SPECIFICATION FOR PORTABLE HAND HELD AIR PLASMA CUTTING MACHINE

Specification No. Mech/M&P/2900/GM/06

Important Notice: Tenderers are required to give clauses Deviation etc. to avoid back reference. Offers are likely to be ignored in case non-compliance of these instructions.

1.0 PURPOSE FOR WHICH REQUIRED AND CAPABILITY:

1.1 Capability:

The plant should be capable of;

1.1.1 Air plasma/industrial gases cutting of stainless steel sheet thickness up to 06mm and corten steel/ mild steel sheet thickness up to 12 mm.

1.1.2 The equipment should be portable and should be suitable for good quality cutting.

1.1.3 This plant is required for cutting of various coach components. This plant should be capable of withstanding intensive use for three shifts.

1.2 Leading Parameters :

The capability of the machine should be as per Schedule-1. The bidder should also provide the technical parameters of the machine offered against clauses as given in Schedule-1 along with the bid.

2.0 DESCRIPTION AND SCOPE OF SUPPLY :

2.1 Scope of Supply:

2.1.1 The specification covers supply and commissioning of inverter based portable air plasma cutting plant comprising of power source with in-build high frequency unit, plasma cutting torch, positive lead and ancillary equipment. For basic design features of the machine/plant, please refer clause 3 and its sub-clauses and for general electrical equipment design refer Schedule-II. The supply shall include all concomitant accessories/ equipments as detailed in the specification and other concomitant accessories/ equipments, which the manufacturer consider essential to make the machine fully operational when installed and connected to power supply. The requirements of utilities etc. if any, should be clearly indicated by the tenderers in the offer. Cutting Head of the equipment should be based on cyclonic Turbine “BICT” plasma head technology.

2.2 The Concomitant Accessories :

2.2.1 The machine shall be accompanied by the following concomitant accessories, the cost of which shall be included in the basic price of the machine. However, the cost of each item of following concomitant accessories should also be given separately in the offer.

2.2.2 Constant current power source with inverter based technology. It should be possible to do the infinitely variable cutting adjustments through the control provided on the unit.

2.2.3 The power source should have in-built high frequency unit for non contact plasma arc initiation.

2.2.4 The power source should have over voltage, under voltage protections.

2.2.5 The following indications/ controls should be available on the main panel of the plant.

2.2.5.1 The main panel should have suitable safety indicators. The power source should have cutting parameter adjustment through potentiometer available on the power source.

2.2.5.1.1 Thermal indicator for over temperature.

2.2.5.1.2 Mains voltage for indicating the input supply voltage.

2.2.5.1.3 Pressure fault indicator for any loss in the air/gas pressure.

2.2.5.2 A suitable positive lead with proper clamping arrangement should be provided with the plant.

2.2.5.3 The plant should have suitable plasma cutting torch of 7-8 meter length through which a high quality cutting can be achieved.

2.2.5.4 Any other concomitant accessories required to make

2.2.5.5 The machine fully operational on installation when connected to mains power source must also be included in the scope of supply and the cost of such accessories should be included in the basic price of the machine.

2.2 Optional Accessories :

2.2.5 The optional accessories will include consumables like electrode, nozzle and torch head to be quoted separately. The individual cost each item should be indicated separately.

3.0 BASIC DESIGN FEATURES :

3.1 General Characteristics:

The general characteristics of the machine shall be as per Schedule-III.

3.2 Specific Characteristics :

3.2.1 Plasma cutting power source :

3.2.1.1 The plasma cutting power source should be a drip proof enclosure constant current inverter based power source with stepless regulation of current. It should be capable of operating at maximum continuous welding current at specified duty cycle (as per Schedule-I) without over-heating.

3.2.1.2 The power source should be suitable for working on 415 +/- 10% single phase and should be protected against over voltage and under voltage.

3.2.1.3 The power source should be provided with cooling fan for effective forced draft cooling. An automatic device, which must switch off the power source in the event of inadequate airflow, should be provided.

3.2.1.4 The power source unit should be systematically arranged in housing.

3.2.1.5 All control PCB is to be arranged in such a manner that it should be possible to remove or refix easily without affecting/disturbing any other parts and wiring.

3.2.2 **Plasma Cutting Torch** :

3.2.2.1 The torch should be suitable for cutting the thickness mentioned in Schedule-I of the specification.

3.2.2.2 The cutting torch should be 7-8 meter long air-cooled. It should be capable to withstand the rated current without over heating.

4.0 TECHNICAL LITERATURE :

4.1 One copy of the printed illustrative catalogue showing features of the machine and its elements must be enclosed with each copy of the bid.

4.2 The successful tenderer will have to furnish, for each machine 2 copies of spare parts catalogue giving the part list number of each component with exploded views and assembly drawings, maintenance manual, trouble shooting guide, operational manual of the machine and all electrical circuit diagrams including PCB circuits to the consignee directly within 3 months of placement of the

purchase order. The bidder should provide a list of literature, they will supply along with the machine. The technical literature shall be provided for complete machine including imported and indigenously purchased components/ sub-assemblies.

5.0 SPARES :

5.1 The rate of following optional spares shall be quoted separately along with offer.

1. Control Cards - One set
2. Pressure Gauge - 01 No.
3. Torch Body - 02 Nos.
4. Spare Air Plasma cutting Torch - 01 No.
5. Solenoid Valve - 0 1 No.
6. Thyristor control - 01 Set

5.2 The list of recommended perishable and non-perishable spares required for normal maintenance to cover complete range of mechanical and electrical equipments (including controls) on double shift working basis shall be furnished and quoted separately. The quantities shall relate in case of non-perishable spares to two years normal maintenance and in case of perishable spares, to the duration of its shelf life or two years, whichever is less. The shelf life should be indicated with the quotation for spares. A complete catalogue giving the part list number of each component and assembly drawings shall also be provided with each machine in duplicate.

6.0 SPECIAL FEATURES :

6.1 Special features incorporated into the machine, if any, shall be indicated separately by the tenderer, clearly indicating the advantages of these features.

7.0 **DEVIATIONS:**

7.1 The tenderer should certify that the machine offered fully meets the specifications. Various design features incorporated in the machine to fulfil different technical and performance requirements should be fully explained in the offer. However, minor deviations from this specification, which do not effect or in any way interfere with the stipulated performance standards, or would result in improved safety/ reliability or would reduce recurring maintenance/ operating cost of the machine, can be considered for acceptance. The tenderer in such eventuality shall clearly indicate the details of the deviations and their implications.

8.0 WARRENTY

Warranty of the plant shall be as per IRS condition of the contract.

9.0 TRAINING :

9.1 Technical experts of the manufacturer during commissioning of machine will fully and adequately train operators/ maintenance staff nominated by the consignee including repairs of electronics gadgets, sub-assemblies and Printed Circuit Boards up to component level.

10.0 INSTALLATION, COMMISSIONING AND PROVING TESTS:

10.1 Installation of machine would be done under the supervision/ direction of firm's engineers. The contractor shall arrange commissioning of the machine after installation is done by the Indian Railway Staff. Adequate number of teams of technical experts shall be made available so that the commissioning delays are eliminated.

10.2 The contractor or his agent shall commission the machine within 30 days from the date of intimation by the consignee.

11.0 **REFERENCE:**

11.1 The tenderer should provide satisfactory evidence acceptance to the purchaser to show that he is licensed manufacturer and has adequate plant and manufacturing capacity and has a "quality assurance programme". He should furnish a statement giving a list of items as per his offer and/or similar items supplied by him in the past 3 years, along with the purchaser's names and addresses, order number date and quantity supplied and their performance and whether the supplies were made within the delivery period. In the absence of the above information, the tender is liable to be rejected. The manufacturer should also be ISO 9000 holder and has to submit certificate to this effect

SCHEDULE-I

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Major Parameters:

1.1	Type	Constant current Inverter based Air Plasma Cutting Machine
1.2	Input power supply	240 V, 50 Hz, 3- Phase AC Power supply +/-10%
1.3	Out put current range	20 to 40 Amp.
1.4	Open circuit voltage	145 volt DC or above
1.5	Duty cycle	50 Amp. at 60% duty cycle
1.6	Air pressure	5-6 Kg/cm^2
1.7	Cutting Capacity	Stainless Steel-06 mm. Mild Steel :12mm
1.9	Input power cable required	4 X 16 mm^2 copper flexible 20 meters long.
2.0	Length of air plasma torch	7 to 8 meters.
2.1	Type of Air Plasma Torch	curved torch body
2.2	Cooling	Forced Air
2.3	Protection	IP- 52
2.4	Power factor	Not less than 0.95
2.5	Weight	20 kg approx.

Essential spares required with each machine:

1. Control cards - 01 set complete with each machine
2. Pressure gauge - 01 No
3. Torch body - 02 Nos.
4. Spare air plasma cutting torch - 01 No
5. Solenoid valve - 01 No
6. Thyrister - 01 Set

SCHEDULE-II

GENERAL SPECIFICATION (ELECTRICAL)

1.0 The provision of this general specification shall apply.

2.0 All equipments and material shall comply with appropriate Indian Standards (latest) or National Standards of the country of origin provided the latter are equivalent to or better than the former. For items for which Indian Standards are not published, National Standards shall be acceptable. The tenderer shall indicate the Standards applicable. The following standards are applicable in particular.

(Corresponding International Standards like ASA, MEMA, DIN etc. may also be quoted).

IS: 325-1979 (latest)	-	Three phase induction motors (corresponding to IEC Pub-34-1) latest.
IS: 1240 (latest)	-	Direct acting indicating analogue electrical measuring instruments and their accessories (corresponding to IEC Pub-51) (latest).
IS: 1271-1965 (latest)	-	Classification of insulation material for elect. Machinery & apparatus in relation to their thermal stability in service (corresponding to IEC-Pub-85) (latest).
IS: 6875 (latest)	-	Push buttons and related control switches (corresponding to IEC Pub/73) (latest).
IS: 375-1963 (latest)	-	Marking and arrangement of switch gear, bus bars, main connection & Auxiliary wiring.
IS: 996-1979 (latest)	-	Single phase small A.C. and universal electrical motors.
IS: 2516 (latest)	-	Circuit breakers (corresponding to IEC Pub-56) (latest).

SCHEDULE-III

GENERAL CHARACTERISTICS

1.0 RIGIDITY AND STABILITY :

1.1 The change in ambient temperature shall not affect the performance of the machine.

1.2 There shall be no change in the performance of the machine either on switching on the machine or after continuous running.

2.0 SAFETY CONTROLS :

2.1 The machine shall incorporate safety devices to provide protection to the operator and machine against all possible operational and machinery failures.

2.2 Suitable interlock shall be provided to prevent machine operations in the event of;
- faulty sequence of operation
- fluctuation in supply voltage
- resumption of power supply after power failure.

3.0 MACHINE MAINTAINABILITY :

3.1 The machine shall be so designed so as to require minimum possible maintenance and to give trouble free service.

3.2 All assemblies/parts of the machine shall be easily accessible for maintenance.

3.3 The machine shall not require major dis-assembly for checking and replacement of particular part, especially for parts requiring periodical check up and replacement.

4.0 The supplier shall furnish 3 sets of complete electrical and electronic wiring diagrams in full details to enable the maintenance staff to locate faults in the circuits, 3 sets of part catalogues, maintenance manuals operating instructions with details of coils and windings used in the equipment to facilitate repairs and maintenance should also be supplied.

5.0 POWER SUPPLY :

5.1 The machine should be suitable for operation on 415V +/-10% at 50 +/- 3% Hz.

5.2 The electronics should be well protected against any fluctuation in power supply or any spike.

6.0 ATMOSPHERIC CONDITIONS :

6.1 The ambient temperature at the site at which the machine will be installed may vary from 0 degree C to +50 degree C over the year. The relative humidity may be as high as 98%. The atmosphere is expected to be dusty. The machines offered shall be suitably tropicalised to work under these atmospheric conditions without any adverse affect on their performance.

6.2 The temperature rise shall not reach a value that there is a risk of injury to any insulating material or adjacent parts.

Portable air plasma machine