

ANNEXURE - II		
TECHNICAL SPECIFICATIONS FOR RETROFITTING OF OBSOLETE MIG WELDING POWER SOURCE AND ACCESSORIES IN STRAIGHT TUBE BUTT WELDING MACHINE		
S.No	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER (with complete Technical
1.0.0	PURPOSE & APPLICATION	Vendor to note
1.1.0	The machine is designed for butt-welding of straight tubes with edge prepared ends (without tack welding) using entirely by Pulsed GMAW Welding IMPORTANT NOTE: a) The machine is intended for tube build-up to 24 meters with ONE GMAW Power Source consisting of THREE MIG Torches with Three Cold Wire feeders. b) Welding of tubes of similar or dissimilar materials in steel (like carbon steel to alloy steel, alloy steel to stainless steel, Inconel etc.) c) Welding of tubes of various outer diameters and thicknesses. d) Torch have to be employed, exclusive MIG welding process and using two/three types of filler wire respectively for different material combination butt-welds. e) The welds produced using the above system should pass Radiography Test (RT) / Ultrasonic Test (UT) as stipulated in ASME sec. IX, ANSI B31.1, and B31.3 for welding high-pressure tube butt joints of power plant.	[BIDDER is expected to give technical write up on power source and accessories design, construction and operational features to bring out the capability of the proposed retrofitting, to meet the BHEL specification requirements]
2.0.0	WORK PIECE / JOB DETAILS	
2.1.0	Only Seamless Steel Tubes (All are Outer Diameter controlled tubes with a tolerance of maximum 12% on tube wall thickness)	Vendor to note
2.2.0	Tube Outer Diameters 28.6mm / 31.8mm / 38.1mm / 42.4mm / 44.5mm / 51mm / 54mm / 63.5mm / 69.85mm / 76.1mm Tube Wall Thickness: 3mm to 16mm	Vendor to note
2.3.0	MATERIAL SPECIFICATION Minimum - 1.2 meters Maximum - 15 meters Note: a) Small tubes known as inserts of length 80mm / 110mm with straight gripping length of 30mm have to be welded to the longer tubes. The machine grips these inserts in the chucks and welds them to the longer tubes. b) Tube lengths less than 4 meters are loaded manually. Tube lengths greater than 4 meters are feed automatically into the machine. Tube Material a. Carbon Steel: SA192, SA210 Gr. A1, SA210 Gr.C b. Alloy Steel :SA209 T1, SA213 T11, SA213 T22, SA213 T23, SA213 T91, SA213 T92 c. Stainless Steel: SA 213 TP304H, SA 213 TP321H, SA 213 TP347H, d. Inconel Tube End Edge Preparation Style and Weld Groove Design a. Grade C, SA213 T11, T22 - 45 degree chamfer b. SA213 T91 and Stainless Steel - 37.5 degree chamfer c. Combination of T91/SS with T22 - 37.5 degree chamfer d. Chamfering styles shall always be either 37.5 or 45 degrees	Vendor to note

3.0.0	MACHINE OUTPUT / PRODUCTIVITY	
3.1.0	Number of radiography quality weld joints expected per shift of 8 hours, for following tubes of 10 or 12m length. 80 joints / shift of OD 44.45mm x Th. 7.11mm SA213 T91 to T91 with 0.8mm ER80S-B2 wire by Pulsed GMAW process to build a length of 24m. The joints should be of RT quality to meet ASME Sec V / IX code.	Vendor to confirm
4.0.0	EXISTING MACHINE	
4.1.0	Sinamics Single Motor Module (Chuck) Make: Siemens Model: 6SL3120-1TE15-0AA4	Vendor to note
4.2.0	CPU: Simotion D435 Make: Siemens Model: 6AU1435-0AA00-0AA1	Vendor to note
4.3.0	Sinamics Double Motor Module (Vertical & Horizontal) Make: Siemens Model: 6SL3120-2TE13-0AA3	Vendor to note
4.4.0	Micromaster MM420 Make: Siemens 4kW	Vendor to note
4.5.0	Sinamics (Horizontal) Make: Siemens Model: 1FK7022-5AK71-1DA2	Vendor to note
4.6.0	Sinamics (Vertical) Make: Siemens Model: 1FK7022-5AK71-1DB0	Vendor to note
4.7.0	Sinamics (Chuck) Make: Siemens Model: 1FK7060-5AF71-1DG0	Vendor to note
4.8.0	HMI: Siemens TP270	Vendor to note
4.9.0	Infeed/Outfeed Motors: 3kW Make: Siemens 100L, 1420RPM, Flange Mount	Vendor to note
4.10.0	MIG/MAG Power Source Make: OTC Daihen Model: CPDP350 Wire Feeder: CMH1407 TIG Power Source: OTC Daihen Model: ACCUTIG 500 TIG Wire feed - Motor: Mitsubishi Servo HF-KP-23K, Motor : Mitsubishi MR-J3-20A	Vendor to note
4.11.0	Chiller Make: Abicor Binzel Power: 0.35kW Voltage: 230V, 50Hz Model: GK3226	Vendor to note
4.12.0	Water-cooled MIG/MAG torch Make: Abicor Binzel Type: Straight neck, water-cooled Model: AUT 501D Length: 1535mm Wire Size: 0.8 to 1.2mm	Vendor to note

5.0.0	Scope of Supply - Supply, installation, commissioning and interfacing of existing Straight Tube Butt MIG welding system (3 MIG Torch) with following system.	
5.1.0	New welding power source 350A or higher (pulse mode) with 3 separate wire feeder units & 3 number of water cooled torches with cooler and related accessories.	Vendor to confirm
6.0.0	POWER SOURCE FOR SYNERGIC PULSED GMAW - 1 no.	
6.1.0	Type: Inverter Controlled (IGBT Based) Welding Power Source for Synergic Pulsed GMAW with 3 separate wire feeder units (with euro adapter only) Make: OTC / DAIHEN Corporation ONLY Process: Synergic Pulsed GMAW preprogramed for 0.80 mm Wire of CS, AS, SS & Inconel with gas shielding [Argon (95-98%) + CO2 (5-2%) Mix] Model: Bidder to Specify Output Rating a. Current: 350 A (pulse mode) or higher b. Voltage: 15-36 V c. Duty Cycle: 60% or more Suitable gas flow controller to be provided. Weight & Dimensions: Bidder to Specify Wire Sizes: 0.8, 1.0, 1.2 mm Reference Model: OTC Welbee WB-P500L (CE version). NOTE: 1. The offered model shall be a suitable replacement for the power source and wire feeder as per 4.10.0 2. Detailed product catalogue to be enclosed with the offer.	Vendor to confirm
6.2.0	Wire feeder Details - 3 nos. (Suitable to power source in sl.no 6.1.0) Type Bidder to Specify type & rating Model: Bidder to Specify Wire Sizes: 0.8, 1.0, 1.2 mm Drive: 4-Roll Drive (Rollers to be suitable for 0.8 mm wire) Wire Feed Speed: 8 m/min or more (variable from 0 to maximum) Feeder Motor Capacity: Bidder to Specify Weight of Wire Spool: Suitable for loading 25 kg Wire Spools. Bidder to Confirm Scope of Supply: Bidder to Confirm supply of complete unit with cables, gas hoses, end connectors & protective sheath and Feed Rolls for 0.8, 1.0, 1.2 mm wire (each size 1 set) with Euro adapter. Reference Model: OTC CM-7403 (CE Version)	Vendor to confirm

7.0.0	GMAW WELDING TORCH - 3 NOS	
7.1.0	GMAW WELDING TORCH Type: Water Cooled Make: Binzel / Bernard Model: Bidder to Specify Rating: 450 A or more @ 100% Duty Cycle Type: Straight neck Wire size: Torch fitted with Accessories for 0.8, 1.0, 1.2 mm steel wire. (1 set/each size to be supplied and include along with scope of supply) Wire feed speed: 0 to 8 m/min (variable from 0 to maximum) With Euro adapter Suitable capacity chiller for cooling the torches along with related accessories also to be provided. Details to be submitted along with the offer.	Vendor to confirm
7.2.0	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. Bidder to Confirm	Vendor to confirm
8.0.0	ELECTRICAL & ELECTRONICS SYSTEMS	
8.1.0	415V + 10% / -10%, 50HZ +/-3 Hz, 3 Phase AC (3 wire system without neutral) power supply will be provided by BHEL at a single point near the machine.	Vendor to confirm
8.2.0	Tropicalization: All electrical / electronic equipment shall be tropicalized.	Vendor to confirm
8.3.0	Motors & other electrical components shall conform to IEC or Indian Standards.	Vendor to confirm
8.4.0	All cables moving with traversing axes should be enclosed properly. Additionally, all the cable trays or other accessories required for laying of cables should be included in the offer.	Vendor to confirm
8.5.0	Vendor should ensure the proper earthing for the machine and its peripherals. BHEL will provide earth at a location near to the machine.	Vendor to confirm
9.0.0	TOOLS FOR ERECTION, OPERATION & MAINTENANCE	
9.1.0	The Vendor shall bring special tools and equipment required for erection of the machine. Necessary tools like Torque Wrench, Spanners, Keys, grease guns etc. for operation and maintenance of the machine should be supplied. List of such tools should be submitted with offer.	Vendor to confirm
10.0.0	MACHINE SPARES	
10.1.0	Itemized break-up of mechanical, electrical and electronic spares used in the power source, wire feeder, torch and other accessories in sufficient quantity as per recommendation of Vendor for 2 years of trouble free operation on three shifts continuous running basis shall be offered by vendor.	Vendor to confirm
10.2.0	Welding Consumable spares such as Contact tips, Gas nozzles, Tip adapters, other torch spares for atleast 3 months continuous operation shall be provided along with the offer. (Shall include in scope of supply).	Vendor to confirm
10.3.0	Critical electronic components/PCBs in the power source shall also be offered in the list of recommended spares.	Vendor to confirm
10.4.0	Recommended set of spares for all attachments, welding consumables are to be offered with details.	Vendor to confirm

10.5.0	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
10.6.0	Vendor to confirm that complete list of spares for components, 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
10.7.0	The following spares are to be included in the offer: a. Pressure roller, K1822H00 - 4 nos. b. Feed roller (0.8-0.9mm), K1821V00 - 4 nos. c. Pressure roller, K1822H00 - 4 nos. d. Feed roller (1.0mm), K182 - 4 nos. e. Pressure roller (1.0mm), K5439C00 - 5 nos. f. Feed roller (0.8/0.9-1.0), K5439B13 - 5 nos. g. Control PCB, P30099P00 - 1 no. h. Power supply PCB, P30086Q00 - 2 no.	Vendor to confirm
10.8.0	BHEL reserves the right to add or remove any of the offered accessories/spares. The final list shall be clearly indicated in the Scope of Supply after technical evaluation.	Vendor to note
11.0.0	DOCUMENTATION	
11.1.0	Two sets of following documents (2 Hard copies) in English language should be supplied along with the machine.	Vendor to confirm.
11.2.0	Operating & Troubleshooting Manuals of Power Source & supplied	Vendor to confirm
11.3.0	Programming Manuals of Power Source & supplied accessories	Vendor to confirm
11.4.0	Catalogues, O&M Manuals of all bought out items and accessories including drawings, wherever applicable.	Vendor to confirm
11.5.0	The vendor shall submit complete Master List of spare parts used in the supplied components.	Vendor to confirm
11.6.0	One additional set of all the above documentation shall be given in the form of CD/DVD (English Language).	Vendor to confirm
12.0.0	MACHINE ERECTION & COMMISSIONING	
12.1.0	Vendor to take full responsibility for supervision of the erection, vendor shall start up, test the power source, it's control, operation & 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. Other requirements like crane and helping personnel shall also be provided by BHEL. Details of these requirements should be informed by Vendor in advance.	Vendor to note
12.2.0	Integration of the offered power source, wire feeders and torches with the existing machine setup and control systems is under the scope of the vendor. Machine operation shall remain the same. All necessary modification to the machine or its controls (including materials) are in the vendor's scope.	Vendor to confirm
12.2.0	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
12.3.0	Commissioning spares, required for commissioning of the machine within stipulated time, shall be brought by the Vendor on returnable basis.	Vendor to confirm

12.4.0	Schedule of Erection and Commissioning shall be submitted with the offer.	Vendor to confirm
12.5.0	Charges, duration, terms & conditions for E&C should be furnished in detail separately by Vendor along with offer.	Vendor to confirm
12.6.0	Portion, if any, of the power source, 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.	Vendor to confirm
13.0.0	TRAINING	
13.1.0	The Vendor shall impart training to BHEL's Machine Operators and Maintenance crew in Operation, Maintenance and Troubleshooting after the commissioning of the system in the machine at BHEL works for not less than 2 working days.	Vendor to confirm
13.2.0	Competent, English speaking experts shall be arranged by the vendor during training for satisfactory & effective training of BHEL personnel	Vendor to Confirm
14.0.0	AMBIENT CONDITIONS & THERMAL STABILITY	
14.1.0	Power source and accessories shall work trouble free and efficiently under following operating conditions & shall give specified accuracies. Power Supply: Voltage : 415 V $\pm$ 10%, 3 Phase AC Frequency : 50 Hz $\pm$ 3% The machine shall be suitable for an ambient temperature of +50 ° C and relative humidity of 85 % respectively, but both do not occur simultaneously [The offered machine shall be suitable for the above and details of provisions on the items for the same are to be furnished by Vendor]	Vendor to confirm
14.2.0	Weather conditions are tropical, Atmosphere may be dust laden during some part of the year. Machine shall be kept in the normal shop floor condition. [The offered machine shall be suitable for the above and details of provisions on the machine for the same are to be furnished by Vendor]	Vendor to confirm
14.3.0	The machine, including attachments and accessories, should be suitable for 24 hrs. Continuous operation to its full capacity for 24 hour a day and 7 days a week throughout.	Vendor to Confirm
15.0.0	PROVE-OUT OF BHEL COMPONENTS	
15.1.0	a. The prove-out trials shall be for the straight tubes for sizes given by BHEL during the technical discussions / at the time of releasing the Purchase Order. b. The production rate expected out of the machine, as detailed under the Specification Clause No. 3.0.0, will be the base.	Vendor to confirm
16.0.0	GUARANTEE TERMS	
16.1.0	Performance Guarantee for a minimum period of 12 months (for the power source in total and sub-systems or bought-out items in particular) from the date of acceptance.	Vendor to confirm
16.2.0	Vendor shall visit the existing machine in the presence of area maintenance executive to study the layout and understand the requirement before quoting the offer. Otherwise, the offer is liable for rejection.	Vendor to confirm