

Model Curriculum

Manual Metal Arc welding/Shielded Metal Arc Welding 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

REF. ID : CSC/Q 0204 / VERSION -1.0

NSQF LEVEL : 3



Certificate

CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

CAPITAL GOODS SKILL COUNCIL

for the

MODEL CURRICULUM

Complying to National Occupational Standards of

Job Role/ Qualification Pack: **Manual Metal Arc Welding / Shielded Metal Arc Welding Welder'**
QP No. '**CSC/Q 0204 NSQF Level 3'**

Date of Issuance: **November 4th, 2015**

Valid up to: **November 3rd, 2016**

* Valid up to the next review date of the Qualification Pack



Authorised Signatory
(Capital Goods Skill Council)

TABLE OF CONTENTS

1. Curriculum	01
2. Trainer Prerequisites	05
3. Annexure: Assessment Criteria	06

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

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	Key Learning Outcomes	Equipment Required
1	<p>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 , Oxy-fuel gas cutting.</p> <p>Theory Duration (hh:mm) 80:00</p> <p>Practical Duration (hh:mm) 220:00</p> <p>Corresponding NOS Code CSC/N 0204,CSC/N 0201</p>	<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 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 . 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, 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 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 	<p>MMAW/SMAW(AC or DC) , 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.</p>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<p>joints in 1F/1G, 2F/2G and 3F/ 3G welding 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	<p>Use basic health and safety practices at the workplace</p> <p>Theory Duration (hh:mm) 30:00</p> <p>Practical Duration (hh:mm) 70:00</p> <p>Corresponding NOS Code CSC/ N 1335</p>	<ul style="list-style-type: none"> • Understand importance of complying health safety and environmental regulation at work place. • 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 ,hand shields, machine guards, residual current devices, shields, dust sheets, respirator 	Sample Helmet, gloves, earplugs, goggles, Shoes, node mask, Apron Etc.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		etc.	
3	<p>Work effectively with others</p> <p>Theory Duration (hh:mm) 40:00</p> <p>Practical Duration (hh:mm) 60:00</p> <p>Corresponding NOS Code CSC/N 1336</p>	<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. 	
	<p>Total Duration 500</p> <p>Theory Duration 150</p> <p>Practical Duration 350</p>	<p>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, nose mask, Apron Etc.</p>	

Grand Total Course Duration: 500 Hours 00 Minutes

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

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	Minimum - Diploma/Degree in Mechanical Engineering
4a	Domain Certification	Certified for Job Role: “MMAW/SMAW Welder” 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/Q1402” 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.

Annexure: Assessment Criteria

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.

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
Minimum Pass% to qualify:				70	60	60



Capital Goods Skill Council

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