Government of Maharashtra

Directorate of Vocational Education and Training

Craftsman Training Scheme

SPECIFICATION FOR WELDING

Version 4, 2024

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1 Oxy Acetylene Gas Cutting Blow Pipe

1.1 Basic indicative diagram

1.2 Should have ANM nozzle for use with Acetylene
1.3 Should have “positive suction” NM nozzles to safeguard the torch and operator from “sustained backfire” or “flashback”.
1.4 Maximum cutting thickness: 300 mm
1.5 Length of torch: 450 to 500 mm
1.6 Weight of torch: 1 to 1.5 Kgs
1.7 Standard: Generally confirming to IS: 7653 – 1975 and Certified by Bureau of Indian Standards.
1.8 Should be supplied with ISI certification license number

2 Air Plasma Cutting Equipment with standard accessories

2.1 Basic indicative diagram

2.2 Should be three phase inverter based
2.3 Should have soft switching technology for high efficiency and cutting capacity
2.4 Should be suitable for both manual and mechanized cutting operation with suitable Cutting Torch
2.5 Should have digital display for precise setting of cutting current
2.6 Should have time delay function for effective protection to cutting torch
2.7 Should have self-Hold ON / OFF setting feature for the machine to be typically suitable for use with Automatic CNC Cutting outfit

2.8	Input supply:	380 - 415 V AC, 3 phase, 50 / 60 Hz
2.9	Rated Input KVA	14.5
2.10	Cutting Current range:	30 – 100 Amps
2.11	Cutting current at 40˚C:	10 minute cycle @ 100% duty cycle: 100 Amps
2.12	Maximum severing capacity:	40 mm
2.13	Optimal cutting capacity:	1 – 20 mm
2.14	Maximum automated cutting capacity:	≤ 15 mm
2.15	Nominal Air Pressure requirement:	0.45 MPa / 4.5 Bar
2.16	Dimensions L X W X H (approx.):	550 X 300 X 500 mm
2.17	Weight (approx.):	40 Kg

3 Pug Cutting Machine - Capable of cutting Straight and Circular with Standard Accessories

3.1 Basic indicative diagram

3.2 Cutting Capacity: Up to 75 mm thick Plate
3.3 Straight Cutting: In 1.8 meters length or its multiples by adding extra track.
3.4 Circle Cutting: From Ø150 mm to Ø1200 mm.
3.5 Bevel Cutting: Up to 45^{o}, 50 mm thick plate
3.6 Cutting Speed: Min.: 0-200 mm/min.(approx)
3.7 Max.: 800-1000 mm/min.(approx.)
3.8 Horizontal Adjustment of Cutting Torch: 80 mm
3.9 Vertical Adjustment of Cutting Torch: 60 mm
3.10 Weight of the machine: 8 Kgs. (Approx.)
3.11 Power Supply: 220/250V, 1ø, 50 Hz, or 220/250V DC
3.12 Speed Control: Wire Wound Potentiometer
3.13 Inlet Gas Hose connections for Gas Torch 1/4” BSP RH & LH
3.14 Cutting Nozzles: 75 mm Length, A type for Oxy-Acetylene & P type for Oxy-LPG
3.15 Unique design with louvers for ventilation which reduces overheating of motor and electrical parts.
3.16 Unbreakable, smooth and precise horizontal and vertical adjustment of torch.
3.17 Bevel setting with locking facility ensures bevel accuracy during continuous cutting operation.
3.18 Heat reflector with air gap, which protects the motor and other electrical parts from overheating.
3.19 Non-metallic moulded lifting handle, hence machine can be lifted easily even if when it is hot.
3.20 Travels on standard 1.8 meter long extruded Aluminium rail track

4 Cylinder trolley

4.1 Basic indicative diagram

4.2 Should be suitable to be used with full size Oxygen & Acetylene Cylinders.
4.3 Should have robust Construction
4.4 Should have Solid wheels for easy movement
4.5 Should have Safety chain for securing cylinders
4.6 Wheel Size: 10 to 12 Inch

5 Flash Back Arrester - Cylinder Mounted

5.1 Basic indicative diagram

5.2 Flashback arrestors for reliable protection against dangerous reverse gas flows and flashbacks.

5.3 Material:

5.3.1	Housing:	Brass,
5.3.2	Flame Arrestor:	Stainless Steel
5.3.3	Seal:	Elastomer

5.4 Weight: 180 Grams

5.5 Acetylene (A)

5.5.1	Max Working Pressure:	1.5 BAR
5.5.2	Inlet Female Thread:	3/8" BSP LH
5.5.3	Outer Male Thread:	3/8" BSP LH

5.6 LPG (P)

5.6.1	Max Working Pressure:	5 BAR
5.6.2	Inlet Female Thread:	3/8" BSP LH
5.6.3	Outer Male Thread:	3/8" BSP LH

5.7 Oxygen (O)

5.7.1	Max Working Pressure:	30 BAR
5.7.2	Inlet Female Thread:	3/8" BSP RH
5.7.3	Outer Male Thread:	3/8" BSP RH

6 Flash Back Arrester - Torch Mounted

6.1 Basic indicative diagram

6.2 Flashback arrestors for reliable protection against dangerous reverse gas flows and flashbacks.

6.3 Material:

6.3.1	Housing:	Brass,
6.3.2	Flame Arrestor:	Stainless Steel
6.3.3	Seal:	Elastomer

6.4 Weight: 110 Grams

6.5 Acetylene (A)

6.5.1	Max Working Pressure:	1.5 BAR
6.5.2	Inlet Female Thread:	3/8" BSP LH
6.5.3	Outer Male Thread:	3/8" BSP LH

6.6 LPG (P)

6.6.1	Max Working Pressure:	5 BAR
6.6.2	Inlet Female Thread:	3/8" BSP LH
6.6.3	Outer Male Thread:	3/8" BSP LH

6.7 Oxygen (O)

6.7.1	Max Working Pressure:	30 BAR
6.7.2	Inlet Female Thread:	3/8" BSP RH
6.7.3	Outer Male Thread:	3/8" BSP RH

7 Oven Electrode Drying

7.1 Basic indicative diagram

7.2	Input Voltage:		230 V
7.3	Current:		2 A
7.4	Phase:		Single Phase
7.5	Frequency:		50 Hz
7.6	Watts:		0.5 KW
7.7	Temperature:		50-350 Degree Celsius
7.8	Capacity:		5 Kg
7.9	Dimensions (L X W X H) mm		
	7.9.1	External:	515 X 190 X 190
	7.9.2	Internal:	435 (L) X 62 (Ø)
7.10	Temperature Control:		Thermostat

8 Acetylene Gas Pressure Regulator Double Stage

8.1 Basic indicative diagram

8.2 Compliance: generally conforming to IS: 6901 - 2009.

8.3 Should have stainless steel diaphragm in first stage to absorb shock of inlet pressure up to 230 bar.

8.4 Should have flexible rubber diaphragm in second stage for fine gas control.

8.5 Should have forged brass bonnet in first stage and die cast special alloy bonnet in second stage for higher strength.

8.6 Should have Teflon moulded valve at the heart of the regulator and stainless steel machined & ground valve spindle in the valve assembly capsule in both stages for leak-proof performance.

8.7 Should have distinctive colour for pressure adjusting knob labels.

8.8 Should have triple filter: one in inlet and two wire-mesh in the valve assembly protect the sensitive internal parts from any dust particles.

8.9 Weight: 2.40 Kg.

8.10 Should have self-adjusting safety valve, Double protection through separate safety valves in first and second stage.

8.11 Should have second stage plenum chamber volume is six times than first stage ensuring very stable flow characteristics.

8.12 Acetylene

8.12.1	Max Inlet Pressure:	25 BAR
8.12.2	Max Outlet Pressure:	1.5 BAR
8.12.3	Max Flow:	250 LPM
8.12.4	Inlet Connections:	5/8" BSP LH (Male)
8.12.5	Outer Connections:	3/8" BSP LH (Male)

9 Argon Gas Pressure Regulator Double Stage

9.1 Basic indicative diagram

9.2 Compliance: generally conforming to IS: 6901 - 2009.
9.3 Should have unbreakable moulded pressure adjusting knob.
9.4 Should have profile rubber diaphragm.
9.5 Should be stainless steel machined and ground valve spindle
9.6 Should have Teflon moulded valve at the heart of the regulator.
9.7 Should have sintered filter in the inlet, wire mesh filter in valve assembly
9.8 Should have self-adjusting safety valve
9.9 Should have flow meter attached
9.10 Weight: 1 to 1.30 Kg. approx.
9.11 Regulators should have outlet flow-gauge design, so that additional flow-meter is not required
9.12 Max Inlet Pressure: 200 BAR
9.13 Max Flow: 25 LPM
9.14 Inlet Connections: 5/8" BSP RH (Male)
9.15 Outer Connections: 3/8" BSP RH (Male)

10 CO2 Gas Pressure Regulator Double Stage

10.1 Basic indicative diagram

10.2 Compliance: generally conforming to IS: 6901 - 2009.
10.3 Should have unbreakable moulded pressure adjusting knob.
10.4 Should have profile rubber diaphragm.
10.5 Should be stainless steel machined & ground valve spindle
10.6 Should have Teflon moulded valve at the heart of the regulator.
10.7 Should have sintered filter in the inlet, wire mesh filter in valve assembly
10.8 Should have self-adjusting safety valve.
10.9 Should have flow meter attached
10.10 Should have gas pre heater attached
10.11 Weight: 1 to 1.30 Kg. approx.
10.12 Regulators should have outlet flow-gauge design, so that additional flow-meter is not required
10.13 Max Inlet Pressure: 200 BAR
10.14 Max Flow: 25 LPM
10.15 Inlet Connections: BSW 0.86 X 14 TPI RH (Female)
10.16 Outer Connections: 3/8" BSP RH (Male)

11 Oxygen Gas Pressure Regulator Double Stage

11.1 Basic indicative diagram

11.2 Compliance: generally conforming to IS: 6901 - 2009

11.3 Should have stainless steel diaphragm in first stage to absorb shock of inlet pressure up to 230 bar.

11.4 Should have flexible rubber diaphragm in second stage for fine gas control.

11.5 Should have forged brass bonnet in first stage and die cast special alloy bonnet in second stage for higher strength.

11.6 Should have teflon moulded valve at the heart of the regulator and stainless steel machined & ground valve spindle in the valve assembly capsule in both stages for leak-proof performance.

11.7 Should have distinctive colour for pressure adjusting knob labels.

11.8 Should have triple filter: one in inlet and two wire-mesh in the valve assembly protect the sensitive internal parts from any dust particles.

11.9 Weight: 2.40 Kg.

11.10 Should have self-adjusting safety valve, Double protection through separate safety valves in first and second stage.

11.11 Should have second stage plenum chamber volume is six times than first stage ensuring very stable flow characteristics.

11.12 Oxygen (O)

11.12.1	Max Inlet Pressure:	230 BAR
11.12.2	Max Outlet Pressure:	10 BAR
11.12.3	Max Flow:	1000 LPM
11.12.4	Inlet Connections:	5/8" BSP RH (Male)
11.12.5	Outer Connections:	3/8" BSP RH (Male)

12 Rubber Hose - Acetylene, Diameter = 8 mm, Length = 10 metres

12.1 Basic indicative diagram

12.2	Should be manufactured as per IS 447	
12.3	Diameter:	8 mm
12.4	Length:	10 Meters
12.5	Should be highly flexible and electrical resistant	
12.6	Should be light in weight and abrasion resistant	
12.7	Colour:	RED
12.8	Core:	Plasticized PVC
12.9	Reinforcement:	High Tensile Polyester Yarn
12.10	Cover:	Hyper Flame Retardant Thermo-compound
12.11	Temperature Range:	-40^0 C to $+55^0$ C
12.12	Hose Inner Diameter (NOM.):	8.0 mm
12.13	Hose Outer Diameter (NOM.):	16.0 mm
12.14	Working Pressure:	200PSI / 15bar
12.15	Minimum Bursting Pressure:	800 PSI / 55bar
12.16	Minimum Bending Radius:	25mm

13 Rubber Hose - Oxygen, Diameter = 8 mm, Length = 10 metres

13.1 Basic indicative diagram

13.2	Should be manufactured as per IS 447	
13.3	Diameter:	8 mm
13.4	Length:	10 Meters
13.5	Should be highly flexible and electrical resistant	
13.6	Should be light in weight and abrasion resistant	
13.7	Colour:	BLACK/ BLUE
13.8	Core:	Plasticized PVC
13.9	Reinforcement:	High Tensile Polyester Yarn
13.10	Cover:	Hyper Flame Retardant Thermo-compound
13.11	Temperature Range:	-40^0 C to $+55^0$ C
13.12	Hose Inner Diameter (NOM.):	8.0 mm
13.13	Hose Outer Diameter (NOM.):	16.0 mm
13.14	Working Pressure:	200PSI / 15bar
13.15	Minimum Bursting Pressure:	800 PSI / 55bar
13.16	Minimum Bending Radius:	25mm

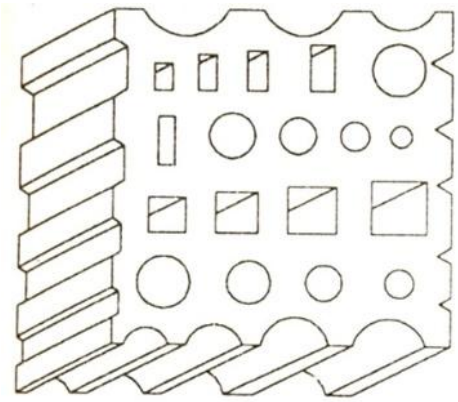
14 Rubber Hose Clips - 1/2 inch

14.1 Basic indicative diagram

14.2 Size: 1/2 Inch
14.3 Should be suitable for clamping hose pipe for welding purpose
14.4 Material: Stainless Steel

15 Swage Block

15.1 Basic indicative diagram



15.2 Generally conforming to IS:845- 1974
15.3 Material: Cast iron Grade 20
15.4 Size: minimum 400 X 400 X 100 mm
15.5 Should be sound castings, free from blow holes, scales and other defects.
15.6 Should be smoothly finished all over.
15.7 The surface of holes, slots and sides shall be properly formed and reasonably smooth. The half circles and other shapes on the vertical edges shall be less than half the intended nominal dimension.

16 Magnetic Particle Testing Kit

16.1 Basic indicative diagram

16.2 Kit should contain
16.3 Magnetic crack detector,
16.4 One AC/HWDC Yoke,
16.5 One pair of Cables,
16.6 One pair of Prods, ASTM
16.7 Dry Powder Blower & Dry Powder
16.8 Cord length of Yoke: 6 Feet
16.9 Operating Voltage of Yoke: 230V AC, 50 HZ
16.10 Output Current of MPI: 1000 Amp
16.11 Operating Voltage of MPI: 230V AC
16.12 Lifting Capacity of Yoke: 0-5 Kg in AC
16.13 Leg Spacing: 0-30 Cm Across Poles
16.14 Lifting Capacity in DC of Yoke: 0-30 Kg
16.15 Field Indicator to be provided
16.16 Testing Block to be provided

17 Tip Cleaner Set

17.1 Basic indicative diagram

17.2 Tip should cover Size No. 6 through No. 26
17.3 Cleaning Drill Size 77 – 49
17.4 Material: Stainless Steel
17.5 13 Stainless Steel tips cleaners with file
17.6 Should efficiently clean the tip of the cutting torch after the welding process.
17.7 Should have corrosion abrasion resistance
17.8 Should have sturdy construction

18 Arc Welding Cables Multi Cored Copper - 400 A, 50 Meter

18.1 Basic indicative diagram

18.2 Capacity: 400 A
18.3 Length: 50 Meter
18.4 Made in accordance with IS 9857/90
18.5 Cables should be manufactured with rope-lay stranded, bunched members of Plain/ Annealed Copper in accordance with IS 8130/84.
18.6 Polyester tape should separate the conductor from the rubber insulation.
18.7 The cable should be covered with general purpose grade rubber Type SE-1 or HOFR Type SE-3 in accordance with IS 6380/84

19 Arc Welding Cables Multi Cored Copper - 600 A, 50 Meter

19.1 Basic indicative diagram

19.2 Capacity: 600 A
19.3 Length: 50 meter
19.4 Made in accordance with IS 9857/90
19.5 Cables should be manufactured with rope-lay stranded, bunched members of Plain/Annealed copper in accordance with IS 8130/84.
19.6 Polyester tape should separate the conductor from the rubber insulation.
19.7 The cable should be covered with general purpose grade rubber Type SE-1 or HOFR Type SE-3 in accordance with IS 6380/84

20 Earth Clamps - 600 A capacity Brass/ Copper Alloy

20.1 Basic indicative diagram

20.2 Capacity: 600 A, Heavy duty
20.3 Should be made of brass or copper
20.4 Max Jaw Opening: 60 mm
20.5 Should have suitable fixing mechanism for welding cable

21 Electrode Holder - 600 A

21.1 Basic indicative diagram

21.2 Should be Type B and should have fully insulated head to resist spatter
21.3 Jaw should be made of copper
21.4 Handle should be sturdy and made of fiberglass
21.5 Should have insulation resistance above 1 Mega Ohm
21.6 Should have dielectric strength up to 3000 V
21.7 This holder should be suitable for cables up to AL120/ CU70 Sq mm and CE certified as per European standard EN60974-11

22 Spark Lighter

22.1 Basic indicative diagram

22.2 Should provide the spark that is necessary to kick-start the torch for the welding job.
22.3 Size: 25.5 cm X 3 cm (± 5%)
22.4 Should be provided with extra 5 Nos. of sparking Stones/ Flints

23 AC/DC GTAW Welding Machine with Water Cooled torch 300 A, Argon Regulator, Gas Hose, Water circulating system and Standard Accessories

23.1 Basic indicative diagram

23.2 Should have large input supply voltage range with under/over voltage and single-phase protection
23.3 Should have minimum efficiency of 80 %
23.4 Should have latest PWM inverter technology with inbuilt SPOT TIG welding facility, AC/ DC as well as mixed TIG welding facility.
23.5 Should also have Inbuilt PULSE TIG welding controls with independent settings of all parameters from front panel.
23.6 Constant Current characteristics irrespective of arc length variation for smooth, stable arc for spatter-less welding
23.7 Should have water cooling unit with suitable type of water cooled TIG torch
23.8 Input supply: 415 V AC +15%, -10%, 3 Phase, 50/ 60 Hz
23.9 Input KVA @ 415 V Supply @ 100% Duty Cycle: Manual Metal Arc (MMA) mode – 7, TIG mode – 7.5
23.10 Input KVA @ 415 V Supply @ 60% Duty Cycle: MMA Mode – 10, TIG mode – 11
23.11 Power factor: 0.9 or higher
23.12 Efficiency %: 80% or higher
23.13 Open circuit voltage @ 415 V input supply: 70 V DC or higher
23.14 Welding current range: 10 – 300 A (TIG Mode)
23.15 Welding current at 40 Degree C, 10 minute cycle, @ 60% duty cycle: 300 A (TIG Mode)
23.16 Welding current at 40 Degree C, 10 minute cycle, @ 100% duty cycle: 230 A (TIG Mode)
23.17 Should have an option of remote controller and Foot switch control for Current setting
23.18 Should have protections: Over/ Under Voltage, Single Phasing, Over Temperature
23.19 Front panel functions:
- 23.19.1 MMA/ TIG Selection Switch
- 23.19.2 2T/ 4T/ SPOT/CYCLE Selection Switch
- 23.19.3 Pulse/ Normal Mode Selection Switch
- 23.19.4 HF On/ HF Off Selection Switch

23.19.5 Normal/ Foot Switch Selection Switch
23.19.6 Menu Switch for Selecting all functions-
23.19.7 Gas Pre Flow, Start Current, Upslope Time, Base Current, Pulse Current, Down Slope Time, Crater Current, Gas Post Flow Time, Cleaning for AC, AC Frequency, AC Offset, Pulse Width/ Spot Time, Pulse Frequency as Per Selected Mode of Operation.
23.19.8 Torch Switch Connector
23.19.9 Foot Switch Connector
23.19.10 Remote Connector
23.19.11 Gas Out Connector
23.19.12 Cam-Lock Output Connectors
23.19.13 Mains On 'Green' Colour Indication
23.19.14 Trip 'Red' Colour LED for that machine is under protection mode.
23.19.15 Water / Gas Cooled Selection Switch
23.19.16 Encoder for Selected Parameter Value Increment / Decrement.

23.20 Cooling type: Forced Air
23.21 Ambient temperature rating: 40 Degree C
23.22 Class of insulation: H
23.23 Degree of protection: IP 23 S
23.24 Dimensions L X W X H (without handle) in mm: 650 X 425 X 515 (Approx.)
23.25 Weight: 50 Kg (Approx.)
23.26 Gas Flow Meter to be provided

24 DC Arc Welding Rectifiers set with Standard Accessories - 400 A, OCV 60-100 V, 60% Duty Cycle

24.1 Basic indicative diagram

24.2 DC Arc Welding Rectifiers set with Standard Accessories - 400 A, OCV 60-100 V, 60% Duty Cycle
24.3 Should be three phase inverter based IGBT based DC Welder
24.4 Should be suitable for Long distance welding (100 meter + 100 meter cables) and cellulosic electrodes
24.5 TIG Welding should be possible with External HF Unit
24.6 Should be capable of Welding with all types of cellulosic electrodes
24.7 Should have arc force adjustment on panel.
24.8 should have BUILT-IN VRD (Voltage reducing device) for protection against electric shock when welding is not going on.
24.9 Input supply: 415 V AC +15%, -10%, 3 phase, 50 / 60 Hz
24.10 Input KVA @ 415 V Supply @ 100% Duty Cycle: 14
24.11 Input KVA @ 415 V Supply @ No load: 0.24
24.12 Power factor: 0.9 or higher
24.13 Efficiency %: 85% or higher
24.14 Open circuit voltage @ 415 V input supply: 80 V DC or higher
24.15 Welding Current range: 10 – 400 A
24.16 Welding current at 40˚C, 10 minute cycle, @ 60% duty cycle: 400 A
24.17 Welding current at 40˚C, 10 minute cycle, @ 100% duty cycle: 310 A
24.18 Protections: OV/ UV, Single Phasing, Over Temperature
24.19 Compatibility to International standard: Generally, conforms to IEC 60974-1
24.20 Current and Arc Force setting: Potentiometer
24.21 Current display (set current and actual current): 3 Digit – 7 segment Digital Panel Meter
24.22 Electrode sizes applicable: 2.5 – 6.3 mm
24.23 Cooling type: Forced Air
24.24 Ambient temperature rating: 40 Degree C
24.25 Class of insulation: H
24.26 Degree of protection: IP 23 S
24.27 Dimensions L X W X H in mm: 660 X 305 X 530 (Approx.)
24.28 Weight: 40 Kg (Approx.)

25 GMAW Welding Machine - 400 A, Air Cooled Torch, Regulator, Gas Preheater, Gas Hose and Standard Accessories

25.1 Basic indicative diagram

25.2 Should have digitally controlled Gas metal arc welding (GMAW) outfit with High efficiency and power factor (above 0.9) – resulting in energy saving
25.3 Should have auto “Weld Stop” when welding torch is taken away from weld job
25.4 Should be compatible to Power Generator Supply
25.5 Should have digital Panel for adjusting the welding parameters
25.6 Should have excellent dynamic response through special dynamic inductance control enables superior arc characteristics.
25.7 Should have 2T, 4T operating modes, Crater voltage and Crater current adjustment through digital panel.
25.8 Should have feature to avoid globule formation.
25.9 Input supply: 415 V AC +15%, -10%, 3 phase, 50 / 60 Hz
25.10 Input KVA @ 415 V supply @ 100% Duty Cycle: 12
25.11 Input KVA @ 415 V supply @ No load: 0.24
25.12 Power factor: 0.9 or higher
25.13 Efficiency %: 85% or higher
25.14 Open circuit voltage @ 415 V input supply: 65 V DC
25.15 Welding / Crater Current range: 50 – 400 A
25.16 Welding / Crater Voltage range: 16 – 39 Volts DC
25.17 Welding current at 40˚C, 10 minute cycle, @ 60% duty cycle: 400 A
25.18 Welding current at 40˚C, 10 minute cycle, @ 100% duty cycle: 310 A
25.19 Protections: Over/ Under Voltage, Single Phasing, Over Temperature
25.20 Compatibility to International standard: Generally, conforms to IEC 60974-1
25.21 Wire diameters applicable: 1.2 / 1.6 Aluminium, 0.8 / 1.0 / 1.2 / 1.6 for all Steel
25.22 Cooling Type: Forced Air
25.23 Ambient temperature rating: 40 Degree C
25.24 Class of insulation: H
25.25 Degree of protection: IP 23 S
25.26 Dimensions L X W X H in mm: 700 X 450 X 600 (Approx.)
25.27 Weight: 45 Kg (Approx.)

25.28 Technical Specifications for Wire Feeder Unit:

- 25.28.1 Wire feed speed: 1.5 – 18 m / min.
- 25.28.2 Wire Drive Unit: 4 Roll Drive with PMDC Motor, 42 V DC
- 25.28.3 Suitable for Wire Spool capacity: 15 Kg
- 25.28.4 Wire feeder Dimensions L X W X H in mm: 563 X 230 X 410 (Approx.)
- 25.28.5 Weight (approx.): 16 Kg (Approx.)

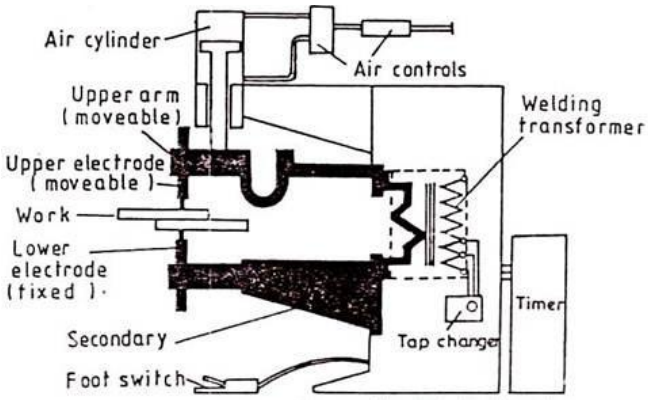
25.29 Technical Specifications for Torch:

- 25.29.1 Current Rating: 400 Amps @ 60% Duty cycle (for CO_2), 350 A, @ 60% Duty cycle (for mixed gas)
- 25.29.2 Suitable for Diameters: 0.8 – 1.6 mm
- 25.29.3 Torch length: 3 Meters

25.30 Gas Flow Meter and Gas Pre Heater to be provided

26 Spot Welding Machine - 15 KVA with Standard Accessories

26.1 Basic indicative diagram



26.2 Should have water-cooled transformer

26.3 Should have high strength robust sturdy pedestal type frame for high speed spot welding operation.

26.4 Electro-valve and gas cylinder should be connected directly for increasing speed of responding and spot welding and reducing air flow cost.

26.5 Descending speed of the machine head pressurization should be adjusted as per requirement which will soften impact and lower noise when the workpiece is pressurized.

26.6 Should have straight type pressing structure

26.7 Should have pneumatic cylinder operation, having single Force up to - 600 KGF or double stroke.

26.8 Should have water cooled electrode and welding arm

26.9 Transformer rating: 35 to 200 kVA

26.10 Controllers - AC / Medium frequency Direct Current (MFDC)

26.11 Input supply: 415 V AC, 2 lines of 3 phase, 50 Hz

26.12 Power Supply connection cable size: 50 sq. mm. copper, 3 Core, 2P + E

26.13 Thyristor Assembly: Water cooled

26.14 Recommended MCCB with RCCB rating: 30 mA / 30 ms

26.15 Throat Gap / Throat Depth: 300 mm / 450 mm

26.16 Pneumatic cylinder: Single operating type

26.17 Nominal Force: 350 kgf @5 bar for Single Acting Cylinder

26.18 Welding Stroke: 50 – 80 mm

26.19 Maximum Short circuit current: 12000 A

26.20 Nominal cooling water flow requirement: 16 Litres/ Minute @ 3 bar pressure

26.21 Joining material thickness (maximum): 2.5 + 2.5 mm Steel, 1.5 + 1.5 mm Brass

27 Welding Transformer - 300 A, OCV 60 - 100 V, 60% Duty Cycle with Standard Accessories

27.1 Basic indicative diagram

27.2 Three phase Welding Transformer with 'Open-delta' design for conversion of three phase input into single phase output
27.3 Should have user friendly AC ARC Welder with Stepless, smooth and infinitely variable current regulation
27.4 Should have forced air cooled transformer – with less coil temperature rise resulting in longer service life
27.5 Should have stepless, smooth and infinitely variable current regulation by moving core magnetic shunt design
27.6 Should have adjustment of welding current possible even while welding is in progress
27.7 Should have one swivel front wheel and two rear wheel arrangement for easy manoeuvrability from job to job on the shop-floor
27.8 Should have ON-OFF switch control, current control and current indicator provided on the front panel
27.9 Input supply: 380 / 415 V AC, 3 phase, 50 Hz
27.10 Input KVA @ 415 V supply @ 100% Duty Cycle:16.5
27.11 Input Switch Fuse Rating: 55 A
27.12 Recommended Capacitor rating for Power factor correction: 6 KVAR
27.13 Open circuit voltage @ 415 V input supply: 65 V AC or higher
27.14 Welding Current range: 40 – 300 A AC
27.15 Welding Voltage range: 22 – 32 V AC
27.16 Welding current at 40˚C, 10 minute cycle, @ 60% duty cycle: 225 A AC
27.17 Welding current at 40˚C, 10 minute cycle, @ 100% duty cycle: 175 A AC
27.18 Maximum intermittent hand welding current: 300 A AC
27.19 Applicable Electrode sizes: 2.5 – 5 mm
27.20 Cooling Type: Forced Air
27.21 Ambient temperature rating: 40˚C
27.22 Class of insulation: A
27.23 Degree of protection: IP 23 S
27.24 Dimensions L X W X H in mm 720 X 500 X 800 (Approx.)
27.25 Weight: 125 Kg (Approx.)

28 Welding Transformer - 400 A, OCV 60 - 100 V, 60% Duty Cycle with Standard Accessories

28.1 Basic indicative diagram

28.2 Should have 2 lines of 3 phase supply

28.3 Should have user friendly AC ARC Welder with Stepless, smooth and infinitely variable current regulation

28.4 Should have forced air cooled transformer – with less coil temperature rise resulting in longer service life

28.5 Should have stepless, smooth and infinitely variable current regulation by moving core magnetic shunt design

28.6 Should have adjustment of welding current possible even while welding is in progress

28.7 Should have ON-OFF switch control, current control and current indicator provided on the front panel

28.8 A Special design provides for excellent dynamic characteristic and ensures smooth and optimum metal transfer

28.9 With VRD (Voltage reducing device) for protection against electric shock when welding is not going on, energy saving and helps in reduction in machine heating

28.10 Input supply: 415 V AC, 3 phase, 50 Hz

28.11 Input KVA @ 415 V supply @ 100% Duty Cycle: 19

28.12 Input Switch Fuse Rating: 80 A

28.13 Recommended Capacitor rating for Power factor correction: 8 KVAR

28.14 Open circuit voltage @ 415 V input supply: 80 V AC or higher

28.15 Welding Current range: 60 – 400 Amps AC

28.16 Welding Voltage range: 22.5 – 36 Volts AC

28.17 Welding current at 40˚C, 10 minute cycle, @ 60% duty cycle: 305 A AC

28.18 Welding current at 40˚C, 10 minute cycle, @ 100% duty cycle: 230 A AC

28.19 Maximum intermittent hand welding current: 400 A AC

28.20 Applicable Electrode sizes: 2.5 – 6.3 mm

28.21 Cooling Type: Forced Air

28.22 Ambient temperature rating: 40˚C

28.23 Class of insulation: A

28.24 Degree of protection: IP 23 S

28.25 Dimensions L X W X H in mm: 745 X 460 X 540 (Approx.)

28.26 Weight: 98 Kg (Approx.)

29 Arc Welding Table - 900 X 600 X 750 mm with Positioner

29.1 Basic Indicative Diagram

29.2 Length: 900 mm, ± 10%
29.3 Width: 600 mm, ± 10%
29.4 Height (Including leveller): 750 mm ± 10%
29.5 Material: Mild steel
29.6 Table top
- 29.6.1 Thickness: 16 mm
- 29.6.2 Finish: Nitride finish for weld splash, rust & scratch resistance

29.7 Should have 16 mm holes in Grid form of 50 mm x 50 mm
29.8 Should have M.S. structure with M.S. angle of 50 x 50 x 5 mm.
29.9 Should be provided with suitable GTAW, GMAW welding Gun Holder
29.10 Should be supplied with suitable KIT of Jigs/ Fixtures / Clamps (Clamping and Holding Kit) for welding of different jobs like
- 29.10.1 Square Tube Framing
- 29.10.2 Round Tube Framing
- 29.10.3 I-Beam Framing
- 29.10.4 Sheet metal Box welding
- 29.10.5 LAP joint position
- 29.10.6 Butt joint position
- 29.10.7 T-joint position.

29.11 Should be supplied with minimum ten sets of required clamps and accessories for the above jobs.
29.12 KIT Should be supplied to perform one job at a time.
29.13 All the Jigs / Fixtures / Clamps should be fit into holes on the table for quick and accurate holding and mounting the job.
29.14 Should be provide Accessories:
- 29.14.1 Cleaning brush
- 29.14.2 Spanner set
- 29.14.3 Allen key set
- 29.14.4 Anti-spatter liquid 5 litre

29.15 Should be supplied with
- 29.15.1 Plasma cutting tray
- 29.15.2 Round stock plier
- 29.15.3 Removable tool tray

29.15.4 Magnetic part tray
29.15.5 Magnetic tool bar
29.16 Should be supplied with positioner to hold a job in vertical and overhead position.

30 Gas Cutting Table - 900 X 600 X 750 mm

30.1 Basic Indicative Diagram

30.2 Length: 900 mm
30.3 Breadth: 600 mm
30.4 Height: 750 mm
30.5 Material: 32 X 32 X 3 mm angle Iron M.S. Structure.
30.6 Should have angle Iron support at bottom
30.7 Should be provided one Tool Tray
30.8 Should be provided suitable Quenching Tank (Stainless Steel).

31 Welding Table - 900 X 600 X 750 mm with Fire Bricks

31.1 Basic Indicative Diagram

31.2 Length: 900 mm
31.3 Width: 600 mm
31.4 Height: 750 mm
31.5 Welding Table Top should have arrangement for keeping Fire Bricks.
31.6 Fire bricks of size 240 X 120 X 80 mm (Approx.) should be supplied to cover table top.
31.7 Should have arrangement for mounting Positioner on one side of table with Turn Table with slots to keep JIGs for clamping the Job as required for Welding.
31.8 Positioner should be motorized with Speed Controller and is operated by Foot Switch.
31.9 Should have suitable clamp to hold the job in various positions.
31.10 Clamp should be with Vertical and Horizontal pipe fixed with coupling to adjust Height and Length.
31.11 Water Tank should be made of stainless steel, fitted to one end of the Welding Table
31.12 Should have tool box fitted to the welding table to keep Gas Welding accessories
31.13 Suitable stand should be attached to the Welding Table for keeping Gas Welding Torch
31.14 Should have partition to keep all jobs and other items in the Table.
31.15 Minimum 6 number of Extra Bricks should be provided in addition to the Bricks required for Table TOP

32 H. P. Welding Torch - with 5 nozzles

32.1 Basic indicative diagram

32.2 Material: Forged Brass Body and Nozzles
32.3 Should be suitable for versatile applications using oxygen & acetylene
32.4 Should be suitable for gas welding/brazing from 0.5mm to 3mm thick plate
32.5 Should have safety protection to give dependable performance against backfire
32.6 5 TIPS should be provided of different sizes along with torch for gas Welding/ Brazing