BHARAT HEAVY ELECTRICALS LIMITED

ENQUIRY
(INDIGENOUS)

(A Government of India Undertaking)
HIGH PRESSURE BOILER PLANT
PURCHASE DEPARTMENT - FOSSIL BOILERS
THIRUCHIRAPALLI - 620014
TAMILNADU (INDIA)

PHONE :2577645
GRAMS : BHARATELEC
FAX NO: 2520719
E-mail: srchandran@bheltry.co.in
Web:

429-002/A

Vendor Code : Vendor Name :	Enquiry No	Enquiry Date	Due Date for Quotation
	2691000157 - 41	10.08.2010	24.08.2010
	Please quote Enquiry No, Date and due date in all correspondences. This is only a request for quotation and not an order		

Item	Description	Unit	Quantity	Delivery Schedule Quantity	Delivery Schedule Date
10	DRUM TO NOZZLE WELDING MACHINE BY SUBMERGED ARC WELDING PROCESS (DETAILS OF SPECIFIATIONS ARE ECLOSSED) NOZZLE WELDING MACHINE	NO	1.000	1.00	15.10.10

General Note:

1) Please submit your detailed offer in TWO PART BID system as per annexure enclosed.

2) BHEL shall have the right to go for REVERSE AUCTION instead of sealed tender bid which will be decided after tender evaluation.

Enclosures:

"LD clause has to be confirmed without fail."

"Payment to vendors will be made only thro E-Payment mode"

The offers should reach us 30 minutes before the time of opening of tenders.
The offers will be opened at 14.30 hrs on the due date of tender in the presence of tenderers who have submitted their offer and who may like to be present for the tender opening.Late and delayed offers are liable to be rejected.

Yours faithfully,
For **BHARAT HEAVY ELECTRICALS LIMITED**

MANAGER / PURCHASE
(FOSSIL BOILERS)

PART B

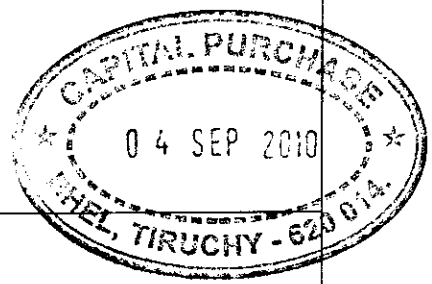
WR:DN SPEC: 001/Rev/00 **Dt:300610**

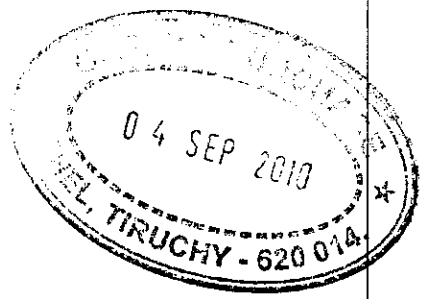
TECHNICAL SPECIFICATION FOR DRUM TO NOZZLE WELDING MACHINE BY SUBMERGED ARC WELDING PROCESS

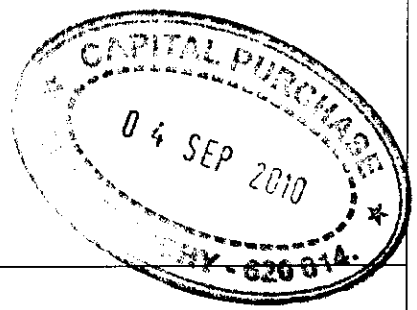
SlNo	Particulars	Description/Specification	Bidders offer with complete technical details
1.0	APPLICATION	a. This machine submerged arc welding (SAW) of nozzle to drum welding is to be carried out. This involves welding of feed nozzles/full throat nozzles and down comer nozzles /set on nozzles on drums as shown in ANNEXURE –1.The drum to nozzle welds should be free from defects and are to be subjected to 100% ULTROSONIC TESTING (UT) as per BHEL standard applicable for Boiler Drums.	
2.0	PRODUCTIVITY	The Machine is to weld Nozzles of OD 570x115.45mm long 1448mm and OD315x67.95mm long 1327mm. The nozzles are arranged in different pitches in to a drum assembly of Carbon Steel Material. In a shift of eight hours productivity expected is welding of 1 Nozzle of OD 570 x 115.45 x 1448 mm.	
3.0	JOB DETAILS	Nozzle OD range : 315mm to 750mm Nozzle ID range : 179mm to 339mm Nozzle Thickness range : 50 to 125mm Nozzle length range : 750-1600mm Material : Carbon Steel - SA 299 Grade B. The Drum Shell + Nozzle shall be preheated using a gas burner arrangement from the inside of the shell to 150 – 200deg C. which would be maintained several hours before, during and after welding.	CAPITAL PURCHASE BHEL, TIRUCHY - 620 014. 24 JUL 2009
4.0	MACHINE CONFIGURATION	Machine shall have the following basic elements or components: 4.1. Machine is for welding of feed nozzles and down comer nozzles on heavy wall thickness drum shells for High Pressure boiler service. 4.2. A cross bar complete with required connecting rod is to be provided. Once placed inside the nozzle, this device has to prevent any possible falling of the whole machine due to faults of the roller bed rotation. 4.3. The rotary system of the welding head to be provided	

SINo	Particulars	Description/Specification	Bidders offer with complete technical details
		by means of geared motor with adjustable angular speed between 0.1 and 2.0 rpm. 4.4. The welding head shall be provided with an Automatic Rise & Fall system for positioning of the Torch in a path along the intersection curve between the Drum shell ID and the Nozzle OD, pass after pass. With a vertical setting within 180 mm max. 4.5. Rotary distributor for compressed air supply to the flux suction system. 4.6. Welding torch positioning: Welding Torch shall be mounted on motorized cross slides with a cam for positioning the nozzle for deep groove welding 4.7.**Welding head** A6 Arc Master head or equivalent, 100% duty cycle. 4.8:VEC Motor or equivalent for feeding solid wires 2 to 4 mm dia with suitable wire straightening mechanism. Plastic wire reel with brake hub support Flux hopper (5-10 liter capacity) Reinforced wire guide with metallic spiral Special insulated nozzles for the welding torch. 4.9. **Control system:** PEH-1 or equivalent. Welding control system to enable wire feeding speed regulation (feedback) according to SAW arc voltage. The control box to be mounted on the machine. It should withstand the effect of preheating carried out on the joints **CAN BUS** or equivalent communication interface shall be used in control system. The control box to include: Digital reading instrument and relative setting for current, voltage, welding speed and wire feed rate. Possibility to select automatic start, scratch start or manual start. Max. Operating environmental temperature 45 deg C. 4.10 **Special tilting system** enabling the clock/ counter clock rotation of the roller bed. This function to be activated according to the welding movement of the machine (position of the torch).Therefore the welding pool to be kept in perfect plane position during	CAPITAL PURCHASE 04 SEP 2010 BHEL, TIRUCHY - 620 014

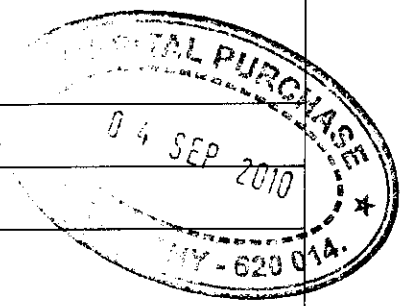
SINo	Particulars	Description/Specification	Bidders offer with complete technical details
		the whole turning cycle. Tilting exceeding 24degrees of inclination (from vertical position of the work piece) is to be automatically stopped by means of a safety system(No risk for machine falling) 4.11. Power source 800A at 100% duty cycle Type: Constant Voltage DC Rectifier or equivalent. Current range: 75-800A OCV: 60 V Max Protection class: IP22 Insulation class: H	
5.0	**ELECTRICAL AND ELECTRONIC DEVICES AND CONTROLS INPUT POWER SUPPLY:**	5.1. Input supply; 415V +/- 10%, 50HZ, +/-5%, 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 Bidder. Hence design & supply of all cables, connections, circuit breakers etc. Required for connecting BHEL's power supply to the machine shall be in the scope of Bidder. Bidder to Confirm 5.2 Bidder to specify the type and capacity of the power source with details about power transformer and associated controls. Bidder to Specify 5.3 Digital display to be provided on the front side of the power source for easy visibility to the operator. Bidder to Confirm.	
6.0	**MACHINE SPARES:**	Itemized break-up of mechanical, electrical and electronic spares used in the machine in sufficient quantity as per recommendation of Bidder for 2 years of trouble free operation on three shifts continuous running basis shall be furnished by Bidder along with offer. **(Unit Price for each item of spare shall be offered)** Bidder to confirm	
7.0	**DOCUMENTATION:**	7.1 The following documents in English language should be supplied along with the machine: **Hard Copies - 3 Sets** **In CD form - 1 Set Bidder to confirm** 1. Operating manuals of Machine & its PLC System 2. Programming manuals of Machine 3. Maintenance manuals with all drawings of machine	



SINo	Particulars	Description/Specification	Bidders offer with complete technical details
		assemblies / subassemblies with parts list 4. Electrical circuit diagrams and components with bill of materials 5. Maintenance & Interface manuals for Machine Control System 6. Preventive Maintenance check list for Electrical and Mechanical System	
8.0	**MACHINE INSPECTION & ACCEPTANCE**	8.0.Pre dispatch inspection shall be conducted by WRI ,BHEL, Engineers at the supplier works 8.1 Acceptance of the machine for dispatch to BHEL will be based on satisfactory welding of one plate butt joint and one set of drum to nozzle welding using the mockup prepared by the supplier. Bidder to Confirm 8.2 All tests as per annexure 2. Shall be conducted by the supplier at their works and at their cost in the presence of BHEL Engineers.Bidder to Confirm	
9.0	**AT BHEL WORKS:**	9.1 The weld parameters for the given below sizes of nozzle to drum welding shall be established by the Supplier at BHEL Works after installation, Sizes:OD 517x115.45mm long 1448mm nozzle to be welded with drum shell .The test samples will be provided by BHEL. Bidder to Confirm 9.2 WPS shall be qualified for the machine for the sizes given above as per ASME Section IX after stress relieving of weld joints at 610 ± 10 deg C for 300 minutes in a furnace that is connected to a temperature recorder and has a time temperature graph. Heat treatment and testing for WPS qualification shall be done by BHEL.	
10.0	**TRAINING:**	10.1 The supplier shall train TWO Engineers from WRI BHEL, in Operation (Mechanical, Electrical/ Electronics and Programming) of the Machine for FIVE working days at supplier's works during the pre-dispatch inspection. Bidder to confirm 10.2 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 Specify	

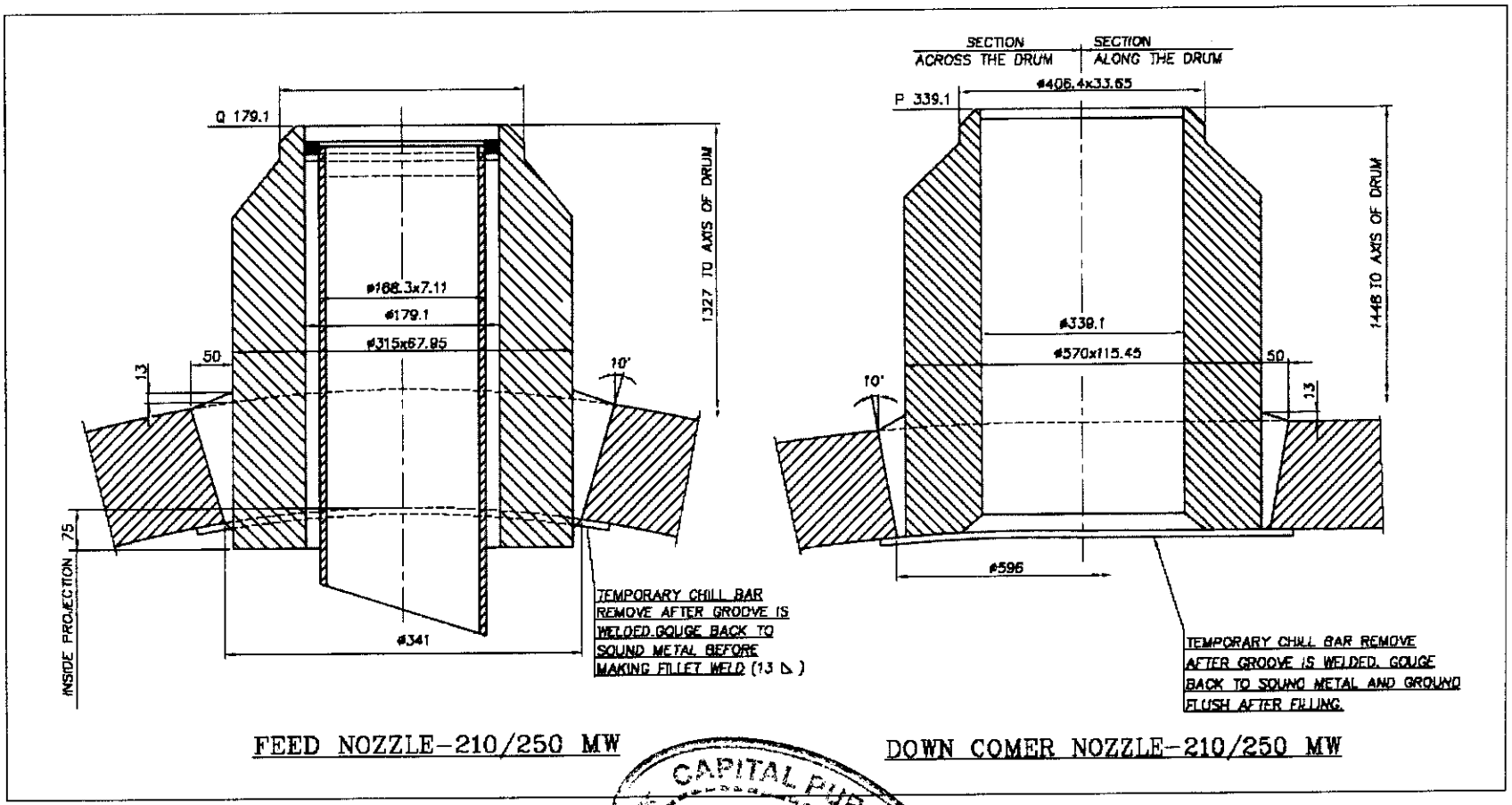
SlNo	Particulars	Description/Specification	Bidders offer with complete technical details
		10.3 Travel charges, board & lodging for the BHEL Engineers who will be visiting supplier's works for pre-dispatch inspection and training, shall be borne by BHEL. Bidder to note 10.4 The Supplier shall impart training to BHEL's Machine Operators and Maintenance crew in Operation and Maintenance (Mechanical, Electrical/ Electronics and PLC based control System) during commissioning of the Machine at BHEL works for 10 working days. Bidder to confirm 10.5 The training shall include specialized coaching in 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 10.6 Competent, English speaking experts shall be arranged by the Bidder during training for satisfactory & effective training of BHEL personnel Bidder to Confirm	
11.0	**ERECTION & COMMISSIONING**	11.1 Supplier to take full responsibility for Supervision of commissioning of machine, its controls and accessories. Supplier shall send suitable qualified Engineers for supervision of Commissioning of the machine at BHEL works. Bidder to Confirm 11.2 Successful proving out of the Machine at BHEL works for welding of a minimum of 3 Nozzles under the supervision of 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 11.3 **Commissioning spares**, required for commissioning of the machine shall be supplied free of cost Bidder to Confirm	

SlNo	Particulars	Description/Specification	Bidders offer with complete technical details
12.0	**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	
13.0	**MACHINE PACKING:**	Air worthy & rigid packing for all items of complete machine, PLC System, Data logger 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	
14.0	**GENERAL:**	14.1 Machine Model No. Bidder to specify 14.2 Total connected load (KVA): Bidder to specify 14.3 Length, Width, Height for complete machine Bidder to specify 14.4 Total weight of the machine Bidder to specify	
15.0	**The Technical Offer shall contain the following:**	a) Point by Point confirmation / details wherever called for to be provided. b) Complete Scope of Supply. c) List of Spares d) Performance Prove-Out Details.	
16.0	**Option.1**	**Without tilting system: The drum nozzle welding machine should be independent of job rotator.**	
17.0	**Option .2**	**Automatic programming of weld parameters like welding current, voltage and welding speed.**	
18.0	**Option .3**	**Automatic welding parameters data logging system to record welding current, voltage, welding speed and temperature.**	
19.0	**Option .4**	**Seam tracking with suitable sensors system for drum to nozzle welding**	



ENCLOSURES : 1) ANNEXURE – 1 : TYPICAL NOZZLE DRAWING
2) ANNEXURE – 2 : TESTING OF DRUM NOZZLE WELDS

ANNEXURE – 1 : TYPICAL NOZZLE DRAWING



ANNEXURE – 2: TESTING OF DRUM NOZZLE WELDS

Testing of drum nozzle welding

NDT

MPI and UT

Destructive testing

Transverse tensile test in plate

Side bend test in plate

Root bend test in plate