







Model Curriculum

1. Assistant Oxy Fuel Gas Cutter

SECTOR: CAPITAL GOODS

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/Q0201, V1.0

NSQF LEVEL: 2















Certificate

CURRICULUM COMPLIANCE TO QUALIFICATION PACK - NATIONAL OCCUPATIONAL **STANDARDS**

is hereby issued by the

CAPITAL GOODS SKILL COUNCIL

for the

MODEL CURRICULAM

Complying to National Occupational Standards of Job Role/ Qualification Pack: 'Assistant Oxy Fuel Gas Cutter' QP No. 'CSC/ Qozo1 NSQF Level 2'

Date of Issuance: July 12th, 2016 Valid up to : Aug 30th, 2016

Authorised Signatory (Capital Goods Skills Council)









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Assistant Oxy Fuel Gas Cutter

CURRICULUM / SYLLABUS

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

Program Name	Assistant Oxy Fuel Ga	s Cutter			
Qualification Pack Name & Reference ID. ID	CSC/Q0201, v1.0				
Version No.	1.0	Version Update Date			
Pre-requisites to Training	5th Standard passed, p	referably			
Training Outcomes	 Work safely: workplace, a regulations an Prepare for accessories ar setup and test prepare surface Carry out the metal piece to oxy fuel gas so product meets Deal with control procedure in control pequipm Basic health a and hazards at practices, etc., 	 Standard passed, preferably Work safely: state the importance of safe working practices at the workplace, and comply with health and safety legislation, regulations and other guidelines. Prepare for cutting operation: identify oxy fuel gas cutting accessories and their functions, arrange the oxy fuel gas cutting setup and test the equipment for any malfunction or leakages and prepare surface for cutting operation. Carry out the cutting operation, and test for accuracy: cut the metal piece to the required shape as per the specification by using oxy fuel gas setup and range of hand tools to ensure that the final product meets tolerance requirement. Deal with contingency: adherence to standard operating procedure in case of equipment failure or hazards arising out of gas cutting equipment during the operation. Basic health and safety practices at the workplace: identify risks and hazards at workplace, use of PPE, and apply good housekeeping practices, etc., 			









This course encompasses <u>3</u> out of <u>3</u> National Occupational Standards (NOS) of "<u>Assistant Oxy Fuel Gas Cutter</u>" Qualification Pack issued by "<u>Capital Goods Skill Council</u>".

Sr.			Equipment
No.	Module	Key Learning Outcomes	Required
No. 1	Introduction Theory Duration (hh:mm) 03:00 Practical Duration (hh:mm) 00:00 Corresponding NOS Code Bridge Module Work safely Theory Duration (hh:mm) 10:00 Practical Duration (hh:mm) 02:00 Corresponding NOS Code CSC/N0201	 State the various opportunities available in fabrication industry Describe the role and responsibilities of a oxy fuel cutter Explain various types of cutting process used in the fabrication industry Classify materials and state their properties and composition List advantages and disadvantages of various metal cutting methods Explain the principle and application of oxy fuel gas cutting Compare oxy fuel gas welding and cutting Explain importance of safe working practices at the work place Apply electrical safety practices at the work place Explain and comply with health and safety legislation, regulations and other guidelines Follow general safety practices at the workplace Identify hazards at the workplace and take corrective actions to avoid such hazards Follow the stated procedure for material handling State the causes of fire and demonstrate methods to control fire accidents List the personal protective equipment (PPE) required for gas cutting operation 	Training Kit (PowerPoint, Trainer Guide) Training kit (Trainer guide, PowerPoint) Leather apron; leather gloves; welding screen – helmet type; hand screen welding; safety shoes; fire extinguisher- dry powder type; fire bucket with sand and first aid kit
3	Prepare for cutting	 equipment correctly Follow the safety recommendations while handling oxy fuel gas set up Read drawings to interpret specification 	Training kit (Trainer
	operations Theory Duration (hh:mm) 10:00 Practical Duration (hh:mm) 25:00 Corresponding NOS Code CSC/N0201	 and cutting procedure Identify oxy fuel gas set up, accessories and their functions Identify oxygen and acetylene cylinders by colour coding Connect accessories to oxygen and acetylene cylinders – regulators, hoses, clamps etc., Select right sized nozzle and connect to the torch Check for any leakages in the system. Use of soap solution to detect acetylene leakage and fresh water for oxygen 	guide, PowerPoint) Oxygen cylinder - 7m3, acetylene cylinder- 6 m3, oxygen pressure regulator; acetylene pressure regulator; flashback arrestors; cutting torch; rubber hoses; cutting nozzles;









Sr. No.	Module	Key Learning Outcomes	Equipment Required
		 leakage Operate pressure regulators and set correct pressure for oxygen and acetylene State the purpose of cutting aids like, spade guide, small circle cutting attachment, radius guide, circle cutting attachment, bevel guide Explain various types of flames and their application Generate neutral flame i.e. balanced flame, oxidizing flame (excess oxygen) and carburizing flame (excess acetylene) by varying oxygen supply Carry out gas cutting using a neutral flame on a test piece Use other tools required for gas cutting operation Prepare work area by cleaning the table and organize all the tools and equipment required 	trolley to secure oxygen and acetylene cylinders; chain to secure oxygen and acetylene cylinders; lighter/flint; spanner set; spindle key; non return valves; spade guides; radius guide; bevel guide; gas welding/ cutting table 822 cm x 92 cm x 60 cm; surface plate; scriber - 15 cm; dividers 20 cm; calliper outside 15 cm; prick punch; chisel cold flat - 19 mm; centre punch – 9 mm x 127 mm; rule 60 cm; two fold; brass toped to read inches and mm; hammer scaling 0.25 kg with handle; steel rule - 30 cm to read inch and millimetre; Vernier calliper - digital - 0-150 mm; ball peen hammer with handle - 0.25 kg; cross peen hammer with handle - 0.25 kg; holding tongs - 30 cm; wire brush – 15 cm x 3.7 cm and double ended spanner
4	Carryout cutting operation and test for accuracy Theory Duration (hh:mm) 20:00	 Read drawing to interpret procedure and cutting tolerance Select the right sized tip based on the plate thickness to be cut Check connection of the accessories, and ensure that there is no gas leakage in the system Perform cutting operation on sheet/ pipe/ 	Training kit (Trainer guide, PowerPoint) Tools and equipment as mentioned above









Sr. No.	Module	Key Learning Outcomes	Equipment Required
	Practical Duration (hh:mm) 55:00	tube/ bar/ rod as per the drawing, which may include down hand straight cut, straight cuts, angled cuts, bevelled edge welding preparation Produce thermal cuts in low carbon steels	
	Corresponding NOS Code CSC/N0201	 State the possible defects that may occur, and take corrective action Remove slag Measure the cut part for accuracy. The accuracy should be within +- 2 mm 	
5	Theory Duration (hh:mm) 05:00 Practical Duration (hh:mm) 10:00 Corresponding NOS Code CSC/N0201	 Able to communicate with superiors regarding malfunctioning of any component in the setup Seek assistance from superiors in case of any difficulty Take necessary actions in case of following emergencies: contact with heat, sparks, molten metal or direct contact fire/ explosion caused by gas leaks sustained back fire in blow pipe State relevant legislation, standards, policies and procedures followed in the organization Know the key purpose of the organization Know various departments and their functions Understand the work flow and own role in the work flow Understand hierarchy and protocols Read and interpret information correctly Fill appropriate forms Perform numerical calculations Participate in on-the-job learning, training and development, interventions and assessments Use problem solving skills Explain the importance of planning and organizing day-to-day activities Develop analytical thinking capabilities Critically evaluate the work done State the importance of team work 	Training kit (Trainer guide, PowerPoint) Oxy-acetylene gas cutting setup
6	Health and safety Theory Duration (hh:mm) 10:00 Practical Duration	 Explain the importance of personal protective equipment (PPE) required for gas cutting operation State the causes for accidents Identify job site hazardous work and state possible causes of risk or accident at the workplace 	Training kit (Trainer guide, PowerPoint) Leather gloves, leather apron, welding screen – helmet types, hand screen welding and









Sr. No.	Module	Key Learning Outcomes	Equipment Required
	(hh:mm) 08:00 Corresponding NOS Code CSC/N1335	Explain the importance of '5S' at the workplace	safety shoes
7	Fire Safety	Explain types of fires - Class A, B, C and D	Training kit (Trainer guide, PowerPoint)
	Theory Duration (hh:mm) 05:00 Practical Duration (hh:mm) 30:00 Corresponding NOS Code CSC/N1335	 Select appropriate fire extinguisher to control fire Use PASS method to operate a fire extinguisher Follow fire safety signs and safe evacuation method in case of a fire Identify the location of assembly point, fire exit, fire alarm Follow reporting procedure in case of a fire 	Class A, B, C, D and K fire extinguishers
8	Emergencies, rescue and first aid procedure Theory Duration (hh:mm) 09:00 Practical Duration (hh:mm) 18:00 Corresponding NOS Code CSC/N1335	 Follow electrical safety procedures Use approved method to rescue a person from electrocution State the importance of first aid Identify the contents of a first aid kit and their application Administer first aid in case of bleeding, burns, choking, electrical shock, poisoning, etc. Use of CPR process Bandage wounds Explain stages of crisis and crisis management Prepare an incident report 	Training kit (Trainer guide, PowerPoint) First aid kit with all contents
9	Work effectively with others Theory Duration (hh:mm) 20:00 Practical Duration (hh:mm) 60:00 Corresponding NOS Code CSC/N1336	 Explain the importance of team work and team dynamics State 4Cs of working in a team Explain types of communication Apply effective communication technique Overcome barriers to effective communication Demonstrate active listening skills Demonstrate good customer service skills Explain the importance of ethical behaviour in your day-to-day work State the importance of discipline in life and apply the same at workplace 	Training kit (Trainer guide, PowerPoint)









Sr. No.	Module	Key Learning Outcomes	Equipment Required
10	Final Assessment	To test skills and knowledge	
	Theory Duration (hh:mm) 04:00		
	Practical Duration (hh:mm) 06:00		
	Corresponding NOS Code		
	Total Duration	Unique Equipment Required: Leather gloves; leather apron; welding screer	n - helmet type; hand
	Theory Duration 94:00	screen welding; safety shoes; fire extinguishe extinguisher; fire bucket with sand, first aid kit; with all accessories; surface plate - standard	gas cutting equipment
	Practical Duration 217:00	dividers 20 cm; calliper outside 15 cm; prick pur mm; centre punch – 9 mm x 127 mm; rule 6 toped to read inches and mm; hammer scaling steel rule - 30 cm to read inch and millimetre; Ve 0-150 mm; ball peen hammer with handle - hammer with handle - 0.25 kg; holding tongs -	50 cm; two fold; brass g 0.25 kg with handle; ernier calliper (digital) - - 0.25 kg; cross peen
		cm x 3.7 cm and double ended spanner	Jo Cili, Wile Diasit – 13

Grand Total Course Duration: 310 Hours, 0 Minutes

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









Trainer Prerequisites for Job role: "Assistant Oxy Fuel Gas Cutter" mapped to Qualification Pack: "CSC/Q0201 v1.0"

Sr. No.	Area	Details		
1	Description	Perform manual oxy-fuel cutting for a range of standard cutting job requirements using oxy-fuel gas. This is for a skilled cutter who can cut carbon steels in the basic positions.		
2	Personal Attributes	asic communication, numerical and computational abilities. Openness to arning, ability to plan and organize own work and identify and solve problems the course of working. Understanding the need to take initiative and manage alf and work to improve efficiency and effectiveness.		
3	Minimum Educational Qualifications	Diploma /Degree in Mechanical Engineering		
4a	Domain Certification	Certified for Job Role: "Assistant Oxy Fuel Gas Cutter" mapped to QP: "CSC/Q0201, v1.0". Minimum accepted score is 80%		
4b	Platform Certification	Recommended that the Trainer is certified for the Job Role: "Trainer", mapped to the Qualification Pack: "SSC/Q1402". Minimum accepted 70 % as per respective SSC guidelines is 70%.		
5	Experience	 3-4 years of industry experience in the relevant field 3-4 years of teaching experience 		









Annexure: Assessment Criteria

Assessment Criteria	
Job Role	Assistant Oxy Fuel Gas Cutter
Qualification Pack	CSC/Q0201, v1.0
Sector Skill Council	Capital Goods Skill Council

Sr. No.	Guidelines for Assessment
1	Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.
2	The assessment for the theory part will be based on knowledge bank of questions created by the SSC.
3	Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training centre(as per assessment criteria below)
4	Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training canter based on this criteria
5	To pass the Qualification Pack, every trainee should score a minimum of 60% in aggregate and 40% in each NOS
6	The marks are allocated PC wise; however, every NOS will carry a weight age in the total marks allocated to the specific QP









Assessable		Total	Out Of	Marks Allocation	
Outcome	Assessment Criteria	Mark (300)		The ory	Skills Practi cal
	PC1. work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines		3	1	2
	PC2. take necessary safety precautions for gas cutting operations including equipment, processes and checks		2	0	2
	PC3. interpret cutting procedure data sheets specifications		3	1	2
	PC4. check regulators, hoses and check that valves are securely connected and free from leaks and damage		2	0	2
	PC5. check equipment is calibrated and approved for use		2	0	2
	PC6. check/fit the correct size gas nozzle to the torch		2	0	2
	PC7. ensure preheat and oxygen holes on the tips are clean		2	0	2
	PC8. check that a flashback arrestor is fitted	100	2	0	2
	PC9. set appropriate gas pressures		2	0	2
	PC10. use the correct procedure for lighting, adjusting and extinguishing		3	1	2
1.CSC/N0203 Manually cut	PC11. adjust torch valve for type of flame such as neutral, carburizing and oxidizing		2	0	2
metal and metal alloys	PC12. follow sequence of operations such as preheating material and initiating cut		3	1	2
using oxy-fuel	PC13. mark out the locations for cutting accurately and as per requirement		3	1	2
gas	PC14. use appropriate and safe procedures for handling and storing of gas cylinders		3	1	2
	PC15. prepare the work area for the cutting activities		2	0	2
	PC16. obtain the appropriate tools and equipment for the oxy-fuel gas cutting operations, and check that they are in a safe and usable condition	-	2	0	2
	PC17. check that the oxy-fuel gas cutting equipment is set up for the operations to be performed		2	0	2
	PC18. adjust cylinder valves and adjust regulator for operating pressure to achieve specifications for required operations		3	1	2
	PC19. where appropriate, mark out the components for the required operations, using appropriate tools and techniques		2	0	2
	PC20. perform trial cut to check for cut defects		3	0	3
	PC21. operate the oxy-fuel gas cutting equipment to produce items/cut shapes to the dimensions and profiles specified		5	1	4
	PC22. use various types of oxy-fuel gas cutting methods		4	0	4
	PC23. perform various cutting operations correctly		4	0	4









Assessable		Total Mark (300)	Out	Marks Allocation	
Outcome	Assessment Criteria		Of	The ory	Skills Practi cal
	PC24. produce thermal cuts in various forms of material (metal of 3mm and above)		4	0	4
	PC25. produce cut profiles for various type of materials		3	0	3
	PC26. produce thermally-cut components which meet specified quality criteria		4	1	3
	PC27. recognize and correct burnback and flashback		3	1	2
	PC28. detect and correct defects in cut		2	0	2
	PC29. ensure the work area is left in a safe and tidy condition on completion of the cutting activities		2	0	2
	PC30. check that the finished components meet the standard required		3	1	2
	PC31. use appropriate methods and equipment to check the quality, and that all dimensional and geometrical aspects of the cut material are to the specification		4	1	3
	PC32. identify various cutting defects and follow organization recommended procedures to address them		3	1	2
	PC33. report any difficulties or problems that may arise with the cutting activities, and carry out any agreed actions		2	0	2
	PC34. detect equipment malfunctions and deal with them appropriately		2	0	2
	PC35. deal promptly and effectively with problems within their control, and seek help and guidance from the relevant people if they have problems that they cannot resolve		2	0	2
	PC36. shut down and make safe the cutting equipment on completion of the cutting activities		2	0	2
	PC37. in case of emergencies follow standard emergency procedures		3	1	2
	Total		100	14	86
	PC1. use protective clothing/equipment for specific tasks and work conditions		5	2	3
	PC2. state the name and location of people responsible for health and safety in the workplace		3	1	2
2.CSC/ 1335 Use basic	PC3. state the names and location of documents that refer to health and safety in the workplace		3	1	2
health and safety practices	PC4. identify job-site hazardous work and state possible causes of risk or accident in the workplace	100	5	2	3
at the workplace	PC5. carry out safe working practices while dealing with hazards to ensure the safety of self and others state methods of accident prevention in the work environment of the job role		4	2	2
	PC6. state location of general health and safety equipment in the workplace		3	2	1
	PC7. inspect for faults, set up and safely use steps		5	2	3









Assessable Outcome	Assessment Criteria	Total Mark (300)	Out Of	Marks Allocation	
				The ory	Skills Practi cal
	and ladders in general use				
	PC8. work safely in and around trenches, elevated		5	2	3
	places and confined areas			_	
	PC9. lift heavy objects safely using correct procedures		5	2	3
	PC10. apply good housekeeping practices at all				
	times		4	2	2
	PC11. identify common hazard signs displayed in		_		2
	various areas		5	2	3
	PC12. retrieve and/or point out documents that refer		3	1	2
	to health and safety in the workplace				
	PC13. use the various appropriate fire extinguishers on different types of fires correctly		4	1	3
	PC14. demonstrate rescue techniques applied				
	during fire hazard		4	1	3
	PC15. demonstrate good housekeeping in order to		3	1	2
	prevent fire hazards		3	1	2
	PC16. demonstrate the correct use of a fire		4	1	3
	extinguisher		-		
	PC17. demonstrate how to free a person from electrocution		4	1	3
	PC18. administer appropriate first aid to victims				
	where required eg. in case of bleeding, burns,		4	1	3
	choking, electric shock, poisoning etc.				
	PC19. demonstrate basic techniques of bandaging		3	1	2
	PC20. respond promptly and appropriately to an				
	accident situation or medical emergency in real or		4	1	3
	simulated environments				
	PC21. perform and organize loss minimization or		,	4	2
	rescue activity during an accident in real or simulated environments		3	1	2
	PC22. administer first aid to victims in case of a heart				
	attack or cardiac arrest due to electric shock, before				
	the arrival of emergency services in real or simulated		3	1	2
	cases				
	PC23. demonstrate the artificial respiration and the		3	1	2
	CPR Process		_	-	_
	PC24. participate in emergency procedures		3	2	1
	PC25. complete a written accident/incident report or dictate a report to another person, and send report		4	1	3
	to person responsible			'	ر
	PC26. demonstrate correct method to move injured		4		2
	people and others during an emergency		4	1	3
	Total		100	36	64
3.CSC/N1336	PC1. accurately receive information and instructions				
Work	from the supervisor and fellow workers, getting	100	10	3	7
effectively with	clarification where required		10	٦.	7
	PC2. accurately pass on information to authorized		10	3	7









Assessable Outcome	Assessment Criteria	Total Mark (300)	Out Of		arks cation Skills Practi cal
others	persons who require it and within agreed timescale				
	and confirm its receipt PC3. give information to others clearly, at a pace and in a manner that helps them to understand		10	3	7
	PC4. display helpful behavior by assisting others in performing tasks in a positive manner, where required and possible		10	3	7
	PC5. consult with and assist others to maximize effectiveness and efficiency in carrying out tasks		10	3	7
	PC6. display appropriate communication etiquette while working		10	3	7
	PC7. display active listening skills while interacting with others at work		10	3	7
	PC8. use appropriate tone, pitch and language to convey politeness, assertiveness, care and professionalism		10	3	7
	PC9. demonstrate responsible and disciplined behaviors at the workplace		10	3	7
	PC10. escalate grievances and problems to appropriate authority as per procedure to resolve them and avoid conflict		10	3	7
	Total		100	30	70
	Grand Total	300	300	117	183
	Percentage Weightage:			39	61
	Minimum Pass% to qualify (aggregate):			60	