



Bharat Heavy Electricals Limited

Enquiry No. :

Due Date :

Supplier's Ref.:

Date :

Part A (Techno-Commercial Bid)

Section 3

Specification cum Compliance Certificate for AUTOMATIC LONGITUDINAL SEAM WELDING SPM

Scope: Design, Manufacturing, Supply, Erection & Commissioning of **AUTOMATIC LONGITUDINAL SEAM WELDING SPM** complying with the following specification

S No.	Description - BHEL's Requirement	Specified	Offered	Deviations	Remarks
1.0 PURPOSE & WORK PIECE MATERIAL					
1.1	Purpose: Automatic Longitudinal Welding	Full Welding			
1.2	Work Piece Material:	Aluminium Alloy(Tensile strength 35kgf/mm ²) & mild steel			
2.0 SPECIFICATION					
2.1	MACHINE CONFIGURATION:Automatic Longitudinal MIG Welding Machine with Power Source 500 Amps @60% duty cycle, Feed Unit, Mig Torch Assembly, Seam Tracking System, Motorized Side Beam Carriage Unit for Torch Manipulation, Fixture for Job holding & resting, for Welding Aluminium Bus Duct of size mention under clause 2.2.	Vendor to confirm			
2.1.1	Power Source:-Synergic Pulse MIG or Double Pulse MIG type from reputed manufacturer capable of giving Radiographic Quality welding in aluminium Alloy e.g. Lincoln Electric, OTC Daihen.	Vendor to confirm and give details with manufactures name & model			
2.1.2	Wire Feed Unit -Suitable For above	Vendor to confirm and give details with manufactures name & model			
2.1.3	Torch Manipulation Unit	Vendor to confirm and give details with manufactures name & model			
2.1.4	Motorised Side Beam Carriage of stroke length approx. 2500 mm with Controlled speed through Variable frequency drive. This Unit should house entire Torch Manipulation Unit, Wire Feeder Unit, Wire Spool Unit etc.	Vendor to confirm and give details with manufactures name & model			
2.1.5	Torch Weaving Unit	Vendor to confirm and give details with manufactures name & model			
2.1.6	Controlling Speed (Suitable for required welding)	Vendor to specify			
2.1.7	Welding Speed (Suitable for required welding)	Vendor to specify			
2.1.8	Job Holding Fixture:-It shall be such that the position of the joints is maintained as per requirement of welding system supplied. The welded joint shall be NDT (X Ray, DP Test) quality	Vendor to confirm			
2.1.9	Option to weld Discontinuous welding at gap 400-500mm with welding length 100mm-200mm	Vendor to confirm			
2.1.10	ESSENTIAL:-(a)Torch Weaving Unit for giving wider welding bead in a single pass having the following controls.	Vendor to confirm			
2.1.10.1	Weaving speed 150-1500 mm/min	Vendor to confirm			
2.1.10.2	Width Control	Vendor to specify			
2.1.10.3	Left/Right Dwell Control	Vendor to specify			
2.1.10.4	Centre shift control within the stroke length of the weaver	Vendor to specify			
2.1.10.5	Stroke length of the torch weaving unit 75 mm approx.	Vendor to specify			
2.1.11	ESSENTIAL: Video Monitoring System to capture the position in two views while welding through Monitor, so that the operator monitors the same in one place and adjusts the torch using joystick for fine tuning while welding. This unit shall comprise of :	Vendor to confirm			
2.1.11.1	CCTV Camera with accessories	Vendor to confirm			
2.1.11.2	Monitor	Vendor to confirm			
2.1.11.3	Interconnecting cable accessories	Vendor to confirm			
2.2 CAPACITY & SIZE					
2.2.1	Drum Dia of Aluminium alloy At Following thickness				
a	At tk 8 / 9 mm	Ø1000 - Ø1800			
b	At tk 15 / 16 mm	Ø450 - Ø1030			
c	At tk 6.35 mm	Ø780 - Ø1000			
d	At tk 4.78mm	Ø680 - Ø780			
2.2.2	Continuous Welding Length	2000 mm			

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2.2.3	Motor Power	Vendor to specify			
2.2.4	Working Height from floor level	Vendor to furnish			
2.3	CONSTRUCTION:				
2.3.1	Vendor to furnish details of material, hardness & constructional details, including explanatory drawings, of various components like Torch, frame, clamping & adjusting system, Lubrication system, etc .of the machine.	Vendor to furnish			
2.3.2	Video images on CD including hard copy explaining the technical features / Literature with photographs, drawings explaining the technical features should be enclosed with the offer.	Vendor to furnish			
2.3.3	The working principle of the above mechanism shall be explained clearly.	Vendor to Confirm			
2.3.4	Digital display of major weld parameters like current, voltage, wire, speed, programme w.r.t. material / thickness etc	Vendor to Confirm			
2.3.5	Any other feature if required	Vendor to Confirm			
3.0	OPERATION AND CONTROL SYSTEM:				
3.1	CONTROL PANEL:				
3.1.1	Control Panel PLC based controlled panel unit which houses all the electrical and electronics accessories for the complete control and automatic operations	Vendor to Confirm			
3.1.2	Control panel side and Layout showing complete details shall be submitted.	Vendor to submit			
3.1.3	Machine shall be provided with main switch with key and signal light.	Vendor to Confirm			
4.0	OPERATOR PENDANT & MANUAL CONTROL :				
4.1	The Operator Pendant provided with all the controls relevant for operator functions like Emergency stop,On/Off,Cycle start/Stop,Weld on/Off,Side beam carriage speed control,joy stick for Cross Slide adjustment,Auto/manual,etc.	Vendor to confirm			
5.0	First filling of all required Oils & Grease etc. to be supplied by vendor. Indigenous (Indian) source or Indian equivalent and specifications of oils/ greases are also to be provided by the vendor.	Vendor to confirm			
5.1	Lubrication shall be life time lubricated wherever possible. Other lubrication points shall be of automatic type. Details shall be submitted.	Vendor to confirm			
6.0	ELECTRICAL :				
6.1	415V + 10% / -10%, 50HZ +/-3 HZ, 3 Phase AC (3 wire system with out neutral) Power Supply Voltage 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. Requirement of grounding/earthing with required material details is to be informed by vendor well in advance so that same could be incorporated during construction of foundation.	Vendor to confirm			
7.0	Tropicalisation: All electrical / electronic equipment shall be tropicalized	Vendor to confirm			
7.1	All electrical & electronic control cabinets & panels should be dust and vermin proof	Vendor to confirm			
7.2	All electrical components in the cabinets should be mounted systematically	Vendor to confirm			
7.3	Motors shall conform to IEC or Indian Standards	Vendor to confirm			
7.4	All cables and cable trays required for the machine should be included in the offer.	Vendor to confirm			
7.5	Vendor should ensure the proper earthing for the machine and its peripherals.	Vendor to confirm			
7.6	The electrical components used shall be from reputed international makes such as Siemens / Telemecanique / Merlin Gerin / GE/ ABB and shall be accordance with DIN/IEC Standards.	Vendor to confirm			
8.0	SAFETY ARRANGEMENTS:				
	Following safety features in addition to other standard safety features should be provided on the machine:				
8.1	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. Details shall be submitted in the technical bid.	Vendor to furnish details			
8.2	Welding operation control through hand switch				
8.3	In case of overloads due to wrong manoeuvres /malfunctions the machine should stop to avoid damage to machine and man.				
8.4	Detailed list of safety alarms / indications provided on the machine shall be submitted along with the offer.				
8.5	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.	Vendor to furnish details			
8.6	Emergency Switches at suitable locations as per International Norms should be provided.				
8.7	Necessary protection shall be provided to prevent from over loading.				

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8.8	Automatic Welding Machine to have adequate Safety Guards and interlocks. Bidder to submit details on these arrangements				
	ENVIRONMENTAL PERFORMANCE OF THE MACHINE : The Machine shall conform to following factors related to environment : (a) Maximum noise & (b) maximum fume level shall be as per the national/ international norms. This will be measured as per international standards like DIN 45635-16. Supplier to mention the requirement of accoustic chamber/Enclosure separately and demonstrate compliance to fume & noise level, if so required. (b) If any safety / environmental protection enclosure is required it should be built in the machine by the vendor.	Vendor to confirm			
	9.0				
	10.0 TOOLS FOR ERECTION, OPERATION & MAINTENANCE :				
10.1	Special tools and equipment required for erection of the machine shall be brought by the vendor. 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 agree			
	11.0 SPARES:				
11.1	Item wised breakup of (1) standard-mechanical, hydraulic, electrical and electronic accessories & spares (included in Basic machine cost),(2) Essential -spares/accessories required for the Purpose and (3)Optional in sufficient quantity as per recommendation of Vendor for 5 years (After initial 24 month's Guarantee period)of trouble free operation on three shifts continuous running basis should be offered by vendor.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 The list to include following, in addition to other recommended spares: (Unit Price of each item of spare should be offered in the price bid)	Vendor to agree			
	a) Mechanical Pneumatic & Hydraulic Spares: All types of Pumps, Valves, Pressure Switches, Transducers, Flow Switches, Filters, Seals, O-rings, Hydraulic Hoses etc. If required.	Vendor to confirm			
	b) Electrical /Electronics: All types of Relays, Contactors, Proximity Switches, Push Buttons, Indicating Lamps, Semiconductor Fuses, Special Fuses, Circuit Breakers, Main Power Switch, etc.	Vendor to confirm			
11.2	Vendor to supply 2 Sets of Electronic cards or PCBs or LCD Monitors, Modules or PLCs or Display Boards if used in the machine along with machine as essential spares.	Vendor to confirm			
11.3	Recommended set of standard & optional spares for all attachments are to be offered with details.	Vendor to confirm			
11.4	Vendor to confirm that complete list of spares for machine and accessories, along with 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			
11.6	DOCUMENTATION : Three sets of following documents (Hard copies) in English language should be supplied along with the machine. Only originals shall be supplied. Photocopies will not be accepted.	Vendor to confirm			
11.7	Operating manuals of Machine	Vendor to confirm			
11.8	Programming Manuals of Machine	Vendor to confirm			
11.9	Detailed Maintenance manual of machine with all drawings of machine assemblies/sub-assemblies/parts including Electrical / Pneumatic/ Hydraulic circuit diagrams. All Assembly/ Sub Assembly Drawings including ladder drawing shall be supplied with the parts list.	Vendor to confirm			
11.10	Manufacturing drawings for all supplied Tables frame ,fixtures etc.	Vendor to confirm			
11.11	Catalogues, O&M Manuals of all bought out items including drawings, wherever applicable.	Vendor to confirm			
11.12	Detailed specification of all rubber items and hydraulic/lube fittings.	Vendor to confirm			
11.13	PLC program on CD,	Vendor to confirm			
11.14	Complete Master List of parts used in the machine shall be submitted by the vendor.	Vendor to confirm			
11.15	One additional set of all the above documentation on CD ROM, wherever possible.	Vendor to confirm			
	12.0 TRAINING				
12.1	BHEL Persons should be trained at supplier's Works for mutually agreed period in the area of (a) Electrical, Electronic maintenance for machine & other supplied equipments (b) Mechanical & Hydraulic maintenance of the machine & other supplied equipments (c) Operation of the machine & other supplied equipments.	Vendor to confirm			
12.2	Fare, boarding & lodging for the trainees shall be borne by BHEL.	Vendor to confirm			

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12.3	Competent experts shall be arranged by the vendor during training for satisfactory & effective training of BHEL personnel.	Vendor to confirm			
12.4	Vendor to quote for training on <i>per diem</i> basis	Vendor to confirm			
13.0 FOUNDATION :					
13.1	Vendor shall submit the layout drawing within one month from the date of Letter of Intent (LOI) / P.O. Layout should contain layout of the machine and load points including details viz. static / dynamic load details etc. The layout should consist of all requirements pertaining to complete machine including space requirement for Voltage Stabilizer, Isolation Transformer, Air compressor, Chip Bin & any other accessories. Foundation of the machine if required will be designed by supplier. BHEL shall construct complete foundation for the machine under supervision of supplier and at supplier's responsibility. supplier should arrange equipments required for the testing of foundation, if required . The vendor shall also indicate detailed specifications of grouting compound and Grouting procedure etc. for foundation bolts of the machine.	Vendor to agree			
14.0 ERECTION & COMMISSIONING					
14.1	Supplier to take full responsibility for carrying out the erection, start up, testing of machine, it's control & all types of other supplied equipment, machining of test pieces etc. Service requirement like power, air & water shall be provided by BHEL at only one point to be indicated by supplier in their foundation/layout drawings. 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 agree			
14.2	Successful working of full capacity of the machine by the supplier shall be considered as part of commissioning. All tests, as mentioned at clause 15 & 16 shall form part of the commissioning activity.	Vendor to agree			
14.3	Tools, Tackles, instruments and other necessary equipments required to carry out all above activities should be brought by the supplier.	Vendor to agree			
14.4	Commissioning spares, required for commissioning of the machine within stipulated time, shall be brought by the supplier on returnable basis.	Vendor to agree			
14.5	All Cover Plates required for the machine and its peripherals including pits, if any, shall be supplied and installed by the vendor.	Vendor to agree			
14.6	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 should supply sufficient quantity of touch-up paint of various colours of paint used.	Vendor to agree			
14.7	Schedule of Erection and Commissioning shall be submitted with the offer.	Vendor to agree			
14.8	Charges if any ,duration, terms & conditions for E&C should be furnished in detail separately by vendor along with offer.	Vendor to confirm			
15.0 TESTING STANDARD & PROCEDURE					
15.1	Welding Quality Test viz.Non Destructive Test(DP , X Ray,)etc				
15.2	Repeatability of settings				
15.3	a) Satisfactory welding should be demonstrated on minimum of three assemblies each for the smallest and the biggest sizes of the assemblies b) The sample welded joints should pass through the macro section test and satisfy the requirements of millivolt drop test where the difference between parent metal and weld metal value shall not exceed 10%. c) Vendor should demonstrate the full penetration welding .	Vendor to specify the Standard.			
15.4	Any other testing if required				
16.0	MACHINE ACCEPTANCE: (Tests/Activities should be Performed by Vendor)	Vendor to agree			
16.1	Tests/Activities should be carried out at supplier's works on the machine before dispatch :				
16.1.1	The machine should be tested for full load test at supplier works before despatch.	Vendor to confirm			
16.1.2	Demonstration of all features of the machine, control system & accessories.	Vendor to confirm			
16.1.3	Any other tests/activities	Vendor to confirm			
16.2	Tests/Activities should be carried out at BHEL works while commissioning the machine :				
16.2.1	Full load test to demonstrate the maximum power & capacity of the machine at BHEL works.	Vendor to agree			
16.2.2	Machine should qualify on actual job at min & max size	Vendor to agree			
16.2.3	Demonstration of all features of the machine, control system & accessories to the satisfaction of BHEL for efficient and effective use of the machine.	Vendor to agree			
16.2.4	Training of BHEL machine operators in operation of complete machine & accessories etc by the supplier's experts / engineers during their stay at BHEL works.	Vendor to agree			

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16.2.5	Demonstration by actual use of all supplied attachments and accessories to their full capacity for actual jobs.	Vendor to agree			
17.0 PACKING:					
17.1	Rigid packing for all items of complete machine with 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.	Vendor to confirm			
18.0 GUARANTEE :					
18.1	Guarantee for 24 months from the date of acceptance of the machine at BHEL works . During this Guarantee period at least 2 visits per year and/or whenever called by BHEL (within 24 hours of call) by the service engineer of the supplier to be made & the parts, items, spares etc. needing replacement to be replaced by the supplier free of cost. In support a Performance Bank Guarantee of 10% of Basic Value of P.O. valid for 24 months from the date of commissioning will have to be furnished by supplier	Vendor to confirm			
19.0 GENERAL :					
19.1	Machine Model	Vendor to furnish			
19.2	Total connected load (KVA):	Vendor to furnish			
19.3	Floor area required (Length, Width, Height) for complete machine & accessories	Vendor to furnish			
19.4	Painting of Machine / Electrical Panels : RAL 6011 Apple Green (Polyurethane Paint)	Vendor to confirm.			
19.5	Total weight of the machine	Vendor to furnish			
19.6	Weight of heaviest part of machine	Vendor to furnish			
19.7	Weight of the heaviest assembly / sub-assembly of the Machine	Vendor to furnish			
19.8	Dimensions of largest part/ sub-assembly/ assembly of the machine	Vendor to furnish			
19.9	Detailed catalogues, sketch/photographs of the m/c and accessories/ attachments should be submitted with the offer.	Vendor to submit			
19.10	Formula for calculating required time/speed of torch/job for welding Aluminium plates to be furnished by the vendor.	Vendor to confirm.			
19.11	Hydraulic, Pneumatic & oil pipings should be preferably metallic except places where flexible pipings are essential. All the pipes required for the same shall be included in the standard scope of the machine.	Vendor to confirm.			
Signature & Seal of Tenderor					