

## **TECHNICAL SPECIFICATION FOR PROJECTION WELDING MACHINE – (Qty. 2 Nos.)**

### **1. Requirement:**

Two (02) Nos. DC Type, 3 phase, 3 wire Projection Welding Machine is required for welding of ventilation M.S. / Stainless Steel spacers to the motor stamping.

### **2. Features:**

- 2.1 The machine is to be pneumatically operated type and is required to weld the spacer and stampings. The electrode should be able to be fitted vertically and it should have capability to weld seven spots at a time.
- 2.2 The main frame of the machine should have heavy, rigid reinforced steel construction and should be able to resist mechanical deflection. Transformer should be fitted inside the body. The pneumatic/hydraulic control and electronic control cabinet should be mounted suitably.
- 2.3 Welding transformer should be of special type (IS 4804 Part I – 1968) secondary winding should be water-cooled, having core of high grade electrical steel and should be able to withstand continuous temperature rise as per ISS. Thermo switch should be provided for protecting the transformer from overloading in case of temperature rise.
- 2.4 Cooling system for transformer electrode holders, welding electrodes and other parts of the system required cooling should be water-cooled type with close loop water circulation arrangement. The water circulating system should provide adequate continuous water supply for cooling purpose. The motor & pump should be reputed make.
- 2.5 A suitable filter on the inlet side of the water cooling system should be provided to prevent entry of foreign particle. Suitable float valves with electrical interlock should be provided in the tank.
- 2.6 A suitable air compressor of sufficient capacity for entire working range of projection welding machine shall be provided by vendor with the machine. The prices for the same shall be inclusive in total quoted price. All the fittings and pipings for the compressor shall also be supplied by the vendor. Vendor shall furnish the technical details of compressor in the offer document.
- 2.7 An electronic timer suitable for heavy duty and quick repetition work having a low voltage welding initiation circuit directly connected to pressure switch should be provided.
- 2.8 The welding set to be complete with pressure cylinder, foot switch, air regulator, air filter, pressure gauge, pressure switch, air pressure reducer if required & all other necessary accessories.
- 2.9 The pneumatic valves and cylinders should be quick action and festo make.
- 2.10 Proper functioning of the following features and systems should be ensured.
  - 2.10.1 The timing and sequence controller should preferably be microprocessor based.
  - 2.10.2 Auto voltage compensation system should function properly.
  - 2.10.3 Welding parameters viz. voltage, current and pressure should be consistent throughout the welding process from start to finish.
  - 2.10.4 Exhaust valve of the main cylinder water flow switches and indexing system provided should give problem free service.
  - 2.10.5 Trouble free setting of various heats should be possible. There should not be any matching problems between the setting and indication on the machine.
  - 2.10.6 There should not be any gap between the spacer and punching after projection welding. The welding of the spacer should be such that the spacer should be peeled off the parent material when hammering on weld spacers.

2.10.7 The machine should be capable of projection welding spacer with one projection.

### 3. **Performance:**

- 3.1 The machine should be able to give the guaranteed performance as specified in specification Clause No. 4.
- 3.2 Machine should confirm to relevant ISS (IS 4804 Part I – 1968)

### 4. **Specification:**

- 4.1 Primary Voltage : To be suitable for 415V, 3 phase, 3 wire, 50 Hz, AC Supply.
- 4.2 Rating @ 50% duty cycle : 200 KVA
- 4.3 Secondary No load voltage ( in stages) : 6- 12 V
- 4.4 Max. Welding current : 68 KA
- 4.5 Secondary short circuit current : 85 KA (VDE 0545)
- 4.6 Max. Welding load : 680 KVA
- 4.7 Connected load : 520 KVA
- 4.8 Electrode pressure : 300 to 2500 KPa.
- 4.9 Electrode working range : 250 mm
- 4.10 Arm spacing : 65/445 mm
- 4.11 Clamping plates: (Above) : 400 x 400 mm  
: ( Below) : 400 x 400 mm
- 4.12 Ventilation spacer : Rectangular cross section (2x10). Sq.mm
- 4.13 Max. dia. of stamping : 1300 mm
- 4.14 In case of segment dia. up to : 3000 mm
- 4.15 Thickness of Ventilation stamping: up to 1.0 mm.
- 4.16 Operating speed. : 60 to 90 Spots/min
- 4.17 Weldable Spots : 1 to 7 spots in a single stroke.
- 4.18 Cooling : Water cooling
- 4.19 Primary Current : 280 A
- 4.20 Max Primary Current : 1180 A
- 4.21 Throat Depth : 480 mm
- 4.22 Machine should be able to work with air pressure of 70 PSI and supplier should provide moisture drying system.

### 5. **Electrical Equipment:**

- 5.1 The Equipment & machine's Electrical system must be suitable for operation on BHEL power supply of 415V  $\pm$  10%, 3 phase, 3 wire, 50 Hz  $\pm$  5%, no neutral AC supply. Suitable voltage stabilizer/CVT if recommended by supplier should be supplied with the equipment. The necessary transformer for stepping down to lower voltages for control etc. fuses, terminal bars contactors, and indicators and other auxiliaries are to be included. Schematic drawings and other technical details for these are to be forwarded with the quotation.
- 5.2 The electronic timer should provide following controls for the welding cycle.
- On Delay.
  - Welding Time.
  - Forge Delay.

- iv. Off Delay.
- v. Percentage Heat.
- 5.3 The timer should be microprocessor based with digital display for showing welding cycle details and other information. The timer should have features for self-diagnostics and automatic voltage compensation.
- 5.4 All control and elements in the electrical and electronic circuits should be grouped together and located in a separate cabinet.
- 5.5 Machine lightning should be suitable for 24 volts.
- 6. **Safety:**  
Suitable electrical mechanical interlock, limit switches, personnel safety guards, overload protection should be provided to prevent the machine from damage and for safety of the operator in case of malfunctioning of the machine. Safety enclosure / cover should be provided to prevent the arc of surroundings.
- 7. **Maintenance:**  
7.1 All the parts of the equipment should have easy accessibility for maintenance work, inspection and repair work.  
7.2 Any special tools required for maintenance and repairs for the machine should be indicated and the same shall be offered along with the equipment.  
7.3 Service manual should be supplied, with blowout diagram of mechanical items.  
7.4 The electrical / electronic circuit diagrams including PCB details must be provided.
- 8. **Tropicalisation:**  
All electrical should be suitably tropicalised to Indian Standards to work up to a maximum temperature of 45<sup>0</sup>C and relative humidity up to 95% maximum.
- 9. **Painting:**  
The machine should be painted to DIN RAL 6018 yellow green.
- 10. **Details to be included in the offer:**  
10.1 General arrangement drawing of the machine showing the following details:
  - I. Constructional features.
  - II. Dimensional details and capacities of items.
  - III. Details of accuracy of alignment.
- 10.2 Technical Literature.
- 10.3 Specification of the machine offered.
- 10.4 Circuit Diagram along with details of electric and electronic equipment.
- 10.5 Type and make of motors.
- 10.6 Weight and space requirement of the machine.
- 10.7 A list of customers to whom identical/similar machines have been supplied.
- 11. **Technical Literature & drawings to be supplied along with the machine:**  
5 copies of the following literature and drawings are required in English rendering.
  - 11.1 Descriptive Leaflet.

- 11.2 Technical Literature.
- 11.3 Operation & Maintenance Manuals.
- 11.4 Electrical wiring diagram and circuit diagram of electrical.
- 11.5 Reproducible masters for drawings (One master for each drawing).
- 11.6 Instruction for maintenance / repair of bought out components supplied with main machine.
- 11.7 Detailed catalogues and drawings for spare parts.
- 11.8 Circuit diagram of PCB's and microprocessor details.

**12. Spares:**

Recommended spares are to be quoted item wise for two years normal working of the machine.

**13. Testing at vendor's works and Erection & Commissioning at BHEL works:**

- 13.1 The machine has to be completely tested and inspected at vendor's works and four copies of test and inspection certificates are to be furnished. BHEL Engineers may witness the test and inspection of the machine before supply of the machine.
- 13.2 The equipment is to be erected and commissioned by the supplier. The quotation for the same must be furnished in the offer.
- 13.3 All the Tools & Tackles required for erection & commissioning of the machine shall be arranged by vendor.
- 13.4 The equipment should meet all our general clauses as enclosed.

**14. Testing at BHEL Works:**

BHEL shall test the machine performance as per the specifications mentioned in clause 4. Vendor shall prove machine capability and machine shall render properties of all clauses as per technical specification.

- 15. Other Facilities / Services required for equipment like civil works, water etc. shall be provided by BHEL. Vender shall inform his requirement well in advance prior to start of erection of machines.
- 16. Supplier must quote all materials / facilities / services required for satisfactory installation and commissioning. Proving of equipment will have to be arranged by supplier.

**17. Guarantee Period:**

The machine is to be guaranteed in respect of Accuracy, Design, Materials, Construction, Performance and against any Manufacturing Defects for a period of eighteen months from the date of supply or twelve months from the date of commissioning whichever is later and four copies of guarantee certificate should be supplied. Free after sales service should be provided during guarantee period.

**18. Scope of Supply:**

The equipment should consist of the following:

- 18.1 Equipment as per meeting on above specification from clause 1 to 17.
- 18.2 Installation, Commissioning, Testing & Proving.
- 18.3 Accessories:
- 18.3.1 De-mineralized Close Loop Water Cooling System:1 No. for each PW machine

- 18.3.2 MCCB with Door Interlock Facility: 1 Set. for each PW machine
- 18.3.3 Electrode/Tooling for other range of jobs: 1 Set for each PW machine
- 18.3.4 Orbital make IR-Sensor actuated safety guards: 1 set for each PW machine.
- 18.3.5 Air Compressor of suitable capacity: 1 set for each PW machine.
- 18.3.6 Any other Accessories/Equipments required for trouble free, efficient and smooth operation of machine should be provided by the supplier.

**19. Qualification requirement:**

Only those vendors, who have supplied and commissioned at least one this type of projection welding machine in last 10 years, should quote. However, if such projection welding machine has/had been supplied to BHEL, then the same should be presently working satisfactorily for more than six months after its commissioning and acceptance in BHEL. Quoted equipment should be proven Equipment and suppliers should furnish the list of customers where quoted equipment has been supplied earlier with necessary certificate for good performance and after sales service. This is required from all the vendors for qualification of their offer.

**20. Evaluation Criteria:**

Equipment should meet all our above specification from Clause 1 to 19 and bidders must furnish point-to-point replies against all the points of our above specification enclosed failing which their offer may not be considered.

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