

SYLLABUS  
FOR  
**ADVANCED WELDING TECHNICIAN**

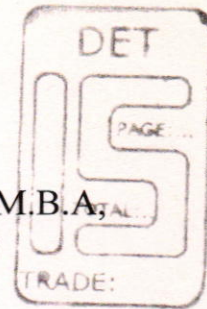


**UNDER CODE OF REGULATIONS FOR  
INDUSTRIAL SCHOOL**

**AS APPROVED BY  
DEPT OF EMPLOYMENT AND TRAINING  
CHEPAUK, CHENNAI – 600 005**



**LIST OF COMMITTEE MEMBERS  
FOR  
ADVANCED WELDING TECHNICIAN**



Members and Experts

- THIRU S.SUBBAIAH , M.E, M.B.A,**  
Regional joint Director of Trg  
Trichy
- THIRU A.MARIAPPAN, D.M.E.,**  
Deputy Director/Principal (i/c)  
Govt I.T.I. Trichy
- THIRU UMA SHANKAR.,**  
HEAD , Welding Research Institute,  
BHEL, Trichy.
- THIRU ASHOK SESHADRI.**  
DGM, Welding Research Institute,  
BHEL, Trichy
- THIRU Dr.K.ASHOK KUMAR.**  
DGM, Welding Research Institute,  
BHEL, Trichy
- THIRU Dr.G.BUVANASHEKARAN,**  
Senior Manager, Welding Research Insitute  
BHEL, Trichy.
- THIRU G.NAGARETHINAM., B.E**  
Asst. Trg. Officer,  
Govt. I.T.I. Trichy
- THIRU M.SELVAM., B.E.,**  
Asst. Trg. Officer,  
Govt. I.T.I. Trichy
- THIRU T.SUBRAMANIAN., B.E.,**  
Junior. Trg. Officer,  
Govt. I.T.I. Trichy

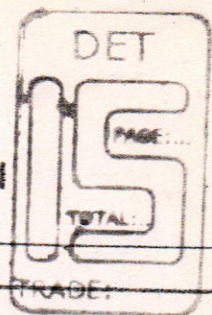


**COURSE DETAILS**

<b>Name of Trade</b>	<b>: ADVANCE WELDING TECHNICIAN</b>
<b>Qualification</b>	<b>: 10<sup>TH</sup> PASS / FAIL</b>
<b>Age</b>	<b>: 14-40 Years</b>
<b>Duration</b>	<b>: 1 Year</b>
<b>Number of Trainees</b>	<b>: 20</b>
<b>Number of Practical hours</b>	<b>: 32 hrs. per week</b>
<b>Number of Theory Hours</b>	<b>: 8 hrs. per week</b>
<b>Number of Workshop Calculation hours</b>	<b>: 2 hrs. per week.</b>
<b>Number of Engineering Drawing hours</b>	<b>: 2 hrs. per week</b>
<b>Space Required</b>	
<b>Workshop</b>	<b>: 1000sq. feet</b>
<b>ClassRoom</b>	<b>: 200 sq. feet</b>
<b>Power Required in KW</b>	<b>: 25 k.w.</b>

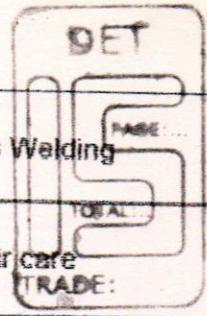


# ADVANCED WELDING TECHNICIAN



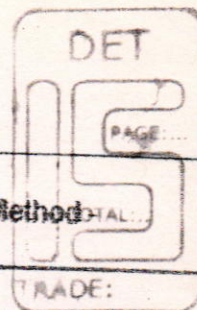
Week No.	Theory
1	Importance of safety and general precautions observed in the Institute and in the Section. Importance of the trade in the development of Industrial Economy of the country. What is related instructions-subjects to be taught-achievement to be made. Recreational, Medical facilities and other extra-curricular activities of the institute (All necessary guidance to be provided to the new comers to become familiar with other working of Industrial School system including stores procedure etc)
2	Safety precautions in Gas and Electric Welding. Elementary knowledge of first Aid. Description and use of Tools and equipment used in the trade. Welding terms and definitions.
3	Principle of Arc Welding-Necessity of Welding - Types of Machines-construction - Advantages and disadvantages of each machine-Care and maintenance.
4	Electrodes-Types - Objects of flux coating-characteristics of flux-IS-B-S-A.W.S- Specification. Criteria for choice of electrodes.
5	Effect of Moisture on electrodes-Necessity and importance of baking the electrodes before use-storage conditions and handling of electrodes for better welding quality.
6	Common gases used in Welding-Oxygen-Hydrogen-Acetylene, Coal, Gas etc. Types of Oxy-Acetylene flames-Their setting-uses-Various Gas combinations-Flames, Temperatures and their uses-States of matter.
7	Acetylene-Its properties-Acetylene Generators - Carbide to water type - Working principle-Care and maintenance - water to Carbide type-Working principle-Care and maintenance. Comparison of two types of generators. Acetylene purifier-Hydraulic Back Pressure valve.
8	Oxygen-its properties-Manufacturing methods - Oxygen cylinder-D.A. Oxygen-its properties-Manufacturing methods - Oxygen cylinder-D.A.
9	Chemistry and structure of Oxy-Acetylene flame. Manufacture of Calcium Carbide-Quality Control-Properties - Its impurities. Effect of each element on metals.





10	Gas Welding hand tools-Uses-Care and maintenance - Various Welding Processes - Their Classification and their applications.
11	Oxy-Acetylene Cutting equipment-Principle and Application-their care and maintenance.
12	Regulators-Types-Construction and use. Care and maintenance. Welding Blow Pipes-Types-Description-Operation-Construction Uses-Care and maintenance-Difference between H.P. & L.P. System.
13	Faults in gas welding - definition of faults - their effects - causes - Corrections - Manifold system - Necessity -Operations -Limitations - Care and maintenance.
14	Simple Electrical terms and their definitions-Uses of electricity as applied to welding-Electricity-AC-DC-Types of Electric Welding and applications - Modern power sources-Invertors.
15	Arc and its characteristics-Arc length-types-Uses-Advantage and disadvantages. Polarity-Types-Method of identification-Uses of each type-Importance and indication of wrong polarity.
16	Arc Blow-Definition-Its causes and effects-Methods to overcome in practice-Faults in Arc Welding-Definition-Effects, Causes and Correction of each fault. <b>REVISION &amp; TEST.</b>
17	Safety precautions in Fitter Shop-Steel Rule types and its uses-Punches-types and its uses Try-square-Scriber-its functions. Chisel-types and construction - Hacksaw frame Hacksaw blade - its types. Files-Parts, Hammer types - parts and its uses.Vices and clamps - their types.
18	Different Process of metal joining-Bolting - Riveting-Soldering Brazing and Micro joining etc.
19	Nomenclature of welding joints-Terms applied to each joint-Explanation with simple sketches-Welding symbols-Description and use. Edge preparation-application.
20	Welding positions - Flat - Horizontal - Vertical and overhead - Slope and Rotation for plates and pipes.





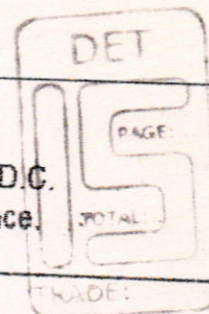
21	Welding Technique - Right Hand - Left Hand. Explanation - Method application - Linde Welding - Application.
22	Distortion in Arc Welding - Causes and effects. Methods employed to minimise its effects.
23	Methods employed to control distortion in Gas Welding - Stress relieving Outdoor method - Edge preparations - Methods - Applications.
24	Specifications for filler rods and wires for Gas Welding. Effect of atmosphere on metals. Use of Gas Welding flux and rods for different methods - Effect of alloying elements on Weldability.
25	Sheet Metal Shop Safety rules-Measuring tools-Marking tools-Sheet Metal Hammers-Pullers-Mallets, Punches. Grooves-Rivet set and uses-Types of sheets and use-Soft solder and soldering process. Development of Parallel line method-Examples Taper tray and different elbow and Tee pipes-Hand lever shears-Guillotine shearing machine-Circular Cutting-machine parts. Description use Nibbling shearing parts and use.
26	Welding of M.S. Pipe-Difference between pipe and plate welding-pipe development 90 degree and 45 degree branch pipe. Pipe Welding-Position 1G 2G 5G 6G - Procedure of pipe welding.
27	Cast Iron-determination of weldability-preheating methods-Choice of Methods of welding(Arc). Bronze Welding of Cast Iron -its Limitation.
28	Fusion Welding of Cast Iron-Bronze welding of Cast Iron-Determination of weldability.
29	Conservation of metallic resources-Welding repairing need of the hour-Advantage of low heat input alloys in weld repair-Powder welding-Tribology (wear and tear)-Hard surfacing electrodes-uses.
30	Classification of steel-Welding of High carbon steel-Low and Medium alloy steels-Limitations preheating and inter pass temperature of plate for such alloys during welding of stainless steel - Grades - Edge preparation - Method of welding.



31	Welding of aluminium-Edge preparation-Flame and angle of blow pipe and filler rod-Flux preheating-Welding of Cast Aluminium-Preheating-Determination of preheating-Technique of welding.
32	Welding of Copper-Properties-Weldability Methods-preheat and post heat-Finishing of Weld-Effect of alloying elements. <b>REVISION &amp; TEST.</b>
33	Welding of copper by gas-procedure-Finishing of weld. Welding of copper, Bronze welding process-Finishing of Welding.
34	Arc cutting of mild steel-Selection methods. Arc Cutting Equipment-Arc Gouging and its application-Types of Arc Cutting Electrodes. Arc Cutting and its applications.
35	Welding of dissimilar metals-Choice of methods. Application of each method-Limitations. Different Flame cutting machines and cutting of quality-care and maintenance.
36	Modern welding Process-Submerged Arc welding Principle of the process- Wires and fluxes for welding & Hard facing -Equipment used Weld procedure-advantages-Limitations and defects in SAW. Electro Slag Welding-Weld Procedure-Advantages, Limitations, weld defects.
37	Introduction to CO2 Welding CO2 Welding Equipment and Accessories-Description of CO2 Welding set with diagram.
38	Mode of metal transfer in CO2 welding. Dip Transfer or Short circuiting transfer Spray Transfer (Free - Flight) Globular Transfer (Intermittent).
39	Welding Wires used in CO2 welding, its composition, diameters, application. Various Gas mixtures and its application in CO2 Welding. Wire feed system-Types-applications-Limitations-Care and maintenance.
40	Tables/Datas related to CO2 Welding Information on solid flux Cored Wires. Defects of CO2 welding and Suitable remedies.
41	Introduction to TIG Welding-TIG Welding Equipments-Advantages of TIG Welding Process over Manual Metal Arc Welding and Oxy-Acetylene Welding Process.



42	Power Sources for TIG welding-Types-Application-Care and maintenance-High frequency unit-parts, construction and use-D.C. Suppressor Unit Construction application-Care and Maintenance Tungsten Electrodes Types. Sizes, uses.
43	Argon Gas-Properties-Uses-Ceramic shield Defects-Causes, and correction in TIG Welding Types of polarity and its application.
44	Datas/Tables for TIG Welding. Defects in TIG welding. Causes and remedies.
45	Pipe welding by Arc and gas-Methods-differences between welding and Pipe welding-advantages.
46	Hard facing-Necessity of types-Methods-applications. Destructive test. Stellite-Necessity-types-flame adjustment-Methods-application.
47	Friction Welding-Principle of the process Description of the equipment. Application of the process-Advantages over the Metallic Arc Welding-Limitation-Applications on Non-Ferrous metals.
48	Resistance Welding-Principle of resistance welding-Types, Application Advantages-Laser Beam Welding and Cutting principle of Laser Beam-Description of equipments. <b>REVISION &amp; TEST.</b>
49	Electron Beam Welding-principle of the Process-Description of equipment-application of the process-Advantages over the Metallic Arc Welding-Limitations. Plasma welding & cutting principle-Limitations.
50	Arc Brazer-Principle of the process-Description of the Equipment-Application of the process-Advantages. Thermit welding.
51	Inspection and Testing of Weld-Destructive Non-destructive test-Semi-Destructive Test Explanation of each method. Economy in Welding Simple Weld Estimation.
52	<b>TEST.</b>



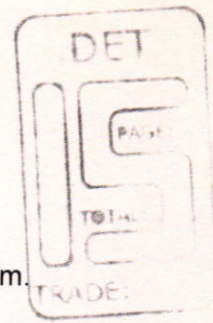


- 17 Allied Ex:1 Marking out on M.S.plate.  
Fitter Ex:2. Filing to square and Hack sawing practise.
- 18 16E Straight line beads and depositing weaved beds on M.S.plate  
10mm in vertical upward position.
- 19 17E Outside corner joint M.S.plate 10mm in vertical upward position.  
18E Fillet weld in T.joint and lap joint on M.S.plate 10mm in vertical  
upward position.
- 20 19G Square butt weld on M.S.sheet 2 mm in vertical postion.  
20E Butt weld on sigle "V" Butt joint on M.S.plate 10 mm in  
Vertical upward position.
- 21 21E Straight line beads in M.S.plate 6mm O.H.position.  
22E Single "V" butt joint on M.S.plate on 10mm in O.H.position.
- 22 23G Fillet weld in lap joint on M.S.sheet 2 mm O.H.Position.  
24E Fillet weld in lap joint on M.S.splate 10mm in O.H.Position.
- 23 25E Fillet weld in sheet 6 mm to dia 50 mm pipe in Flat  
position [flange]  
26E Pipe butt joint on M.S.pipe dia 50mm X 6WT in 1G position.
- 24 27G Pipe elbow joint on M.s.pipe dia 50mm in flat position  
28G pipe welding in 90 degree T-Joint on M.S.pipe 50mm in flat position.
- 25 Allied Ex:3. Sheet metal joints.  
SMW Ex:4. Pipe joint-T- pipes-Equal dia.
- 26 29E Fusion welding in single "V" butt on C.I plate 12mm
- 27 30E Bronze weld of cast iron 10mm thick plate "F".  
31G Bronze welding in square butt joint on copper to brass sheet  
of 3.15mm in flat position.
- 28 32E Deposition bead on M.S. Round rod 25 mm by hard facing  
electrodes in flat position.
- 29 33 Oxy-acetylene machine cutting-straight, bevel, circular on  
M.S.plate 10mm.  
34 Flame gouging on M.S.plate 12mm
- 30 35 TIG Fusion runs without filler rod on Aluminium  
Aluminium sheet 3mm position F.  
36 TIG Fusion Runs with filler rod on Aluminium.  
Aluminlum sheet 3 mm position F.



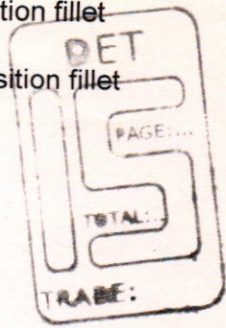


- 31 37 TIG Fillet weld lap joint on Aluminium  
Aluminium sheet 3 mm position F.  
38 TIG Fillet weld Tee Join ton Aluminium.  
Aluminium sheet 3 mm position F.
- 32 39 TIG Butt weld square butt joint on Aluminium.  
Aluminium sheet 3mm position F.  
40 TIG Fillet weld outside corner joint on Aluminium.  
Aluminium sheet 3mm position F.
- 33 41 TIG Butt weld -Square butt joint on Aluminium pipe  
42 TIG Aluminium pipe dia 50mm x 3 mm WT. Position F.
- 34 43 TIG Fusion run without filer rod on stainless steel sheet.  
stainless steel sheet-2mm position.  
44 TIG Fusion run without filer rod on stainless steel sheet.  
stainless steel sheet-2mm position.
- 35 45 TIG Fillet weld-lap joint on stainless steel sheet  
stainless steel sheet-2 mm position F.  
46 TIG Fillet weld-Tee joint on stainless steel sheet  
stainless steel sheet-2 mm position F.
- 36 47 TIG Fillet weld -outside corner joint.  
stainless steel Sheet-2 mm position F.  
48 TIG Butt weld square butt joint.  
stainless steel Sheet-2 mm position F.
- 37 49 TIG Butt weld-square but joint on stainless steel tube.  
Stainless steel tube 30 or 40 mm O.D 3 mm WT position F.  
50 TIG Butt weld on M.S.pipe. MS pipe 50 mm OD x 3 mm WT  
position F.
- 38 51 TIG Fillet Tee joint on M.S.pipe. M.S.pipe 50mm OD X 3mm  
52 TIG Pipe elbow joints on M.S. pipe. M.S.Pipe 50mm OD x 3 mm WT  
Position.
- 39 53 CO2 CO2 Straight line beads on M.S.plate 10mm position F.
- 40 54 CO2 CO2 Fillet weld Tee joint on M.S.flat 50 x 12 mm position F.  
55 CO2 CO2 Fillet weld lap joint M.S.flat 50 x 12 mm position F.
- 41 56 CO2 CO2 Straight line beads in Horizontal position. M.S.plate 10mm  
57 CO2 CO2 Fillet weld Tee joint. M.S.flat 50 x 10 mm podiyion H.





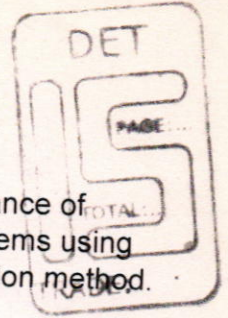
- 42 58CO2 CO2 welding of 3mm MS plate:practice in 1F&2F position fillet welding
- 59CO2 CO2 welding of 3mm MS plate:practice in 3F & 4F position fillet welding
- 43 60 Plasma cutting practise in SS sheet
- 44 61CO2 CO2 welding of pipe of 127 mm dia-5G position.
- 62CO2 CO2 welding of pipe of 127 mm dia-6G position.
- 45 63 Flux cored arc welding of 3mm MS plate:practice in 1F & 2F position fillet welding.
- 64 Flux cored arc welding of 3mm MS plate:practice in 3F & 4F position fillet welding.
- 46 65 Flux cored arc welding of 12 mm MS plate:practice in 1G & 2G position groove welding.
- 66 Flux cored arc welding of 12 mm MS plate:practice in 3G position groove welding.
- 47 67 Flux cored arc welding of pipe of 127mm dia -5G position.
- 68 Flux cored arc welding of pipe of 127mm dia -6G position.
- 48 69 Resistance spot welding-0.8mm, 1.2 mm, 2mm MS sheets
- 70 Resistance seam welding-0.8mm & 1.2 MS sheet
- 49 71 SAW-Bead on plate with various parameter 25 mm & 1 F position fillet welding - Demo in the Industry.
- 72 SAW-IG position 25mm MS plate groove welding - Demo in the Industry.
- 50 73 Friction welding of rods and tubes - 25mm dia rod and tube of 44.5mm dia - Demo in the Industry.
- 74 EBW & Laser - Demo in the Industry.
- 75 MIG Brazing of 1mm sheet - Demo in the Industry.
- 51 Revision .
- 52 Test.





# ADVANCED WELDING TECHNICIAN

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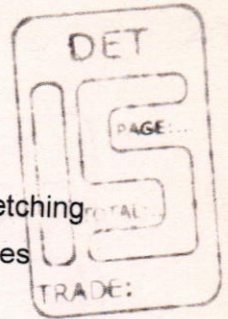
- | MonthNo | Work shop calculation and science  |
|---------|--|
| 1       | Importance of science and calculation to the trade skill and Importance of fraction and decimals - Multiplication and division - Simplified problems using BODMAS rule - square root - simplified problems using rationalization method.   |
| 2       | Engineering materials- Properties & uses - Explanation of mechanical properties with practical applications related to the trade - Types of steels Classification of steels (By method, By process, By properties) - Heat treatment processes.   |
| 3       | Non - Ferrous materials - copper, Zinc, Lead, Tin and Aluminium - Properties and uses. <b>REVISION &amp; TEST</b><br>Density and specific gravity, Mass, Weight - Archimede's principle.   |
| 4       | Percentage-changing percent to decimal and fraction and vice - versa.<br>Problems in percentages related to the trade.<br>Ratio and proportion - shop problems.  |
| 5       | Dynamics - Speed, Velocity and Acceleration - Newton's law of motion - Work , Power and Energy - simple problems.  |
| 6       | Algebra - Stanardproofs - Simple equations - simultaneous equations - Quadratic equations - Problems. <b>REVISION &amp; TEST.</b>  |
| 7       | Statics - Law of parallelogram of forces - Bending moment and Shear force with diagram - Law of triangle of forces - Problems.   |
| 8       | Heat - Conversion of heat - Transfer of heat - Volume coefficient of gas - Calorimetry - Latent heat - Pyrometer - Heat gain & Heat loss - Humidity.   |
| 9       | Importance of Logarithm applications - Mensuration - Area, Volume and Weight of simple solid bodies and prism - Shop problems. <b>REVISION &amp; TEST.</b>   |
| 10      | Strength of materials - stress , strain , Types of stresses - Elastic limit - Hooke's Law - Modulus of Elasticity (Young's modulus) - Poission's ratio - Bulk modulus - Stresses in a cylindrical shell due to an internal pressure - Circumferential stress (Hoopstress) - Longitudinal stress - Design of Cylindrical shell- pressure of boiler - Simple problems. |
| 11      | Mensuration problems by using the Logarithm.<br>Caculate the material requirement for a particular production jobs.  |
| 12      | Finding the capacity in litres of square , Rectangle, Hexagon, Cone and Cylinder shaped vessels.<br><b>REVISION &amp; TEST.</b>  |



## ADVANCED WELDING TECHNICIAN

Month No.

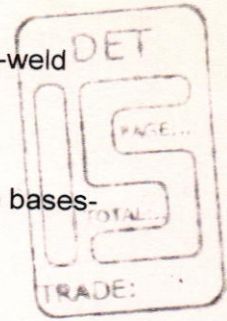
Engg. Drawing



- 1 Importance of Engineering drawing-Uses of drawing Instruments, Letters, numbers and Alphabets as per IS 696/1972-Free hand sketching of straight lines, rectangles, Circles, polygons-Uses of different types of lines, scales and dimensions.
- 2 Isometric views and Oblique views with dimensions-Explanation of simple orthographic projection First angle and Third angle as per IS 696/1972-Views of simple objects-Reading of simple blue print reading.
- 3 Views of simple hollow and solid bodies with dimensions-Orthographic Projection from the given Isometric projection of shaped block in First angle and Third angle. **Revision and test.**
- 4 Exercise on blue print reading related to missing lines and missing views-simple isometric drawing from the given orthographic views-Free hand sketching of rivets, washers with dimensions-Free hand sketching of rivetted joints.
- 5 Free hand sketching of nuts, bolts, keys, cotters, and screw threads as per ISI Free hand sketching of hand tools related to the trade.
- 6 Geometrical development of prism, pyramid, cylinder, and cone-views of simple solid bodies cut by section plane on drawing standard methods (Full and half sections) IS 696/1972. **Revision and test.**
- 7 Sketching of finished articles from drawing and preparation of sequence of operations-Free hand sketching of simple objects related to the trade and preparation of simple working drawing from the sketches-conventional representation of material by ISI- method of indicating surface roughness by IS.



- 8 Welding design basic details-terminology-different types of joints-weld symbols-ISI standards-Standard groove details for fusion welds.
- 9 Welding processer design - Construction of materials of machine bases-choice of materials.
- 10 Joint designs - Permissible stresses-Stress analysis and design data-allowable unit stress-thro' welds-weld co-efficient factor - Joint design , location of joints within a member - transmission of stresses through welds-design and drawing exercises.
- 11 Design of structures minimum size of Fillets-Design of static loaded structurals-Plate girders-Beam brackets-detailed design for typical part assemblies-design of dynamic loaded structurals-Design and drawing exercises-Design of welding fixtures.
- 12 Design of pressure parts - Pressure vessels-boilers-flux and gas pipes-significance-corrosion and erosion factors-radiography-extent of testing-typical design of tubular systems-drum exercise on drawing offer design.





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**INDUSTRIAL SCHOOLS**  
**TRADE SYLLABUS – REVISED**

Name of the Trade : Advanced Welding Technician

**SPACE REQUIRED:**

- (1) Workshop/Lab : 1000 sq. ft.  
(2) Class Room : 200 sq. ft.

**List of Tools & Equipments**  
**For The Trade of ADVANCED WELDING TECHNICIAN**  
**(For a batch of unit of 20 trainees)**

S.NO	NAME OF THE ITEM	REVISED NUMBER
1	Gloves pair leather	5
2	Apron leather	5
3	Screen welding helmet type	5
4	Screen welding hand type	20
5	Goggles pair welder	10
6	Hammer scaling 0.25 kg. with handle	5
7	Chisel cold flat 19 mm	5
8	Center punch 9 mm x 127 mm	5
9	Dividers 20 cm	6
10	Caliper outside 15 cm	5
11	Rule 60 cm two fold, brass tipped to read inches and mm	5
12	Wire brush 15 cm x 3.7 cm	5
13	Spark lighter	5
14	Chipping screen hand	5
15	Safety boots for welders	20
16	Safety goggles	10
17	Square blade 15 cm	10
18	Scriber 15 cm	5
19	Tongs holding 30 cm	5
<b><u>SHOP OUTFIT</u></b>		
20	Brass rule 30 cm or nickel chrome steel rule 30 cm	4
21	Hammer ball pein 1 kg. With handle	4
22	Chisel cold cross 9 mm	8
23	Screw driver 25 cm blade	5
24	Number punch 6 mm and letter punch 6 mm	1 set
25	Leg vice on stand 150 mm	1
26	Hacksaw frame adjustable 30 cm	4
27	Hammering blocks 5cm thick 60 sq.	2
28	Magnifying glass 15 cm	4



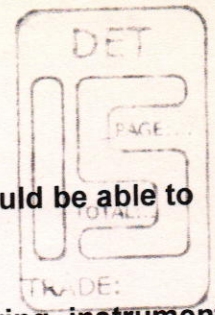
29	Weld measuring gauge fillet and butt	1
30	File half round bastard 30 cm	6
31	File flat 35 cm rough	6
32	Spanner 12 x 15 mm double ended	4
33	Spanner D.E.6mm to 15 mm by 1.5 mm set of nos.	1
34	Clamps 10 cm, 15 cm, 20 cm, 30 cm.	1 each
35	Hammer sledge double faced 3kg.	1
36	Pipe wrench 25 cm and 35cm	1
37	Steel tape 182 cm flexible in case	3
38	Tinman's square 60 cm x 30 cm	1
39	Welding torches with 10 nozzles 2 to 45 Low pressure with nozzle.	6 sets
40	Eutalloy micro flow powder welding process hot	1 kit
41	Rototec powder welding process cold	1 kit
42	Earth clamps	12
43	Pipe cutter (cap 50mm dia)	1 set
44	Cutting torch Oxy-Actylene with cutting nozzle 3/64.	2 sets
45	Heavy duty cutting and gouging blow pipe with cutting and gouging nozzles.	1 set
46	Electrode holder 400 amps	6
47	Welding rubber hose, Oxygen and Acetylene 8mm	30 m each
48	Rubber hose clips	50
49	Spindle key (for opening cylinder valve)	4
50	Pressure regulator oxygen double stage	4
51	Pressure regulator acetylene Regulators	4
52	Tip cleaner	4
53	Glasses coloured 108 mm x 82 mm x 3mm DIN 11A 13A.	16
54	Glass white 108 mm x 82 mm	32
55	Outfit spanners	8
56	Rubber hose pipe black and red 5 mm	15 meters
57	Leather sleeves	12 pairs
<b><u>GENERAL INSTALLATION</u></b>		
58	Transformer welding, continuous welding, current with all accessories (I) 300A (II) 400A	1 set each
59	Arc welding set rectifier type 300- 450Amps.	1 set
60	Welding generator DC rotary set 200-300 Amps with all accessories.	1 set
61	CO2 Welding machine complete set 400 Amps.	1 set
62	TIG welding set complete 300 Amps AC/DC.	1 set
63	Welding cables to carry 350 Amps with flexible rubber.	20 Mtr.
64	Air plasma cutting machine 350 Amps.	1 set
65	Lugs for cables	24
66	Oxygen cutting machine (Line and Circle) Gas welding table 822 cm x 60 cm fire bricks on stand with.	1



67	Positioners	3
68	Arc welding table all metal with positioners 122 cm x 92 cm x 60 cm.	3
69	Trolley for cylinder (HP unit)	1
70	Bench shear hand capacity up to 5 mm	1
71	D.E Grinder 30 cm wheel motorized pedestal type	1
72	Vice bench 10 cm	4
73	Power hacksaw	1
74	Electrode driving over thermostatically (controlled temperature 0-250°C, 10kg/cap)	1
75	AG 7 Grinder	1
76	Portable drilling machine (6mm Cap)	1
77	Brass weld equipment eraser which can be used with existing welding transformer	1
78	Fire extinguisher (foam type and CO <sub>2</sub> type)	1 each
79	Metal rack 182 cm x 152 cm x 45 cm	1
80	Instructor table (steel)	1
81	Block board with easel	1
82	Instructor chair (steel)	1
83	First Aid box	1
84	Welding helmets	6
85	Fire buckets with stand	3
86	Steel locker with 8 pigeon holes	2



# ACHIVEMENT



After completion of one year training, the trainee should be able to

Identify and use of hand tools and measuring instruments related to the Trade.

Manipulate all types of welding machines and accessories like Welding Transformer, D.C. Generators, Rectifiers, TIG, MIG welding Machines and Plasma welding machines.

Perform basic Fitting work and Sheet Metal work.

Perform to weld joints and weld pipes in all positions by Gas and Arc welding .

Perform to weld Ferrous and Non ferrous metals to a reasonable standards.

Perform TIG, MIG welding and plasma Cutting.

Knowledge about weld tests - Destructive and Non - destructive test.

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