



GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP
DIRECTORATE GENERAL OF TRAINING

COMPETENCY BASED CURRICULUM

WELDER

(Duration: One Year)

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL- 4



SECTOR – CAPITAL GOODS AND MANUFACTURING



Directorate General of Training

WELDER

(Engineering Trade)

(Revised in 2019)

Version: 1.2

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL - 4

Developed By

Ministry of Skill Development and Entrepreneurship

Directorate General of Training

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1. COURSE INFORMATION

During the one year duration a candidate is trained on subjects Professional Skill, Professional Knowledge, Engineering Drawing, Workshop Science & Calculation and Employability Skills related to job role. In addition to this a candidate is entrusted to undertake project work and extracurricular activities to build up confidence. The broad components covered under Professional Skill subject are as below:

The practical skills are imparted in simple to complex manner & simultaneously theory subject is taught in the same fashion to apply cognitive knowledge while executing task. The safety aspects covers components like OSH & E, PPE, Fire extinguisher, First Aid and in addition 5S being taught. The practical part starts with edge preparation by hacksawing, filing and fitting followed by Oxy Acetylene Welding & Brazing, Oxy Acetylene Cutting, Shielded Metal Arc Welding, Gas Metal Arc Welding, Gas Tungsten Arc Welding and Spot Welding, Plasma Cutting and Arc Gouging. These processes are widely used in Industries.

During the practice on Welding / Brazing process, the trainees will learn to read the job drawing, select the required base metal and filler metals, cut the metals by appropriate process, carry out edge preparation, setup the plant and do welding/Brazing on M.S, SS, Aluminium and Copper in different positions. On completion of each job the trainees will also evaluate their jobs by visual inspection, and identify the defects for further correction/improvement. They learn to adapt precautionary measures such as preheating; maintaining inter-pass temperature and post weld heat treatment for Welding Alloy steel, Cast Iron etc. The Work Shop calculation taught will help them to plan and cut the required jobs economically without wasting the material and also used in estimating the Electrodes, filler metals etc. The Workshop Science taught will help them to understand the materials and properties, effect of alloying elements etc. Engineering Drawing taught will be applied while reading the job drawings and will be useful in understanding the location, type and size of weld to be carried out.

The professional knowledge taught will be useful in understanding the principles of Welding, Brazing and Cutting process, use of jigs and Fixtures, distortion and methods of control, selection of consumables and to take precautionary measures for storage and handling and apply the same for executing the Cutting, Welding and Brazing.

The knowledge and practice imparted on Destructive and Non-destructive testing will be use in understanding the standard quality of welds and to carry out shop floor Inspection and test in laboratories.

One project need to be completed by the candidates in a group. In addition to above components the core skills components viz., Workshop calculation & science, Engineering drawing, employability skills are also covered. These core skills are essential skills which are necessary to perform the job in any given situation.

Learning outcomes are a reflection of total competencies of a trainee and assessment will be carried out as per the assessment criteria.

5.1 LEARNING OUTCOMES (TRADE SPECIFIC)

1. Set the gas welding plant and join MS sheet in different position following safety precautions. *[Different position: - 1F, 2F, 3F, 1G, 2G, 3G.]*
2. Set the SMAW machine and perform different type of joints on MS in different position observing standard procedure. *[different types of joints- Fillet (T-joint, lap & Corner), Butt (Square & V); different position - 1F, 2F, 3F,4F, 1G, 2G, 3G, 4G]*
3. Set the oxy- acetylene cutting plant and perform different cutting operations on MS plate. *[Different cutting operation – Straight, Bevel, circular]*
4. Perform welding in different types of MS pipe joints by Gas welding (OAW). *[Different types of MS pipe joints – Butt, Elbow, T-joint, angle (45°) joint, flange joint]*
5. Set the SMAW machine and perform welding in different types of MS pipe joints by SMAW. *[Different types of MS pipe joints – Butt, Elbow, T-joint, angle (45°) joint, flange joint]*
6. Choose appropriate welding process and perform joining of different types of metals and check its correctness. *[appropriate welding process – OAW, SMAW; Different metal – SS, CI, Brass, Aluminium]*
7. Demonstrate arc gouging operation to rectify the weld joints.
8. Test welded joints by different methods of testing. *[different methods of testing- Dye penetration test, Magnetic particle test, Nick break test, Free band test, Fillet fracture test]*
9. Set GMAW machine and perform welding in different types of joints on MS sheet/plate by GMAW in various positions by dip mode of metal transfer. *[different types of joints- Fillet (T-joint, lap, Corner), Butt (Square & V); various positions- 1F, 2F, 3F,4F, 1G, 2G, 3G]*
10. Set the GTAW machine and perform welding by GTAW in different types of joints on different metals in different position and check correctness of the weld. *[different types of joints- Fillet (T-joint, lap, Corner), Butt (Square & V) ; different metals- Aluminium, Stainless Steel; different position- 1F & 1G]*
11. Perform Aluminium & MS pipe joint by GTAW in flat position.
12. Set the Plasma Arc cutting machine and cut ferrous & non-ferrous metals.
13. Set the resistance spot welding machine and join MS& SS sheet.
14. Perform joining of different similar and dissimilar metals by brazing operation as per standard procedure. *[different similar and dissimilar metals- Copper, MS, SS]*

15. Repair Cast Iron machine parts by selecting appropriate welding process. [*Appropriate welding process- OAW, SMAW*]
16. Hard facing of alloy steel components/ MS rod by using hard facing electrode.