Government of Maharashtra

Ver–03
2024-25

Directorate of Vocational Education and Training, Maharashtra State

SPECIFICATION FOR TRADE – INDUSTRIAL ROBOTICS AND DIGITAL MANUFACTURING TECHNICIAN (NSQF LEVEL-3)

INDUSTRIAL ROBOTICS AND DIGITAL MANUFACTURING TECHNICIAN (NSQF LEVEL-3)

1._____ 2._____ 3._____ 4._____

TABLE OF CONTENTS

1._____ 2._____ 3._____ 4._____

16	Robot Power Wiring 4mm Sq.3core copper cable	28
17	Welding wire, gas hose and gas regulator	29
18	Piping/Hose pipe up to robot gripper	32
19	Air Compressor (ELGI or Equivalent) 7.5 Hp	33
20	Steel rule 30 cm & 60 cm graduated both in English & Metric units	34
21	Micrometer Outside 0 – 50 mm outside	35
22	Vernier Caliper 0- 15 cm	36
23	Micrometer Inside up to 20 mm	37
24	Hand Gloves	38
25	Safety Shoes	39
26	Helmet	40
C. TOOLS AND GENERAL SHOP OUTFIT		
27	“V” block pair 7 cm with clamps	41
28	“V” block 15 cm with clamps	42
29	Metal L - 15cm	43
30	Metal L - 30cm	44
31	Angle Plate 10 x 20 cm.	45
32	Spirit Level 15 cm metal	46
33	File warding 15 cm smooth	47
34	File knife edge 15 cm smooth	48
35	File cut saw 15 cm smooth	49
36	File feather edge 15 cm smooth	50
37	File triangular 15 cm smooth	51

1._____ 2._____ 3._____ 4._____

38	File round 20 cm second cut	52
39	File square 15 cm second cut	53
40	File square 25 cm second cut	54
41	File triangular 20 cm second cut	55
42	File flat 30 cm second cut.	56
43	File flat 20 cm bastard	57
44	File flat 30 cm bastard	58
45	File Swiss type Needle set of 12.	59
46	File half round 25 cm second cut.	67
47	File half round 25 cm bastard.	68
48	File round 30 cm bastard.	69
49	File hand 15 cm second cut.	70
50	Card file	71
51	Oil Stone 15 cm x 5 cm x 2.5 cm	72
52	Pliers combination 15 cm	73
53	Blow Lamp 0.50 liters.	74
54	Spanner D.E. 6 -26 mm set of 10 pcs.	75
55	Spanner adjustable 15 cm	76
56	Box spanner Set 6-25 mm set of 8 with Tommy bar.	77
57	Glass magnifying 7 cm	78
58	Clamp toolmaker 5 cm set of 2.	79
59	Clamp “C” 5 cm	80
60	Clamp “C” 10 cm	81

1._____ 2._____ 3._____ 4._____

61	Scraper flat 15 cm	82
62	Scraper triangular 15 cm	83
63	Scraper half round 15cm	84
64	Chisel cold 9 mm cross cut 9 mm diamond.	85
65	Chisel cold 19 mm flat	86
66	Chisel cold 9 mm round nose.	87
67	Motorized + Tenon Saw	88
68	Hand hammer 1 kg. with handle Ball Peen	89
69	Hacksaw frame fixed 30 cm.	90
70	Mallets Wooden	91
71	V-Block, Files, mallets, screwdrivers, chisels, etc	92
72	Hand Drilling Machine Rated input power: 600W, Power output: 301W, Rated torque: 1.8 Nm	93
73	Metal Saw No-Load Speed: 3,800 rpm, Saw blade diameter 355 mm, Saw blade bore 25.4 mm	95
74	Straight Grinder HEAVY DUTY with attachments No-Load Speed: 10000 – 30000 rpm, Rated power output: 380W	96
75	Professional Air Blower Power consumption: 820 W, No-load speed: 16000 rpm , Flow rate: 0-4.5 m3/s	97
76	Jig Saw Portable Input Power: 900W, No-load speed: 11,000 rpm, Disc Diameter: 100	98
77	Hammer Drill Wired Drill type: hammer, optimum power transfer	99
78	Hand Held Sander / Polisher No Load Speed: 11000 rpm	100
79	Digital Dial Torque Wrench Range: 20 to 280 Nm	101
80	Lifting Tackle/Sling 1 Ton×2 mtr	102

1._____ 2._____ 3._____ 4._____

81	Impact Wrench 1/2 inch drive	103
82	Laser Light Pen ...	104
83	Surface Plate Cast iron 300 x 300 mm	105
84	Digital Screw Pitch Gauge Working voltage: 3.0 V / DC, Measure precision: 0.1 degree	106
85	Laser Distance Measurement Instrument Levelling Accuracy (Vial): +/- 0.2degree, Measuring Accuracy Typical: +/- 1/16 inch (1.5 mm)	104
86	Palm Scale Capacity-500gms, Least Count-0.1g	108
87	Allen Screwdriver Wrench Tool 6Pcs T Handle Ball Ended Hex Key	109
88	Universal Quick Adjustable multifunction Wrench spanner : Range 6 - 32 mm	110
89	Double Ended Wrench Hex Socket Spanner : 8 in 1, Range 6 - 32 mm	111
90	Terms & Condition	112

1._____ 2._____ 3._____ 4._____

SPECIFICATION FOR EQUIPMENTS

1) Robot AR 1440 OR equivalent Robot 12kg Payload, 6 Axis

1.1 Basic Indicative Diagram

1.2 Number of Axis : - 6
1.3 Payload : - 12 Kg,
1.4 Max. Working Range : - 1440 mm Horizontal & 2400 Vertical
1.5 Repeatability : - 0.02 mm
1.6 Weight : - Max. 150 KG
1.7 Power Supply : - 1KVA 3phase/single phase
1.8 Mounting : - Floor
1.9 External Axis accessories : - 1.3 KW External Axis with positioner & This axis should work as a seventh axis of a robot working linearly. A separate gantry should be provided equipped with linear motion guideways and minimum travel of 3 meter on which Robot is mounted.
1.10 Application : - Robotic Mug Welding (Accessories for welding)
1.11 Online programming software ----------Online programming software should be developed by the same OEM as Robot. Third party software (Other than RobotOEM) will not be accepted. Software should be perpetual.
1.12 Safety---------- Robot must follow three safety rules, fencing should be installed.

1._____ 2._____ 3._____ 4._____

1.13 Range of motion:-

Axes	Range of motion in degree	Maximum speed in deg /sec	Allowable movement in N.m	Allowable inertia (GD2/4) Kg.m^2
J1	370	260	-	-
J2	235	235	-	-
J3	455	455	-	-
J4	380	380	26	0.90
J5	360	360	26	0.90
J6	900	900	11	0.30

1.14 Protected Structure: - Body IP24, Wrist: - IP67
1.15 Mounting Option: - To be mounted on the Gantry axis
1.16 Provision of self-calibration after certain cycle
1.17 IP level IP56
1.18 Compact structure, high speed, high precision & easy operation
1.19 Software to oversee, diagnose & fix various components of robot
1.20 Drive system AC servo motors
1.21 Position Detector method: - Absolute Encoder
1.22 Enabling device for robot movement
1.23 Emergency stop button should provide in case of any emergency
1.24 Robot movement for high speed should be restricted using key switch
1.25 Fencing should be done around robot
1.26 Offline Process and Factory Simulation Software 1 user
Detailed technical specifications are attached below

1.27 Offline Programming and simulation software which includes a minimum of Fifty Major industrial brands and minimum at least 40 manufacturers post processors (10+1 user).
1.28 Installation and Commissioning On – site installation. Parameter setting, setup Installation, trial. Machine startup, operation training. Programming and Wiring. PLC and HMI Programming. Wiring, ducting, routing
1.29 Tool Box for maintenance of Robot
1.30 Operating Manual

2. **Robot GP12 or equivalent, Robot 12kg Payload, 6 Axis for Handling**

2.1 Basic Indicative Diagram

2.2 Number of Axis : - 6
2.3 Payload : - 12 Kg,
2.4 Max. Working Range : - 1440 mm Horizontal & 2400 Vertical
2.5 Repeatability : - 0.02 mm
2.6 Weight : - Max. 150 KG
2.7 Power Supply : - 1KVA, 3phase/single phase
2.8 Mounting : - Floor
2.9 External Axis : - 1.3 KW External Axis with positioner & accessories
2.10 Online programming software ----------Online programming software should be developed by the same OEM as Robot. Third party software (Other than RobotOEM) will not be accepted. Software should be perpetual.
2.11 Application ----------Handling (Accessories for handling such as gripper)
2.12 Safety---------- Robot must follow three safety rules, fencing should be installed.

2.13 Range of motion:-

Axes	Range of motion in degree	Maximum speed in deg /sec	Allowable movement in N.m	Allowable inertia (GD2/4) Kg.m^2
J1	370	260	-	-
J2	235	235	-	-
J3	455	455	-	-
J4	380	380	26	0.90
J5	360	360	26	0.90
J6	900	900	11	0.30

2.13 Protected Structure: - Body IP54, Wrist: - IP67
2.14 Mounting Option: - Floor
2.15 Provision of self-calibration after certain cycle
2.16 IP level: - IP67 rated wrist, & IP54 body standard
2.17 Compact structure, high speed, high precision & easy operation
2.18 Software to oversee, diagnose & fix various components of robot
2.19 Drive system AC servo motors
2.20 Position Detector method: - Absolute Encoder
2.21 Enabling device for robot movement
2.22 Emergency stop button should provide in case of any emergency
2.23 Robot movement for high speed should be restricted using key switch
2.24 Fencing should be done around robot
2.25 Electric Gripper with Profinet communication for Pick and Place Operations Vacuum based gripper for picking up jobs of different shapes and sizes.
1.20 Offline Programming and simulation software which includes a minimum ofFifty Major industrial brands and minimum at least 40 manufacturers post processors (10+1 user).
1.21 Installation and Commissioning On – site installation. Parameter setting, setupInstallation, trial. Machine startup, operation training. Programming and Wiring. PLC and HMI Programming. Wiring, ducting, routing
2.28 Tool Box for maintenance of Robot
2.29 Operating Manual

SPECIFICATION FOR TRADE – INDUSTRIAL ROBOTICS AND DIGITAL MANUFACTURING TECHNICIAN NSQF LEVEL-3

ACCESSORIES AND ATTACHMENT REQUIRED FOR ABOVE TWO ROBOTS

1) Operator pendant with suitable arrangement. (One no each with robot)
2) Pick and place gripper – Profinet Based Electrical Gripper (Two fingers, provision to change the speed of opening and holding torque of the gripper.)
3) Suitable Teach table arrangement for training with minimum 20 no's .work pieces
4) Magazine for gripper with tracer pen arrangement and square /cube demo model work pieces with one set of three different colour pens and two set additional should be provided. (One no)
5) 50 inches' colour android based smart TV to display the programs on the screen with necessary data and power cables (length is as per lab arrangement) (Qty-01 No).

AC Servo System Module (Qty-01 No).

6) It should have PLC with 12digital input and 12 digital outputs(Minimum) with 02 nos.AI/AO each with cables to interface PLC with license software and communication cable one each, servo drives with AC servo motor and controller should be provided on panel to understand the working principal of servo motor for X-Y movement and encoder use with indicators. Servo motor used in robot and in training module should be same. Panel structure should be made up of aluminium and aluminium profile based trolley type table with lockable caster wheel. All inputs and outputs should have brought on panel with 4mm shrouded connector, DPM, Tower Light, Voltage /current source etc.
7) Lock arrangement. It is to be interlock with robot movement.
8) Project work book for teacher which includes at least 50 programs from simple to complex in soft and hard copy.

.

Conveyer System (Qty-01 No).

11) Long conveyor with colour system to identify the object (Three different colour work pieces-10 each) with minimum 1.5 m. length, controlled by separate PLC with atleast 6 DI/DO each, 02 AI/AO each, license programming software, communication cable with AC servo motor and servo motor controller.
    Separate Smart Vision system with profinet communication should be provided to detect different shapes. Arrangement to identify different shapes and provision to carry out shape based sorting experiments should be provided.
12) Interactive smart panels of minimum size 65 inches should be provided (With OPS with min specification of i5 11th gen 256GB SSD and 1TB HDD)
13) Tool box with required all tool for maintenance of robot (One no each with robot)
14) Computer Workstations with minimum specifications of i5 processor and 16 GB RAM should be provided for Offline programming Softwares (Qty: 10 + 1)
15) Simulation lab of approx. 500 squre feet with 10 tables & chairs for Offline programming Softwares

16)	**Technical Specifications for Robotics Process Simulate Software**
1	Software should facilitate simulation of assembly processes, human operations and mechanical procedures of tools, devices and robots.
2	Process simulate software should consist of Assembly and robotic path planning • Resource modeling (3D and kinematics) • Line and workstations design • Documentation tools • Natively supported JT™ visualization standard
3	Software should provide Discrete and continuous process simulation -- Projection of welds on parts -- Gun search wizard -- Project arc seam -- Torch alignment -- Weld gun validation -- Design/modify weld gun and tooling geometry and kinematics -- Robot reach test -- Robot smart placement -- Robotic simulation editing
4	Software should consist of Robotics process simulation -- Event-driven simulation -- Detailed robot programming -- Controller-specific command recognition -- Boolean and non-Boolean signals exchange -- Robot logic editing and validation
5	Software should have capability to do Virtual commissioning -- Model control resources (sensors and controlled devices) -- Signal definition based on real HW -- Simulate internal resource logic (Boolean and analog) -- Connect virtual model with real PLC code -- Integrated simulation using actual PLC code and HW over OPC interface
6	Software should enable users to design and simulate highly complex robotics manufacturing zones. Synchronizing multi-robot zones – a highly complicated task – is simplified with Process Simulate tools such as cyclic event evaluator and emulated specific robot controller. The robotics simulation tools provide the capability of designing a collisionfree path for all the robots and optimize their cycle times.
7	Software should have Process Simulate Spot Weld that enables users to design and validate spot welding processes in a 3D graphics and simulation environment from early planning phase up to detailed engineering stages and offline programming. Process Simulate Spot Weld facilitates manufacturing engineering tasks such as distribution of weld points to stations catering for geometric and cycle time constraints and selection of best weld gun from a classified library to re-use existing guns and tools.

1._____ 2._____ 3._____ 4._____

8	Software should have Process Simulate Commissioning enables users to streamline the existing manufacturing and engineering data from conceptual design down to the shop floor. Process Simulate Commissioning should have a common integration platform for the various disciplines participating in real commissioning of a production zone/cell (mechanical and electrical). Using Process Simulate Commissioning, users can simulate real PLC code with the actual hardware using OPC and the actual robot programs, thus enabling the most realistic virtual commissioning environment.
9	Software should consists of Process Simulate Human allows users to verify the design of a workstation, ensuring the product parts can be reached, assembled and maintained. Process Simulate Human provides powerful capabilities to analyze and optimize the ergonomics of the human operation, thus ensuring an ergonomically safe process according to industry standards. Using the human simulation tools, the user can perform realistic simulation of the human tasks and optimize process cycle times according to industry standard ergonomics libraries.
10	Software should have simulation capability that emulates realistic human behavior, robotic controllers and PLC logic. It should provide integrated environment for robotic process validation.

2 Robot Controller for welding robot

3.1 Basic Indicative Diagram

3.2 Power requirements: - 3 phase, 180 - 220 VAC (+10%,-15%), 50/60 Hz (+-2%)
3.3 Short circuit current rating: - 5KA
3.4 Standard I/O:- 32 inputs / 32 outputs consisting of 24 user inputs/ outputs32 transistor outputs, 8 relay outputs
3.5 Position feedback: - Absolute Encoder
3.6 Program memory: - 256 MB
3.7 LAN : - Ethernet 2 (10 BASE-T/ 100 BASE-TX)
3.8 Interface : - RS-232C/RS422: 1CH
3.9 Cooling system: - Indirect Cooling
3.10 It should be compatible to both standard teach pendant & smart teach pendant
3.11 It should access minimum 8 axis
3.12 Weight: - 70Kg max
3.16.3 +24V D.C. (V1 24VDC for system, V2 24V D.C. for I/0)
3.16.4 +26V D.C.
3.13 Indicator: - Power ON, +12V, FAN, +24V
3.14 Inbuild CPU, inverter, drive card, converter card, Profibus, device net etc.
3.15 Safety Features: - Emergency stop push button, 3-position enable switch With key-lock & manual brake release built into programming pendant.
3.16 Software safety Features: - ARM interference, collision detection, machine lock & Safety interlock.

4 Robot Controller for Handling Robot

4.1 Basic Indicative Diagram

4.2. Power requirements: - 3 phase, 180 - 220 VAC (+10%,-15%), 50/60 Hz (+-2%)

4.3 Short circuit current rating: - 5KA

4.4 Standard I/O:- 32 inputs /32 outputs consisting of 24 user inputs/ outputs32 transistor outputs, 8 relay outputs

4.5 Position feedback: - Absolute Encoder

4.6 Program memory: - 256 MB

4.7 LAN : - Ethernet 2 (10 BASE-T/ 100 BASE-TX)

4.8 Interface : - RS-232C/RS422: 1CH

4.9 Cooling system: - Indirect Cooling

4.10 It should be compatible to both standard teach pendant & smart teach pendant

4.11 It should access minimum 8 axis

4.12 Weight: - 70Kg max

4.12.1 +24V D.C. (V1 24VDC for system, V2 24V D.C. for I/0)

4.12.2 +26V D.C.

4.13 Indicator: - Power ON, +12V, FAN, +24V

4.14 Inbuild CPU, inverter, drive card, converter card, Profibus, device net etc.

4.15 Safety Features: - Emergency stop push button, 3-position enable switch With key-lock & manual brake release built into programming pendant.

4.16 Software safety Features: - ARM interference, collision detection, machine lock & Safety interlock.

5. Robotic Welding Power Source

Robotic Welding Power Source	
Mains voltage	380 / 400V
Mains voltage tolerance	-10 / +15%
Welding current min.	10A
Welding current max.	300 A
Welding current / Duty cycle [10min/40°C]	300A / 40%
Welding current / Duty cycle [10min/40°C]	280A / 60%
Welding current / Duty cycle [10min/40°C]	240A / 100%
Operating voltage min.	14,5 V
Open-circuit voltage	59 V
Degree of protection	IP23
Interference emission class	A
Feeder Roll 1.2 mm	Qty : 04
GroundCable 70mm² EC/BY	4 meter

5 Robotic Welding Torch

Robotic Welding torch should be seamlessly mounted on the welding robot to carry out robotic welding applications. Robotic welding torch should be from the same OEM as that of Robotic welding source.
The gas-cooled MIG/MAG hand welding torch should be equipped with a screwed gas nozzle. The ergonomically shaped handle, a ball joint and optimal weight distribution should enable fatigue-free work. The robust design should make it a reliable partner for all applications. The up/down welding torch should have the following functions: Changing the welding power in synergic mode using the up/down buttons.

Technical Data for Welding Torch	
Welding current / duty cycle [ArCO2]	320A / 40%
Weight	2.7kg
Central connection (Euro, F++, Dinse,...)	FSC
Wire diameter range	1.0-1.6mm
Dimension / Width	41mm
Dimensions / Length	3500mm
Torch body angle	45 degrees
Continuous welding current [CO2]	210A
Welding current / duty cycle [CO2]	320A / 40%
Cooling system (gas cooled, water cooled)	G
Continuous welding current [ArCO2]	210A
Burner equipment (Up down, Jobmaster,...)	Standard with LED and UpDown

6. Welding Power Source (Moto PAC- WR100) 350 amps short arc Power Source

INCLUDED IN ABOVE ITEM NO. 5 **Robotic Welding Power Source**

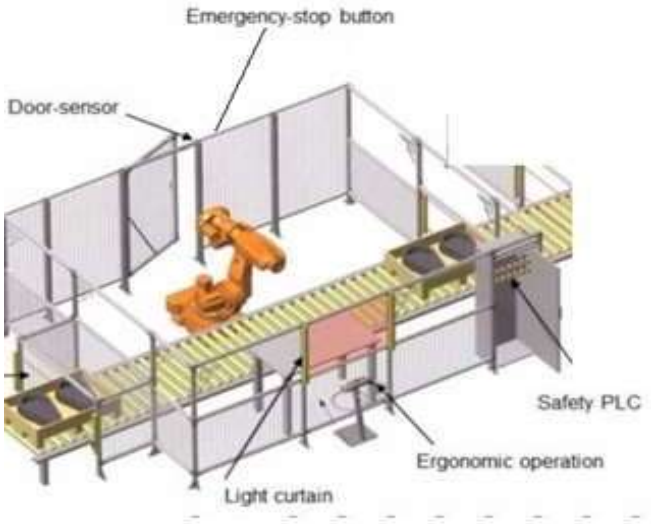
7.0 Programming Pendant for welding robot and Handling robot.
Touch screen pendant with Full color 5-7" screen display.

7.1 Basic Indicative Diagram

7.2 Material :- Reinforced thermoplastic enclosure with a detachable suspending strap
7.3 IP54 Protection
7.4 Display Unit :- 5 to 7 inch TFT full color graphic LCD/LED display,
7.5 Operated Units :- Three position enable switch,
7.6 Cable Length :- Sufficient length cable from robot controller to teach pendant
7.7 Provided with SD card slot & USB connector
7.8 Co-ordinate system :- Joint, Rectangular/Cylindrical, Tool, User cordinator
7.9 Modification of teaching point
7.10 Inching operation
7.11 Path confirmation;- Forward/Reverse step, Continuous feeding
7.12 Provision for fine speed adjustment
7.13 Joystick or equivalent required for jogging of the robot.

8.0 Standard welding cell with safety fence, fixture, HMI

8.1 Basic Indicative Diagram



8.2 Fencing for robot as per space available

8.3 Emergency stop button should be placed on fencing

8.4 Door sensor for sensing the door open/close to shut down the system if door is open

8.5 Arrangement for placing the teach pendent on outside wall of fencing

8.6 Arrangement for welding table with Ergonomic operation

8.7 Facility to keep HMI interface

9.0 Isolation transformer

9.1 Basic Indicative Diagram

9.2 Input Voltage: - 415 V 3 phase

9.3 Output Voltage: - 415 V 3phase

9.4 Power rating : - 15 KVA

9.5 Efficiency : - 95% to 97 % at Full load

9.5 Protection: - Voltage spikes & filter noise in the line

10.0 PLC Panel

10.1 Basic Indicative Diagram

10.2 Digital Inputs & Outputs : - 14/10

10.3 For Digital Inputs (DI)
- 10.2.1 Type: Sink & Source
- 10.2.2 Rated voltage: - 24VDC at 4mA nominal
- 10.2.3 Continuous permissible voltage: - 30 VDC.max
- 10.2.4 Logic 1 signal (min): 15 VDC at 2.5mA
  Logic 0 signal (max): 5VDC at 1mA

10.4 For Digital Outputs
- 10.4.1 Type: Relay, Dry contact
- 10.4.2 Voltage Range: 5 to 30VDC or 5 to 250 VAC

10.5 For Analog inputs
- 10.5.1 Number of inputs: 2
- 10.5.2 Type: Voltage (single-ended)
- 10.5.3 Full Scale Range: 0 to 10V
- 10.5.4 Full Scale Range (data word): 0 to 27648
- 10.5.5 Maximum withstand voltage: 35VDC
- 10.5.6 Cable Length: - 100m shielded twisted pair

10.6 Communication cable with AC servomotor & servomotor controller

10.7 License programming software

10.8 Panel structure should be made of aluminum

10.9 Table type: Aluminum profile based trolley type table with lockable caster w wheel.

10.10 All inputs and outputs should have brought on panel with 4mm shrouded Connector, DPM, Tower Light, Voltage/current source (POWER SUPPLY) etc.

10.11 Patch cords and wires required for connection

SPECIFICATION FOR TRADE – INDUSTRIAL ROBOTICS AND DIGITAL MANUFACTURING TECHNICIAN NSQF LEVEL-3

11.0 Welding Table

11.1 Basic Indicative Diagram

11.2 Length: 900 mm, ± 10%
11.3 Width: 600 mm, ± 10%
11.4 Material: Mild steel Table top Thickness: 16 mm
11.5 Height (Including leveler): 750 mm ± 10%
11.6 Finish: Nitride finish for weld splash, rust & scratch resistance
11.7 Should have 16 mm holes in Grid form of 50 mm x 50 mm
11.8 Should have M.S. structure with M.S. angle of 50 x 50 x 5 mm
11.9 Should be supplied with suitable KIT of Jigs/ Fixtures / Clamps (Clamping and Holding Kit) for welding of different jobs like Square Tube Framing
11.10 Round Tube Framing
11.11 Beam Framing
11.12 Sheet metal Box welding
11.13 Should be supplied with a minimum ten sets of required Clamps and accessories for Types of joint jobs.
11.14 Accessories: - Cleaning brush, Spanner set, Allen key set
11.15 Welding table should be able to carry out following welding joints in robotic welding applications:

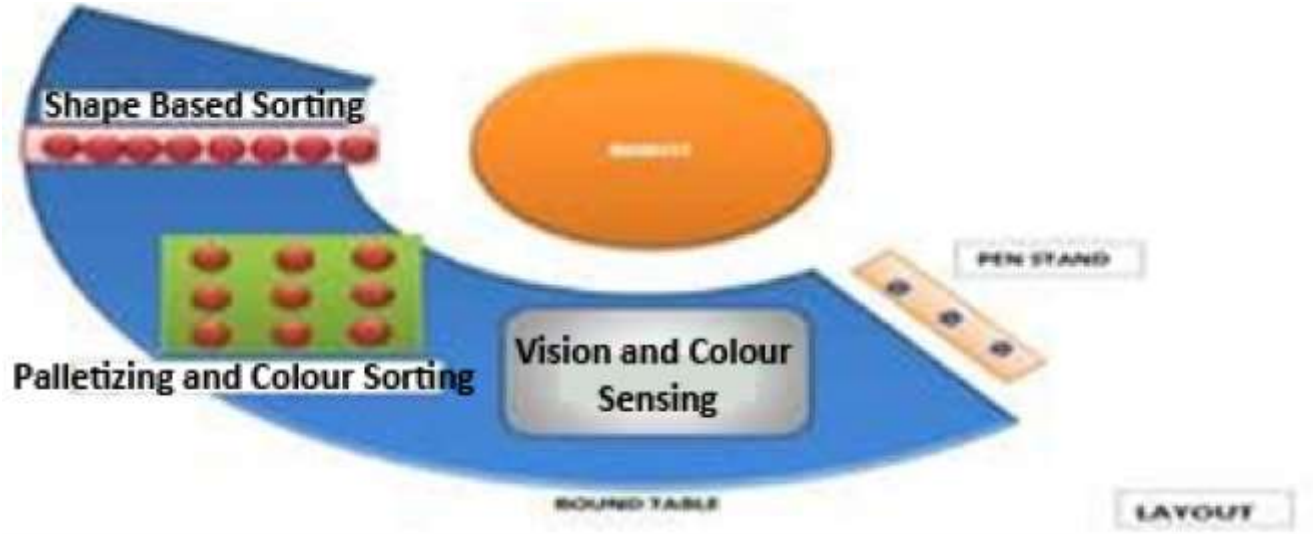
1. 1 Tee Joint
2. 2 Butt Joint
3. Lapp Joint
4. Edge Joint
5. Corner Joint

1._____ 2._____ 3._____ 4._____

SPECIFICATION FOR TRADE – INDUSTRIAL ROBOTICS AND DIGITAL MANUFACTURING TECHNICIAN NSQF LEVEL-3

12.0 Pick and Place table

12.1 Basic Indicative Diagram



12.2 Suitable Teach table arrangement for training with minimum 20 no's .work pieces
12.3 rack to store 20 work pieces
12.4 Magazine for gripper with tracer pen arrangement and square /cube
12.5 Demo model work pieces with one set of three different color pens and two set Additional should be provided.
12.6 Appropriate table height & length to interface with robot
12.6 Vision Sensor should be mounted suitable to carry out vision sensing applications
12.7 Colour sensor should be mounted suitably along with sensing pallet for colour sensing applications

1._____ 2._____ 3._____ 4._____

13.0 Input conveyor for palletizing

13.1 Basic Indicative Diagram

13.2 Height: - Suitable to interface with robot

13.3 Width: - Suitable to keep at least 2 work piece & also safe distance from robot

13.4 Length: - Minimum 4 mtr.

13.5 Arrangement to keep at least 10 work pieces

13.6 Arrangement for color sensors to identify color work pieces

13.7 Arrangement to fit 3 solenoids for pushing work pieces according to color

13.8 Arrangement to be done to collect three different work pieces according to color

13.9 Controlled by separate PLC with at least 6DI/DO each & 2 AI/A0 each

1._____ 2._____ 3._____ 4._____

14.0 Earthing Cable 6mm Sq.1core Copper cable

14.1 Basic Indicative Diagram

14.2 Indian Standard High Insulation Resistance, Anti Termite & Anti-Rodent Non- Flammable.

14.3 Standard: IS: 694 (RoHS)

14.4 Rated Voltage: 1100 V

14.5 Wire Type: Flame Retardant

14.6 Current Carrying Capacity: 33A

14.7 Conductor Material: Copper

14.8 Nominal Size: 6.0 SQ. MM.

14.9 Weight & Length: 4.300 Kg (Approx.) & 90 m

1._____ 2._____ 3._____ 4._____

15.0 Robot Power Wiring 10mmSq.4 Core copper cable

15.1 Basic Indicative Diagram

15.2 Indian Standard High Insulation Resistance, Anti Termite & Anti-Rodent Non-Flammable.

15.3 Standard: IS: 694 (RoHS)

15.4 Core Material: - Copper

15.5 Core Size – 10 Sq.mm

15.6 Nos of core in cable: - 4

15.7 Protection: - Armored cable

1._____ 2._____ 3._____ 4._____

16.0 Robot Power wiring 4mm Sq.3core copper cable

16.1 Basic Indicative Diagram

16.2 Indian Standard High Insulation Resistance, Anti Termite & Anti-Rodent Non-Flammable.

16.3 Standard: IS: 694 (RoHS)

16.4 Core Material: - Copper

16.5 Core Size – 4 Sq.mm

16.6 Nos of core in cable: - 3

16.7 Protection: - Armored cable

1._____ 2._____ 3._____ 4._____

17.0 Welding wire, gas hose and gas regulator

As Per DVET, Maharashtra State, SPECIFICATION FOR MECHANICAL TOOLS AND EQUIPMENTS GROUP ITEMS – VOLUME 06Version 3 -- 2018-19 Sr. No 19 Page no 22

17 A Welding wire

1 Basic Indicative Diagram

2 Capacity: 400 A
3 Length: 50 Meter
4 Made in accordance with IS 9857/90
5 Cables should be manufactured with rope-lay stranded, bunched members of Plain/ Annealed Copper in accordance with IS 8130/84.
6 Polyester tape should separate the conductor from the rubber insulation.

1._____ 2._____ 3._____ 4._____

17 B Gas Hose

As Per DVET, Maharashtra State, SPECIFICATION FOR MECHANICAL TOOLS AND EQUIPMENTS GROUP ITEMS – VOLUME 06 Version 3 - 2018-19 Sr. No -38 Page no 4, 12, 15,16,17,18

1 Basic Indicative Diagram

2 Should have ANM nozzle for use with Acetylene
3 Should have “positive suction” NM nozzles to safeguard the torch and operator from “sustained backfire” or “flashback”.
4 Maximum cutting thickness: 300 mm
5 Length of torch: 450 to 500 mm
6 Weight of torch: 1 to 1.5 Kg
7 Standard: Generally confirming to IS: 7653 – 1975 and Certified by Bureau of Indian Standards.
8 Should be supplied with ISI certification license number

1._____ 2._____ 3._____ 4._____

17 C Gas Regulator

As Per DVET, Maharashtra State, SPECIFICATION FOR FITTER TRADE (NSQF V) Version FT-01, 2021-22 Sr. No -184 Page no 209

1. Basic Indicative Diagram

Compliance: generally conforming to IS: 6901 - 2009.

2 Should have stainless steel diaphragm in first stage to absorb shock of inlet pressure up to 230 bar.
3 Should have flexible rubber diaphragm in second stage for fine gas control.
4 Should have forged brass bonnet in first stage and die cast special alloy bonnet in second stage for higher strength.
5 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.
6 Should have distinctive colour for pressure adjusting knob labels.
7 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 Weight: 2.40 Kg.
9 Should have self-adjusting safety valve, Double protection through Separate safety valves in first and second stage.
10 Should have second stage plenum chamber volume is six times than first stage ensuring very stable flow characteristics.
11 Acetylene
    1. Max Inlet Pressure: 25 BAR
    2. Max Outlet Pressure: 1.5 BAR
    3. Max Flow: 250 LPM
    4. Inlet Connections: 5/8" BSP LH (Male)
    5. Outer Connections: 3/8" BSP LH (Male)actions: 3/8" BSP LH (Male)

1._____ 2._____ 3._____ 4._____

18. Piping/Hose pipe up to robot gripper

18.1 Basic Indicative Diagram

18.2 Flexible conduit Hose pipe

18.3 Diameter: - Required according for installation

18.4 Length: - Required according for installation

1._____ 2._____ 3._____ 4._____

19. Air Compressor (ELGI or Equivalent) 7.5 Hp

Compressor unit suitable for Pressure: 8 bar, Delivery: 50 lpm (OR more), Reservoir capacity: 24 Liters (or more), 230V, 50 Hz, with pressure regulator and water separator

19.1 Basic Indicative Diagram

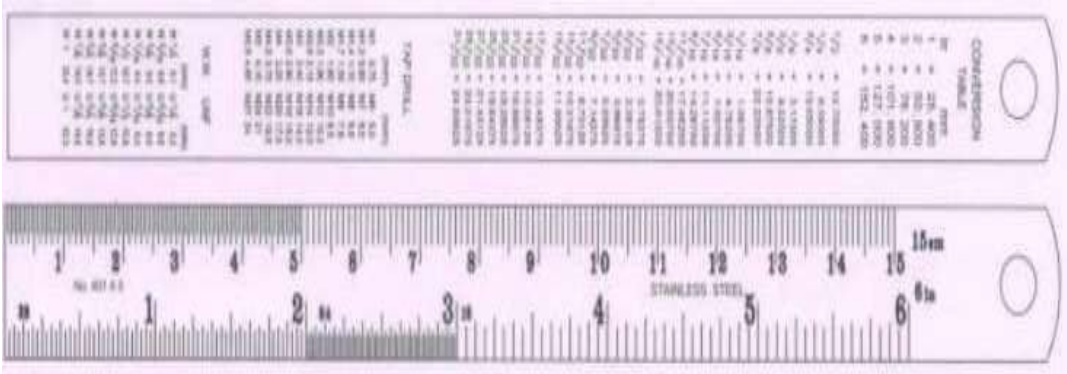
Air Compressor Unit: 1 No.
19.2 Bar gage & shut off valve with 8 mm Brass male connector hose
19.3 Displacement: 3 cam or more
19.4 FRL unit
19.5 Working pressure: 7 Kg/cm2 (7 Bar)
19.6 Electric Motor: 0.5HP or more, 1440 RPM, 230V, 50Hz, Single Phase
19.7 Safety Valve
19.8 Pressure Switch
19.9 Storage Tank: 35-50 liters
19.10 Pressure Gauge
19.11 Double Acting Cylinder: 2 No.
19.12 Bore: 32 mm
19.13 Stroke: 250 mm
19.14 With mounting Bracket
19.15 Valve way directional control valve mid position closed, hand-lever operated
Air Compressor
19.16 Air Compressors Displacement: 3 cam or more
19.17 Working Pressure: 7 kg/cm2 (7 Bar)
19.18 Electric Motor: 0.5 HP or more, 1440 RPM, 230 V/ 50Hz, Single Phase
19.19 Bar gage & shut off valve with 8 mm Brass male connector hose
19.20 Safety Valve
19.21 Pressure Switch
19.22 Storage Tank: 35-50 liter
19.23 OR Function valve

1._____ 2._____ 3._____ 4._____

20. STEEL RULE 300 MM & 600 MM ENGLISH AND METRIC COMBINED

As Per DVET, Maharashtra State SPECIFICATION FOR MECHANICAL MEASURING EQUIPMENTS GROUP ITEMS - Version 3--2018-19 Sr. No -31 Page no 34

20.1 Basic Indicative Diagram



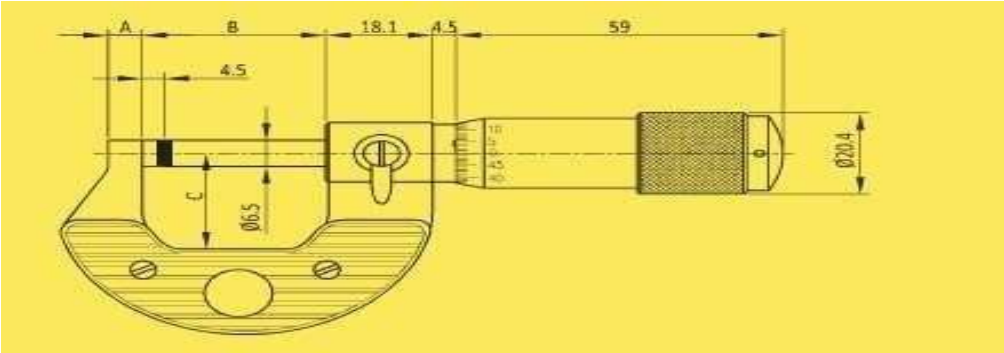
20.1 Material: Stainless Steel
20.2 Thickness: 0.5 mm
20.3 Hardness: 30 - 35 HRC (Specially Hardened)
20.4 Finish: Polished 2B / Anti-Glare Satin Chrome
20.5 Surface roughness: 0.6 Microns max
20.6 Range: 300 mm & 600mm Scale
Measuring least count: Metric Graduation +0.5 mm and English graduation 1 /64 inch
20.7 Accuracy: Metrology Standard EEC Class - I

1._____ 2._____ 3._____ 4._____

21] Micrometer outside (0 – 50 mm outside)

As Per DVET, Maharashtra State SPECIFICATION FOR MECHANICAL MEASURING EQUIPMENTS GROUP ITEMS Version 3 - 2018 - 19 Sr.No:- 53 Page No.:-56

21.1 Basic Indicative Diagram



21.2	Compliance:	Generally Compliant to IS 2967
21.3	Range:	0 mm -50 mm
21.4	Reading:	0.01 mm
21.5	Accuracy:	4 µm
21.6	Spindle Material:	Stainless Steel / Alloy steel
21.7	Standard	

21.7.1 Suitable spanner

21.7.2 Wooden / Plastic Box with proper cushioning

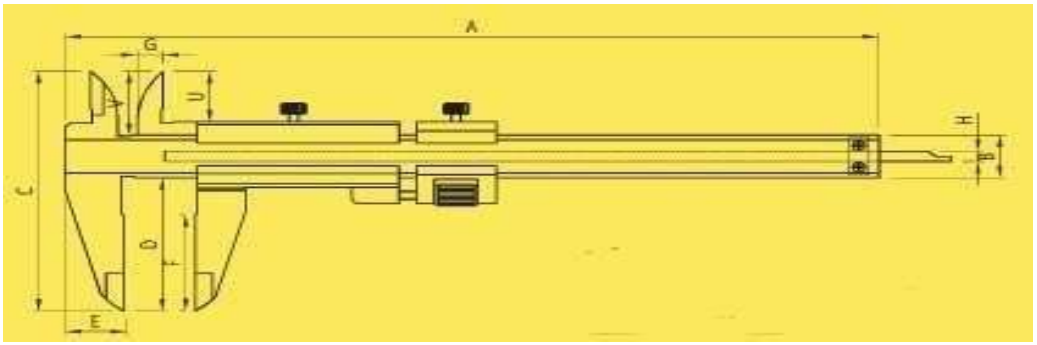
21.7.3 Operating Manual

1._____ 2._____ 3._____ 4._____

22. Vernier Caliper (0- 15 cm)

As Per DVET, Maharashtra State SPECIFICATION FOR MECHANICAL MEASURING EQUIPMENTS GROUP ITEMS Sr.No:- 58, 59 Page No.:- 61, 62

22.1 Basic indicative Diagram



22.2	Compliance:	Generally Compliant to DIN 862
22.3	Range:	0 mm – 150mm
22.4	Overall Length:	280 mm
22.5	Lower jaw length:	Min. 50 mm
22.6	Upper jaw length:	Min. 24 mm
22.7	Graduation:	0.02 mm
22.8	Accuracy:	± 0.05 mm
22.9	Material:	Stainless Steel / Alloy Steel
22.10	Standard Accessories:	
	22.10.1	Operating Manual
	22.10.2	Wooden/Plastic box with proper cushioning

1._____ 2._____ 3._____ 4._____

23. Micrometer Inside up to 20 mm

As Per SPECIFICATION BY WORKING COMMITTEE FOR TOOL & DIE MAKER Version-TDM- 01 - 2021 – 22

23.1 Basic Indicative Diagram

Type of Product	Analog Inside Micrometers
Sub Type :	Next Rod Type Inner Micrometer
Instrumental Error (µm)	± (3 + number of rods + maximum measurement length / 50) (rounded up) Type of Product: Analog Inside Micrometres Sub Type: Next Rod Type Inner Micrometer Instrumental Error (µm): ± (3 + number of rods + maximum measurement length / 50) (rounded up) Minimum Reading (mm): 0.01 Series: 137 , Type: Articulated foot inside Micrometer Head Stroke (mm): 13 Number of Rods: 5 (13, 25, 50, 50, 100mm)

Type of Product	Internal Micrometer
Range (mm)	50-63 mm
Resolution (mm)	0.01 mm
Sub Type	Interchangeable Rod Type
Travel of Micrometer Head (mm)	13 mm

1._____ 2._____ 3._____ 4._____

24. Hand Gloves

As Per DVET, Maharashtra State, SPECIFICATION FOR SAFETY EQUIPMENTS GROUP ITEMS Version 3- 2018 -19 Sr. No -3 Page no 4

24.1 Basic Indicative Diagram

24.2 Material - made from split or top leather

24.3 Brightly colored for high visibility

24.4 Length: 13.5 to 14 inches

24.5 Lining inside

1._____ 2._____ 3._____ 4._____

25. Safety Shoes

As Per DVET, Maharashtra State, SPECIFICATION FOR SAFETY EQUIPMENTS GROUP ITEMS Version 3- 2018 -19 Sr. No -9 Page no 7

25.1 Basic Indicative Diagram

Compliance: Generally Conforming to IS-15298

25.2 Size : UK 7, UK 8 and UK 9 (Size to be confirmed from DVET)
25.3 Genuine Full Grain Leather Barton Print
25.4 Steel Toe as Per IS 15298 & EN 20345 Standards
25.5 Red Mesh Breathable lining
25.6 Synthetic PU Crispy Black Collar with Extra Cushioning
25.7 Moulded Full Socks
25.8 Direct Injected light Weight PU Sole
25.9 Antistatic & Slip Resistant

1._____ 2._____ 3._____ 4._____

26. Helmet

As Per DVET, Maharashtra State, SPECIFICATION FOR SAFETY EQUIPMENTS GROUP ITEMS Version 3- 2018 -19 Sr. No -9 Page no 7

26.1 Basic Indicative Diagram

26.2 Made from polypropylene material (PPCT).
26.3 Should be provided with gear system
26.4 Should be provided with foam for absorbing sweat
26.5 Should be provided with ventilation
26.6 Should be provided with nylon strap
26.7 Should be made from all virgin material
26.8 CE approved
26.9 Colour: Yellow

1._____ 2._____ 3._____ 4._____

SPECIFICATION FOR TOOLS & GENERAL SHOP OUTFIT

27. "V" block pair 7 cm with clamps

As Per DVET, Maharashtra State SPECIFICATION FOR MECHANICAL TOOLS AND EQUIPMENTS GROUP ITEMS – VOLUME 03 Sr.No:-204 & 207 .Page No.211 & 214

27.1 Basic Indicative Diagram

27.2 Total Length: 70 mm ± 1mm
27.3 Total Width. 30 mm ± 0.2 mm
27.4 Total Height: 75 mm ± 0.2 mm
27.5 Angle: 90 Degree
27.6 Vie run out: 10 µ
27.7 Clamping capacity: 25 mm

1._____ 2._____ 3._____ 4._____

28. "V" block 15 cm with clamps

As Per DVET, Maharashtra State SPECIFICATION FOR MECHANICAL TOOLS AND EQUIPMENTS GROUP ITEMS – VOLUME 03 Sr.No:-204 & 207. Page No.:-211 & 214

28.1 Basic Indicative Diagram

28.2 Total Length: 150 mm ± 1mm
28.3 Total Width. 100 mm ± 0.2 mm
28.4 Total Height: 75 mm ± 0.2 mm
28.5 Angle: 90 Degree
28.6 Vie run out: 10 µ
28.7 Clamping capacity: 25 mm

1._____ 2._____ 3._____ 4._____

29. Metal L - 15cm

This is a consumable item

29.1 Basic Indicative Diagram

29.2 Dimension: 15 x 12 x 3.6cm/6" x 4.7" x 1.4"(L*W*H)
29.3 Mounting Hole Diameter: 4mm/0.16"
29.4 Hole Quantity: 6
29.5 Material :- MS

1._____ 2._____ 3._____ 4._____

30. Metal L - 30cm

This is a consumable item

30.1 Basic Indicative Diagram

30.2 Dimension: 30 x 12 x 3.6cm/12" x 4.7" x 1.4"(L*W*H)
30.3 Mounting Hole Diameter: 4mm/0.16"
30.4 Hole Quantity: 6
30.5 Material: - MS

1._____ 2._____ 3._____ 4._____

31. Angle Plate 10 x 20 cm.

As Per DVET, Maharashtra State SPECIFICATION FOR MECHANICAL TOOLS & EQUIPMENTS GROUP ITEMS VOLUME 03 Sr.No:- 1 Page No.:- 7

31.1 Basic Indicative Diagram

31. 2 Dimensions

31.2.1 Length: 100 ± 4 mm
31.2.2 Width: 200 ± 4 mm
31.2.3 Height: 300 ± 4 mm

31.3 Body should be made of ductile Cast Iron.
31.4 Tilting Angle: 0 - 90 degree
31.5 Smooth tilting movement
31.6 Should be provided with swiveling face with machined “T” slots.
31.7 Working face flatness: 12 microns per 300 mm
31.8 Base of angle should be adjustable and with cutting slot for fixing.
31.9 “T” Slot of plate: M12

1._____ 2._____ 3._____ 4._____

32. Spirit Level 15 cm metal

As Per DVET, Maharashtra State SPECIFICATION FOR MECHANICAL TOOLS & EQUIPMENTS GROUP ITEMS VOLUME 03 Sr.No:- 175 Page No.:- 182

32.1 Basic indicative Diagram

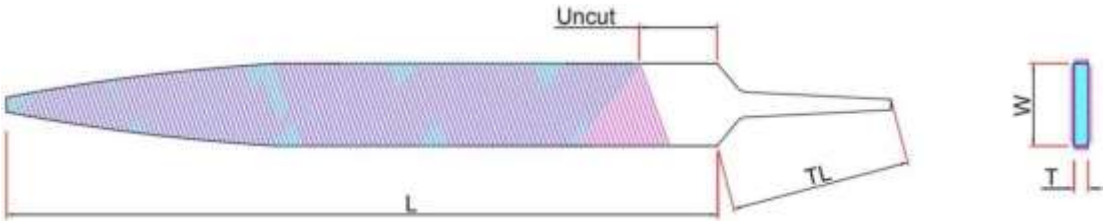
32.2 Size: 150 mm
32.3 Accuracy: 0.50 mm/ meter
32.4 Precision milled base for high accuracy
32.5 Have a solid spirit bulb which doesn't break easily.
32.6 The Aluminum frame should be strong and precision extruded which increases Accuracy and strength of the Spirit levels.
32.7 Two spirit bulbs to be provided so that it can be used horizontally & vertically
32.8 Rubber molding is provided on the sides of the spirit levels to prevent damage to The body of the spirit levels.
32.9 Magnet should be provided at the base

1._____ 2._____ 3._____ 4._____

33. File warding 15 cm smooth

As Per DVET, Maharashtra State SPECIFICATION FOR GENERAL HAND TOOLS - FILES Sr.No:-31 Page No.:- 33

33.1 Basic indicative Diagram



		Range (In MM)	
		From	To
33.2	Generally conforming to IS 1931-2000		
33.3	Body Length (L)	148	152
33.4	Tang Length (TL)	50	51
33.5	Width (W)	15.5	16.5
33.6	Thickness (T)	1.55	2.25
33.7	No. of Up cut / Inch	55	57
33.8	Up cut inclination	62^0	68^0
33.9	No. of Overcut / Inch	47	48
33.10	Overcut Inclination	47^0	53^0
33.11	No. of Edge cut / Inch	58	59
33.12	Edge cut Inclination	87^0	93^0
33.13	Hardness	60 HRC	64 HRC
33.14	Rake Angle	-7^0	-12^0

1._____ 2._____ 3._____ 4._____

34 File knife edge 15 cm smooth

As Per DVET, Maharashtra State SPECIFICATION FOR GENERAL HAND TOOLS - FILES Sr.No:-16 Page No.:- 18

34.1 Basic indicative Diagram

		Range (In MM)	
		From	To
34.2	Generally conforming to IS 1931-2000		
34.3	Body Length (L)	150	152
34.4	Tang Length (TL)	50	51
34.5	Width (W)	19	19.4
34.6	Thickness (T)	3	4
34.7	No. of Up cut / Inch	53	54
34.8	Up cut inclination	64^0	66^0
34.9	No. of Overcut / Inch	46	47
34.10	Overcut Inclination	49^0	51^0
34.11	No. of Edge cut / Inch	55	56
34.12	Edge cut Inclination	89^0	91^0
34.13	Hardness	60 HRC	64 HRC
34.14	Rake Angle	-7^0	-12^0

1._____ 2._____ 3._____ 4._____

35. File cut saw 15 cm smooth

As Per DVET, Maharashtra State SPECIFICATION FOR GENERAL HAND TOOLS - FILES Sr.No:-1 Page No.:- 3

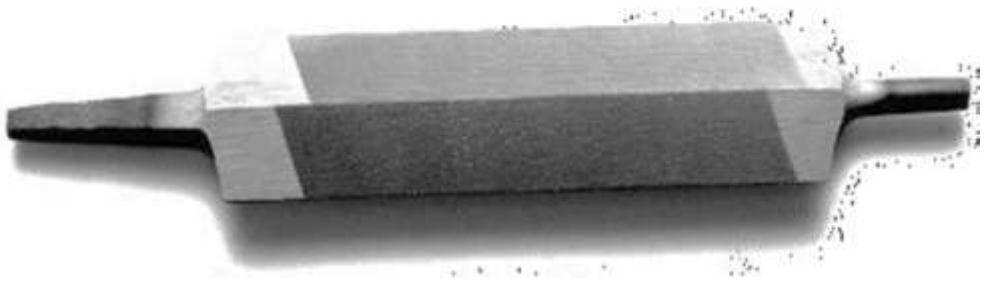
35.1 basic Indicative Diagram:-

	From	To
Generally conforming to IS 1931-2000		
35.2 Body Length (L)	150	152
34.3 Tang Length (TL	50	51
35.4 Width (W)	12.4	12.7
35.5 Thickness (T)	1.55	02.25
35.6 No. of Up cut / Inch	50	51
35.7 Up cut inclination	64^0	66^0
35.8 No. of Overcut / Inch	47	48
35.9 No. of Edge cut /inch	58	59
35.10 Edge cut Inclination	89^0	91^0
35.11 Hardness	60 HRC	64 HRC
35.12 Rake Angle s	-2^0	-5^0

1._____ 2._____ 3._____ 4._____

36. File feather edge 15 cm smooth

36.1 Basic Indicative Diagram



Generally conforming toIS1931-2000

36.2 Type: Feather edge

36.3 Material: Steel

36.4 Size: 150mm, 6inches

36.5 Width: 27.3mm

36.6 Thickness: 9.6mm

36.7 Key Features: Easy cutting, Durable

36.8 Hardness :- 64 HRC

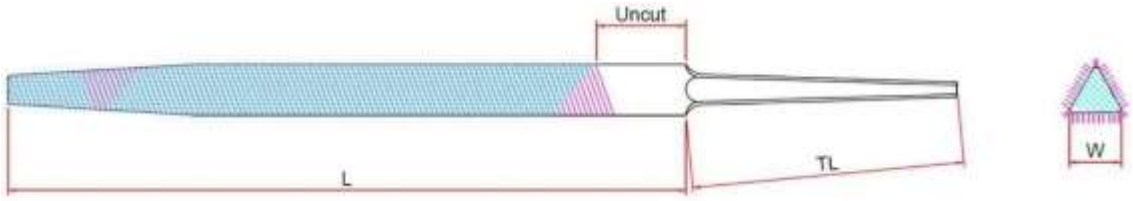
36.9 Rake Angle :- 12^0

1._____ 2._____ 3._____ 4._____

37. File triangular 15 cm smooth

As Per DVET, Maharashtra State SPECIFICATION FOR GENERAL HAND TOOLS - FILES Sr.No:-30 Page No.:- 32

37.1 Basic Indicative Diagram



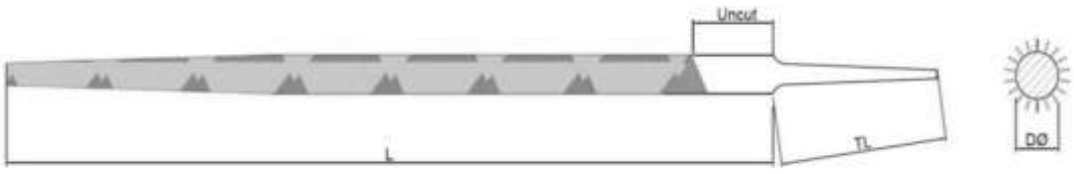
	Range (In MM)	
	From	To
37.2 Generally conforming to IS 1931-2000		
37.3 Body Length (L)	148	152
37.4 Tang Length (TL)	58	59
37.5 Equilateral Triangle Side (W)	11.05	11.75
37.6 No. of Up cut / Inch	480	490
37.7 Up cut inclination	57	63
37.8 No. of Overcut/Inch	38	39
37.9 No. of Edge cut / Inch	51	52
37.10 Edge cut Inclination	76^0	78^0
37.11 Hardness	60 HRC	64 HRC
37.12 Rake Angle	-7^0	-12^0

1._____ 2._____ 3._____ 4._____

38. File round 20 cm second cut

As Per DVET, Maharashtra State, SPECIFICATION FOR GENERAL HAND TOOLS - FILES Version 4 2019 - 20- Sr. No -18 Page no. 20

38.1 Basic Indicative Diagram

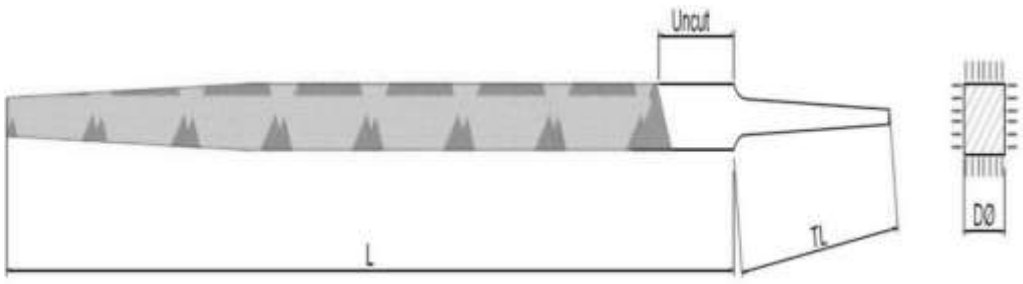


Particulars	Range(In MM)	
	From	To
38.2 Generally conforming toIS1931-2000		
38.3 Body Length(L)	198	202
38.4 Tang Length(TL)	55	55
38.5 Diameter(Ø)	6.35	7.25
38.6 No. of Up cut/Inch	31	32
38.7 Up cut inclination	64^0	66^0
38.8 No. of Over cut/ Inch	31	32
38.9 Over cut Inclination	49^0	51^0
38.10 Hardness 38.11 Rake Angle	60HRC -7^0	64 -12^0

1._____ 2._____ 3._____ 4._____

39. File square 15 cm second cut

39.1 Basic Indicative Diagram



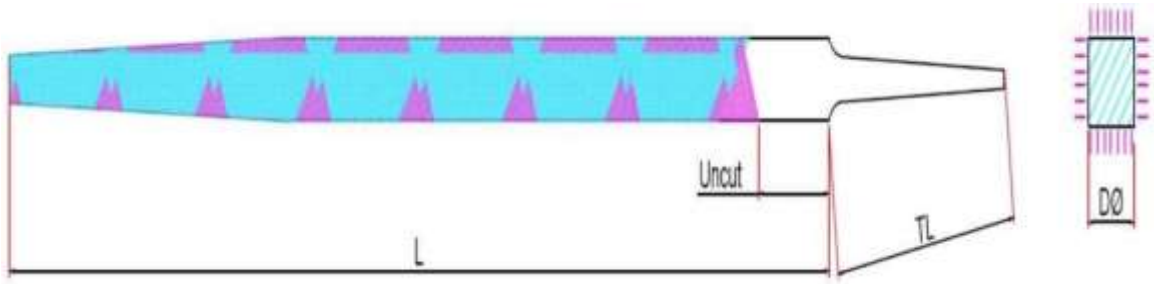
	Range(In MM) From	To
39.2 Generally conforming toIS1931-2000		
39.3 Body Length(L)	148	152
39.4 Tang Length (TL)	55	56
39.5 Square Side	6.80	7.80
39.6 No. of Up cut/Inch	37	38
39.7 Up cut inclination	65^0	65^0
39.8 No. of Over cut/ Inch	31	32
39.9 Over cut Inclination	50^0	50^0
39.10 Edge cut Inclination	89^0	91^0
39.11 Hardness	60HRC	64 HRC
39.12 Rake Angle	-7^0	-12^0

1._____ 2._____ 3._____ 4._____

40. File square 25 cm second cut

As Per SPECIFICATION BY WORKING COMMITTEE FOR TOOL & DIE MAKER Version-TDM- 01 - 2021 – 22

40.1 Basic Indicative Diagram



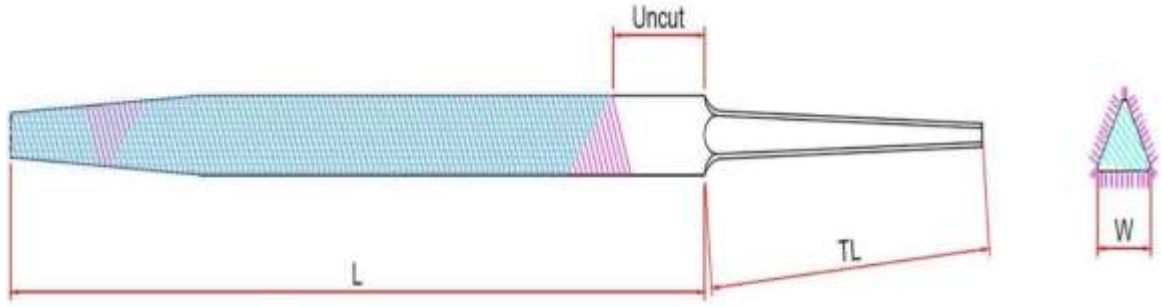
Particulars		Range (In MM)	
	From		To
40.2 Generally conforming to IS 1931-2000			
40.3 Body Length (L)	248		252
40.4 Tang Length (TL)	53		59
40.5 Square Side	7.80		9.80
40.6 No. of Up cut / Inch	40		42
40.7 Up cut inclination	65^0		65^0
40.8 No. of Overcut / Inch	35		36
40.9 Overcut Inclination	50^0		50^0
40.10 Edge cut Inclination	89^0		91^0
40.11 Hardness 40.12 Rake Angle	60 HRC-7^0		64 HRC -12^0

1._____ 2._____ 3._____ 4._____

41. File triangular 20 cm second cut

As Per SPECIFICATION BY WORKING COMMITTEE FOR TOOL & DIE MAKER Version- TDM- 01 - 2021 – 22

41.1 Basic Indicative Diagram



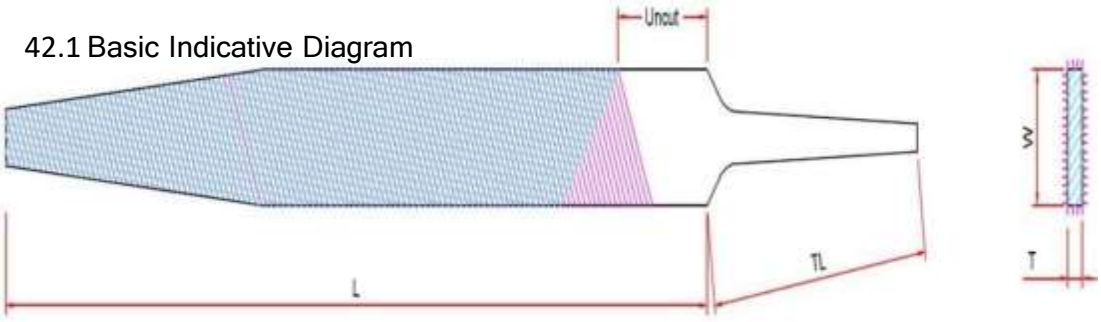
Particulars	Range (In MM)		
	From		To
41.2 Generally conforming to IS 1931-2000			
41.3 Body Length (L)	198		202
41.4 Tang Length (TL)	68		69
41.5 Equilateral Triangle Side (W)	11.05		11.75
41.6 No. of Up cut / Inch	48		49
41.7 No. of Over cut / Inch	38		39
41.8 Up cut inclination	57^0		63^0
41.9 No. of Edge cut / Inch	49		51
41.10 Edge cut Inclination	76^0		78^0
41.11 Hardness 41.12 Rake Angle	60 HRC -7^0		64 HRC -12^0

1._____ 2._____ 3._____ 4._____

42. File flat 30 cm second cut

As Per DVET, Maharashtra State SPECIFICATION FOR GENERAL HAND TOOLS - FILES Version 4 - 2019 – 20 Sr. No - 06 Page no 08

42.1 Basic Indicative Diagram



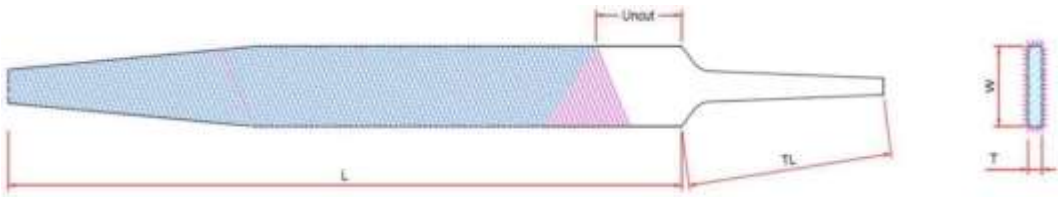
Particulars		Range (In MM)	
	From		To
42.2 Generally conforming to IS 1931-2000			
42.3 Body Length (L)	298		302
42.4 Tang Length (TL)	59		61
42.5 Width (W)	23.9		24.9
42.6 Thickness (T)	5.05		5.75
42.7 No. of Up cut / Inch	29		30
42.8 Up cut inclination	64^0		66^0
42.9 No. of Overcut / Inch	23		24
42.10 Overcut Inclination	44^0		46^0
42.11 No. of Edge cut / Inch	31		32
42.12 Edge cut Inclination	89^0		91^0
42.13 Hardness 42.14 Rake Angle	60HRC -7^0		64HRC -12^0

1._____ 2._____ 3._____ 4._____

43. File flat 20 cm bastard

As Per DVET, Maharashtra State, SPECIFICATION FOR GENERAL HAND TOOLS - FILES Version 4 2019 - 20-Sr. No -2 Page no 4

43.1 Basic Indicative Diagram



43.2 Generally conforming to IS1931-2000

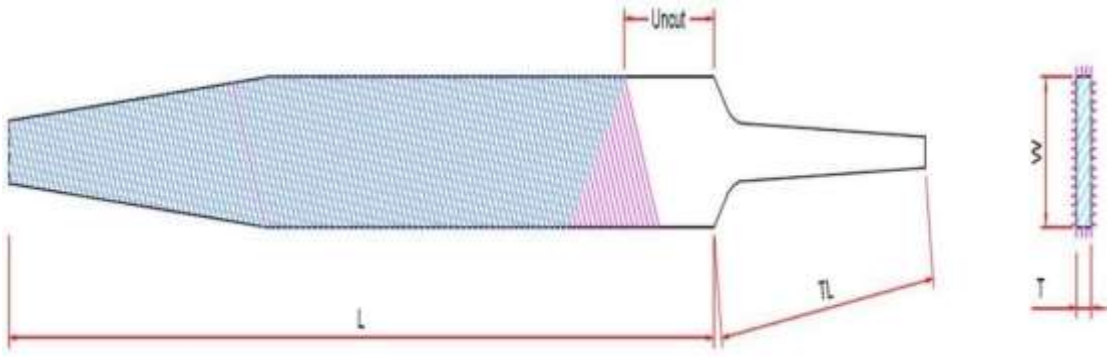
		Range(In MM) From	To
43.3	Body Length(L)	198	202
43.4	Tang Length(TL)	54	56
43.5	Width (W)	19.6	20.6
43.6	Thickness(T)	3.7	4.4
43.7	No. of Up cut/Inch	24	26
43.8	Up cut inclination	64^0	66^0
43.9	No. of Over cut/ Inch	18	20
43.10	Over cut Inclination	44^0	46^0
43.11	No. of Edge cut /Inch	25	27
43.12	Edge cut Inclination	89^0	91^0
43.13	Hardness	60HRC	64 HRC
43.14	Performance in 7500 strokes	15	15.5
43.15	Rake Angle	-7^0	-12^0

1._____ 2._____ 3._____ 4._____

44. File flat 30 cm bastard

As Per DVET, Maharashtra State SPECIFICATION FOR GENERAL HAND TOOLS - FILES Version 4 - 2019 - 20 Sr. No - 03 Page no 05

44.1 Basic Indicative Diagram



44.2 Generally conforming to IS 1931-2000

		Range (InMM) From	To
44.2	Body Length (L)	298	302
44.3	Tang Length (TL)	69	71
44.4	Width (W)	28.9	29.9
44.5	Thickness (T)	5.35	6.05
44.6	No. of Up cut / Inch	15	16
44.7	Up cut inclination	64^0	66^0
44.8	No. of Overcut / Inch	12	13
44.10	Overcut Inclination	44^0	46^0
44.11	No. of Edge cut / Inch	18	19
44.12	Edge cut Inclination	89^0	91^0
44.13	Hardness	60 HRC	64 HRC
44.14	Rake Angle	-7^0	-12^0

1._____ 2._____ 3._____ 4._____

45. File Swiss type Needle set of 12

As Per DVET, Maharashtra State SPECIFICATION FOR GENERAL HAND TO OLS - FILES

45 Basic indicative Diagram

45.1	Barrete	
45.2	Crossing	
45.3	Flat	
45.4	Half Round	
45.5	Hand Tre	
45.6	Hand	
45.7	Knife	
45.8	Marking	
45.9	Round	
45.10	Slitting	
45.11	Square	
45.12	Three Square	

1._____ 2._____ 3._____ 4._____

SPECIFICATION FOR TRADE – INDUSTRIAL ROBOTICS AND DIGITAL MANUFACTURING TECHNICIAN NSQF LEVEL-3

45.1 Needle File - Barrette - 160 mm

S.N.	Particulars	Range (in mm)	
		From	To
1	Total Length (L)	158	162
2	Tang Dia	3.2	3.25
3	Width (W)	5.1	5.9
4	Thickness (T)	2	2.4
5	Length of cut	77.5	82.5
	a) 0 Cut	61	67
	b) 2 Cut	76	84
7	Up cut inclination	65^0	NA
	a) 0 Cut	53	57
	b) 2 Cut	65	71
9	Overcut Inclination	55^0	NA
10	Hardness	60 HRC	64 HRC
11	Grade	2^N	

45.2 Needle File - Crossing - 160 mm

S.N.	Particulars	Range (in mm)	
		From	To
1	Total Length (L)	158	162
2	Tang Dia	3.2	3.25
3	Width (W)	5.15	5.95
4	Thickness (T)	1.8	2.2
5	Length of cut	77.5	82.5
6	No. of Up cut / Inch Etching		
	a) 0 Cut	61	67
	b) 2 Cut	76	84
7	Up cut inclination	60	NA
8	No. of Overcut / Inch Etching		
	a) 0 Cut	53	57
	b) 2 Cut	65	71
9	Overcut Inclination	50	NA
10	Hardness	60 HRC	64 HRC
11	Rake Angle	NA	NA
12	Grade	2^{ND}	

1._____ 2._____ 3._____ 4._____

45.3 Needle File - Flat - 160 mm

S.N.	Particulars	Range (in mm)	
		From	To
1	Total Length (L)	158	162
2	Tang Dia	3.2	3.25
3	Width (W)	5.5	6.3
4	Thickness (T)	1.2	1.6
5	Length of cut	77.5	82.5
6	No. of Up cut / Inch Chisel Cut		
	a) 0 Cut	61	67
	b) 2 Cut	76	84
7	Up cut inclination	65^0	NA
8	No. of Overcut / Inch Chisel Cut		
	a) 0 Cut	53	57
	b) 2 Cut	65	71
9	Overcut Inclination	55^0	NA
10	No. of Edge cut / Inch Chisel Cut		
	a) 0 Cut	61	67
	b) 2 Cut	76	84
11	Edge cut Inclination	65^0	NA
12	Hardness	60 HRC	64 HRC
13	Grade	2	

45.4 Needle File – Half Round - 160 mm

S.N.	Particulars	Range (in mm)	
		From	To
1	Total Length (L)	158	162
2	Tang Dia	3.2	3.25
3	Width (W)	5.2	6
4	Thickness (T)	1.6	2
5	Length of cut	77.5	82.5
6	No. of Up cut / Inch For Flat Side Chisel Cut (For Round Side Etching)		
	a) 0 Cut	61	67
	b) 2 Cut	76	84
7	Up cut inclination		
	a) Chisel Cut (Flat Side)	65^0	NA
	b) Etching (Round Side)	60^0	NA
8	No. of Overcut / Inch		
	a) 0 Cut	53 (Flat Side Chisel	57 (For Round Side
	b) 2 Cut	65 (Flat Side Chisel	71 (For Round Side
9	Overcut Inclination		
	a) Chisel Cut (Flat Side)	55^0	NA
	b) Etching (Round Side)	50^0	NA
10	Hardness	60 HRC	64 HRC
11	Grade	2	

1._____ 2._____ 3._____ 4._____

45.5 Needle File – Hand Tre - 160 mm

S.N.	Particulars	Range (in mm)	
		From	To
1	Total Length (L)	158	162
2	Tang Dia	3.2	3.25
3	Width (W)	5.4	6.2
4	Thickness (T)	1.3	1.7
5	Length of cut	77.5	82.5
6	No. of Up cut / Inch Chisel Cut (Only edge cutting)		
	a) 0 Cut	61	67
	b) 2 Cut	76	84
7	Up cut inclination (Only edge cutting)	65	NA
8	No. of Overcut / Inch On edge Chisel cut (Only edge cutting)		
	a) 0 Cut	53	57
	b) 2 Cut	65	71
9	Overcut Inclination (Only edge	55	NA
10	Hardness	60 HRC	64 HRC
11	Grade	2	

45.6 Needle File – Hand - 160 mm

S.N.	Particulars	Range (in mm)	
		From	To
1	Total Length (L)	158	162
2	Tang Dia	3.2	3.25
3	Width (W)	5	5.8
4	Thickness (T)	1.4	1.8

1._____ 2._____ 3._____ 4._____

5	Length of cut	77.5	82.5
6	No. of Up cut / Inch Chisel cut		
	a) 0 Cut	61	67
	b) 2 Cut	76	84
7	Up cut inclination	65^0	NA
8	No. of Overcut / Inch Chisel Cut		
	a) 0 Cut	53	57
	b) 2 Cut	65	71
9	Overcut Inclination	55^0	NA
10	No. of Edge cut / Inch Chisel cut		
	a) 0 Cut	61	67
	b) 2 Cut	76	84
11	Edge cut Inclination	65^0	NA
12	Hardness	60 HRC	64 HRC
13	Grade	2^{nd}	

45.7 Needle File – Knife - 160 mm

S.N.	Particulars	Range (in mm)	
		From	To
1	Total Length (L)	158	162
2	Tang Dia	3.2	3.25
3	Width (W)	5.45	6.35
4	Thickness (T)	2	2.4
5	Length of cut	77.5	82.5
6	No. of Up cut / Inch Chisel Cut		
	a) 0 Cut	61	67
	b) 2 Cut	76_0	84
7	Up cut inclination	65	NA
8	No. of Overcut / Inch Chisel Cut		
	a) 0 Cut	53	57
	b) 2 Cut	65_0	71
9	Overcut Inclination	55	NA
10	No. of Edge cut / Inch Chisel Cut		
	a) 0 Cut	61	67
	b) 2 Cut	76_0	84
11	Edge cut Inclination	65	NA
12	Hardness	60 HRC	64 HRC
13	Grade	2^{ND}	

1._____ 2._____ 3._____ 4._____

45.8 Needle File – Marking - 160 mm

S.N.	Particulars	Range (in mm)	
		From	To
1	Total Length (L)	158	162
2	Tang Dia	3.2	3.25
3	Width (W)	5.4	6.2
4	Thickness (T)	1.55	1.95
5	Length of cut	77.5	82.5
6	No. of Up cut / Inch Etching (Cutting on Round side flat side no cutting)		
	a) 0 Cut	61	67
	b) 2 Cut	76	84
7	Up cut inclination (Cutting on Round side flat side no cutting)	0	NA
8	No. of Overcut / Inch Etching (Cutting on Round side flat side no cutting)		
	a) 0 Cut	53	57
	b) 2 Cut	65	71
9	Overcut Inclination (Cutting on Round side flat side no cutting)	0	NA
10	Hardness	60 HRC	64 HRC
11	Grade	2	

45.9 Needle File - Round - 160 mm

S.N.	Particulars	Range (in mm)	
		From	To
1	Total Length (L)	158	162
2	Tang Dia	3.2	3.25
3	Body Dia	2.9	3.7
4	Length of cut	77.5	82.5
5	No. of Up cut / Inch Etching		
	a) 0 Cut	61	67
	b) 2 Cut	76	84
6	Up cut inclination	60^0	NA
7	No. of Overcut / Inch Etching		
	a) 0 Cut	53	57
	b) 2 Cut	65	71
8	Overcut Inclination	50^0	NA
9	Hardness	60 HRC	64 HRC
10	Grade	2	

1._____ 2._____ 3._____ 4._____

45.10 Needle File - Slitting - 160 mm

S.N.	Particulars	Range (in mm)	
		From	To
1	Total Length (L)	158	162
2	Tang Dia	3.2	3.25
3	Width (W)	5.55	6.35
4	Thickness (T)	2	2.4
5	Length of cut	77.5	82.5
6	No. of Up cut / Inch Chisel Cut		
	a) 0 Cut	61	67
	b) 2 Cut	76	84
7	Up cut inclination	65^0	NA
8	No. of Overcut / Inch Etching		
	a) 0 Cut	53	57
	b) 2 Cut	65	71
9	Overcut Inclination	50^0	NA
10	Hardness	60 HRC	64 HRC
11	Grade	2	

45.11 Needle File - Square - 160 mm

S.N.	Particulars	Range (in mm)	
		From	To
1	Total Length (L)	158	162
2	Tang Dia	3.2	3.25
3	Width (W)	2.5	3.3
4	Length of cut	77.5	82.5
5	No. of Up cut / Inch Chisel Cut		
	a) 0 Cut	61	67
	b) 2 Cut	76	84
6	Up cut inclination	65^0	NA
7	No. of Overcut / Inch Etching		
	a) 0 Cut	53	57
	b) 2 Cut	65	71
8	Overcut Inclination	50^0	NA
9	Hardness	60 HRC	64 HRC
10	Grade	2	

1._____ 2._____ 3._____ 4._____

45.12 Needle File - Three Square - 160 mm

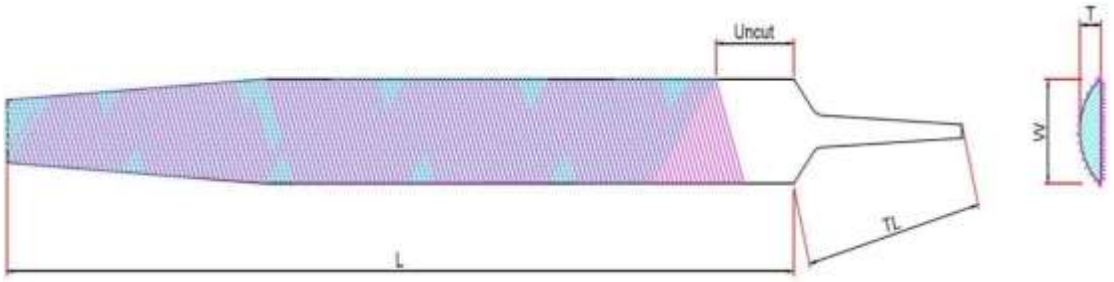
S.N.	Particulars	Range (in mm)	
		From	To
1	Total Length (L)	158	162
2	Tang Dia	3.2	3.25
3	Width (W)	3.5	4.3
4	Length of cut	77.5	82.5
5	No. of Up cut / Inch Chisel Cut		
	a) 0 Cut	61	67
	b) 2 Cut	76	84
6	Up cut inclination	60	NA
7	No. of Overcut / Inch Etching		
	a) 0 Cut	53	57
	b) 2 Cut	65	71
8	Overcut Inclination	50	NA
9	Hardness	60 HRC	64 HRC
10	Grade	2	

1._____ 2._____ 3._____ 4._____

46. FILE HALF ROUND SECOND CUT 250 MM

As Per DVET, Maharashtra State SPECIFICATION FOR GENERAL HAND TOOLS - FILES Version 4 - 2019 - 20 Sr. No - 13 Page no 15

46.1 Basic Indicative Diagram



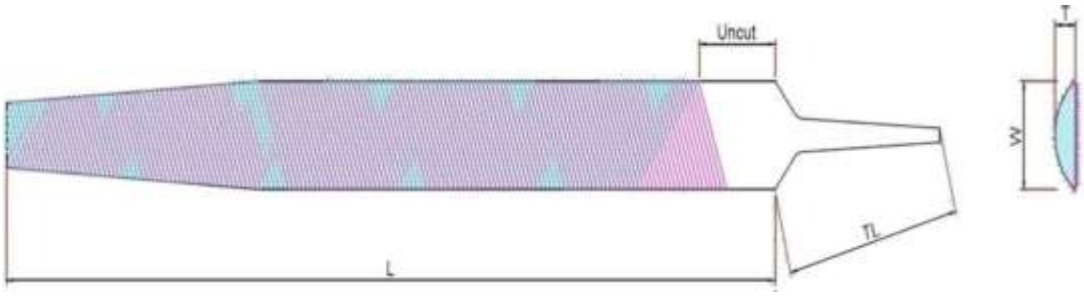
Particulars	Range (In MM)	
	From	To
46.2 Generally conforming to IS 1931-4600		
46.3 Body Length (L)	250	252
46.4 Tang Length (TL)	60	61
46.5 Width (W)	23.70	24.7
46.6 Thickness (T)	6.55	7.25
46.7 No. of Up cut / Inch	(29-30F/S)	(28-29R/S)
46.8 Up cut inclination	65^0	65^0
46.9 No. of Overcut / Inch	(24-25 F/S)	(24-25R/S)
46.10 Overcut Inclination	50^0	50^0
46.11 No. of Edge cut / Inch	28	29
46.12 Edge cut Inclination	65^0	65^0
46.13 Hardness	60 HRC	64 HRC
46.14 Rake Angle	-7^0	-12^0

1._____ 2._____ 3._____ 4._____

47. File half round 25 cm bastard.

As Per DVET, Maharashtra State, SPECIFICATION FOR GENERAL HAND TOOLS - FILES Version 4 2019 – 20- Sr. No -10 Page no 12

47.1 Basic Indicative Diagram



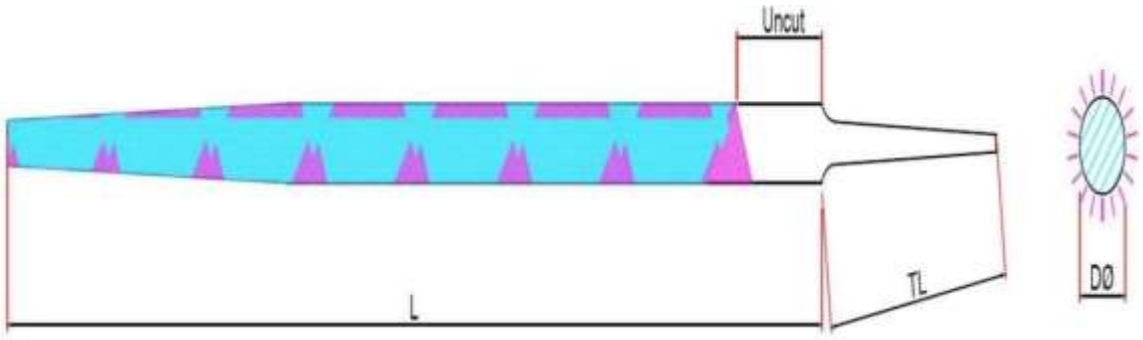
Particulars	Range(In MM)	
	From	To
47.2 Generally conforming toIS1931-2000		
47.3 Body Length(L)	250	252
47.4 Tang Length(TL)	60	61
47.5 Width (W)	23.70	24.7
47.6 Thickness(T)	6.55	7.25
47.7 No. of Up cut/Inch	(23-24F/S)	(23-24R/S)
47.8 Up cut inclination	65^0	65^0
47.9 No. of Over cut/ Inch	(17-18F/S)	(17-18R/S)
47.10 Over cut Inclination	50^0	50^0
47.11 No. of Edge cut /Inch	23	24
47.12 Edge cut Inclination	65^0	65^0
47.13 Hardness	60HRC	64 HRC
47.14 Rake Angle	-7^0	-12^0

1._____ 2._____ 3._____ 4._____

48. File round 30 cm bastard.

As Per DVET, Maharashtra State SPECIFICATION FOR GENERAL HAND TOOLS - FILES Version 4 - 2019 - 20 Sr. No - 17 Page no 19

48.1 Basic Indicative Diagram



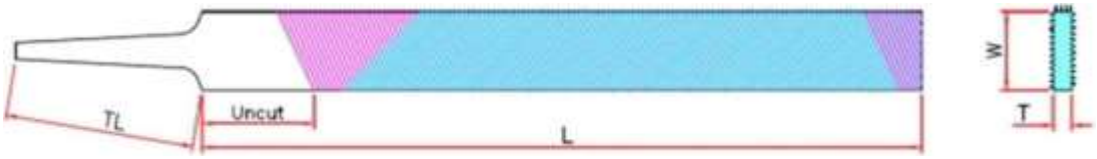
Particulars		Range (In MM)	
	From		To
48.2 Generally conforming to IS 1931-2000			
48.3 Body Length (L)	298		302
48.4 Tang Length (TL)	59		61
48.5 Diameter (Ø)	8.35		9.35
48.6 No. of Up cut / Inch	20		21
48.7 Up cut inclination	64^0		66^0
48.8 No. of Overcut / Inch	20		21
48.9 Overcut Inclination	49^0		51^0
48.10 Hardness	60 HRC		64 HRC
48.11 Rake Angle	-7^0		-12^0

1._____ 2._____ 3._____ 4._____

49. File hand 15 cm second cut.

As Per DVET, Maharashtra State SPECIFICATION FOR GENERAL HAND TOOLS - FILES Version 4 - 2019 - 20 Sr. No - 17 Page no 19

49.1 Basic Indicative Diagram



Particulars		Range(In MM)
	From	To
49.2 Generally conforming to	IS1931-2000	
49.3 Body Length(L)	148	150
49.4 Tang Length(TL)	54	56
49.5 Width (W)	19.6	20.6
49.6 Thickness(T)	3.7	4.4
49.7 No. of Up cut/Inch	34	35
49.8 Up cut inclination	64^0	66^0
49.9 No. of Overcut/ Inch	29	30
49.10 Over cut Inclination	44^0	46^0
49.11 No. of Edge cut /Inch	36	37
49.12 Edge cut Inclination	89^0	91^0
49.13 Hardness 49.14 Rake Angle	60HRC -7^0	64 HRC -12^0

1._____ 2._____ 3._____ 4._____

50 Card file

(This item is Consumable)

50.1 Basic Indicative Diagram

50.2 Material Type: Brass OR steel wire

50.3 File Brush: Used to clean debris and material build-up frommetal files and rasp teeth

50.4 Steel File Card: Steel fills material

50.5 Steel File: The brush has wooden handle with hole for easy storage

50.6 Dimensions: 3 x 5 inches

50.7 Weight: 0.32 ounce

50.8 Wire size die 1mm , 1cmX1cm total 20 no's

1._____ 2._____ 3._____ 4._____

51. Oil Stone 15 cm x 5 cm x 2.5 cm

As Per DVET, Maharashtra State SPECIFICATION FOR MECHANICAL TOOLS AND EQUIPMENTS GROUP ITEMS – VOLUME 03- 2018 – 19 Sr. No - 72 Page no 78

51.1 Basic indicative Diagram

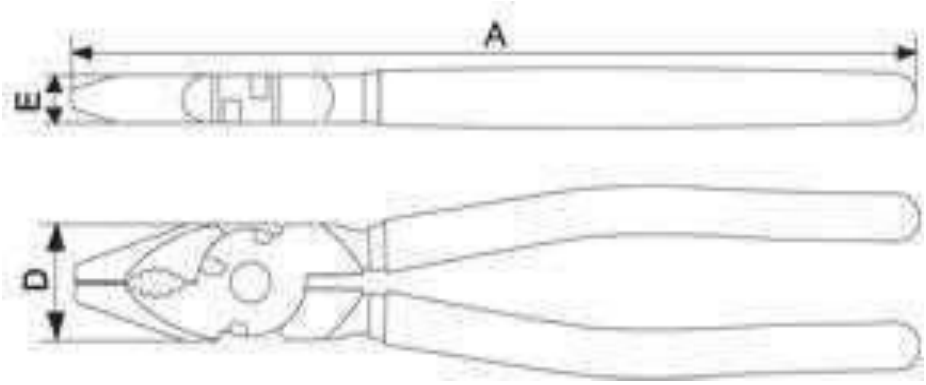
51.2		Length: 150 mm
51.3	Width:	50 mm
51.4	Height H1:	Course - 25 mm
51.5	Height H2:	Fine - 10 mm
51.6	Material:	SiC (Silicon Carbide)
51.7	Bond:	Vitrified

1._____ 2._____ 3._____ 4._____

52. Pliers combination 15 cm

As Per DVET, Maharashtra State SPECIFICATION FOR MECHANICAL TOOLS AND EQUIPMENTS GROUP ITEMS – VOLUME 03 Sr.No:- 94 Page No.:- 100

52.1 Basic Indicative Diagram

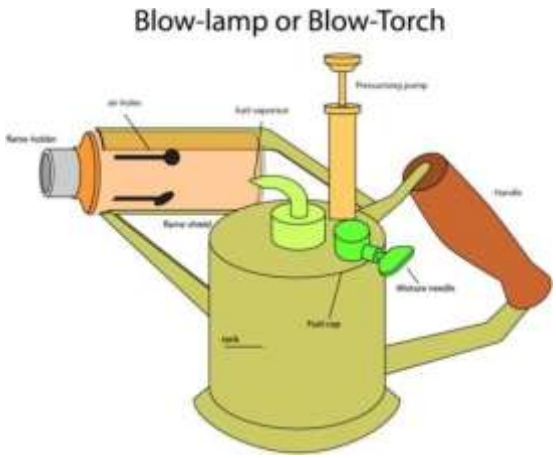


52.2 Generally conform to IS 3650 – 1981
52.3 Material: C – 70
52.4 Finish: Polished / Chrome plated / satin finish
52.5 Length (A): 150 mm
52.6 Drop forged, hardened tempered
52.7 Differential hardening
52.8 Radius Gap from front side: up to 0.2 mm
52.9 Play between shanks: up to 0.3 mm
52.10 Shank Material: C70 / EN9
52.11 Rivet material: SAE 1541 / 40Cr4
52.12 Cutting Edge Hardness: 60 - 62 HRC
52.13 Shank Hardness: 40 - 48 HRC
52.14 Rivet Hardness: 38 - 42 HRC
52.15 High Voltage Insulation: Should be able to withstand 4000 V DC or 2800 V AC
52.16 Insulation Sleeves made from High Quality CA Plastic
52.17 Thicker Sleeves for comfortable Grip
52.18 Special thumb protector for sleeves to minimize the risk of electric shock in case plier Slips while in use.
52.19 Should be able to cut soft (74 to 84 Kg/mm²) & hard (140 Kg/mm²) wires
52.20 Should be able to cut 2 mm of hardwire Diameter & 1 mm of soft wire Diameter

1._____ 2._____ 3._____ 4._____

53. Blow Lamp 0.50 liters.

53.1 Basic Indicative Diagram



-

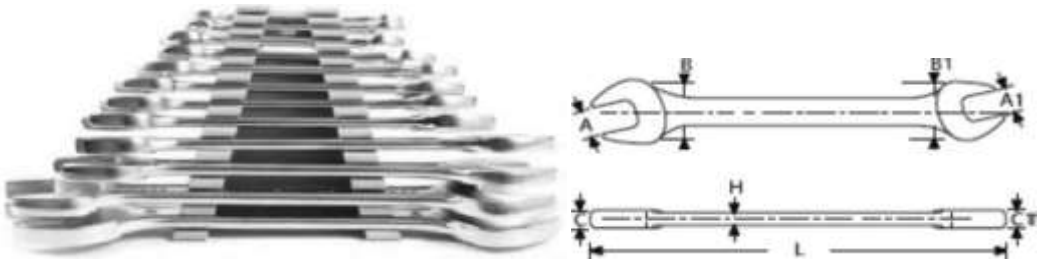
53.2 Generally conform to I.S. 841-983
53.3 Material Used: Brass & Iron Steel
53.4 Additional Name: Brass Pressure Kerosene Blow-Lamp
53.5 Torch Type Soldering Torch, Brazing Torch
53.6 Should be Longer service life Smooth-finish
53.7 Should be Resistance against corrosion
53.8 Should be Precisely designed
53.9 Top quality ,Extremely durable
53.10 Capacity: 0.5 Liters (± 10 %)

1._____ 2._____ 3._____ 4._____

54. Spanner D.E. 6 -26 mm set of 10 pcs.

As Per DVET, Maharashtra State, SPECIFICATION FOR MECHANICAL TOOLS AND EQUIPMENTS GROUP ITEMS - VOLUME 03 Version 3 --2018-19 Sr. No -164 Page no 171

54.1 Basic Indicative Diagram



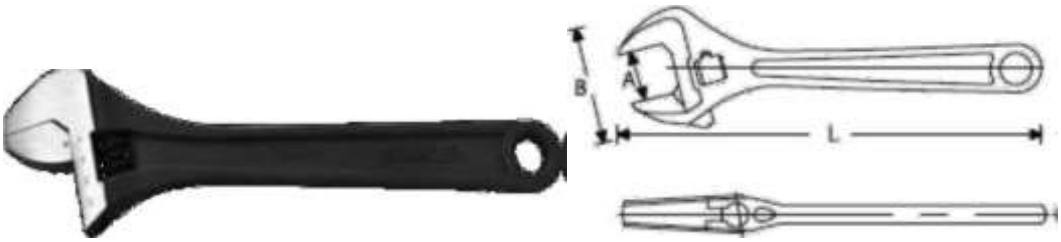
54.2 Generally Conform to IS 2028 - 1998
54.3 Sizes: 6X7, 8X9, 10X11, 12X13, 14X15, 16X17, 18X19, 20X22, 23X24,25X26
54.4 Slightly Rounded handles - Sand Blasted
54.5 Non Damaging Grip on nut due to close wrench opening tolerances
54.6 I - section design of handle and heads to combine strength and low weight
54.7 Thoroughly corrosion protected with Nickel chrome finish
54.8 Deep forged from Chrome vanadium Steel (31CrV3)
54.9 Hardness: 42 - 45 HRC
54.10 Head at each end are of different sizes and set at an angle of 15^0 Rees
54.11 Web should be provided in forging
54.12 Minimum Torque Values in Gm.
54.12.1 Nominal Width A/F 6 - 0.6, 7 - 0.9, 8 - 1.3, 9 - 1.9, 10 - 2.5, 11 - 3.3, 12 - 4.2
54.12.2 Nominal Width A/F 13 - 5.3, 14 - 6.5, 15 - 7.8, 16 - 9.4, 17 - 10.9, 18 - 13.0
54.12.3 Nominal Width A/F 19 - 15.2, 20 - 17.50, 21 - 20.20, 22 - 22.9

1._____ 2._____ 3._____ 4._____

55. Spanner adjustable 15 cm

As Per DVET, Maharashtra State, SPECIFICATION FOR MECHANICAL TOOLS AND EQUIPMENTS GROUP ITEMS VOLUME 03 Version 3 --2018-19 Sr. No -161 Page no 168

55.1 Basic Indicative Diagram



55.2 Generally Conform to IS 6149 - 1984 Grade II
55.3 Length (L): 150 mm
55.4 Plain Carbon Steel/ Cr - V Steel
55.5 Knurl adjusting mechanism for quick & precise adjustment
55.6 Built - in tension spring stabilizes movable jaw.
55.7 Laser - etched mm jaw scale for easy adjustment
55.8 Drop forged with high grade forging Steel
55.9 Play between jaws: 1.20 mm (maximum)
55.10 Hardness: 40 - 50 HRC
55.11 Minimum Torque Value: 8 Gm.
55.12 Maximum Opening (A): 19 mm
55.13 Made with 15^0 head angle to allow use in narrow spaces having arc Movement only 30 degree
55.14 Jaw Shank should not protrude out even when fully in full condition, movable jaw should align with outer radius of the handle.
55.15 Adjustable Wrenches Black Phosphate Finish
55.16 Light weight handle design

1._____ 2._____ 3._____ 4._____

56. Box spanner Set 6-25 mm set of 8 with Tommy bar.

56.1 Basic Indicative Diagram

56.2 Generally conforming to I.S 2030 - 1989
56.3 Made from tubular section of Steel
56.4 Heat treated to give maximum strength
56.5 Hardness: 29 to 34 HRC (carburizing depth minimum up to 0.3 mm)
56.6 Body and Hexagon should have good alignment and ends should be Square with axis
56.7 Bright Zinc plating for rust protection
56.8 Sizes in mm: 6X7, 8X9, 10X11, 12X13, 14X15, 16X17, 18X19, 20X21, 22X23, 24X25, (10ps With Tommy bar-die 8mm X 150mm with hardness finish.

1._____ 2._____ 3._____ 4._____

57. Glass magnifying 7 cm

57.1 Basic Indicative Diagram

57.2	Color	Black
57.3	Magnification	4 X strength
57.4	Premium Design: This magnifying lens comes with a plastic frame. It is durable, Strong and easy to handle.	
57.5	This handheld magnifying glass can be used for extra sharpness and clarity. Suitable for viewing small print or objects	
57.6	Diameter: 70 mm; Lens Type: Plano Convex; Focal Length: 3.15 mm	
57.7	Item Weight: 0.12 gm.	
57.8	Very thick magnifying glass	
57.9	High power magnifying glass	

1._____ 2._____ 3._____ 4._____

58. Clamp toolmaker 5 cm & 7.5 cm set of 2.

As Per DVET, Maharashtra State SPECIFICATION FOR MECHANICAL TOOLS & EQUIPMENTS GROUP ITEMS VOLUME 03 Sr.No:- 213 Page No.:- 220

58.1 Basic indicative Diagram

58.2 Total Length: 153 mm ± 2 mm
58.3 Jaw Width:
58.3.1 50 mm ± 2mm for 50mm clamp
58.3.2 75 mm ± 2mm for 70mm clamp
58.4 Total Height: 80 mm ± 2mm
58.5 Body material: Ductile Cast Iron
58.6 Spring should easily go up & down
58.7 Should be used during grinding, hammering etc.

1._____ 2._____ 3._____ 4._____

59. Clamp "C" 5 cm

As Per DVET, Maharashtra State SPECIFICATION FOR MECHANICAL TOOLS & EQUIPMENTS GROUP ITEMS VOLUME 03 Sr.No:- 213 Page No.:- 220

59.1 Basic indicative Diagram

59.2 Total Length: 153 mm ± 2 mm
59.3 Jaw Width:
59.3.1 50 mm ± 2mm for 50mm clamp
59.4 Total Height: 80 mm ± 2mm
59.5 Body material: Ductile Cast Iron
59.6 Spring should easily go up & down
59.7 Should be used during grinding, hammering etc.

1._____ 2._____ 3._____ 4._____

60. Clamp "C" 10 cm

As Per DVET, Maharashtra State SPECIFICATION FOR MECHANICAL TOOLS & EQUIPMENTS GROUP ITEMS VOLUME 03 Sr.No:- 213 Page No.:- 220

60.1 Basic indicative Diagram:-

60.2 Total Length: 153 mm ± 2 mm
60.3 Jaw Width:
60.3.1 100 mm ± 2mm for 50mm clamp
60.4 Total Height: 80 mm ± 2mm
60.5 Body material: Ductile Cast Iron
60.6 Spring should easily go up & down
60.7 Should be used during grinding, hammering etc.

1._____ 2._____ 3._____ 4._____

61. Scraper flat 15 cm

As Per SPECIFICATION BY WORKING COMMITTEE FOR TOOL & DIE MAKER Version-TDM- 01 - 2021 – 22

61.1 Basic Indicative Diagram

61.2 Flat

61.2.1 Total Length: 230 mm ± 2 mm
61.2.2 Blade Length: 150 mm ± 1 mm
61.2.3 Blade Width: 25 mm ± 1 mm

61.3 Blade Material: High Carbon Steel
61.4 Blade Hardness: 55 - 60 HRC
61.5 With Handle
61.6 Material Laminated Wood Steel ring pacing

61.7 Size Dia 8"X4inch long

1._____ 2._____ 3._____ 4._____

62. Scraper triangular 15 cm

As Per SPECIFICATION BY WORKING COMMITTEE FOR FITTER Version-FT- 01 - 2021 – 22

62.1 Basic Indicative Diagram

62.2 Triangular

62.2.1 Total Length: 230 mm ± 2 mm
62.2.2 Blade Length: 150 mm ± 1 mm
62.2.3 Blade Width: 25 mm ± 1 mm

62.3 Blade Material: High Carbon Steel
62.4 Blade Hardness: 55 - 60 HRC
62.5 With Handle
62.6 Material Laminated Wood Steel ring pacing

1._____ 2._____ 3._____ 4._____

63. Scraper half round 15cm

63.1 Basic Indicative Diagram

63.2 Half Round
- 63.2.1 Total Length: 230 mm ± 2 mm
- 63.2.2 Blade Length: 150 mm ± 1 mm
- 63.2.3 Blade Width: 25 mm ± 1 mm

63.3 Blade Material High Carbon Steel
63.4 Blade Hardness: 55 - 60 HRC
63.5 With Handle
63.6 Material Laminated Wood Steel ring pacing

1._____ 2._____ 3._____ 4._____

64 Chisel cold 9 mm cross cut 9 mm diamond.

As Per DVET, Maharashtra State, SPECIFICATION FOR MECHANICAL TOOLS AND EQUIPMENTS GROUP ITEMS - VOLUME 03 Version 3 - 2018-19 Sr. No -42 Page no 48

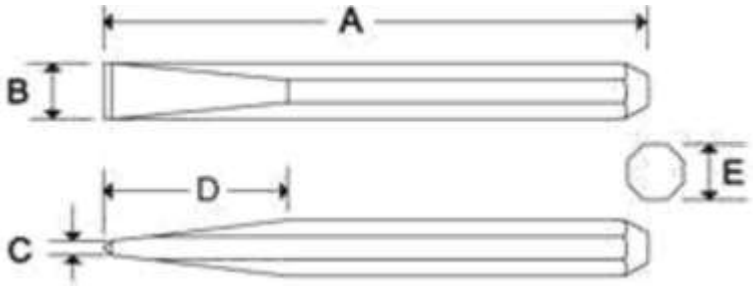
64.1 Basic Indicative Diagram

64.2 Size: 9 mm X 150 mm
64.3 Made from high carbon Steel 45#
64.4 Heat treated
64.5 Hardness
64.5.1 Cutting Portion: 55 - 57 HRC
64.5.2 Striking Portion: 35 - 45 HRC
64.6 Spraying Surface Hardened and Tempered Edges to Cut Steel and Concrete easily

1._____ 2._____ 3._____ 4._____

65. Chisel cold 9 mm flat.

65.1 Basic Indicative Diagram



65.2 Generally, Conform to I.S402-1990

65.3 Dimension sin mm: A: 100, B: 9, C: 1.50, D: 40

65.4 Material Drop forged from high grade carbon Steel

65.5 Hardness

65.6 Cutting Portion: 55-57HRC

65.7 Striking Portion: 35-45HRC

Octagonal Body to facilitate comfortable holding while infuse Cutting edges should be ground accurately to appropriate angle for metal cutting should be phosphate & painted to provide anti rusting properties

1._____ 2._____ 3._____ 4._____

66. Chisel cold 9 mm round nose.

As Per DVET, Maharashtra State, SPECIFICATION FOR MECHANICAL TOOLS AND EQUIPMENTS GROUP ITEMS - VOLUME 03 Version 3---2018-19 Sr. No -40 Page no 46.

66.1 Basic Indicative Diagram

66.2 Size: 9mm X 100mm
66.3 Made from high carbon Steel 45#
66.4 Heat treated
66.5 Hardness
- 66.5.1 Cutting Portion: 55 - 57 HRC
- 66.5.2 Striking Portion: 35 - 45 HRC

66.6 Spraying Surface
66.7 Hardened and Tempered Edges to Cut Steel and Concrete easily

67. Motorized +Tenon Saw

67.1 Basic Indicative Diagram :-

67.2 Nominal absorbed power : 1600 watt

67.3 Sheet guide length : 350mm

67.4 Stroke Length : 50 mm

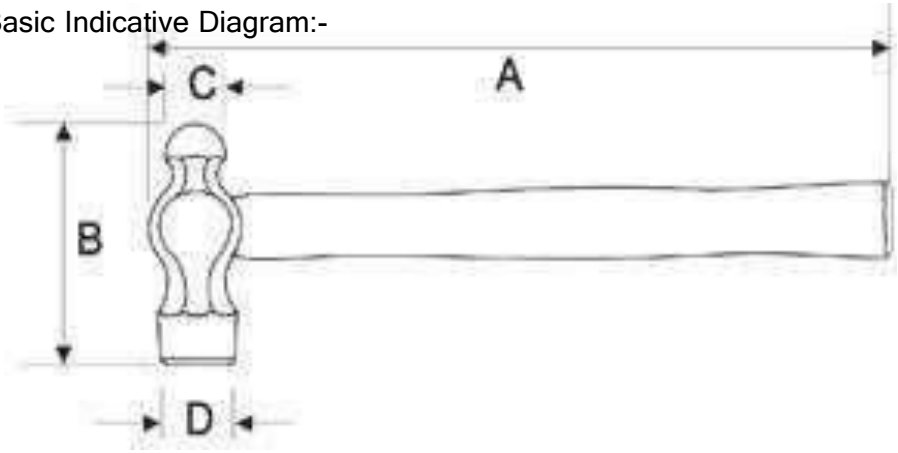
67.5 Number of strokes at idle ----- 850-2500 strokes/minute

1._____ 2._____ 3._____ 4._____

68. Hand hammer 1 kg. With handle Ball Peen

As Per DVET, Maharashtra State SPECIFICATION FOR MECHANICAL TOOLS AND EQUIPMENTS GROUP ITEMS - VOLUME 03 Sr.No:- 57 Page No.:-63

68.1 Basic Indicative Diagram:-



68.2 Generally conform to I.S. 841 - 1983
68.3 Ball Peen Hammer
68.4 Length: 300 mm + 10%
68.5 Weight: 1000 grams
68.6 Drop forged from high grade carbon Steel
68.7 Material: EN - 9
68.8 Partially hardened up to 46 - 56 HRC on striking surface
68.9 Depth of Hardness: 6 mm
68.10 Phosphated and painted
68.11 Handle
- 68.11.1 Material: Hickory Wood/ Red Wood/ Babul Wood/ Indestructible Handle
- 68.11.2 Handle fixed firmly to hammer head so that it does not come out after Long use

1._____ 2._____ 3._____ 4._____

69. Hacksaw frame fixed 30 cm.

As Per DVET, Maharashtra State SPECIFICATION FOR MECHANICAL TOOLS AND EQUIPMENTS GROUP ITEMS – VOL UME 03 Sr.No:- 57 Page No.:-63

69.1 Basic indicative diagram

69.2 One - piece body is designed for ultra - high tension of 150 Kg
69.3 Should have Pre - tensioning mechanism to hold blade in place for quick and easy blade changes.
69.4 Should have Thumb - dial adjustable tension mechanism allows for tension memory.
69.5 Should have Large cutting capacity - up to 4 - 3/4 inch (± 10%) throat depth for extra
- Deep cutting.
69.6 Power load sliding tension should deliver leverage when increasing tension and control when releasing blade.
69.7 Contoured handle and front thumb grip should be ergonomically designed for better control.
69.8 Blade should be able to be positioned at 45° or 90° cutting angle.
69.9 Should have long reach cutting capability.
69.10 Should provide removable file inside frame for finishing up surfaces after cutting.
69.11 Should be able to store 3 blades inside frame.
69.12 Should accept 12 Inch blade
69.13 Hacksaw blade should be included

1._____ 2._____ 3._____ 4._____

70 Mallets Wooden

As Per DVET, Maharashtra State SPECIFICATION FOR MECHANICAL TOOLS AND EQUIPMENTS GROUP ITEMS - VOLUME 03 Sr.No:- 68 Page No.:-74

70.1 Basic Indicative Diagram

70.2 Dimensions

70.2.1 Total Length: 325 mm ± 3 mm
70.2.2 Max. Width.: 128 ± 1 mm
70.2.3 Min. Width: 112 ± 1 mm
70.2.4 Thickness: 60 mm ± 1 mm

70.3 Wood material: Hard Wood
70.4 Handle grip is secured by a long taper
70.5 Should be light weight for fine working
70.6 Finishing: Fine finishing with body or chamfered.
70.7 Should easy to operate for operator during hammering.

1._____ 2._____ 3._____ 4._____

71. V-Block, Files, mallets, screwdrivers, chisels, etc.

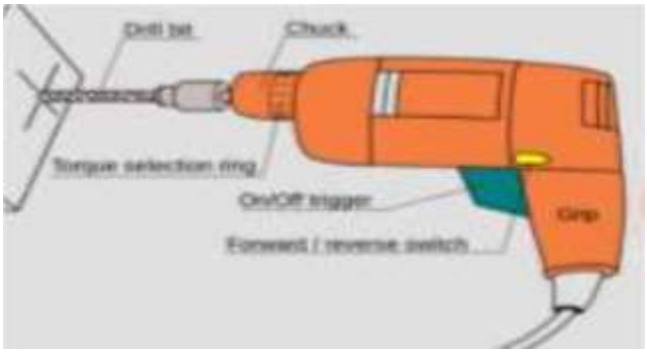
Already given separately

1._____ 2._____ 3._____ 4._____

72 Hand Drilling Machine Rated input power: 600W, Power output: 301W, Rated torque: 1.8 Nm

As Per DVET, Maharashtra State, SPECIFICATION FOR MECHANICAL TOOLS AND EQUIPMENTS GROUP ITEMS - VOLUME 04 Version 3---2018-19 Sr. No 2 Page no 4

72.1 Basic Indicative Diagram



72.2 Drilling machine should generally conforming to IS 36501 - 1981.
72.3 Power input: 600 Watt (Min.)
72.4 Drilling diameter:.4.1 Concrete: 13 mm
72.4.1 Steel: 10 mm
72.3.2 Wood: 25 mm
72.5 No load speed: 0 – 2800 rpm
72.6 Impact rate: 25000 bpm
72.7 Should have soft in line grip for a secure hold
72.8 Should have Rotating brush plate for constant power in reverse and forward rotation
72.9 Should have Forward / Reverse rotation for inserting and removing screws
72.10 Should be able to have Easy and precise control of the RPM variable speed
72.11 Should have double insulation – shock proof fibre body
72.12 Dimensions:
72.12.1 Overall Length in mm (± 10 %): 275 mm
72.12.2 Overall Height in mm (± 10 %): 180 mm
72.12.3 Net Weight (without cable & blade) (± 10%.) 1.7 kg

1._____ 2._____ 3._____ 4._____

72.13 Protection Class: Double Insulation
72.14 Standard Accessories
72.14.1 Auxiliary handle = 01 no
72.14.2 Blow molded plastic case to securely fit all pieces for easy organization and convenient portability = 01 no
72.14.3 Depth gauge = 01 no
72.14.4 Spirit level (225 mm) with 3 spirit bulbs (for horizontal, vertical & angular level testing) = 01 no
72.14.5 Knife (Length - 150 mm, Blade width 15 mm) = 01 no
72.14.6 Claw Hammer (Weight 340 grams) = 01 no
72.14.7 Adjustable Wrench (Length 150 mm, Maximum jaw opening 19 mm) = 01 no
72.14.8 Combination Pliers (Length 160 mm, Maximum jaw opening 25 mm) = 01 no
72.14.9 Measuring tape (Length 3 meter, 11 mm tape width) = 01 no

72.14.10 Drill bits
72.14.10.1 Masonry: 05 no
72.14.10.2 Wood: 04 no
72.14.10.3 HSS: 05 no
72.14.11 CRV Bit: 10 no
72.14.12 Magnetic Bit Holder: 01 no
72.14.13 Socket: 7 no
72.14.14 Socket Adaptor: 1 no
72.14.15 Assorted Screws: 30 no
72.14.16 Assorted Plastic Plugs: 30 no

1._____ 2._____ 3._____ 4._____

73. Metal Saw No-Load Speed: 3,800 rpm, Saw blade diameter 355 mm, saw blade bore 25.4 mm

73.1 Basic Indicative Diagram

73.2 No Load speed: 3800 p.m.
73.3 Saw Blade Diameter: 355 mm
73.4 Saw Blade Bore 25.4 mm
73.5 Operating voltage: - 230 V A.C.
73.6 Power consumption: 2.2 KW
73.7 Max cutting capacity 45^0: 105 X 105 mm
73.8 Max cutting capacity 90^0: 120 X 120 mm

1._____ 2._____ 3._____ 4._____

74. Straight Grinder HEAVY DUTY with attachments No-Load Speed: 10000 – 30000 rpm, Rated power output: 380 W

74.1 Basic Indicative Diagram :-

74.2 No Load Speed : - 10000 To 30000 rpm
74.3 Rated output : - 380 watt
74.4 Spindle Diameter : - 40 to 50mm
74.5 Grinding Tool Diameter : - up to 30mm
74.6 Switch : - Lockable
74.7 Power Source : - 230 V A.C.
74.8 Accessories : - Safety guard for gridding tools, spanner, at least 6 different grinding tools attachment
74.9 Two motion side switch for one hand operation and maximum safety.

1._____ 2._____ 3._____ 4._____

75 Professional Air Blower Power consumption: 820 W, No-load speed: 16000rpm, Flow rate: 0-4.5 m3/s

75.1 Basic Indicative Diagram

75.2 Power source : - 230 V A.C.
75.3 Power consumption: - 820 watt
75.4 Flow rate : - 400 to 500 GHz
75.5 No load speed : - 16000 r.p.m
75.6 Volumetric Flow rate: - 4.5m^3/min
75.7 Handgrip design suitable for left/right handed users

1._____ 2._____ 3._____ 4._____

SPECIFICATION FOR TRADE – INDUSTRIAL ROBOTICS AND DIGITAL MANUFACTURING TECHNICIAN NSQF LEVEL-3

76. Jig Saw Portable Input Power: 900W, No-load speed: 11,000 rpm, Decimeter: 100

As Per DVET, Maharashtra State SPECIFICATION FOR MECHANICAL TOOLS AND EQUIPMENTS GROUP ITEMS – VOLUME 04 Sr.No:- 7 Page No.:-10

76.1 Basic Indicative Diagram:

Generally Conforming to IS 36501-1981

76.2 Power input: 570 Watt (Min.)
76.3 Stroke height: 26 mm
76.4 No load stroke rate: 500 – 3100 rpm
76.5 Cutting Depth
- 76.5.1 Wood: 85 mm
- 76.5.2 Aluminium: 20 mm
- 76.5.3 Non-alloy steel: 10 mm

76.6 Should have Adjustable saw blade pendulum action
76.7 Should have Fast tool-free changing of application tools
76.8 Should have Speed pre-selection for adjusting to suit any application
76.9 Should have Saw dust blower can be switched on / off
76.10 Should have fibre body – shock proof – double insulation
76.11 Dimensions:
- 76.11.1 Overall Length in mm (± 10 %): 270 mm
- 76.11.2 Overall Height in mm (± 10 %): 200 mm
- 76.11.3 Net Weight (without cable & blade) (± 10%.): 2.5 kg

76.12 Jigsaw Blades for Following Material & Other Accessories:
- 76.12.1 Wood & laminates: 10 pcs
- 76.12.2 Aluminium: 5 pcs
- 76.12.3 Mild steel: 5 pcs
- 76.12.4 Acrylic: 5 pcs
- 76.12.5 Sandwich material: 5 pcs
- 76.12.6 fibre glass: 3 pcs
- 76.12.7 Stainless steel: 3 pcs
- 76.12.8 Parallel guide with circle cutter: 1 pc

76.13 Standard Accessories:
- 76.13.1 Carrying case
- 76.13.2 Anti-splinter guard
- 76.13.3 3 jig saw blades

1._____ 2._____ 3._____ 4._____

77 Hammer Drill Wired Drill type: hammer, optimum power transfer

As Per DVET, Maharashtra State, SPECIFICATION FOR MECHANICAL TOOLS AND EQUIPMENTS GROUP ITEMS - VOLUME 04 Version 3 - 2018-19 Sr.No -2 Page no 4

Already repeated in SR.NO. Of 72

78 Hand Held Sander / Polisher - No Load Speed: 11000 rpm

78.1 Basic Indicative Diagram:-

78.2 No Load speed: 11000 rpm
78.3 Pad Size : 125 mm
78.4 Input power : 250 watt
78.5 Weight : 1.5 kg max.
78.6 Oscillating circuit Diameter: 2.5mm
78.7 Eccentricity : 1.25 mm
78.8 Orbits/minute : 15000-25000 opm

1._____ 2._____ 3._____ 4._____

79 Digital Dial Torque Wrench Range: 20 to 280 Nm

79.1 Basic Indicative Diagram

79.2 Torque Wrench range: - 20 to 280 Nm
79.3 Display:-
- 79.3.1 14 segment LCD 6 line 7mm height
- 79.3.2 7 segment LCD 4 line 3mm height
- 79.3.3 Battery Life indicator

79.4 Memory: - 50
79.5 Torque setting memory:-
- 79.5.1 Preset Mode - 10 Torque values to register
- 79.5.2 Judge Mode - up to 10 values of each Upper/Lower/Tightening directions.

79.6 Basic Functions: - Auto power off, Auto memory reset & Auto zero.
79.7 RS232C/USB Compliance for communication
79.8 Power: - Battery AA
79.9 Accessories: - TQH head, Carrying case, Batteries, inter change able heads
79.10 Compliant of calibration procedures of ISO 6789 Type I Class C
79.11 CE mark

80 Lifting Tackle/Sling 1 Ton × 2 mtr

As Per DVET, Maharashtra State, SPECIFICATION FOR FITTER (NSQF-LEVEL V) Regional Office Nashik – Ver-FT-01 2021-2022 Sr. No -133 Page no 151

80.1 Basic indicative Diagram

80.2 up to 1 Ton capacity
80.3 3 Variations available: Soft Eyes each end, Thimble Eyes each end, Master link c/w
80.4 Sling Hook & Catch
80.5 M Height of Lift as standard
80.6 Up to 10M available
80.7 BS EN13414-1:2003
80.8 Stainless Steel available upon request
80.9 ShapeFlat
80.10 Capacity 1 Ton
80.11 provide a wide assortment of single Leg wire slings
80.12 Length 2 meter

1._____ 2._____ 3._____ 4._____

81 Impact Wrench 1/2 inch drive

81.1 Basic indicative Diagram

81.2 Overall Length: - 500 to 520 mm
81.3 Square Drive Size: - ½ inch
81.4 Operating Torque--- 40-200 Nm
81.5 Standards ISO 6789, ASME B107.4
81.6 Cr-Mo square driver
81.7 Cr-Mo pawl
81.8 Si-Cr-Mo spring
81.9 Aluminum Alloy handle with anodic treatment
81.10 Adjusting ring locking system
81.11 Quick Release button
81.12 Dual Scales
81.13 Dual way Direction
81.14 Visual & Audible indication
81.15 Accuracy +- 4 %
81.16 1year warranty

82 Laser Light Pen

This is a consumable item

82.1 Basic Indicative Diagram

82.2 Maximum output power 5mW
82.3 Accessories: - Assorted pointing heads, batteries

1._____ 2._____ 3._____ 4._____

83 C.I. Surface Plate:-

As Per DVET, Maharashtra State SPECIFICATION FOR Mechanical Tools & Equipment's Group Items Volume 03 Version 3 2018 - 19 Item No - 179 P.No.186

83.1 Basic indicative diagram

83.2 Total Length: 300 mm ± 1 mm
83.3 Total Width: 300 mm ± 1 mm
83.4 Total Height: 350 mm ± 0.5 mm
83.4 Plate Thickness: 25 mm ± 0.2 mm
83.5 Surface Plate Material: Cast Iron
83.6 Surface Finish: Precision Lapped Finish.
83.7 Uniformity in Hardness, Low Porosity, Non Magnetic, Easy To Clean, Rust Proof, Non- corrosive
83.8 Should be useful for measuring area flatness.
83.9 Suitable plywood cover should provided

1._____ 2._____ 3._____ 4._____

84 Digital Screw Pitch Gauge- Working voltage 3.0 Vdc, Measure precision: 0.1^0

84.1 Basic Indicative Diagram

84.2 Working voltage: - 3V D.C.
84.3 Measure precision 0.1^0
84.4 Range 0 to 25 mm
84.5 Operating manual, carrying box

1._____ 2._____ 3._____ 4._____

85 Laser Distance Measurement Instrument – Levelling accuracy : +/- 0.2^0 Measuring accuracy Typical: +/- 1/16 inch (1.5 mm)

85.1 Basic Indicative Diagram:-

85.2 Measuring Range : - up to 135 ft.
85.3 Measuring Accuracy :- +/- 1.5mm
85.4 Unit Measurement :- m/cm, Ft/inch
85.5 Levelling Accuracy :- +/- 0.2^0
85.6 Three Line Display Illumination for better readability.
85.7 Robots shockproof housing with IP54 protection class.
85.8 Features like Auto Shut off, Hold function , availability of backlight

1._____ 2._____ 3._____ 4._____

86 Palm Scale – Capacity 500 gems. Least count 0.1gm

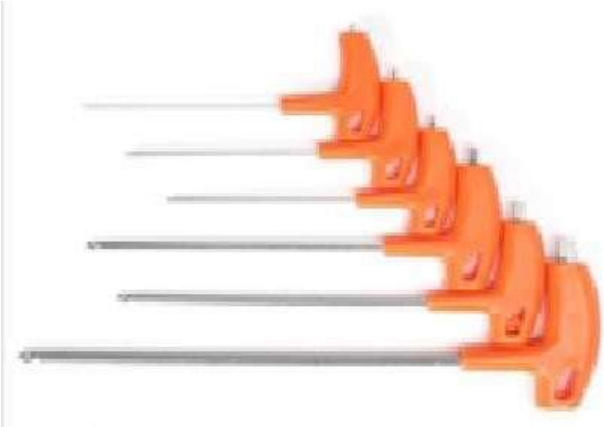
86.1 Basic Indicative Diagram:-

86.2 Maximum Weight: - 500 gm.
86.3 Operating Voltage: - 3V D.C.
86.4 Accuracy : - +/- 0.01 gm.
86.5 Accessories ;- Carrying case , Batteries ,operating manual

1._____ 2._____ 3._____ 4._____

87 Allen Screw Driver Wrench Tool – 6 Pcs T handle Ball ended Hex key

87.1 Basic Indicative Diagram:-



87.2 Material : Chrome Vanadium Steel
87.3 Head Style : Hex
87.4 Operation Mode : Mechanical
87.5 Handle set. - High quality, plastic handle and long reach. - None slip firm Ergonomically designed grip.
87.6 T-handle hex / Allen key drivers - double ended
87.7 Size: 2,2.5,3,5,6,8 mm/0.08,0.10,0.12,0.20,0.24,0.31"
2mm x 85mm long shaft (total length 125mm)
2.5mm x 85mm long shaft (total length 125mm)
3mm x 85mm long shaft (total length 125mm)
5mm x 133mm long shaft (total length 180mm)
6mm x 140mm long shaft (total length 190mm)
8mm x 198mm long shaft (total length 260mm)

1._____ 2._____ 3._____ 4._____

88. Universal Quick Adjustable Multifunction Wrench Spanner (Range 6-32 mm)

88.1 Basic Indicative Diagram

88.2 Material: CR-V chrome vanadium steel and Chrome plated surface treatment.
88.3 handle grip: - TPR anti-skid
88.4 Self-adjusting technology for nuts and bolts of all sizes and shapes.
88.5 Large wrench: Size 23~32mm (0.9"~1.25"), Full length 27cm (10.6")
88.6 Small wrench: Size 6-22mm (0.35"~0.9')',Full length 21cm (8.3"), two heads design
88.7 Finish Type : Chrome

1._____ 2._____ 3._____ 4._____

89 Double Ended Wrench Hex Socket Spanner (8 in 1 , Range 6-32 mm)

89.1 Basic Indicative Diagram

89.2 Material :- High Carbon steel
89.3 Rotation : 360^0
89.4 Range 6-32 mm sockets

1._____ 2._____ 3._____ 4._____

TERMS AND CONDITION

For robots system:-

1) Mechanical and electrical and civil Installation and commissioning, loading and unloading will be done by bidder at site.
2) Three sets of Operating, maintenance, and programming instructions manual should be provided of robot, controller, teach pendant ,VFD & PLC
3) Practical manual should be provided in both hard & soft copy
4) Vinyl display boards of safety instructions, equipment specifications and operating instructions of size 2X3 feet should be provided
5) Lock arrangement is to be interlock with robot movement.
6) Robot should follow all three safety rules
7) Basic and advance Training to staff should be conducted at bidder site for at least 5 trainers
8) All programming software and simulation software should have valid licence
9) In case of any failure technical support should provide by bidder
10) Material required for installation & commissioning will be provided by bidder
11) After installation bidder will check if there is any possibility of accident, if so then bidder will have to resolve it.

1._____ 2._____ 3._____ 4._____