Model Curriculum

Assistant Manual Metal Arc Welding/Shielded Metal Arc Welding Welder

Assistant MMAW/SMAW Welder

SECTOR:	**CGSC**
SUB-SECTOR:	**Machine Tools** **Tools Dies 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 0202**
NSQF LEVEL:	**2**

CGSC
CAPITAL GOODS SKILL COUNCIL

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Assistant MMAW/SMAW Welder

CURRICULUM / SYLLABUS

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

Program Name	**Assistant MMAW/SMAW Welder**		
Qualification Pack Name & Reference ID.	CSC/Q 0202		
Version No.	1.0	**Version Update Date**	26 – 12 – 2015
Pre-requisites to Training	Minimum qualification –5th Standard		
Training Outcomes	**After completing this programme, participants will be able to:** • **Manually weld carbon and low alloy steel in simple welding position using MMAW/ SMAW processes:** read and interpret routine information from job instructions, identify welding machines and produce defect free fillet and grove joints in IG/IF, 2F and 2G position using single or multiple run welds. • **Carrying out simple manual cutting operations on low carbon and low alloy steel using oxy-fuel gas:** interpret cutting procedure data specification and produce defect free thermal cuts through various cutting procedures using oxy-fuel gas cutting equipment. • **Work safely following health and safety standards:** read and understand the safety signs and instructions on the machine, use of PPE, identify job – site hazards and apply good housekeeping practices etc		

This course encompasses 4 out of 4 National Occupational Standards (NOS) of "CSC/Q0202" 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 simple welding positions using Manual Metal Arc Welding / Shielded Metal	50:00	150:00	• Understand main components and controls of welding equipment, various welding methods and specific equipment requirements for MMAW / SMAW.	CSC/N 0202, CSC/N 0201	MMAW/SMAW(AC or DC) , oxy-fuel gas such as oxy-acetylene , Cutting tools measuring tools , Hand Tools , Power tools , PPE

	Arc Welding ,			Understand type of current used and implications, types of consumables and various kinds of defects associated with this welding process. • Understand types of joints (groove and fillet), weld bead shape and characteristics (spatter deposits, roughness, evenness, fill, crater, overlap etc), welding positions (IG/IF, 2F, 2G), process specification sheets, travel speeds and heat inputs, importance of pre and post heating and types of visual inspections methods like distance from workpiece, angle of observation, adequate lighting etc, to check welding defects (lack of continuity, uneven and irregular ripple formation, excessive spatter, burn through, undercutting, overlap, distortions, porosity, internal cracks, surface cracks, sharp edges etc) • Read and interpret routine information from job instructions to identify welding machine (transformers, rectifiers, inverters and generators),		(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.

				perform measurements for joint preparation on carbon steel and low alloy steels of plate size (>1.5mm, <24 mm), and sheet size (1.5mm), which are free from rust, scaling, paint, grease and moisture. Prepare welding machine (AC) or (DC), electrodes, dyes, accessories, ancillary equipment (power saw, angle, grinders etc) for a test welding specimen. • Produce quality fillet and groove joints maintaining proper bead sequence and using appropriate travel speed on carbon and low alloy steel material sheet and plates from 1.5 mm to 24 mm using drag, weave, whip methods in flat IG/IF, horizontal 2F and 2G position and remove slag in appropriate manner by wire brush, hammer etc • Measure and check all dimensional and geometric aspects of weld using visual inspection for lack of continuity, uneven and irregular ripples formation, excessive spatter, incorrect weld size or profile, burn		

				through, undercutting, overlap, distortions, porosity, internal and surface cracks, stray arc strikes, sharp edges etc		
2	Perform simple manual cutting operations on carbon steels using oxy-fuel gas	As above	As above	• Understand principles of oxy-fuel gas cutting, specifications of various type of gas cutting equipment ((hand held, simple, portable, track driven and fixed bench gas cutting equipment etc. Understand various components like colour coded oxygen and acetylene gas cylinders, cylinder valves, flashback arrestor, nozzles, gas lighter nozzles, cutting tips, pressure regulators, non-return values, colour coded flexible hoses, trolleys, torches etc types of accessories used with handheld cutting equipment like cutting guides, trammels, templates etc. • Understand types of oxy-fuel gases such as acetylene, natural gas and propane types of cutting operations like down-hand straight cuts (freehand), making straight cuts (track guided), cutting regular shapes, making angled cuts,		

				beveled edge-weld preparations. Types of flames and their implications. Lighting, cutting and extinguishing procedures, • Understand quality parameters for gas cutting material like shape, length of dragline, smoothness of sides, sharpness of the top edges, amount of slag adhering to the metal, causes of cutting defects and methods of correction and prevention. • Interpret the cutting procedure and obtain and prepare the appropriate tools and equipment for gas cutting (hand held, simple, portable or track driven (electrical or mechanical) etc, adjust the valve for type of flame. Prepare material by pre-heating. • Produce quality thermal cuts following safety procedures in carbon steel (1.5mm to 10 mm thickness) with dimensional accuracy within tolerances specified or within +/- 2mm, angled / radial cuts which are clean and smooth and free from		

				flutes and drags. Correct burn-back and flashback and defects.		
3	Use basic health and safety practices at the workplace	30	70	• Follow standard emergency procedures; attending to sustained backfire in a blowpipe, attending to flashback into the hose and equipment or a hose pipe explosion or a fire at the gas regulator connection. • Understand hazards of working with welding and cutting equipment; condition of welding leads, earthing arrangements and electrodes and gas cylinders. • 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,	CSC/ N 1335	Helmet, gloves, earplugs, goggles, Shoes, node mask, Apron Etc.

				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 etc.		
4	Work effectively with others	40	60	• 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. • Understand and practices active listening, teamwork, effective communication; understands the barriers to effective communication and common reasons for interpersonal conflict.	CSC/N 1336	

	Total Duration: 400	Theory 120	Practical 230	Unique Equipment Required:
				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.
				Helmet, gloves, earplugs, goggles, Shoes, node mask, Apron Etc
				.

Grand Total Course Duration: **400 Hours 00 Minutes**

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

Annexure1: Assessment Criteria

Assessment Criteria for Assistant MMAW/SMAW Welder	
Job Role	**Assistant MMAW/SMAW Welder**
Qualification Pack	**CSC/Q 0202**
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 0202	Manually weld carbon and low alloy steels in simple welding positions using Manual Metal Arc Welding / Shielded Metal Arc Welding	100	82	18	..
2	CSC/N 0201	Perform simple manual cutting operations on low carbon and low carbon steel alloys using oxy-fuel gas.	100	75	25	
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**	**221**	**109**	**70**
	Percentage Weightage:			**70%**	**60%**	**60%**
	Minimum Pass% to qualify:			**70%**	**20%**	**10%**

Annexure2: Trainer Prerequisites for Job role: "Assistant MMAW/SMAW Welder " mapped to Qualification Pack: "CSC /Q 0202"

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 0202".
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 0202" 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.

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