

**BHARAT HEAVY ELECTRICAL LIMITED, JHANSI**

SPECIFICATION NO.	7184
ITEM NO.	ME-1/1/2686 & ME-1/1/2687
LOCATION	FABRICATION SHOP
QUANTITY	TWO NUMBERS
<b>NOTE :</b>	
1	1. BIDDER must submit complete information against clause No. QQ (Qualifying condition). The offer meeting this clause would only be processed.
2	The "OFFER BY BIDDER" Column and where applicable, the " DEVIATIONS" Column of this format shall be filled in by the Vendor and submitted along with the offer. Technical details also submitted with the offer. Inadequate / incomplete, ambiguous, or unsustainable information against any of the clauses of the specification / requirements shall be treated as non - Compliance.
3	The offer and all documents enclosed with offer should be in English language only.

**SCOPE:****DESIGN, MANUFACTURING, SUPPLY ERECTION AND COMMISSIONING OF SUBMERGED ARC WELDING MACHINE****AA. APPLICATION :**

Sl.No.	FEATURES /BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
AA.1	Purpose:- Submerged arc welding machine (SAW) thyristor technology 1200 Amp. rating machine is required in our Fabrication shop to do welding on mild steel and alloy steel. The machine must be rugged and suitable for continuous work in heavy fabrication shop in rough environment.	Bidder to confirm	
AA.2	The offered equipment shall be portable and suitable for semi-automatic (SAW) welding process.	Bidder to confirm	

**BB. MACHINE CONFIGURATION :** [The scope of supply shall consist of the following, for each machine]

Sl.No.	FEATURES /BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
BB.1	Welding Power source with Transport Trolley and Wheels	Bidder to confirm	
BB.2	Wire feeder	Bidder to confirm	
BB.3	Tractor mounted welding head	Bidder to confirm	

BB.4	Flux Hopper assembly	Bidder to confirm	
BB.5	Controller assembly	Bidder to confirm	
BB.6	Wire reel assembly	Bidder to confirm	
BB.7	Wire guide eye assembly	Bidder to confirm	
BB.8	Welding cable assembly	Bidder to confirm	
BB.9	Standard accessories	Bidder to specify	
BB.10	Mandatory spares kit	Bidder to specify	
BB.11	Set of welding cable	Bidder to confirm	
BB.12	Operation & Maintenance Manuals – Three Copies per Machine	Bidder to confirm	
BB.13	Commissioning of Equipment at BHEL Works and Performance Prove-out of the offered equipment by Supplier's representative	Bidder to confirm	

**CC. EQUIPMENT SPECIFICATION : POWERSOURCE FEATURES**

SI.No.	FEATURES	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
CC.1	Type	Constant Potential type, even with a fluctuation of $\pm 10\%$ in the Input Voltage	Bidder to confirm	
C.C.2	Control	The equipment must fully Thyristorised based	Bidder to confirm	
C.C.3	Characteristic	Constant Voltage. Must be capable of switching to constant current mode also	Bidder to confirm	
C.C.4	Model	BIDDER to specify offered model	Bidder to specify	
C.C.5	Welding Current Range	250-1200 A (minimum)	Bidder to specify	
C.C.6	Welding Current At 60 % duty cycle	1200 A considering 10 minutes cycle time at 40°C ambient temperature.	Bidder to specify	
C.C.7	Welding Current At 100 % duty cycle	$\geq 1000$ A considering 10 minutes cycle time at 40°C ambient temperature.	Bidder to specify	
C.C.8	Welding Voltage range	15 to 50Volt	Bidder to specify	
C.C.9	Class of insulation	CLASS - H	Bidder to specify	
C.C.10	Type of Cooling	Forced Air. Must have electronic and thermostatic protection from current overload and excessive temperatures.	Bidder to confirm	
CC.11	Open Circuit Voltage	BIDDER to mention the Open Circuit Voltage for the offered Power source	Bidder to confirm	
CC.12	Current Setting	The variation in the set value of the welding current to the actual value shall not exceed 1 %.	Bidder to confirm	

CC.13	Voltmeter & Ammeter	Factory Installed indication meter (current and voltage) on the front panel with easy removal and replacement.	Bidder to confirm	
CC.14	Power Input	415 $\pm$ 10% V AC, 3 Phase, 50 $\pm$ 2% Hz	Bidder to confirm	
CC.15	Degree of protection	IP23	Bidder to confirm	
CC.16	Voltage selection	By means of course and fine voltage selector switches	Bidder to confirm	
CC.17	Protection [BIDDER] has to specifically furnish technical details on how these protective measures are addressed in the Machine Design]	a) Inbuilt protection for the Power source against Thermal / Overload / Short-Circuit conditions.	Bidder to confirm	
		b) All PCBs shall be sprayed with mould coating to prevent damage from dust and grinding particles.	Bidder to confirm	
		c) Machine Design to ensure proper earthing for the machine and its peripherals	Bidder to confirm	
CC.18	Portability	Under-Carriage with hard rubber lined wheels for portability of the power source by manual pushing	Bidder to confirm	
CC.19	Ambient Conditions	Temperature upto + 50 ° C ; Humidity upto 90 % but both upper limits do not occur simultaneously.	Bidder to confirm	
CC.20	Power Rating	BIDDER to indicate the Maximum Power Rating [in kVA] of the Power source and the NO-LOAD Power Consumption in Watts.	Bidder to confirm	
CC.21	Power Source Model	To Specify the Make & Model of Power source Offered	Bidder to specify	

**DD. EQUIPMENT SPECIFICATION : WIRE FEEDER**

Sl.No.	FEATURES	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
DD.1	Type:	Three / Four roll drive.	Bidder to confirm	
DD.2	Wire Feed rate range	500 -4000 mm/min (minimum)	Bidder to confirm	
DD.3	Wire sizes to be used	2.5, 3.15, 4.0, 5.0 mm	Bidder to confirm	
DD.4	Spool holder dia	300 mm (approx)	Bidder to confirm	
DD.5	Drive rolls	Wire feed drive rolls: 2.5, 3.15, 4.0, 5.0 mm	Bidder to confirm	
DD.6	Weight of Wire spool	25 Kg (Approx)	Bidder to confirm	
DD.7	Feed motor	Wire feed motor type:	Bidder to specify.	
DD.8	Wire feeder model	To Specify the Make & Model of wire feeder Offered	Bidder to specify.	

**EE. EQUIPMENT SPECIFICATION : TRACTOR MOUNTED WELDING HEAD**

Sl.No.	FEATURES	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
EE.1	Type	Tractor mounted welding head assembly suitable to offered power source. The welding head shall consist of following:	Bidder to confirm	
EE.2	CARRIAGE ASSEMBLY	Carriage assembly shall duly fitted with: 1- Horizontal slide assembly 2- Pipe assembly 3- Shunt assembly	Bidder to confirm	
EE.3	WELDING HEAD ASSEMBLY	Welding head assembly shall duly fitted with: 1- Wire feed drive roll ( 2.0 – 5.0) 2- Nozzle (2.5, 3.15, 4.0 & 5.0 mm) (one each) 3- Vertical adjustment assembly	Bidder to confirm	
EE.4	FLUX HOPPER ASSEMBLY	Flux hopper assembly suitable for the power source	Bidder to confirm	
EE.5	CONTROLLEE ASSEMBLY	Feather touch type controller assembly	Bidder to confirm	
EE.6	Wire reel assembly	Wire reel assembly with wire straightening arrangement	Bidder to confirm	
EE.7	Horizontal slide	Horizontal Slide (Transverse to travel direction): 100 mm (min)	Bidder to confirm	
EE.8	Horizontal swing	Horizontal swing: 270 degree (minimum).	Bidder to confirm	
EE.9	Vertical slide	Vertical slide inclusive of welding head adjustment: 100 mm (min)	Bidder to confirm	
EE.10	Transverse to head travel	45 degree (minimum).	Bidder to confirm	
EE.11	Parallel to head travel	30 degree (minimum).	Bidder to confirm	
EE.12	Flux Hopper capacity	5 kg (min)	Bidder to confirm	
EE.13	Length of track for carriage	2000 mm (minimum)	Bidder to confirm	
EE.14	Travel Speed Range	150 - 1000 mm/min (minimum)	Bidder to confirm	
EE.15	Wire feed drive rolls	2.5, 3.15, 4.0, 5.0 mm	Bidder to confirm	
EE.16	Nozzle	2.5, 3.15, 4.0, 5.0 mm	Bidder to confirm	
EE.17	Machine must have facility for automatic start without need of steel wool. To achieve this function provision should be made to start the wire feed in creep speed on start of welding and after arc is established and current is sensed, wire feed should switch to normal speed to continue welding.		Bidder to confirm	

EE.18	After automatic arc initiation & small delay, the machine should start so that weld bead appearance is uniform. At the end of welding the wire must retreat automatically without getting fused with the weld pool.	Bidder to confirm	
EE.19	The power source shall have current limit feature which shall restrict the current in the event of accidental short circuiting of the welding head nozzle with the job to prevent failure of power devices.	Bidder to confirm	

**FF. EQUIPMENT SPECIFICATION : CABLE**

SI.No.	FEATURES	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
FF.1	Power source to Wire feeder Interconnection Cable - 10 m. length (min)		Bidder to confirm	

**GG. EQUIPMENT SPECIFICATION : OPERATION AND CONTROL SYSTEM**

SI.No.	FEATURES	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
GG.1	Welding Process Controller on Welding Head Panel:		Bidder to confirm	
GG.2	Electronic step less Control of Welding Voltage.		Bidder to confirm	
GG.3	Display of Welding Voltage and Current (Should be standard with the machine)		Bidder to confirm	
GG.4	Wire feed speed control and display, Wire inching facility.		Bidder to confirm	
GG.5	Carriage speed control and display.		Bidder to confirm	
GG.6	On/Off switch.		Bidder to confirm	
GG.7	WARN lamp in the front panel of the power source to indicate the abnormalities.		Bidder to confirm	
GG.8	The welding voltage and current to remain in set stable condition against the supply voltage fluctuation of $\pm 10\%$ and even in case of any change in ambient temperature up to $40^{\circ}\text{C}$ .		Bidder to confirm	

**HH. EQUIPMENT SPECIFICATION : ELECTRICAL/ ELECTRONIC SYSTEM**

SI.No.	FEATURES	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
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HH.1	415V $\pm$ 10% , 50HZ $\pm$ 3%, 3 Phase AC Power Supply Source will be provided by BHEL at a single point near the machine, as per layout recommended by Bidder. 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 Bidder.	Bidder to confirm	
HH.2	All electronic control PCB's shall be housed in a separate dust proof chamber. Additionally the PCB's shall be coated with protective film to minimize dust/moisture contamination resulting in longer service life.	Bidder to confirm	
HH.3	Windings and rectifiers must be impregnated to protect against moisture and corrosive environments.	Bidder to confirm	
HH.4	Supplier will specifically mention the protections taken such as seals etc. used to prevent entry of dust etc. in to the machine.	Bidder to confirm	
HH.5	Vendor should ensure the proper earthing for the machine and its peripherals.	Bidder to confirm	

**II. EQUIPMENT SPECIFICATION : SAFETY ARRANGEMENTS**

SI.No.	FEATURES	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
II.1	Following safety features in addition to other standard safety features should be provided on the machine:		Bidder to confirm	
II.2	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. Machine functions should be continuously monitored and alarm / warning indications through lights/ alarm number with messages (on display and panels) should be available.		Bidder to confirm	
II.3	2). All the cables etc. on the machine should be well supported and protected.		Bidder to confirm	

**JJ. EQUIPMENT SPECIFICATION : ENVIRONMENTAL PERFORMANCE OF THE MACHINE**

SI.No.	FEATURES	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
JJ.1	The Machine shall conform to following factors related to environment :		Bidder to confirm	
JJ.2	(a) If any safety / environmental protection enclosure is required it should be built in the machine by the vendor.		Bidder to confirm	

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JJ.3	(d) Paint of the machine should be oil / coolant resistant and should not peel off and mix up with coolant.	Bidder to confirm	
JJ.4	Consumable spares & Accessories to be provided along with machine: The machine should be completely fitted with all spares and accessories to enables the machine to run for 3.15 mm and 4 mm wire and which must be in addition from the spares mentioned below in clause 6.1 to 6.4. The consumable spares and accessories mentioned in clause 6.1 to 6.11 must be quoted separately.	Bidder to confirm	
JJ.5	Hand tool kit consisting of Nozzle cleaners, Allen keys, pliers for cutting wire etc. (Quantity: 1 set)	Bidder to confirm	
JJ.6	Rollers for wire size 3.15 (2 sets to be provided).	Bidder to confirm	
JJ.7	Contact tips of for wire size 3.15 mm (12 no)	Bidder to confirm	

**KK. EQUIPMENT SPECIFICATION : SPARES**

SI.No.	FEATURES	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
KK.1	Itemised breakup of mechanical, electrical and electronic spares used on the machine in sufficient quantity as per recommendation of Vendor for 2 years of trouble free operation on three shifts continuous running basis should be offered by vendor. In addition to the above one set of the following spares for complete lot of machines being procured in this tender shall be offered separately 1) All the electronic PCB's used in the machine. 2) One set of Power Devices used in the machine. 3) One set of Display meters, Keypad assembly etc. The offer shall mention item wise details with separate prices for each item.		Bidder to specify	
KK.2	All types of spares for total machine and accessories should be available for at least seven 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		Bidder to confirm	
KK.3	Bidder 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		Bidder to confirm	

**LL. EQUIPMENT SPECIFICATION : DOCUMENTATION**

SI.No.	FEATURES	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
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LL.1	THREE sets of following documents (Hard copies) in English language should be supplied along with the machine	Bidder to confirm	
LL.2	Operating and maintenance manuals of Machine and all supplied accessories.	Bidder to confirm	
LL.3	Detailed Maintenance manual of machine which shall contain System Description, Block diagram, Schematic drawings, Circuit diagrams &. Trouble shooting charts, All Assembly/ Sub Assembly Drawings shall be supplied with the part list.	Bidder to confirm	
LL.4	Complete Master List of parts used in the machine shall be submitted by the vendor.	Bidder to confirm	
LL.5	One additional set of all the above documentation on CD ROM, wherever possible.	Bidder to confirm	

MM. EQUIPMENT SPECIFICATION : AMBIENT CONDITIONS & THERMAL STABILITY				
Sl.No.	FEATURES	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
MM.1	Total machine and all supplied items should work trouble free and efficiently under following operating conditions and should give specified accuracies. Ambient Conditions: Temperature = 5 to 50 degree Celsius with variation of 25 degree Celsius (max) Relative Humidity = 95% max. (Vendor to confirm that machine is suitable for above and details of provisions on the machine for the same are to be furnished by Vendor)		Bidder to confirm	
MM.2	Test to be carried out at BHEL works while commissioning the machine :		Bidder to confirm	
MM.3	Demonstration of all features of the machine & all accessories to the satisfaction of BHEL for their efficient and effective use.		Bidder to confirm	
MM.4	Demonstration by actual use of all supplied attachments and accessories to their full capacity.		Bidder to confirm	
MM.5	Training of BHEL machine operators in operation of complete machine & accessories etc by the supplier's experts / engineers during their stay at BHEL works		Bidder to confirm	
MM.6	Instrument must be calibrated and proved against setting knob as well as against actual current measured by tong tester while welding a job.			

NN. EQUIPMENT SPECIFICATION : PACKING				
Sl.No.	FEATURES	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
NN.1	Sea worthy & rigid packing for all items of complete machine		Bidder to confirm	



<b>OO. EQUIPMENT SPECIFICATION : GUARANTEE</b>				
<b>SI.No.</b>	<b>FEATURES</b>	<b>BHEL SPECIFICATION</b>	<b>OFFER BY BIDDER</b>	<b>DEVIATIONS</b>
OO.1	24 months from the date of commissioning of the machine.		Bidder to confirm	

<b>PP. EQUIPMENT SPECIFICATION : GENERAL</b>				
<b>SI.No.</b>	<b>FEATURES</b>	<b>BHEL SPECIFICATION</b>	<b>OFFER BY BIDDER</b>	<b>DEVIATIONS</b>
PP.1	The Bidder should submit the following information			
PP.2	Machine Model		Bidder to specify	
PP.3	Total connected load (KVA):		Bidder to specify	
PP.4	Floor area required (Length, Width, Height) for complete machine & accessories		Bidder to specify	
PP.5	Total weight of the machine		Bidder to specify	
PP.6	Detailed catalogues, sketch/ photographs of the m/c and accessories/ attachments should be submitted with the offer.		Bidder to specify	

<b>QQ. EQUIPMENT SPECIFICATION : QUALIFYING CONDITION</b>				
<b>SI.No.</b>	<b>FEATURES</b>	<b>BHEL SPECIFICATION</b>	<b>OFFER BY BIDDER</b>	<b>DEVIATIONS</b>
QQ.1	Only those Bidders, who have supplied and commissioned at least one Thyristor controlled 1200 Amp. or higher capacity submerged arc welding machine and same is presently working satisfactorily for more than one year after commissioning , should only quote. The following information is to be submitted by the vendor about the companies where similar Cranes have been supplied. This is required from all the vendors for qualification of their offer.		Bidder to confirm	
QQ.2	Name of the customer / company along with Purchase Order no. and Purchase Order date where referred crane is installed.(Copy of Purchase Order should be furnished).		Bidder to specify	
QQ.3	Complete postal address of the customer.		Bidder to specify	
QQ.4	Year of commissioning. (Copy of Commissioning Report should be furnished).		Bidder to specify	
QQ.5	Capacity of machine supplied.		Bidder to specify	

QQ.6	Name and designation of the contact person of the customer.	Bidder to specify	
QQ.7	Phone, FAX no. and email address of the contact person of the customer.	Bidder to specify	
QQ.8	Performance certificate from the customers, on their letter head, regarding satisfactory performance of machine supplied to them.	Bidder to submit	

**RR. EQUIPMENT SPECIFICATION :**

SI.No.	FEATURES	BHEL SPECIFICATION	OFFER BY BIDDER	DEVIATIONS
RR.1	<b>BHEL reserves the right to verify information submitted by vendor. In case the information is found to be false / incorrect, the offer shall be rejected.</b>		Bidder to confirm	

Prepared by		Approved by	
Inder Mathur Sr. Mgr.(WE&S)	B.K.Manjhi Sr. Mgr (FBM)	S.J.Chakraborty Sr. DGM (WE&S)	R.N.Jha AGM (FBM)