

Model Curriculum

Oxy Fuel Gas Cutter

SECTOR:	CAPITAL GOODS
SUB-SECTOR:	1.Machine Tools 2.Dies, Moulds And Press Tools 3.Plastic Manufacturing Machinery 4.Textile Manufacturing Machinery 5.Process Plant Machinery 6.Electrical and Power Machinery 7.Light Engineering Goods
OCCUPATION:	Welding and Cutting
REF ID:	CSC/Q0203, V1.0
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: **'Oxy Fuel Gas Cutter'** QP No. **'CSC/Q 0203, NSQF Level 3'**

Date of Issuance: April 30th, 2014

Valid up to : August 30th, 2016

*Subject to periodic updation of the Qualification Pack to the
latest govt. approved national standards & norms.



Authorised Signatory
Tourism & Hospitality Skill Council

TABLE OF CONTENTS

1. Curriculum	01
2. Trainer Prerequisites	07
3. Annexure: Assessment Criteria	08

Oxy Fuel Gas Cutter

CURRICULUM / SYLLABUS

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

Program Name	Oxy Fuel Gas Cutter		
Qualification Pack Name & Reference ID. ID	CSC/Q0203, v1.0		
Version No.	1.0	Version Update Date	
Pre-requisites to Training	8th Standard passed, preferably		
Training Outcomes	<p>After completing this programme, participants will be able to:</p> <ul style="list-style-type: none"> • 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., • Work effectively with others: effectively communicate with others and demonstrate good ethical practices and discipline 		

This course encompasses 3 out of 3 National Occupational Standards (NOS) of “Oxy Fuel Gas Cutter” Qualification Pack issued by “Capital Goods Skill Council”.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	<p>Introduction</p> <p>Theory Duration (hh:mm) 03:00</p> <p>Practical Duration (hh:mm) 00:00</p> <p>Corresponding NOS Code Bridge Module</p>	<ul style="list-style-type: none"> State the various opportunities available in fabrication industry Describe the role and responsibilities of an oxyfuel 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 	<p>Training Kit (PowerPoint, Trainer Guide)</p>
2	<p>Work safely</p> <p>Theory Duration (hh:mm) 10:00</p> <p>Practical Duration (hh:mm) 02:00</p> <p>Corresponding NOS Code CSC/N0203</p>	<ul style="list-style-type: none"> 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 Wear suggested personal protective equipment correctly Follow the safety recommendations while handling oxy-fuel gas set up 	<p>Training kit (Trainer guide, PowerPoint)</p> <p>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</p>
3	<p>Prepare for cutting operations</p> <p>Theory Duration (hh:mm) 5:00</p> <p>Practical Duration (hh:mm) 25:00</p> <p>Corresponding NOS Code CSC/N0203</p>	<ul style="list-style-type: none"> Read drawings to interpret specification 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 	<p>Training kit (Trainer guide, PowerPoint)</p> <p>Oxygen cylinder - 7m3, acetylene cylinder- 6 m3, oxygen pressure regulator; acetylene pressure regulator; flashback arrestors;</p>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<p>oxygen leakage</p> <ul style="list-style-type: none"> • 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 • Carryout marking operations for cutting accurately as per the requirement • Check for the readiness of the equipment • Take trial cut and check for any defects 	<p>cutting torch; rubber hoses; cutting nozzles; 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 topped 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</p>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
4	<p>Carryout cutting operation and test for accuracy</p> <p>Theory Duration (hh:mm) 10:00</p> <p>Practical Duration (hh:mm) 55:00</p> <p>Corresponding NOS Code CSC/N0203</p>	<ul style="list-style-type: none"> • Read drawing to interpret procedure and cutting tolerance • Explain various gas cutting methods • 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 various cutting operations <ul style="list-style-type: none"> ○ Down –hand straight cuts ○ Track- guided cuts ○ Cut regular shapes ○ Cut irregular shapes ○ Angled cuts ○ Chamfer cuts ○ Radius cuts ○ Gouging/flushing ○ Bevelled edge operations ○ Cutting out holes ○ Materials <ul style="list-style-type: none"> ▪ Mild carbon steel ▪ High tensile and special steels ▪ Other suitable materials ○ Forms <ul style="list-style-type: none"> ▪ Plate ▪ Rolled section ▪ Pipe/tube ▪ Solid bars • Produce thermally cut components to meet the specified quality criteria <ul style="list-style-type: none"> ○ Within +/- 2mm ○ Angled/radial cuts are within the specification ○ Clean and smooth cuts ○ Cuts are free from flutes and drags 	<p>Training kit (Trainer guide, PowerPoint)</p> <p>Tools and equipment as mentioned above</p>
5	<p>Test for accuracy</p> <p>Theory Duration (hh:mm) 05:00</p> <p>Practical Duration (hh:mm) 10:00</p> <p>Corresponding NOS Code CSC/N0203</p>	<ul style="list-style-type: none"> • Measure dimensional accuracies using suitable equipment • Identify various cutting defects <ul style="list-style-type: none"> ○ Distortion ○ Grooved ○ Fluted or dragged cuts ○ Poor draglines ○ Rounded edges ○ Tightly adhering slag 	<p>Training kit (Trainer guide, PowerPoint), defective parts</p>
6	<p>Deal with contingencies</p>	<ul style="list-style-type: none"> • Able to communicate with superiors regarding malfunctioning of any 	<p>Training kit (Trainer guide,</p>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	<p>Theory Duration (hh:mm) 05:00</p> <p>Practical Duration (hh:mm) 10:00</p> <p>Corresponding NOS Code CSC/N0203</p>	<p>component in the setup</p> <ul style="list-style-type: none"> Seek assistance from superiors in case of any difficulty Take necessary actions in case of following emergencies: <ul style="list-style-type: none"> ✓ 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 Explain the workflow and own role in the workflow State 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 	<p>PowerPoint)</p> <p>Oxy-acetylene gas cutting setup</p>
7	<p>Health and safety</p> <p>Theory Duration (hh:mm) 10:00</p> <p>Practical Duration (hh:mm) 08:00</p> <p>Corresponding NOS Code CSC/N1335</p>	<ul style="list-style-type: none"> 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 Explain the importance of '5S' at the workplace 	<p>Training kit (Trainer guide, PowerPoint)</p> <p>Leather gloves, leather apron, welding screen – helmet types, hand screen welding and safety shoes</p>
8	<p>Fire Safety</p> <p>Theory Duration (hh:mm) 05:00</p> <p>Practical Duration (hh:mm) 30:00</p> <p>Corresponding NOS</p>	<ul style="list-style-type: none"> Explain types of fires - Class A, B, C and D 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 	<p>Training kit (Trainer guide, PowerPoint)</p> <p>Class A, B, C, D and K fire extinguishers</p>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	Code CSC/N1335	fire	
9	Emergencies, rescue and first aid procedure Theory Duration (hh:mm) 09:00 Practical Duration (hh:mm) 18:00 Corresponding NOS Code CSC/N1335	<ul style="list-style-type: none"> 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
10	Work effectively with others Theory Duration (hh:mm) 20:00 Practical Duration (hh:mm) 60:00 Corresponding NOS Code CSC/N1336	<ul style="list-style-type: none"> 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)
	Total Duration Theory Duration 82:00 Practical Duration 218:00	Unique Equipment Required: Leather gloves; leather apron; welding screen - helmet type; hand screen welding; safety shoes; fire extinguishers - dry powder fire extinguisher; fire bucket with sand, first aid kit; gas cutting equipment with all accessories; surface plate - standard size; scribe - 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 topped 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	

Grand Total Course Duration: **300 Hours, 0 Minutes**

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

Trainer Prerequisites for Job role: “Oxy Fuel Gas Cutter” mapped to Qualification Pack: “CSC/Q0203 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	Basic communication, numerical and computational abilities. Openness to learning, ability to plan and organize own work and identify and solve problems in the course of working. Understanding the need to take initiative and manage self and work to improve efficiency and effectiveness.
3	Minimum Educational Qualifications	Diploma /Degree in Mechanical Engineering
4a	Domain Certification	Certified for Job Role: “Oxy Fuel Gas Cutter” mapped to QP: “CSC/Q0203, 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: “MEP/Q0102”. Minimum accepted as per respective SSC guidelines is 80%.
5	Experience	<ul style="list-style-type: none"> 3-4 years of industry experience in the relevant field 3-4 years of teaching experience

Annexure: Assessment Criteria

Assessment Criteria	
Job Role	Oxy Fuel Gas Cutter
Qualification Pack	CSC/Q0203, 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 center based on this criteria
5	To pass the Qualification Pack, every trainee should score a minimum of 70% in every NOS
6	In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack.

Assessable Outcome	Assessment Criteria	Total Mark (300)	Out Of	Marks Allocation	
				Theory	Skills Practical
1.CSC/N0203 Manually cut metal and metal alloys using oxy-fuel gas	PC1.work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines	100	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		2	0	2
	PC9.set appropriate gas pressures		2	0	2
	PC10.use the correct procedure for lighting, adjusting and extinguishing		3	1	2
	PC11.adjust torch valve for type of flame such as neutral, carburizing and oxidizing		2	0	2
	PC12.follow sequence of operations such as pre-heating material and initiating cut		3	1	2
	PC13.mark out the locations for cutting accurately and as per requirement		3	1	2
	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		4	0	4

Assessable Outcome	Assessment Criteria	Total Mark (300)	Out Of	Marks Allocation	
				Theory	Skills Practical
	correctly				
	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 burn back 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
2.CSC/ 1335 Use basic health and safety practices at the workplace	PC1.use protective clothing/equipment for specific tasks and work conditions	100	5	2	3
	PC2.state the name and location of people responsible for health and safety in the workplace		3	1	2
	PC3.state the names and location of documents that refer to health and safety in the workplace		3	1	2
	PC4.identify job-site hazardous work and state possible causes of risk or accident in the workplace		5	2	3
	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

Assessable Outcome	Assessment Criteria	Total Mark (300)	Out Of	Marks Allocation	
				Theory	Skills Practical
	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 and ladders in general use		5	2	3
	PC8.work safely in and around trenches, elevated places and confined areas		5	2	3
	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 various areas		5	2	3
	PC12.retrieve and/or point out documents that refer to health and safety in the workplace		3	1	2
	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 prevent fire hazards		3	1	2
	PC16.demonstrate the correct use of a fire extinguisher		4	1	3
	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, choking, electric shock, poisoning etc.		4	1	3
	PC19.demonstrate basic techniques of bandaging		3	1	2
	PC20.respond promptly and appropriately to an accident situation or medical emergency in real or simulated environments		4	1	3
	PC21.perform and organize loss minimization or 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 cases		3	1	2
	PC23.demonstrate the artificial respiration and the CPR Process		3	1	2
	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 to person responsible		4	1	3
	PC26.demonstrate correct method to move injured people and others during an emergency		4	1	3
	Total		100	36	64
3.CSC/N1336	PC1.accurately receive information and instructions from the supervisor and fellow	100	10	3	7

Assessable Outcome	Assessment Criteria	Total Mark (300)	Out Of	Marks Allocation	
				Theory	Skills Practical
Work effectively with others	workers, getting clarification where required				
	PC2.accurately pass on information to authorized persons who require it and within agreed timescale and confirm its receipt		10	3	7
	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	80	220
	Percentage Weightage:			27	73
	Minimum Pass% to qualify (aggregate):				70