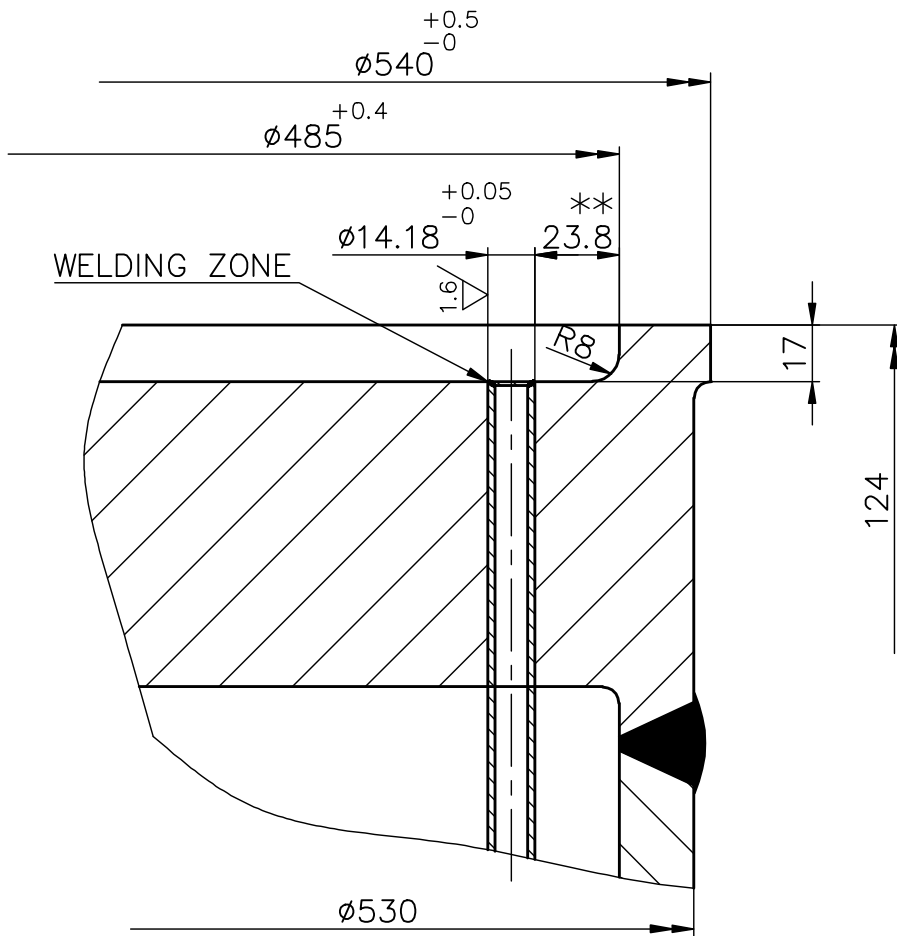
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14.6.0	Charges, terms & conditions for E&C shall be given (in detail) separately by Vendor along with offer.	
15.0.0	AMBIENT CONDITIONS & THERMAL STABILITY:	
	The Welding Machine with all sub-systems shall be suitable for operation in an ambient temperature of 25 to 50°C and with a Relative Humidity of 90% (both higher values do not occur simultaneously).	
	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]	
16.0.0	MACHINE PERFORMANCE PROVE-OUT:	
	a. Prove-out trials of the welding operation on tubes as specified in Clause 1.2.0 to be done at the supplier's works and at BHEL and as mutually agreed.	Bidder to confirm
17.0.0	MACHINE PACKING:	
	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	GUARANTEE TERMS:	
	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
19.0.0	GENERAL POINTS :	
	Machine Model Number and other related details	Bidder to specify
	Total Connected Load (in kVA)	
	Floor area required (Length, Width, Height) for complete machine & accessories	
	Painting of Machine/Electrical Panels: Apple green IS-5/1994 (shade: ISC No. 281)	
	Total Weight of the Machine & Accessories	
	Bidder shall submit General Arrangement drawing with major/critical dimensions for getting BHEL's concurrence before manufacture.	Bidder to confirm

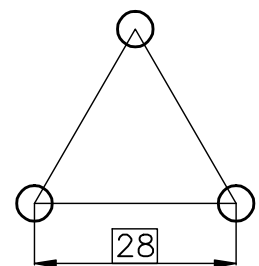
Enclosures: ANNEXURE – 1, 1A & 2.

ANNEXURE-1

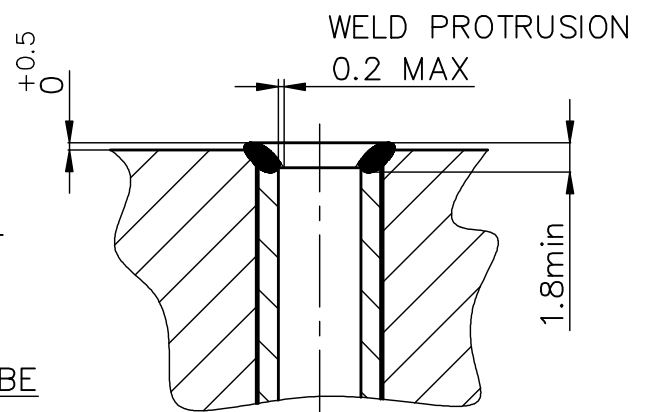
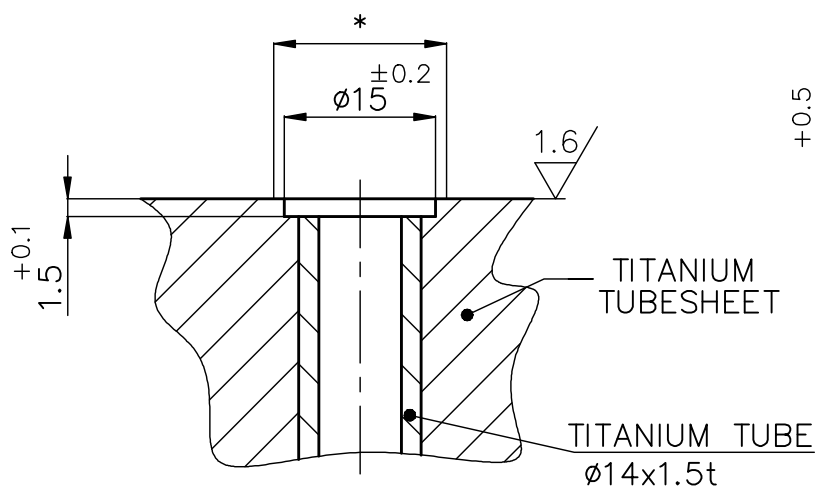
TUBE SHEET



PITCH PATTERN



WELD DETAIL



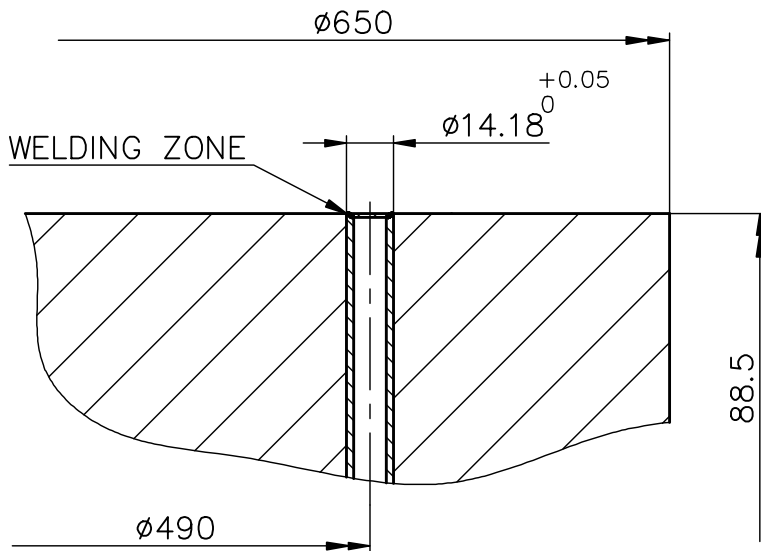
NO.OF HOLES 198

*SPOT FACING DEPTH<0.1MM AND DIA20mm

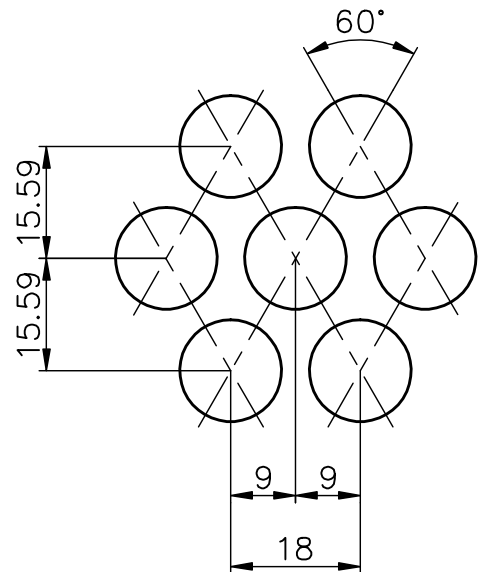
** MINIMUM DISTANCE TO WALL SHOWN.VENDOR TO CONFIRM/MENTION SPACE REQUIREMENT FOR ACCOMODATING THE WELDING HEAD & SHIELDING ARRANGEMENT.

ANNEXURE-1A

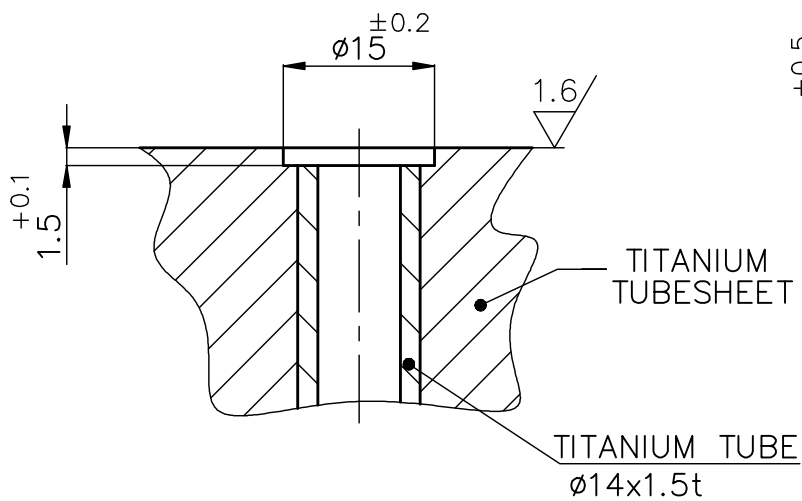
TUBE SHEET



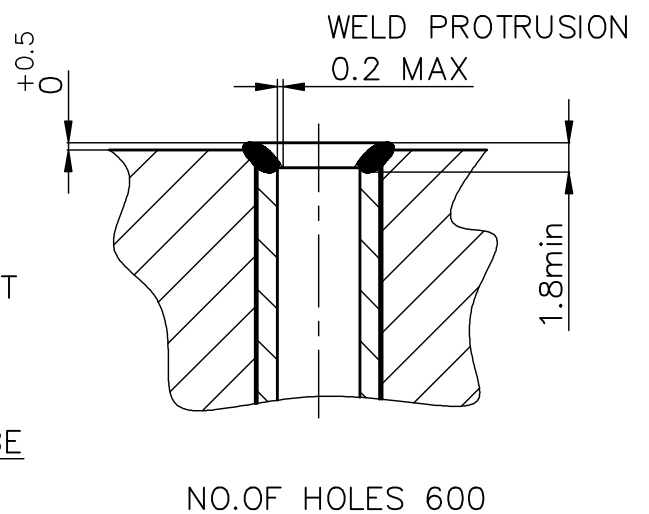
PITCH PATTERN



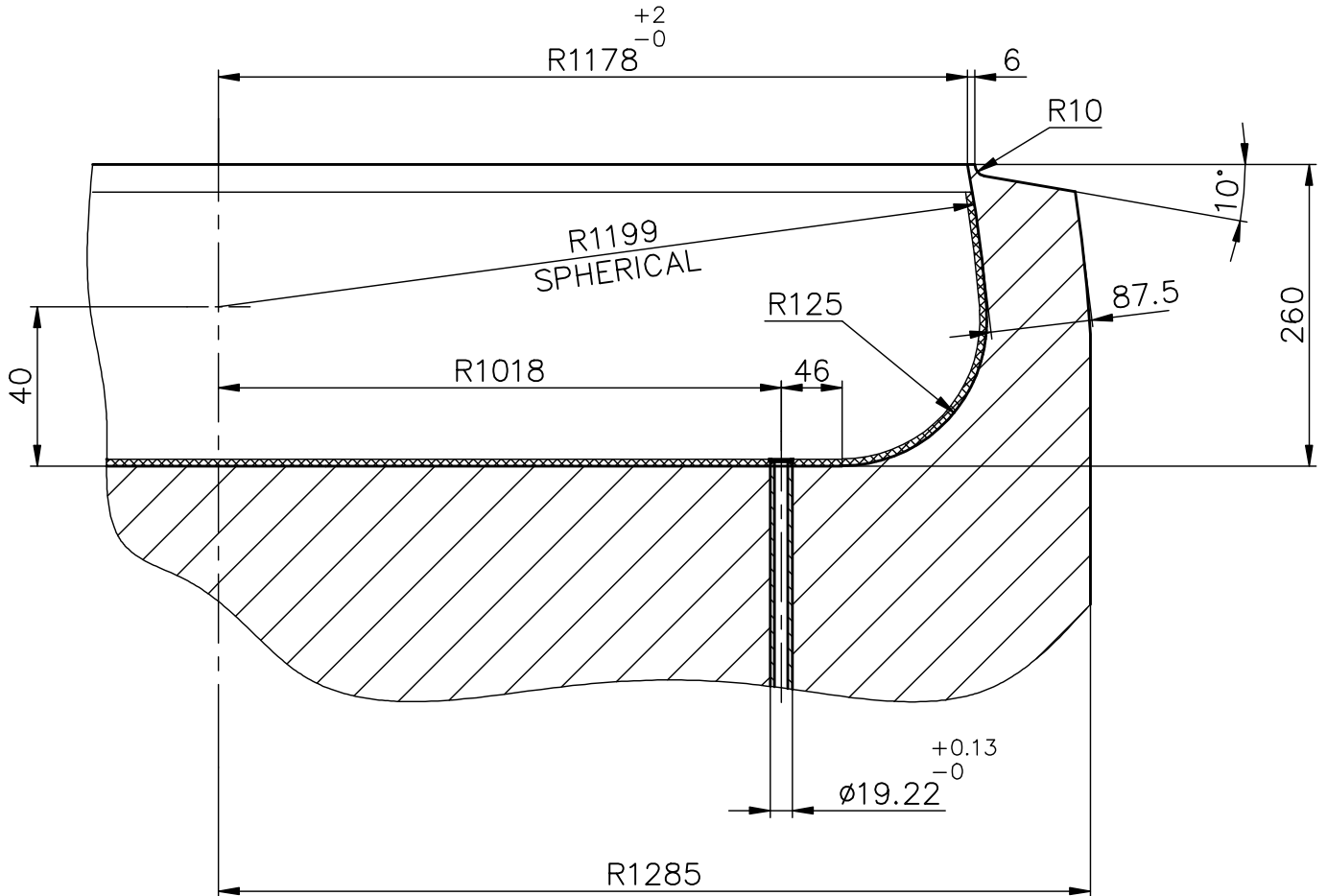
EP DETAIL



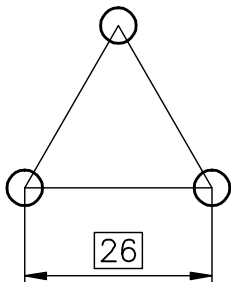
WELD DETAIL



ANNEXURE-2

TUBE SHEET

PITCH PATTERN



WELD DETAIL

