An ISO 9001 Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)
Tiruchirappalli – 620014, TAMIL NADU, INDIA
CAPITAL EQUIPMENT / MATERIALS MANAGEMENT

ENQUIRY NOTICE INVITING TENDER	Phone: +91 431 257 7653 Email : skaruna@bheltry.co.in, ajay@bheltry.co.in Web : www.bhel.com

TWO PART BID	Enquiry Number:	Enquiry Date:	Due date for submission of quotation:
Tender to be submitted in two Parts	2601700023	19.06.2017	26.07.2017

You are requested to quote the Enquiry number date and due date in all your correspondence. This is only a request for quotation and not an order.

Please note that under any circumstances both delayed offer and late offers will not be considered. Hence vendors are requested to ensure that the offer is reaching physically our office before 14.00 hrs on the Date of tender opening.

Item	Description	Quantity
10	**IGBT Controlled Hot wire TIG Welding Power Source with Pulsating Wire feeder** as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in)	**5 Nos**

Important points to be taken care during submission of offer

1. **Compliance Form No: TRY/IMP/02 & TRY/ IND/ 02A to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.**
2. **Delivery period required is 5 months from the date of P.O.**
3. **Commissioning and performance prove out shall be done at BHEL Trichy by the supplier**
4. **Time period required for commissioning and performance prove out shall be 3 week from the date of intimation by BHEL**
5. **EMD for this tender Rs.2,00,000/-**
6. **All updates, amendments, corrigenda, etc., (if any), for each tender will be posted only on the above websites from time to time, as and when required, until each tender is opened. There will be no publication of such updates, amendments, corrigenda, etc., through newspapers or any other media.**

BHEL's General guidelines / instructions (refer MM/CE/GENL/001- EMD), compliance form and technical specification can be downloaded from BHEL web site http://www.bhel.com or from the Government tender website http://tenders.gov.in (public sector units > Bharat Heavy Electricals Limited page) under Enquiry reference.

Tenders should reach us before 14:00 hours on the due date Tenders will be opened at 14:30 hours on the due date Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present	Yours faithfully, For **BHARAT HEAVY ELECTRICALS LIMITED** Manager / Capital Equipment / MM

AJAY V ASALKAR
MANAGER
MM / Capital Equipment
BHEL, Tiruchirappalli - 620 014.

PART A

QUALIFYING CRITERIA FOR THE SUPPLY OF IGBT CONTROLLED HOT WIRE TIG WELDING POWER SOURCE WITH PULSATING WIRE FEEDER .

SECTION : I - The BIDDER is expected to give complete details against each clause in the table given below and wherever necessary additional sheets may be attached (giving clear reference number) to cover the requisite details.

S.No.	PARTICULARS	VENDOR'S RESPONSE
01	Number of Years of Experience of the VENDOR/OEM (Original Equipment Supplier) in the field of design, manufacture and supply of 'INVERTER/IGBT CONTROLLED HOT WIRE TIG WELDING MACHINE WITH PULSATING WIRE FEEDER' for Radiographic /Ultrasonic Testing Quality Welding Applications	
02	YEAR of LAUNCH of the MODEL quoted against this ENQUIRY - Vendor to Specify	
03	Number of 'INVERTER/IGBT CONTROLLED HOT WIRE TIG WELDING MACHINE WITH PULSATING WIRE FEEDER' supplied to FABRICATION / MANUFACTURING INDUSTRIES, till date in the QUOTED MODEL	
04	Number of Advanced Class Welding Machines mentioned under the above clause No.03, with an output current rating of 350 Amps and above @ 100 % Duty Cycle at ambient 40 Deg C, supplied and commissioned till date.	
05	Details on International Standards followed in Design, Manufacture and Testing of the subject model of Welding Machines – copies of the relevant standards (IEC/EN/ISO) are **to be furnished with the TECHNICAL BID compulsorily.**	
06	Comprehensive Details on Performance Testing of Welding Machines carried out at the Factory **are to be furnished with the TECHNICAL BID compulsorily, to ensure process quality.**	
07	Details on SERVICE-AFTER-SALES Set-Up in India including the Addresses of Agents / Service Centres in India, to be furnished compulsorily - to ensure continuous equipment availability.	
08	VENDOR to indicate the Country of Origin for the supply of welding machines. Machines manufactured in Countries like TAIWAN/CHINA are not preferred, as the application is for a critical research project.	

SECTION : II - The VENDOR's offer need to compulsorily contain the following to get qualified for submitting an offer for the 'IGBT CONTROLLED HOT WIRE TIG WELDING POWER SOURCE WITH PULSATING WIRE FEEDER'

S.No.	PARTICULARS	VENDOR'S RESPONSE
09	The VENDOR/OEM shall have a minimum of FIVE Years of Experience in the Design, Manufacture & Supply of 'IGBT controlled hot wire GTAW welding power source with pulsating wire feeder' (for quoted model).	
10	The VENDOR/OEM should have supplied a minimum of 20 (TWENTY) number of 'IGBT controlled hot wire GTAW Welding machine with pulsating wire feeder' (in the quoted model) to Customers around the globe as on the date of this tender opening . VENDOR has to furnish the customer list with contact details, giving the number of such Welding Machines supplied to them.	
11	Performance Certificate from minimum TWO CUSTOMERS [Heavy Engineering / Fabrication Companies] with full contact details of CONTACT PERSON (who are the End Users of the WELDING MACHINE MODEL given under the above clause No.10) to be provided with the TECHNICAL OFFER. The subject welding machines (referred to in the PERFORMANCE CERTIFICATE) shall be in working condition for a period of TWO years and above, as on the date of this tender opening. [A format is enclosed under ANNEXURE-A for use by the vendor's customers, to give the PERFORMANCE CERTIFICATE]	
12	If warranted, the VENDOR/OEM has to assist in BHEL Experts Evaluation Committee to visit the Works of OEM's Customers to acquaint with the performance of the subject welding machines working for more than two years , as on the date of this tender opening.	

SECTION :III - The VENDOR has to comply with the following, for accepting the Technical Offer for scrutiny and evaluation by the Purchaser

S.No.	PARTICULARS	VENDOR's COMPLIANCE
13	The VENDOR shall submit the offer in TWO PARTS - Technical [with PART A & PART B] & Commercial Terms and Price Bid.	
14	The Offer shall contain a comparative statement of Technical Specifications given by BHEL and the Offer Details submitted by the VENDOR, against each clause. A just 'CONFIRMED' or 'COMPLIES' or 'YES' or 'NO-DEVIATION 'or similar words in the technical offer may lead to disqualification of the Technical Offer	
15	The VENDOR / OEM shall assure a continuous support for SPARES and SERVICE for TEN Years, from the date of commissioning of the equipment at BHEL Works. This will be an undertaking by the OEM at the time of release of Purchase Order on the successful bidder.	
16	The Technical Offer shall be supported by Product Catalogue and Data Sheets in ORIGINAL and complete technical details / literature on the QUOTED MODEL of Welding Powersource.	
17	The Commercial Offer (given with the Technical Offer) shall contain the Scope of Supply and the Un-Priced Part of the Price-Bid, for confirmation for the scope of supply – with UNIT RATE.	
18	The expected delivery period (including the time for Pre-Dispatch Inspection clearance by BHEL) for the welding machine is not more than 20 weeks from the date of issue of BHEL Purchase Order.	
19	The Main Powersource and the PULSATING WIRE FEEDER shall be from the same OEM and shall not form as a BOUGHT-OUT Item for interfacing and further supply to BHEL. In case, if the above mentioned two prime components/sub-systems (except the TIG Welding Torches) are from two different sources, the TECHNICAL OFFERS gets summarily rejected.	

Enclosure : ANNEXURE – A (Performance Certificate)

ANNEXURE-A

PERFORMANCE CERTIFICATE

The Performance of the subject model Welding Powersource should be certified by the customer of the OEM/VEBNDOR on Customer's Letter Head, in the following pattern/format and submitted along with the TECHNICAL OFFER positively.

1.0	Name of the Machine Supplier (OEM)	:
2.0	MODEL/MAKE, Serial No. of the Welding Machine	:
3.0	Month & Year of Commissioning of the Machine	:
4.0	Brief Details on the Application/Use of the Machine	:
5.0	Performance of the Welding Machine stated above	: Very Good / Satisfactory / Not Good
6.0	Availability of the Welding Machine stated above	: Good / Poor
7.0	Service After Sales support given by the OEM / Indian Representative, including spares supply	: Satisfactory / Not Satisfactory
8.0	Special Remarks / Recommendations	:

Date:

Signature & Seal of the Authority
Issuing the Performance Certificate

PART B

TECHNICAL SPECIFICATIONS FOR IGBT CONTROLLED HOT WIRE GTAW POWERSOURCE WITH PULSATING WIREFEEDER

S.No.	SPECIFICATION PARTICULARS	VENDOR's RESPONSE
1.0	**APPLICATION :** The proposed Welding Powersources are intended for use in manual and mechanised welding modes for the processes GTAW (with COLD WIRE and HOT WIRE Options with PULSATING WIREFEEDER) and SMAW process for welding of exotic materials (like Alloy 617 and SS304H Cu) with the least process heat input as part of a critical R&D Project , where the jobs shall pass through NDE viz., Radiography Test (RT)/Ultrasonic Test (UT) as stipulated in ASME Sec. IX, ANSI B 31.1, and B 31.3. Vendor to confirm suitability with details.	
2.0	**MACHINE CONFIGURATION**	
2.1	The offered Welding System shall consist of the following sub-systems : a. Welding Powersource with integrated Chiller Unit b. GTAW/MMAW Process Control Unit with DISPLAY c. GTAW Wire Feeder with Cold Wire and Hot Wire Options, including pulsating/oscillating frequency setting facility – displaying options selected d. GTAW Welding Torch suitable for application listed under above Clause Sl.No. 1.0 e. MMAW /SMAW Welding Torch f. Transport Carriage with Rubberised Wheels for portability and holding Weld Shielding Gas Cylinder g. Set of Inter-Connecting Cables, Hoses, Quick-fix Connectors /Couplers, Adaptors, etc.	
3.0	**SCOPE OF SUPPLY**	
3.1	The Scope of Supply shall include the following : a. Welding Powersource as per the below given Specification Clause No. 4.0, 5.0 & 6.0 - 5 Nos. b. GTAW Wire Feeder with Control Unit, as per Specification Clause No. 7.0 & 8.0 - 5 Nos. c. GTAW Welding Torch for Manual Mode welding, as per Specification Clause No. 10.5 - 5 Nos. d. GTAW Welding Torch for Mechanised Mode as per Specification Clause No. 10.6 - 8 Nos. e. MMAW Welding Torch for Manual Mode welding, as per Specification Clause No. 11.0 - 5 Nos. f. Set of Inter-Connecting Cables, Hoses, Quick-fix Connectors /Couplers, Adaptors, etc. as per Specification Clause No. 12.0 - 5 Sets. g. Set of Electrical & Mechanical Spares listed as per **ANNEXURE – 1** and Specification Clause No. 14.0	

S.No.	SPECIFICATION PARTICULARS	VENDOR's RESPONSE
3.1	h. Tungsten Electrode Grinder as per Specification Clause No. 9.0 (including 2 spare wheels) – 3 Nos. i. Set of Manuals for Machine Operation and Maintenance including Trouble Shooting measures as per Specification Clause No. 13.0 j. Pre-Dispatch Inspection at Supplier's Works by BHEL Experts on machine performance testing and Acceptance as per Specification Clause No. 15.0 k. Installation & Commissioning of Welding Machines at BHEL Works, including Prove-out of Machine Performance as per Specification Clause No. 15.0 l. Training for BHEL Staff on Machine Operation and Maintenance including Trouble Shooting at BHEL Works by OEM Representative for a minimum of **5** Working Days, as per Specification Clause No. 17.0 m. Guarantee for total machine performance and all sub-systems availability for a minimum period of TWELVE Months from the date of Acceptance of Machines at BHEL Works, as per Specification Clause No. 18.0.	
4.0	**POWERSOURCE DESIGN FEATURES**	
4.1	The Power source shall be Inverter (IGBT) Controlled and capable of delivering a smooth Constant Current even with a fluctuation of 10 % in the Input Electrical Power Supply Voltage	
4.2	The make of the IGBT used and the Switching Frequency of the Inverter Circuit have to be furnished. {BHEL has the right to reject the offer, if IGBT of internationally reputed companies are not used in the Powersource)	
4.3	The Electrical Power Input will be from a 415 ±10% V AC, Three Phase, 50± 2% Hz source and through a FOUR Wire System [4th wire for EARTHING]. An input power cable with protective sheathing and of length not less than FIVE Metres with suitable end-fittings to form part of the supply.	
4.4	Insulation Class "H" – to suit Tropical Working Conditions in INDIA.	
4.5	Factory Installed Digital Ammeter & Voltmeter on the front panel shall be with easy removal and replacement type for periodic instrument calibration.	
4.6	Machine Cooling : The Power source shall have forced air cooling system that ensures adequate cooling of the components while preventing dust and metal particles from being drawn in. Cooling Fan details to be provided.	

S.No.	SPECIFICATION PARTICULARS	VENDOR's RESPONSE
4.7	Functional / Elemental Design Protection : - a. In-built protection for the IGBT in Power source against Thermal / Overload / Short-Circuit / Single Phase Power Input Conditions. b. All PCBs shall be sprayed with mould coating to prevent damage from dust and grinding particles. c. Machine Design to ensure proper earthing for the machine and its peripherals d. Design features to ensure suppression of EMI	**[BIDDER has to specifically furnish technical details on how these protective measures are addressed in the Machine Design and Construction]**
4.8	Manual Arc Welding (MMAW) Control Unit shall be Integrated with Power source (for availing Hot Start & Arc Dynamics Control facilities) Arc Dynamics Control: Electronic Inductance Variable Control shall be ensured to minimise spatter and optimise weld- bead wetting action, during welding of special materials like High Nickel & Chromium Alloys.	
4.9	Power source shall be suitable for DC pulsed GTAW Welding and GTAW Welding with High Frequency unit and also with Scratch Start /Lift Arc Option.	
4.10	Powersource shall be adaptable to a Wire Feeder with the facility for the GTAW WELDING in COLD Wire Mode or HOT Wire Mode, with wire pulsating / oscillating option and the control unit shall be interfaced with the Main Powersource.	
4.11	The Powersource shall be provided with a skid mounted trolley with rubber lined wheels for easy movability and with lifting hooks for portability by an overhead crane, inside shopfloors. The trolley is desired to have provision for holding the weld shielding gas cylinder / bottle. Vendor to give details.	
5.0	**POWERSOURCE OPERATING FEATURES**	
5.1	GTAW / TIG welding with AC and DC mode option and also with Air Cooled and Water Cooled TIG welding torches using one-knob synergic operation	
5.2	To facilitate simple menu-guided selection of welding parameters from user database (to enable storage of around 256 pre-programmed welding cycles /characteristics in the Database)	
5.3	Control Panel to have Switches for Power ON/OFF, Remote ON/OFF, Voltage & Ampere Control, Polarity Change, Pulse Control, Weld Sequence Control, Gas Pre and Post Flow Controls, , Hot Start Control, GTAW/SMAW Mode Selection, etc.	
5.4	Synergic or manual welding operation	
5.5	Facility for adjustable AC waveform, sine, trapezoidal, square current features	
5.6	Adjustable AC Frequency between 50 Hz and 200 Hz	
5.7	DC Pulsing Frequency 0.05 kHz to 15 kHz	
5.8	Non-latched / latched operation Facility	
5.9	Spot Welding / Tack Welding OPTION	

S.No.	SPECIFICATION PARTICULARS	VENDOR's RESPONSE
5.10	Current Up-slope/down-slope adjustable control : - Up- slope : from 0 to 20 seconds Down-slope : from 0 to 40 seconds	
5.11	Adjustable gas pre-flow/post-flow control :- Pre-flow time : from 0 to 25 seconds Post flow time : from 0 to 50 seconds	
5.12	MMA-Welding and Air Arc Gouging Options	
5.13	Facility for Anti-stick Function is compulsory	
5.14	Adjustable hot start current, hot start time and Arc force	
5.15	Output Current Operating Range : 5 to 500 Amps	
5.16	Output Current at 60% Duty Cycle and at 40 Deg C - 480 Amps (minimum)	
5.17	Output Current at 100% Duty Cycle and at 40 Deg C - 360 Amps (minimum)	
5.18	The Open Circuit Voltage (OCV) : 70 Volts or above.	
5.19	Option for easily connecting machine through LAN, WiFi to monitor the weld data & machine status.	
5.20	Power Rating [in kVA] of the Powersource with all options	
5.21	Power consumption [in Watts] at NO-LOAD condition	
5.22	MODEL Number of the Powersource for the quoted model.	
6.0	**WATER CHILLING UNIT**	
6.1	A Water Cooling / Chiller Unit shall be integral with the Main Powersource and shall be with suitable rating to meet the operational needs . The highest Ambient Temperature is 48 deg C and the relative humidity is 85% (both do not occur simultaneously)	
6.2	Electrical Power Rating of the Chiller Unit	
6.3	Design Rating of the Chiller Unit in Units of Refrigeration	
6.4	Volumetric Capacity of the Chiller Unit for the Coolant	
6.5	Specification of the Coolant in the Chiller Unit (preferably available in INDIA)	
6.6	Flow rate of the Coolant during operation	
6.7	Operating Pressure in Bar for effecting coolant circulation	
7.0	**PULSATING WIRE FEEDER FEATURES**	
7.1	TIG cold wire and hot wire welding with dynamic wire feed system, with an integrated wire heating powersource	
7.2	The wire feeding shall be possible to be superimposed in parallel using a forward and backward movement	
7.3	Dynamic wire feeding for a controllable weld pool even with positional welding:	
7.4	Spot welding/tack function	
7.5	Wire feed mechanism shall be through a 4-wheel drive	
7.6	Suitability for usage with filler wires of diameter 0.8 mm, 1.0 mm and 1.2 mm	
7.7	Separate Wire Feed Rollers suitable for Aluminium, Stainless Steel and High Nickel Alloy materials to be quoted and also for the usage with filler wires of diameter 0.8 mm, 1.0 mm and 1.2 mm	

S.No.	SPECIFICATION PARTICULARS	VENDOR's RESPONSE
7.8	Details on Wire Spool like spool dimensions, weight with filler wire, spool mounting type, etc.	
7.9	Input power supply @ 230 ±10%, 50 Hz Single Phase AC or above – shall be through a tapping from the main machine	
7.10	Wire feeding speed range : 0.5 mtr./min to 15.0 mtr/min	
7.11	Increments for Wire Feed Speed : 0.1 mtr./min. in steps	
7.12	Output Current rating @ 60 % Duty Cycle : 150 Amps (minimum)	
7.13	Output Current rating @ 100 % Duty Cycle : 120 Amps (minimum)	
7.14	Hot wire current range : 40 to 150 amps	
7.15	Filler wire oscillating frequency : 1 to 16 Hz	
7.16	Rubber Wheel fitted metallic trolley for portability of the Wire Feeder Unit to be offered, in addition to the facility for mounting the Wire Feeder Unit on the Main Powersource	
7.17	MODEL Number of the Offered Wire Feeder	
8.0	**REMOTE OPERATOR PENDANT**	
8.1	Pendant shall contain the following controls: a. Selector Switch: Weld / Setting b. Welding Program Access & Selection c. Display screen for welding parameters d. Emergency stop e. Gas flow switch f. Wire feed speed g. Wire oscillation speed h. Welding current up/down (manual override)	
8.2	The cable to be firmly fixed to the pendant and shall not loosen and disconnect from the pendant during usage in shop floor. Necessary joint protections to be provided. Wires to be soldered in the pendent cable connector instead of crimping with lugs.	
8.3	The remote operator pendant shall have proper cooling provisions so that it does not get heated up due to the electronic components / processors housed inside the pendant. The temperature shall not exceed 5 deg above ambient temperature.	
9.0	**TUNGSTEN ELECTRODE GRINDER**	
9.1	Type :- Portable and Electrically Operated	
9.2	To work on a Single Phase AC Supply through a 230 ± 10% V, 50 Hz, Three Wire System 3rd wire for earthing purpose). Input Power Cable to have a length of THREE metres	
9.3	Electrode to be ground : Ceriated Tungsten	
9.4	Electrode Diameter Range – 2.4 mm to 4.00 mm	
9.5	Grinding Angle : 15 to 30 Degrees	
9.6	Make & Model of the offered Tungsten Grinder to furnished	

S.No.	SPECIFICATION PARTICULARS	VENDOR's RESPONSE
10.0	**TIG WELDING TORCHES' FEATURES**	
10.1	Suitable for GTAW Process and for the nature of welding works listed under Clause Sl. No. 1.0 & 3.7 shall be possible with the offered welding Power source.	
10.2	Reputed international makes such as WELD-CRAFT / LINCOLN ELECTRIC / MILLER of USA, KEMPPI of FINLAND, OTC/PANASONIC of JAPAN or Custom Built models, to be quoted	
10.3	Torch Configuration preferred : The Torch Head – Gas Lens & Nozzle configuration shall be suitable for performing the following weld joints : a) Tube Butt Welds in close pitched tubular panels with a minimum clear gap of 12 mm between the adjacent tubes [Gas Nozzle end diameter is to be 10 mm for a length of 25 mm] b) Root GTAW pass welding in a 100 mm (wall thickness) Pipe Butt Welds [Gas Nozzle End diameter is to be around 12 mm for a length of 45/65 mm]	
10.4	Protective Sheathing to be provided for the TIG Torch Cables & Hoses, to withstand shop floor rough use for the entire length of the cables / hoses assembly.	
10.5	VENDOR to quote for Gas Cooled Torches with various current ratings those can be used with the offered Powersource , shall be offered with technical literature - for 100% Duty Cycle and with Cable Length 4.0 Metres	
10.6	VENDOR to quote for WATER Cooled Torches (integrated with Cold Wire and Hot Wire Options) with various current ratings those can be used with the offered Powersource, shall be offered with technical literature - for 100% Duty Cycle and with Cable Length 4.0 Metres	
11.0	**MMAW / SMAW WELDING TORCHES**	
11.1	Manual Stick Electrode Welding Torch (light weight and well insulated against heat) with cable length of 3 mtrs. (minimum) and suitable for electrodes of diameter 2.5 mm, 3.15 mm, 4.0 mm, 5.0 mm and 6.3 mm, including return current cable of length 4 mtrs. and the Earth Clamp to be offered with details. (one set per machine).	
12.0.	**INTERCONNECTING CABLES & HOSES**	
12.1	The set of interconnecting power and control cables, gas hoses, coolant hoses, etc. fitted with suitable adaptors and end connectors , to be offered for the following : a) for a length of 2 metres and b) for a length of 5 metres , for each machine	

S.No.	SPECIFICATION PARTICULARS	VENDOR's RESPONSE
13.0	**OPERATION & MAINTENANCE MANUALS**	
13.1	Three Copies in printed formats (HARD PAPER COPY) and One Copy in the CD Form / Pen Drive for EACH MACHINE	
13.2	Language of O&M Manual : English only	
13.3	Manual Details : - a) Manual shall contain all instructions for machine Installation and welding trial testing, in sequence. b) Manual to give general circuit diagrams, showing the interconnection of various elements and also details on PCBs [Printed Circuit Board] like tapping voltages, main electronic elements specifications and ratings, etc. c) Manual to give other details like trouble shooting chart, weld parameters selection guidelines for various base metals & joint designs, etc. d) Master List of Parts & Spares used in the machine with Make, Model, Rating, etc.	
14.0	**SPARES AND CONSUMABLES**	
14.1	**SPARES FOR Power Source** - All type of Spare Parts NECESSARY FOR 2 YEARS OF TROUBLE FREE OPERATION including the following items 1. IGBT Kit ---------- 3 Nos. 2. Control-Transformers -- 2 Nos 3. PCB – complete set ---------1 Set 4 Ignition Device Board---------- 1 Set 5 Controllers ---------- 1 Set 6 Rectifiers, Thermistors, Capacitors---- 1 Set 7 Switches & Knobs Main Switch ---- 1 Set 8 Coolant for Chiller Unit for two fills 9 Coolant Circulating Motor & Pump Unit – 1 No. 10 Wire Feeder Rollers for Aluminium, SS, Nickel Alloys.	**To submit compulsorily the quote for all the listed spares as per ANNEXURE-1 (attached to PART – B) , including those listed under the Specification Clause No. 14.1 and 14.2**
14.2	**Consumables for all type of TIG Torches offered, such as gas lens, nozzles, tungsten electrodes, cups, 'O' rings, trigger switches, wire guides, tips, etc.**	
15.0	**EQUIPMENT INSPECTION & ACCEPTANCE**	
15.1	**AT VENDOR'S WORKS**	
	1. The welding equipment and accessories shall be tested for its performance prove-out as per BHEL Specifications, at the Supplier's Works prior to Dispatch. (PDI) 2. Welding trials have to be conducted on sample jobs, in presence of BHEL Engineers, at OEM's Works, bringing out the features claimed by the Bidder 3. Welded Joints will be subjected to Radiography test and should pass the test as per ASME Section I, V and VIII (Division 1 & 2) of Radiography Test 4. Supplier to provide necessary arrangements for recording the process parameters & test results.	

S.No.	SPECIFICATION PARTICULARS	VENDOR's RESPONSE
15.2	**AT BHEL WORKS**	
	1) The prove-out trials of the welding operation shall be for the tubular & pipe joints, fillet welds, plate butt joints in Stainless Steel, Aluminium, High Nickel Alloys materials provided by BHEL 2) The supplier to guide at arriving the welding parameters for the above joints & weld samples. 3) Welded joints shall pass through the RT and UT Tests as per ASME Section I, V and VIII (Division 1 & 2) for RT and UT	
16.0	**MACHINE PACKING**	
16.1	Sea worthy & rigid packing for all items of complete machine, control system, all accessories and other supplied items to avoid any damage/loss in transit. When machine is dispatched in containers, all small loose items shall be suitably packed in boxes	
17.0	**TRAINING:**	
17.1	The supplier shall train BHEL Engineers in Operation and Maintenance (Mechanical, Electrical/ Electronics and Programming) of the Machine for TWO working days at supplier's works after the pre-dispatch inspection.	
17.2	Airfare, board & lodging for the BHEL Engineers who will be visiting supplier's works for pre-dispatch inspection and training, shall be borne by BHEL.	
17.3	The Supplier shall impart training to BHEL's Machine Operators and Maintenance crew in Operation and Maintenance (Mechanical, Electrical/ Electronics+) during commissioning of the Machine at BHEL works for 5 working days	
17.4	The training shall include specialized coaching in i) Safety ii) Operation of the machine iii) PC based System & Operation, iv) Trouble-Shooting, v) Software Application vi) All special features of the machine vii) Electrical / Mechanical / Electronics systems	
18.0	**GUARANTEE:** The welding machine in total and the components shall be guaranteed for a minimum of 24 months from the date of commissioning & performance prove-out at BHEL/WRI - Trichy Works. In case of pre-matured free replacement has to be effected at the cost of the supplier, including freight, insurance, taxes & duties, etc.	
19.0	**AMC Rate :** The vendor has to quote for the AMC (Annual Maintenance Contract) for the machines for a period of 3 years, after the guarantee period of 24 months / or beyond that offered by the Bidder.	

ANNEXURE – 1 (PART B)

LIST OF SPARES AND CONSUMABLES (TO BE QUOTED COMPULSORILY)

S.No.	ITEM DESCRIPTION	QUATITY
1	HW Welding Torch Liners for 4.0 Mtr. long cable	10 Nos.
2	IGBT Inverter MODULE	2 Nos.
3	Control PCB (Each Type)	2 Nos.
4	Operation PCB (Each Type)	2 Nos.
5	Control Transformers	2 Nos.
6	Solenoid Valves (Each Type)	2 Nos.
7	Coolant Pump with Motor Unit and Cooling Fan	2 Nos.
8	Master Switch	1 No.
9	HF Filter Unit	1 No.
10	HF Filter Protection PCB	1 No.
11	Wire Feed Motor	1 No.
12	GTAW Hand Remote Control Unit	2 Nos.
13	Geared Motor	1 No.
14	Insulator for Torch Holders (All types)	2 Sets.
15	Insulator Gas Nozzles (All types)	2 Sets.
16	Back Cap for TIG Torches (All sizes)	2 Sets.
17	"O" Rings – All sizes used in the Torches	50 Nos. in Each Size.
18	TIG Torch Electrodes – All Types	10 Nos. in Each Type
19	TIG Torch Collets – All Types	5 Nos. in Each Type
20	HW Narrow Gap Nozzle Holder Set – All Types	5 Nos. in Each Type
21	Cladding Nozzle Holder Set – All Types	5 Nos. in Each Type
22	Gas Nozzle for Lens – All Types	10 Nos. in Each Type
23	Ceramic Coated Nozzle with Bronze Spiral for Wire sizes 0.8 mm , 1.0 mm and 1.2 mm	25 Nos. in Each Size.
24	Ceramic Coated Nozzle **without** Bronze Spiral for Wire sizes 0.8 mm , 1.0 mm and 1.2 mm	50 Nos. in Each Size
25	Inlet Guide with Liners – All types	10 Nos. in Each Type
26	Spool Holder Set	5 Nos.
27	Torch Body Set	5 Nos.
28	HW Handle Switch Module Complete	5 Nos.
29	Wire Feeder Rollers for 0.8 mm wire	10 Nos.
30	Wire Feeder Rollers for 1.0 mm wire	10 Nos.
31	Wire Feeder Rollers for 1.2 mm wire	10 Nos.
32	Teflon Guides	25 Nos.
33	Brass Outgoing Guides	20 Nos.
34	Insulator Sleeve Fibre Glass with Silicon Rubber	10 Nos.
35	Automatic Torch Nozzle Adjustment Slide - XYZ	2 Nos.
36	Wire Feed Roller for Wire sizes 0.8 mm , 1.0 mm and 1.2 mm	5 Nos. in Each Size.
37	Water Chiller Unit Coolant (extra to that filled in the machines)	10 Litres
38	Interconnecting Cable & Hose Set (Between Wire Feeder and the Main Powersource) – 2 Mtr. long	2 Sets
39	Interconnecting Cable & Hose Set (Between Wire Feeder and the Main Powersource) – 2 Mtr. long	1 Set
40	Quick Fix End Coupling Set for the Gas Hoses and Coolant Hoses	10 sets Each