

		<b><u>BHARAT HEAVY ELECTRICAL LIMITED</u></b>				Enquiry No. :	
		<b><u>UNIT'S ADDRESS:</u></b>				Due Date :	
		<b><u>CONTACT PERSON'S NAME/DESIGN./PHONE NO./E-MAIL (FROM PURCHASE DEPTT.)</u></b>				Supplier Qtn. No.:	
						Date :	
<b>SPECIFICATION CUM COMPLIANCE CERTIFICATE OF SUBMERGED ARC WELDING MACHINE</b>							
<b>NOTE:-</b>							
<b>1. Vendor must submit complete information against clause no. 14. The offer meeting this clause would only be processed.</b>							
<b>2. The "Offered" Column and where applicable, the "Deviations" &amp; "Remarks" Column of this format shall be filled in by the Vendor and submitted along with the offer. Inadequate / incomplete, ambiguous, or unsustainable information against any of the clauses of the specifications/requirements shall be treated as non-compliance.</b>							
<b>3. The offer and all documents enclosed with offer should be in English language only.</b>							
<b>NAME &amp; ADDRESS OF THE SUPPLIER :</b>							
<b>TELEPHONE NOS.:</b>							
<b>FAX NOS.:</b>							
<b>E-MAIL ADDRESS :</b>							
<b>SCOPE: SUPPLY, ERECTION &amp; COMMISSIONING OF SUBMERGED ARC WELDING MACHINE COMPLYING WITH SPECIFICATIONS AS BELOW</b>							

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED Parameters	DEVIATIONS	REMARKS
1	<b>PURPOSE &amp; WORKPIECE MATERIAL</b>				
1.1	<b>Purpose: (Operations/Jobs involved) : Thyristor / Inverter based Submerged Arc Welding machine to do welding on mild steel and alloy steel. The model must be rugged and suitable for continuous work in heavy fabrication shop in rough environment.</b>	Vendor to confirm			
2	<b>SPECIFICATIONS:</b>				
2.1	<b>Welding Power Source</b>				
2.2.1	Type: Fully Thyristorised / Inverterized.	Vendor to confirm			
2.2.2	Characteristic: Constant Voltage. Must be capable of switching to constant current mode also	Vendor to confirm			
2.2.3	Model:	Vendor to specify.			
2.2.4	Welding Current Range: 250-1200 A (minimum)	Vendor to confirm			
2.2.5	Welding Current (At 100 % duty cycle) $\geq$ 1000 A considering 10 minutes cycle time at 40°C ambient temperature.	Vendor to confirm			
2.2.6	Welding Voltage range:	Vendor to specify.			
2.2.7	Class of insulation:	Vendor to specify.			
2.2.8	Type of Cooling: Forced Air. Must have electronic and thermostatic protection from current overload and excessive temperatures.	Vendor to confirm			
2.2	<b>Wire Feeder</b>				
2.2.1	Type: Three / Four roll drive.	Vendor to confirm			
2.2.2	Wire Feed rate range: 500 -4000 mm/min (minimum)	Vendor to confirm			
2.2.3	Wire sizes to be used: 2.5, 3.15, 4.0, 5.0 mm	Vendor to confirm			
2.2.4	Spool holder dia: 300 mm (approx)	Vendor to confirm			
2.2.5	Weight of Wire spool: 25 Kg (Approx)	Vendor to confirm			
2.2.6	Wire feed motor type:	Vendor to specify.			

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<b>2.3</b>	<b>Tractor Mounted Welding Head Assembly:</b>				
2.3.1	<b>Tractor mounted welding head fitted with:</b>	Vendor to Confirm			
2.3.1.1	carriage assembly duly fitted with Horizontal slide assembly,	Vendor to Confirm			
2.3.1.2	Welding head assembly duly fitted with wire feed drive roll, Vertical adjustment assembly	Vendor to Confirm			
2.3.1.3	Flux hopper assembly	Vendor to Confirm			
2.3.1.4	Controller assembly	Vendor to Confirm			
2.3.1.5	Wire reel assembly with wire straightening arrangement	Vendor to Confirm			
2.3.1.6	Welding cable assembly: $\geq 10$ meter length	Vendor to Confirm			
2.3.2	Horizontal Slide (Transverse to travel direction): 100 mm (min)	Vendor to Confirm			
2.3.3	Horizontal swing: 270 degree (minimum).	Vendor to Confirm			
2.3.4	Vertical slide inclusive of welding head adjustment: 100 mm (min)	Vendor to Confirm			
2.3.5	Transverse to head travel: 45 degree (minimum).	Vendor to Confirm			
2.3.6	Parallel to head travel: 30 degree (minimum).	Vendor to Confirm			
2.3.7	Flux Hopper capacity: 5 kg (min)	Vendor to Confirm			
2.3.8	Length of track for carriage: 4000 mm (minimum)	Vendor to Confirm			
2.3.9	Travel Speed Range: 150 - 1000 mm/min (minimum)	Vendor to Confirm			
2.3.10	Welding Current (At 100 % duty cycle) $\geq 1000$ A	Vendor to Confirm			
2.3.11	Wire feed drive rolls: 2.5, 3.15, 4.0, 5.0 mm	Vendor to Confirm			
2.3.12	Nozzle: 2.5, 3.15, 4.0, 5.0 mm	Vendor to Confirm			
2.3.13	Tractor should have good tracking control and should be self steering.				
<b>2.4</b>	<b>Features:</b>				
2.4.1	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.	Vendor to Confirm			

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2.4.2	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.	Vendor to Confirm			
2.4.3	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.				
<b>2.5</b>	<b>Cables</b>				
2.5.1	Power source to Wire feeder Interconnection Cable - 8 m. length (min)	Vendor to confirm			
<b>2.6</b>	<b>OPERATION AND CONTROL SYSTEM:</b>				
2.6.1	Welding Process Controller on Welding Head Panel:	Vendor to confirm			
2.6.1.1	Electronic step less Control of Welding Voltage.	Vendor to confirm			
2.6.1.2	Display of Welding Voltage and Current (Should be standard with the machine)	Vendor to confirm			
2.6.1.3	Wire feed speed control and display, Wire inching facility.	Vendor to confirm			
2.6.1.4	Carriage speed control and display.	Vendor to confirm			
2.6.1.5	On/Off switch.	Vendor to confirm			
2.6.2	WARN lamp in the front panel of the power source to indicate the abnormalities.	Vendor to confirm			
2.6.3	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°C.	Vendor to confirm			

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	<b>3 ELECTRICAL/ ELECTRONIC SYSTEM :</b>				
3.1	415V $\pm$ 15% , 50HZ $\pm$ 3%, 3 Phase AC (3 wire system without neutral) Power Supply Source 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.	Vendor to confirm			
3.2	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 minimise dust/moisture contamination resulting in longer service life.	Vendor to confirm			
3.3	Windings and rectifiers must be impregnated to protect against moisture and corrosive environments.				
3.4	Supplier will specifically mention the protections taken such as seals etc. used to prevent entry of dust etc. in to the machine.	Vendor to confirm			
3.5	Vendor should ensure the proper earthing for the machine and its peripherals.	Vendor to confirm			
	<b>4 SAFETY ARRANGEMENTS:</b>				
	Following safety features in addition to other standard safety features should be provided on the machine:				
	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.	Vendor to confirm			
	2). All the cables etc. on the machine should be well supported and protected.	Vendor to confirm			

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5	<b>ENVIRONMENTAL PERFORMANCE OF THE MACHINE :</b>				
	The Machine shall conform to following factors related to environment :	Vendor to confirm			
	(a) If any safety / environmental protection enclosure is required it should be built in the machine by the vendor.	Vendor to confirm			
	(d) Paint of the machine should be oil / coolant resistant and should not peel off and mix up with coolant.	Vendor to confirm			
6	<b>Consumable spares &amp; 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.</b>	Vendor to confirm			
6.1	Hand tool kit consisting of Nozzle cleaners, Allen keys, pliers for cutting wire etc. (Quantity: 1 set)	Vendor to confirm			
6.2	Rollers for wire size 3.15 (2 sets to be provided).	Vendor to confirm			
6.3	Contact tips of for wire size 3.15 mm (12 no)	Vendor to confirm			
6.4	Nozzle extensions of length 300 mm for 3.15 mm wire dia (10 No)				

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7	<b>SPARES:</b>				
7.1	<p>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.</p> <p>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</p> <ol style="list-style-type: none"> <li>1) All the electronic PCB's used in the machine.</li> <li>2) One set of Power Devices used in the machine.</li> <li>3) One set of Display meters, Keypad assembly etc.</li> </ol> <p>The offer shall mention item wise details with separate prices for each item.</p>	Vendor to specify			
7.2	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	Vendor to confirm			
7.3	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			
8	<b>DOCUMENTATION :</b>				
	Five sets of following documents (Hard copies) in English language should be supplied along with the machine	Vendor to confirm			
8.1	Operating and maintenance manuals of Machine and all supplied accessories.	Vendor to confirm			

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8.2	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.	Vendor to confirm			
8.3	Complete Master List of parts used in the machine shall be submitted by the vendor.	Vendor to confirm			
8.4	One additional set of all the above documentation on CD ROM, wherever possible.	Vendor to confirm			
<b>9</b>	<b>AMBIENT CONDITIONS &amp; THERMAL STABILITY :</b>				
9.1	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)	Vendor to confirm			
<b>10</b>	<b>Test to be carried out at BHEL works while commissioning the machine :</b>				
10.1	Demonstration of all features of the machine & all accessories to the satisfaction of BHEL for their efficient and effective use.	Vendor to confirm			
10.2	Demonstration by actual use of all supplied attachments and accessories to their full capacity.	Vendor to confirm			
10.3	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 confirm			



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10.4	Instrument must be calibrated and proved against setting knob as well as against actual current measured by tong tester while welding a job.	Vendor to confirm			
<b>11</b>	<b>PACKING:</b>				
11.1	Sea worthy & rigid packing for all items of complete machine.	<b>Vendor to confirm</b>			
<b>12</b>	<b>GUARANTEE :</b>				
12.1	12 months from the date of acceptance of the machine.	<b>Vendor to confirm</b>			
<b>13</b>	<b>GENERAL : The vendor should submit the following information:</b>				
13.1	Machine Model	Vendor to specify			
13.2	Total connected load (KVA):	Vendor to specify			
13.3	Floor area required (Length, Width, Height) for complete machine & accessories	Vendor to specify			
13.4	Total weight of the machine	Vendor to specify			
13.5	Detailed catalogues, sketch/ photographs of the m/c and accessories/ attachments should be submitted with the offer.	Vendor to confirm			

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<b>14</b>	<b>QUALIFYING CONDITIONS :</b>				
14.1	Only those models to be quoted which are working satisfactorily in rugged environment for continuous operation in Heavy duty Fabrication shop of any Public Limited Company for more than three years after commissioning and of Current capacity 1000 A at 100 % duty cycle ( 10 minutes cycle time.) or higher capacity. The following information is to be submitted by the vendor about the companies where similar machines have been supplied.	Vendor to Confirm			
	1. Name of the customer / company where similar machine is installed.	Vendor to specify			
	2. Complete postal address of the customer.	Vendor to specify			
	3. Year of commissioning.	Vendor to specify			
	4. Application for which the machine is supplied with details of accuracies achieved on the job.	Vendor to specify			
	5. Name and designation of the contact person of the customer.	Vendor to specify			
	6. Phone, FAX no. and email address of the contact person of the customer.	Vendor to specify			
	7. Performance certificate from the customers regarding satisfactory performance of machine supplied to them	Vendor to specify			