

Model Curriculum

Manual Metal Arc welding/Shielded Metal Arc Welding Welder

MMAW/SMAW Welder

SECTOR: **CGSC**
SUB-SECTOR: **Machine Tools**
Dies, Moulds and Press tools
Plastics Manufacturing Machinery
Textile Manufacturing Machinery
Process Plant Machinery
Electrical And Power Machinery
Light Engineering Goods
OCCUPATION: **Welding And Cutting**
REFERENCE ID: **CSC/Q 0204**
NSQF LEVEL: **3**



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MMAW/SMAW Welder

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “MMAW/SMAW Welder”, in the “Capital Goods” Sector/Industry and aims at building the following key competencies amongst the learner

| | | | |
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| Program Name | MMAW/SMAW Welder | | |
| Qualification Pack Name & Reference ID. | CSC/Q 0204 | | |
| Version No. | 1.0 | Version Update Date | 25 – 12 – 2015 |
| Pre-requisites to Training | Minimum qualification – 8 th Standard | | |
| Training Outcomes | <p>After completing this programme, participants will be able to:</p> <ul style="list-style-type: none"> • Carry out preparations for performing MMAW/SMAW & Oxy-Fuel gas cutting operations using Welding Machine: read and establish requirements of raw material, dimensions, limits & tolerances, finish requirements etc. Be able to perform daily maintenance, carry out preliminary checks, obtain and identify correct and calibrated tools. • Carry out MMAW/SMAW & Oxy-Fuel Gas cutting- Welding operations : use and extract information from engineering drawings, labelling data etc, fixing and unfixing components, produce machined components, measure critical parameters of machined components, observe inconsistencies, replace worn out tools and store finished products etc • Work safely following health and safety standards: read and understand the safety signs and instructions on the welding machines, use of PPE, identify job –site hazards and apply good housekeeping practices etc | | |

This course encompasses 3 out of 3 National Occupational Standards (NOS) of “CSC/Q 0204” Qualification Pack issued by “Capital Goods Skill Council”.

| Sr. No. | Module | Theory Duration (hh:mm) | Practical Duration (hh:mm) | Key Learning Outcomes | Corresponding NOS Code | Equipment Required |
|---------|--|-------------------------|----------------------------|--|------------------------|---|
| 1 | Manually weld carbon and low alloy steels in 1G/1F, 2G/2F and 3G/3F welding positions using Manual Metal Arc Welding / | 80:00 | 220:00 | <ul style="list-style-type: none"> • Understand main features and working parts of MMAW/SMAW welding machine and accessories that can be used. • Identify and obtain job | CSC/N 0204,CSC/N 0201 | MMAW/SMAW(AC or DC) , oxy-fuel gas such as oxy-acetylene , Cutting tools measuring tools , Hand Tools , Power tools , PPE(suitable aprons, |



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| | <p>Shielded Metal Arc Welding , Oxy-fuel gas cutting.</p> | | | <p>specifications from valid sources like approved sketches / illustrations, and identify raw material, measuring and cutting tools and their calibration, dimensions, limits and tolerances, surface finish, shapes, cycle time and production rates. Understand types of measurements and dimensions like lengths, depths, flatness, surface finish, squareness,, parallelism, hole size/fit, angles And recesses, runout and roundness .</p> <ul style="list-style-type: none"> • Preparation of work areas for flat (PA) IG/1F, horizontal vertical (PB)2F, horizontal (PC)2G, vertical upwards (PF) 3F / 3G, vertical downwards (PG) 3F / 3G, Plate to Pipe (Fixed) 5F setting up joint in correct position) • Basic daily maintenance of Welding machine and good housekeeping activities like removing and disposing swarf, keeping work areas free from foreign objects and dirt, | | <p>welding gloves, respirators, safety boots, correctly fitting overalls, suitable eye shields/goggles, hard hat/helmet), transformers; rectifiers; generators; invertors; consumables – electrodes, dyes; welding accessories - holders, cables and accessories; ancillary equipment - power saw, angle, color coded cylinder oxygen, color coded cylinder acetylene, cylinder valve, flashback arrestor, set of nozzles, gas lighter nozzle, cutting tips, pressure regulator, pressure gauge, non-return valves, color coded flexible hose, trolleys, torches (rose-bud heating, cutting, others pedestal and straight grinders, tong tester Drawing Tools , Cutting Machines , Hand Grinders , GD&T , Etc.</p> |
|--|---|--|--|---|--|---|



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| | | | | <p>machine lubrication , transformers; rectifiers; generators; invertors; consumables – electrodes, dyes; welding accessories - holders, cables and accessories; ancillary equipment - power saw, angle, pedestal and straight grinders, tong tester</p> <ul style="list-style-type: none"> • Understand the different work holding devices like other tools like hammer (ball peen, mallet), magnifying glass, allen keys, spanner, wrenches. Measuring tools like steel rulers, micrometers, verniers, gauges, dial test indicators, surface finish equipment and height masters. • Fixing and unfixing the job piece using predetermined fixtures or work holding devises and measure the critical parameters of weld component after trial run. Correct the adjustment. • Produce machines components combining different fillet and grove joints in 1F/1G, 2F/2G and 3F/ 3G welding | | |
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| | | | | <p>positions as per the WPS specified using single or multi-run welds .</p> <ul style="list-style-type: none"> • Preform welding operations using different materials like Carbon , low alloy steel (plate; sheet; pipe/tube; bars and rods) etc • Produce quality components using visual inspection for identify various weld defect (like : use of visual techniques, distance from workpiece, angle of observation, adequate lighting, low powered magnification, fillet weld gauges, etc.)required parameters for dimensional accuracy is within the tolerances specified on the drawing/specification, or within +/- 2mm ,angled/radial cuts are within specification requirements; cuts are clean and smooth and free from flutes , ASME section IX, EN 287, ISO 9606, IS 7310. | | |
| 2 | Use basic health and safety practices at the workplace | 30 | 70 | <ul style="list-style-type: none"> • Understand importance of complying health safety and environmental regulation at work | CSC/ N 1335 | Sample Helmet, gloves, earplugs, goggles, Shoes, node mask, Apron Etc. |



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| | | | | <p>place.</p> <ul style="list-style-type: none"> • Understand hazards of working with welding and cutting equipment; condition of welding leads, earthing arrangements and electrodes and gas cylinders. • Be able to identify job site hazards like sharp edged heavy tools, gas cylinders, welding radiations, chemicals, fumes, obstructions in corridors, naked wires / cables etc • Understand: Different types of fire; use of appropriate fire extinguishers risk and accidents; safe working practices and methods of accident prevention at work place • Importance of using protective clothing like leather or asbestos gloves, flame proof aprons, flame proof overalls buttoned to neck, cuffless (without folds), trousers, reinforced footwear, helmets/hard hats, cap and shoulder covers, ear defenders/plugs, safety boots, knee pads, particle masks, glasses/goggles/visors | | |
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| | | | | ,hand shields, machine guards, residual current devices, shields, dust sheets, respirator etc. | | |
| 3 | Work effectively with others | 40 | 60 | <ul style="list-style-type: none"> • Able to receive and pass information from and to authorised persons and seeking clarification from authorized persons where required. • Able to communicate by avoiding use of abusive language; display respect to others. • Respect others time by completing given task in time, avoiding gossip and avoid conflict. | CSC/N 1336 | |

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| Total Duration: 500 | Theory <u>150</u> | Practical <u>350</u> | Unique Equipment Required: MMAW/SMAW , oxy-fuel gas such as oxy-acetylene , Cutting tools measuring tools , Hand Tools , Power tools , PPE(suitable aprons, welding gloves, respirators, safety boots, correctly fitting overalls, suitable eye shields/goggles, hard hat/helmet), transformers; rectifiers; generators; invertors; consumables – electrodes, dyes; welding accessories - holders, cables and accessories; ancillary equipment - power saw, angle, color coded cylinder oxygen, color coded cylinder acetylene, cylinder valve, flashback arrestor, set of nozzles, gas lighter nozzle, cutting tips, pressure regulator, pressure gauge, non- return valves, color coded flexible hose, trolleys, torches (rose- bud heating, cutting, others pedestal and straight grinders, tong tester Drawing Tools, Cutting Machines, Hand Grinders, GD&T, Etc... Sample Helmet, gloves, earplugs, goggles, Shoes, node mask, Apron Etc. |
|--------------------------------------|------------------------------------|---------------------------------------|--|

Grand Total Course Duration: **500 Hours 00 Minutes**

(This syllabus/ curriculum has been approved by Capital Goods Sector Skill Council.



Annexure1: Assessment Criteria

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|---|---|
| Assessment Criteria for MMAW/SMAW Welder | |
| Job Role | MMAW/SMAW Welder |
| Qualification Pack | CSC/Q 0204 |
| Sector Skill Council | Capital Goods Skill Council (CGSC) |

| Sr. No. | Guidelines for Assessment |
|---------|---|
| 1 | Criteria for assessment for Qualification Pack has been created based on the NOSs and performance criteria by CGSC. Each Performance Criteria (PC) has been assigned marks proportional to its importance within NOS and weightages have also been given among the NOSs accordingly. CGSC has laid down the proportion of marks for Skills (Practical), Theory/Knowledge and Behaviour for each PC. |
| 2 | The assessment of the theory/knowledge will be based on written test/viva-voce or both while skill test shall be hands on practical. |
| 3 | The assessment shall be done as per the assessment guides devised by CGSC in coordination with the assessment agencies. Assessment guides consists of a unique question papers for theory/knowledge and the method of assessments and evidence collection and detailed marking. |
| 4 | To pass the Qualification Pack, every trainee should score a minimum of 70% in Skill, 60% in Knowledge OR as per guidelines applicable from time to time. |
| 5 | |
| 6 | |

| Sr. No. | NOS No. | NOS Name | Total Marks | Marks Allocation: Skills | Marks Allocation: Knowledge | Marks Allocation: Behaviour |
|------------------------------|-------------|---|-------------|--------------------------|-----------------------------|-----------------------------|
| 1 | CSC/ N 0204 | Manually weld carbon and low alloy steels in 1G/1F, 2G/2F and 3G/3F welding positions using Manual Metal Arc Welding / Shielded Metal Arc Welding | 100 | 89 | 11 | .. |
| 2 | CSC/N 0201 | Perform simple manual cutting operations on carbon steels using oxy-fuel gas | 100 | 89 | 11 | |
| 3 | CSC/N 1335 | Use basic health and safety practices at the workplace | 100 | 64 | 36 | .. |
| 4 | CSC/N 1336 | Work effectively with others | 100 | | 30 | 70 |
| Total: | | | 400 | 242 | 88 | 70 |
| Percentage Weightage: | | | | 70 | 20 | 10 |



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|----------------------------------|--|-----------|-----------|-----------|
| Minimum Pass% to qualify: | | 70 | 60 | 60 |
|----------------------------------|--|-----------|-----------|-----------|

Annexure2: Trainer Prerequisites for Job role: “MMAW/SMAW Welder ” mapped to Qualification Pack: “CSC /Q 0204”

| Sr. No. | Area | Details |
|---------|---|--|
| 1 | Job Description | To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack “CSC/Q 0204”. |
| 2 | Personal Attributes | Aptitude for conducting training, and pre/ post work to ensure competent, employable candidates at the end of the training. Strong communication skills, interpersonal skills, ability to work as part of a team; a passion for quality and for developing others; well-organised and focused, eager to learn and keep oneself updated with the latest in the mentioned field. |
| 3 | Minimum Educational Qualifications | Preferably Diploma/Degree in Mechanical Engineering |
| 4a | Domain Certification | Certified for Job Role: “CNC Operator Turning” mapped to QP: “CSC /Q 0204” with Minimum acceptance score of 85 %. |
| 4b | Platform Certification | Recommended that the Trainer is certified for the Job Role: “Trainer”, mapped to the Qualification Pack: “SSC/1402” with Minimum accepted score of 85%. Alternatively, must have successfully undergone a CGSC organized TOT workshop on “How to Trainer”. |
| 5 | Experience | Minimum 3 to 4 years of industry experience in relevant job role and a Minimum of 3 to 4 years and Training experience in relevant job role. |



Capital Goods Skill Council

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