



# Operator - Plasma Cutter

QP Code:ISC/Q0910

Version: 2.0

NSQF Level: 4

Indian Iron and Steel Sector Skill Council || Karigari Bhawan 5th Floor, Room No-509  
Plot No- B/7, Action Area III, Newtown,  
Kolkata, West Bengal 700160

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## ISC/Q0910: Operator - Plasma Cutter

### Brief Job Description

The individual is primarily involved in performing cutting process and other activities such as inspection of equipment condition, gauging, testing and inspection of cut work pieces.

### Personal Attributes

The person should be patient, organised, team-oriented and have the ability to work for long hours in adverse conditions. They should be keen observers and have an eye for detail and quality.

### Applicable National Occupational Standards (NOS)

#### Compulsory NOS:

1. [ISC/N0008: Use basic health and safety practices at the workplace](#)
2. [ISC/N0009: Work effectively with others](#)
3. [ISC/N0909: Perform plasma cutting and post-cutting operations](#)
4. [ISC/N0910: Perform oxy-gas cutting and post-cutting operations](#)

### Qualification Pack (QP) Parameters

<b>Sector</b>	Iron & Steel
<b>Sub-Sector</b>	Steel, Sponge iron, Ferro Alloys, Re-Rollers, Refractory, Foundry
<b>Occupation</b>	Iron Making
<b>Country</b>	India
<b>NSQF Level</b>	4
<b>Aligned to NCO/ISCO/ISIC Code</b>	NCO-2015/7212.0402
<b>Minimum Educational Qualification &amp; Experience</b>	10th class pass with 2 years of relevant experience OR 10th Class Pass + ITI (Welder trade or in related trade) OR 12th Class Pass with 6 months relevant experience

Minimum Level of Education for Training in School	
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 Years
Last Reviewed On	NA
Next Review Date	NA
NSQC Approval Date	
Version	2.0

## ISC/N0008: Use basic health and safety practices at the workplace

### Description

This OS unit is about following safety and adopting sustainable practices for optimising use of resources.

### Scope

The scope covers the following :

- Maintain safe and secure working environment
- Emergencies, rescue and first aid procedures
- Health and hygiene
- Housekeeping and waste management
- Material and energy conservation

### Elements and Performance Criteria

#### *Maintain safe and secure working environment*

To be competent, the user/individual on the job must be able to:

- PC1. identify hazardous activities and the possible causes of risks or accidents in the workplace
- PC2. follow safe working practices while dealing with hazards to ensure safety of self and others
- PC3. use appropriate protective clothing/equipment for specific tasks and work
- PC4. follow appropriate safety practices while working in and around trenches, elevated places and confined areas
- PC5. lift heavy objects safely using correct procedures
- PC6. carry out routine check of the machine for identifying potential hazards
- PC7. report any identified breaches in health, safety and security policies and procedures to the designated person

#### *Emergencies, rescue and first aid procedures*

To be competent, the user/individual on the job must be able to:

- PC8. use appropriate type of fire extinguisher
- PC9. apply appropriate rescue techniques during fire hazard
- PC10. provide appropriate first aid procedure to victims wherever required eg.in case of bleeding, burns, choking, electric shock etc.
- PC11. follow emergency procedures such as raising alarm, safe evacuation etc.
- PC12. attend safety training and fire drills to respond promptly during an emergency

#### *Health and hygiene*

To be competent, the user/individual on the job must be able to:

- PC13. follow regular cleaning and disinfection practices at work place using appropriate techniques and materials

PC14. follow hand hygiene practices at work place using appropriate techniques and materials

PC15. report regarding the contagious illness of self or people in close contact

PC16. avoid contact with ill people and self-isolate in a similar situation

#### *Housekeeping and waste management*

To be competent, the user/individual on the job must be able to:

PC17. follow the fundamentals of 5S for housekeeping

PC18. ensure good housekeeping in order to prevent hazards and accidents

PC19. store the material, tools and equipment in the correct location and in good condition

PC20. segregate waste into different categories

PC21. identify recyclable, non-recyclable and hazardous waste

PC22. dispose non-recyclable, recyclable and reusable waste appropriately at identified location

#### *Material and energy conservation*

To be competent, the user/individual on the job must be able to:

PC23. identify ways to optimize usage of material in various tasks/activities/processes

PC24. check for spills/leakages in various tasks/activities/processes

PC25. plug spills/leakages and escalate to appropriate authority if unable to rectify

PC26. check if the equipment/machine is functioning normally before commencing work and rectify wherever required

PC27. ensure electrical equipment and appliances are properly connected and turned off when not in use

### **Knowledge and Understanding (KU)**

The individual on the job needs to know and understand:

KU1. organisation procedures for health, safety and security, individual role and responsibilities in this context

KU2. the organisation's emergency procedures for different emergency situations and the importance of following the same

KU3. evacuation procedures for workers and visitors

KU4. how and when to report hazards

KU5. potential hazards, risks and threats based on the nature of work

KU6. preventative and remedial actions to be taken in case of exposure to toxic material

KU7. various types of fire extinguisher

KU8. various types of safety signs and their meaning

KU9. appropriate first aid treatment relevant to different condition e.g. bleeding, minor burns, eye injuries etc.

KU10. relevant standards, procedures and policies related to 5S followed in the company

KU11. the various materials used and their storage norms

KU12. efficient utilisation of material and water

- KU13. basics of electricity and prevalent energy efficient devices
- KU14. common practices of conserving electricity
- KU15. categorisation of waste into dry, wet, recyclable, non-recyclable and items of single-use plastics
- KU16. usage of different colors of dustbins
- KU17. waste management techniques

### **Generic Skills (GS)**

User/individual on the job needs to know how to:

- GS1. read safety instructions/guidelines
- GS2. modify work practices to improve them
- GS3. ask for clarifications from superior about the job requirement
- GS4. work with supervisors/team members to carry out work related tasks
- GS5. complete tasks efficiently and accurately within stipulated time
- GS6. inform/report to concerned person in case of any problem
- GS7. make timely decisions for efficient utilization of resources
- GS8. write reports such as accident report, in at least English/regional language
- GS9. be punctual and utilize time efficiently

**Assessment Criteria**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Maintain safe and secure working environment</i>	<b>10</b>	<b>14</b>	-	<b>6</b>
PC1. identify hazardous activities and the possible causes of risks or accidents in the workplace	2	2	-	1
PC2. follow safe working practices while dealing with hazards to ensure safety of self and others	2	3	-	1
PC3. use appropriate protective clothing/ equipment for specific tasks and work	1	2	-	1
PC4. follow appropriate safety practices while working in and around trenches, elevated places and confined areas	2	1	-	-
PC5. lift heavy objects safely using correct procedures	1	2	-	1
PC6. carry out routine check of the machine for identifying potential hazards	1	2	-	1
PC7. report any identified breaches in health, safety and security policies and procedures to the designated person	1	2	-	1
<i>Emergencies, rescue and first aid procedures</i>	<b>6</b>	<b>9</b>	-	<b>5</b>
PC8. use appropriate type of fire extinguisher	1	1	-	1
PC9. apply appropriate rescue techniques during fire hazard	1	2	-	1
PC10. provide appropriate first aid procedure to victims wherever required eg. in case of bleeding, burns, choking, electric shock etc.	2	2	-	1
PC11. follow emergency procedures such as raising alarm, safe evacuation etc.	1	2	-	1
PC12. attend safety training and fire drills to respond promptly during an emergency	1	2	-	1
<i>Health and hygiene</i>	<b>2</b>	<b>6</b>	-	<b>2</b>
PC13. follow regular cleaning and disinfection practices at work place using appropriate techniques and materials	1	2	-	1



PC14.follow hand hygiene practices at work place using appropriate techniques and materials	1	2	-	1
PC15.report regarding the contagious illness of self or people in close contact	-	1	-	-
PC16.avoid contact with ill people and self-isolate in a similar situation	-	1	-	-
<i>Housekeeping and waste management</i>	<b>7</b>	<b>12</b>	-	<b>5</b>
PC17.follow the fundamentals of 5S for housekeeping	2	3	-	2
PC18.ensure good housekeeping in order to prevent hazards and accidents	1	2	-	-
PC19.store the material, tools and equipment in the correct location and in good condition	1	2	-	-
PC20.segregate waste into different categories	1	2	-	1
PC21.identify recyclable, non-recyclable and hazardous waste	1	1	-	1
PC22.dispose non-recyclable, recyclable and reusable waste appropriately at identified location	1	2	-	1
<i>Material and energy conservation</i>	<b>5</b>	<b>9</b>	-	<b>2</b>
PC23.identify ways to optimize usage of material in various tasks/activities/processes	1	2	-	-
PC24.check for spills/leakages in various tasks/activities/processes	1	2	-	1
PC25.plugin spills/leakages and escalate to appropriate authority if unable to rectify	1	2	-	1
PC26.check if the equipment/machine is functioning normally before commencing work and rectify wherever required	1	2	-	-
PC27.ensure electrical equipment and appliances are properly connected and turned off when not in use	1	1	-	-
<b>NOS Total</b>	<b>30</b>	<b>50</b>	-	<b>20</b>

## National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	ISC/N0008
<b>NOS Name</b>	Use basic health and safety practices at the work place
<b>Sector</b>	Iron & Steel
<b>Sub-Sector</b>	Generic
<b>Occupation</b>	Generic
<b>NSQF Level</b>	3
<b>Credits</b>	TBD
<b>Version</b>	2.0
<b>Last Reviewed Date</b>	NA
<b>Next Review Date</b>	NA
<b>NSQC Clearance Date</b>	

## ISC/N0009: Work effectively with others

### Description

This OS unit is about communicating with colleagues/superiors and others, either in own work group or in other work groups within organisation.

### Scope

The scope covers the following :

- Communicate effectively with colleagues and others
- Interact with supervisor
- Follow appropriate behaviour at work place

### Elements and Performance Criteria

#### *Communicate effectively with colleagues and others*

To be competent, the user/individual on the job must be able to:

- PC1. coordinate with colleagues to share work, as per the workload in order to achieve team goals
- PC2. maintain clear communication with colleagues and others, wherever needed, through all means i.e. face-to-face, telephonic or written
- PC3. adjust communication styles to reflect gender and persons with disability (PwD) sensitivity
- PC4. respect all colleagues and co-workers
- PC5. resolve conflicts by communicating with colleagues and other departments

#### *Interact with supervisor*

To be competent, the user/individual on the job must be able to:

- PC6. identify work requirements by receiving instructions from reporting supervisor
- PC7. escalate problems to supervisors that cannot be handled
- PC8. report the completed work
- PC9. interact with the reporting supervisor about any possible hazards and safety concerns

#### *Follow appropriate behaviour at work place*

To be competent, the user/individual on the job must be able to:

- PC10. extend help to people with Disability (PwD) at workplace, if required
- PC11. empathize with people with disability
- PC12. adopt a gender neutral behavior
- PC13. adopt responsible and disciplined behaviours at the workplace

### Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1. the importance of effective communication and establishing good working relationships with colleagues and supervisor
- KU2. different methods of communication as per the circumstances
- KU3. importance of teamwork in organization and individual success
- KU4. various components of effective communication
- KU5. barriers to effective communication
- KU6. common reasons for interpersonal conflict
- KU7. what constitutes disciplined behaviour for a working professional
- KU8. gender concepts, issues & legislation
- KU9. organisational policies and procedures related to gender equality
- KU10. challenges faced by PWD and the ways to help them overcome the same

### **Generic Skills (GS)**

User/individual on the job needs to know how to:

- GS1. read instructions/guidelines/procedures
- GS2. listen effectively and orally communicate information
- GS3. ask for clarification and advice from the concerned person
- GS4. maintain positive and effective relationships with colleagues
- GS5. evaluate the possible solution(s) to the problem
- GS6. spot and communicate potential areas of disruptions in the work process and report the same
- GS7. complete written work with attention to detail
- GS8. check that the work meets customer requirements

**Assessment Criteria**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Communicate effectively with colleagues and others</i>	<b>13</b>	<b>20</b>	-	<b>9</b>
PC1. coordinate with colleagues to share work, as per the workload in order to achieve team goals	3	5	-	2
PC2. maintain clear communication with colleagues and others, wherever needed, through all means i.e. face-to-face, telephonic or written	5	7	-	3
PC3. adjust communication styles to reflect gender and persons with disability (PwD) sensitivity	3	4	-	2
PC4. respect all colleagues and co-workers	1	2	-	1
PC5. resolve conflicts by communicating with colleagues and other departments	1	2	-	1
<i>Interact with supervisor</i>	<b>8</b>	<b>14</b>	-	<b>6</b>
PC6. identify work requirements by receiving instructions from reporting supervisor	2	3	-	1
PC7. escalate problems to supervisors that cannot be handled	2	3	-	2
PC8. report the completed work	2	3	-	1
PC9. interact with the reporting supervisor about any possible hazards and safety concerns	2	5	-	2
<i>Follow appropriate behaviour at work place</i>	<b>9</b>	<b>16</b>	-	<b>5</b>
PC10. extend help to people with Disability (PwD) at workplace, if required	2	4	-	2
PC11. empathize with people with disability	2	4	-	1
PC12. adopt a gender neutral behavior	2	4	-	1
PC13. adopt responsible and disciplined behaviours at the workplace	3	4	-	1
<b>NOS Total</b>	<b>30</b>	<b>50</b>	-	<b>20</b>

## National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	ISC/N0009
<b>NOS Name</b>	Work effectively with others
<b>Sector</b>	Iron & Steel
<b>Sub-Sector</b>	Generic
<b>Occupation</b>	Generic
<b>NSQF Level</b>	3
<b>Credits</b>	TBD
<b>Version</b>	2.0
<b>Last Reviewed Date</b>	NA
<b>Next Review Date</b>	NA
<b>NSQC Clearance Date</b>	

## ISC/N0909: Perform plasma cutting and post-cutting operations

### Description

This NOS unit is about performing all plasma cutting and post-cutting operations as per the given work order and the standards specified by the organization.

### Scope

This unit/task covers the following:

- Preparing for plasma cutting operations
- Perform plasma cutting operations
- Perform post-cutting operations

### Elements and Performance Criteria

#### *Preparing for plasma cutting operations*

To be competent, the user/individual on the job must be able to:

- PC1. identify the cutting work to be done by interpreting the engineering drawing, Welding Procedure Specification (WPS) and job orders
- PC2. identify the tools, plasma cutting equipment, measuring instruments, accessories, consumables and input materials as per the requirements mentioned in WPS or drawing
- PC3. select and arrange the right material, plasma cutting equipment, fixtures, accessories such as cutting guides, regulators, hoses and valve and consumables such as plasma cutting gas etc. as per the SOP and job requirements
- PC4. select the correct type of nozzle, consumables, gases and plasma cutting equipment required for the job by following the WPS and drawing
- PC5. check the input material, tools, equipment and accessories for any defects, leakages and that they are as per the required quality standards
- PC6. set the plasma cutting apparatus and its parameters as per the WPS and SOP
- PC7. use correct technique for lighting, adjusting and extinguishing the arc
- PC8. mark the correct measurements on the workpiece by using appropriate tools and measuring instruments as specified in drawing or WPS

#### *Prepare for assembling activities*

To be competent, the user/individual on the job must be able to:

- PC9. start the plasma cutting machine for cutting operations
- PC10. perform plasma-gas cutting techniques as per SOP and produce items/cut shapes to the dimensions and profiles specified in WPS and drawing
- PC11. perform various cutting operations correctly and produce thermal cuts in various forms of material
- PC12. ensure correct angles of torch and right speed for cutting during the cutting operations
- PC13. measure the final workpiece and compare with the dimensions as prescribed in the WPS and engineering drawing

### *Perform post-cutting operations*

To be competent, the user/individual on the job must be able to:

- PC14. check the work pieces as per the work instructions for product quality
- PC15. identify defects in the completed workpiece by using appropriate methods and equipment
- PC16. separate the defective pieces which can be repaired/ reworked and pieces which are beyond repair and maintain records of each category
- PC17. tag and store the right quality pieces by following organisational policies and procedures
- PC18. clean and store all the tools, machine and equipment after completion of work
- PC19. check the machine operations for any malfunctions/defects in the component and immediately inform the supervisor/maintenance team for correction
- PC20. remove chips from different machine areas and dispose scrap or waste material in accordance with the company policies and environmental regulations
- PC21. report to the supervisor about any problems faced or anticipated during the complete process

### **Knowledge and Understanding (KU)**

The individual on the job needs to know and understand:

- KU1. relevant standards and procedures followed in the company
- KU2. relevant standards and procedures followed in the company
- KU3. the basic principle of plasma cutting process and its process flow
- KU4. SOP recommended by the manufacturer for using tools, measuring instruments, accessories, plasma cutting apparatus etc. during the cutting process
- KU5. various materials such as mild steel, high tensile/special steel, stainless steel, Aluminium and its alloys and other appropriate metal and their properties
- KU6. various forms of material used for cutting are plate, rolled section, pipe/tube, solid bars etc.
- KU7. different type of plasma cutting gases and their selection criteria
- KU8. various cutting operations i.e. Down-hand straight cuts (freehand), Making straight cuts (track guided), Cutting regular shapes, Cutting irregular shapes, Making angled cuts, Cutting chamfers, Making radial cuts, Gouging/flushing, Bevelled edge - weld preparations and Cutting out holes
- KU9. ISO colour codes for cutting apparatus such as gas cylinder, hoses, electric cables, etc.
- KU10. impact of various cutting parameters on the quality and quantity of output
- KU11. holding methods that are used to aid plasma cutting
- KU12. types of plasma cutter i.e. transferred and non-transferred (welding)
- KU13. cutting techniques i.e. stand off, circle cutting and profile cutting
- KU14. selection criteria of nozzle on the basis of type and thickness of base materials
- KU15. importance of torch to arc distance in relation to thickness of materials and types of gases
- KU16. factors impacting the nozzle life
- KU17. double arcing and its impact
- KU18. various quality check parameters i.e. shape and length of the draglines, squareness, angle



deviation, smoothness of the sides, sharpness of the top edges and amount of slag adhering to the metal

KU19. various types of cutting defects such as grooved, fluted or ragged cuts, poor draglines, rounded edges, tightly adhering slag, dross, burr, distortion, etc. and their remedies

KU20. effects of oil, grease, scale or dirt on the cutting process

KU21. safety requirements during the cutting work

## **Generic Skills (GS)**

User/individual on the job needs to know how to:

- GS1. read work instructions, equipment manuals and process documents
- GS2. communicate the process requirements to the supervisor and co-workers
- GS3. attentively listen and comprehend the information given by the supervisor/team members
- GS4. write work related information in English/regional language
- GS5. recognise a workplace problem and take suitable action
- GS6. analyse and apply the information gathered from observation, experience, reasoning or communication to act efficiently
- GS7. plan and organise work according to the work requirements
- GS8. complete the assigned tasks with minimum supervision
- GS9. report to the supervisor or deal with a colleague individually, depending on the type of concern

## Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Preparing for plasma cutting operations</i>	<b>11</b>	<b>15</b>	-	<b>10</b>
PC1. identify the cutting work to be done by interpreting the engineering drawing, Welding Procedure Specification (WPS) and job orders	1	2		1
PC2. identify the tools, plasma cutting equipment, measuring instruments, accessories, consumables and input materials as per the requirements mentioned in WPS or drawing	3	2		2
PC3. select and arrange the right material, plasma cutting equipment, fixtures, accessories such as cutting guides, regulators, hoses and valve and consumables such as plasma cutting gas etc. as per the SOP and job requirements	2	3		2
PC4. select the correct type of nozzle, consumables, gases and plasma cutting equipment required for the job by following the WPS and drawing	1	2		1
PC5. check the input material, tools, equipment and accessories for any defects, leakages and that they are as per the required quality standards	1	2		1
PC6. set the plasma cutting apparatus and its parameters as per the WPS and SOP	1	2		1
PC7. use correct technique for lighting, adjusting and extinguishing the arc	1			1
PC8. mark the correct measurements on the workpiece by using appropriate tools and measuring instruments as specified in drawing or WPS	1	2		1
<i>Perform plasma cutting operations</i>	<b>7</b>	<b>13</b>	-	<b>6</b>
PC9. start the plasma cutting machine for cutting operations	1	2		1
PC10. perform plasma-gas cutting techniques as per SOP and produce items/cut shapes to the dimensions and profiles specified in WPS and drawing	1	2		1
PC11. perform various cutting operations correctly and produce thermal cuts in various forms of material	2	4		1
PC12. ensure correct angles of torch and right speed for cutting during the cutting operations	2	4		2
PC13. measure the final workpiece and compare with the dimensions as prescribed in the WPS and engineering drawing	1	1		1

PC14. start the plasma cutting machine for cutting operations	1	2		1
<i>Perform post-cutting operations</i>	<b>9</b>	<b>16</b>		<b>6</b>
PC15. check the work pieces as per the work instructions for product quality	2	3		1
PC16. identify defects in the completed workpiece by using appropriate methods and equipment	1	2		1
PC17. separate the defective pieces which can be repaired/ reworked and pieces which are beyond repair and maintain records of each category	1	2		
PC18. tag and store the right quality pieces by following organisational policies and procedures	1	2		
PC19. clean and store all the tools, machine and equipment after completion of work	1	2		1
PC20. check the machine operations for any malfunctions/defects in the component and immediately inform the supervisor/maintenance team for correction	1	2		1
PC21. remove chips from different machine areas and dispose scrap or waste material in accordance with the company policies and environmental regulations	1	2		
<b>NOS Total</b>	<b>30</b>	<b>50</b>	<b>-</b>	<b>20</b>

## National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	ISC/N0909
<b>NOS Name</b>	Perform plasma cutting and post-cutting operations
<b>Sector</b>	Iron & Steel
<b>Sub-Sector</b>	Steel, Sponge iron, Ferro Alloys, Re-Rollers, Refractory, Foundry
<b>Occupation</b>	Iron Making
<b>NSQF Level</b>	3
<b>Credits</b>	TBD
<b>Version</b>	2.0
<b>Last Reviewed Date</b>	
<b>Next Review Date</b>	
<b>NSQC Clearance Date</b>	

## ISC/N0910: Perform oxy-gas cutting and post-cutting operations

### Description

This NOS unit is about performing all gas cutting and post-cutting operations as per the given work order and the standards specified by the organization.

### Scope

This unit/task covers the following:

- Preparing for cutting operations
- Perform oxy-gas cutting operations
- Perform post-cutting operations

### Elements and Performance Criteria

#### *Preparing for cutting operations*

To be competent, the user/individual on the job must be able to:

- PC1. identify the cutting work to be done by interpreting the engineering drawing, Welding Procedure Specification (WPS) and job orders
- PC2. identify the tools, cutting torch, machine, measuring instruments, accessories, consumables and input materials as per the requirements mentioned in WPS or drawing
- PC3. select and arrange the right material, equipment, fixtures, accessories such as regulators, hoses and valve and consumables such as shielding gas etc. as per the SOP and job requirements
- PC4. select the correct type of nozzle, consumables, gases and oxy-gas cutting equipment required for the job by following the WPS and drawing
- PC5. check the input material, tools, equipment and accessories for any defects, leakages and that they are as per the required quality standards
- PC6. set the oxy-gas cutting apparatus and its parameters as per the WPS and SOP
- PC7. ensure that a flashback arrestor is fitted with the apparatus
- PC8. use correct technique for lighting, adjusting and extinguishing the arc
- PC9. adjust torch valve for type of flame such as neutral, carburizing and oxidizing
- PC10. mark the correct measurements on the workpiece by using appropriate tools and measuring instruments as specified in drawing or WPS

#### *Perform oxy-gas cutting operations*

To be competent, the user/individual on the job must be able to:

- PC11. start the gas cutting machine for cutting operations
- PC12. adjust cylinder valves and regulator for operating pressure to achieve required specifications
- PC13. perform oxy-gas cutting process as per SOP and produce items/cut shapes to the dimensions and profiles specified in WPS and drawing
- PC14. perform various cutting operations correctly and produce thermal cuts in various forms of material

(metal of 3mm and above)

PC15. recognize and correct burn-back and flashback

PC16. measure the final workpiece and compare with the dimensions as prescribed in the WPS and engineering drawing

### *Perform post-cutting operations*

To be competent, the user/individual on the job must be able to:

PC17. check the work pieces as per the work instructions for product quality

PC18. identify defects in the completed workpiece by using appropriate methods and equipment

PC19. separate the defective pieces which can be repaired/ reworked and pieces which are beyond repair and maintain records of each category

PC20. tag and store the right quality pieces by following organisational policies and procedures

PC21. clean and store all the tools, machine and equipment after completion of work

PC22. check the machine operations for any malfunctions/defects in the component and immediately inform the supervisor/maintenance team for correction

PC23. remove chips from different machine areas and dispose scrap or waste material in accordance with the company policies and environmental regulations

PC24. report to the supervisor about any problems faced or anticipated during the complete process

### **Knowledge and Understanding (KU)**

The individual on the job needs to know and understand:

KU1. relevant standards and procedures followed in the company

KU2. the basic principle of oxy-gas process and its process flow

KU3. SOP recommended by the manufacturer for using tools, measuring instruments, accessories gas cutting apparatus etc. during the cutting process

KU4. various materials such as mild steel, high tensile/special steel and other appropriate metal and their properties used for gas cutting

KU5. various forms of material used for cutting are plate, rolled section, pipe/tube, solid bars etc.

KU6. different cutting gases used in oxy-gas cutting and their selection criteria

KU7. various cutting operations i.e. Down-hand straight cuts (freehand), Making straight cuts (track guided), Cutting regular shapes, Cutting irregular shapes, Making angled cuts, Cutting chamfers, Making radial cuts, Gouging/flushing, Bevelled edge - weld preparations and Cutting out holes

KU8. ISO colour codes for cutting apparatus such as gas cylinder, hoses, electric cables, etc.

KU9. impact of various cutting parameters on the quality and quantity of output

KU10. holding methods that are used to aid thermal cutting

KU11. types of flames and their implication for cutting

KU12. various quality check parameters i.e. shape and length of the draglines, smoothness of the sides, sharpness of the top edges and amount of slag adhering to the metal

KU13. various types of cutting defects such as distortion, grooved, fluted or ragged cuts, poor draglines, rounded edges, tightly adhering slag, etc. and their remedies

- KU14. effects of oil, grease, scale or dirt on the cutting process
- KU15. emergency procedures for backfires, flashback and other fires
- KU16. safety requirements during the cutting work

### **Generic Skills (GS)**

User/individual on the job needs to know how to:

- GS1. read signals, work instructions, equipment manuals and process documents
- GS2. communicate the process requirements to the supervisor and co-workers
- GS3. attentively listen and comprehend the information given by the supervisor/team members
- GS4. write work related information in English/regional language
- GS5. recognise a workplace problem and take suitable action
- GS6. analyse and apply the information gathered from observation, experience, reasoning or communication to act efficiently
- GS7. plan and organise work according to the work requirements
- GS8. complete the assigned tasks with minimum supervision
- GS9. report to the supervisor or deal with a colleague individually, depending on the type of concern

## Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Preparing for cutting operations</i>	<b>13</b>	<b>19</b>	-	<b>10</b>
PC1. identify the cutting work to be done by interpreting the engineering drawing, Welding Procedure Specification (WPS) and job orders	1	2		1
PC2. identify the tools, cutting torch, machine, measuring instruments, accessories, consumables and input materials as per the requirements mentioned in WPS or drawing	3	2		2
PC3. select and arrange the right material, equipment, fixtures, accessories such as regulators, hoses and valve and consumables such as shielding gas etc. as per the SOP and job requirements	2	3		2
PC4. select the correct type of nozzle, consumables, gases and oxy-gas cutting equipment required for the job by following the WPS and drawing	1	2		1
PC5. check the input material, tools, equipment and accessories for any defects, leakages and that they are as per the required quality standards	1	2		1
PC6. set the oxy-gas cutting apparatus and its parameters as per the WPS and SOP	1	2		1
PC7. ensure that a flashback arrestor is fitted with the apparatus	1			1
PC8. use correct technique for lighting, adjusting and extinguishing the arc	1	2		1
PC9. adjust torch valve for type of flame such as neutral, carburizing and oxidizing	1	2		
PC10. mark the correct measurements on the workpiece by using appropriate tools and measuring instruments as specified in drawing or WPS	1	2		
<i>Perform oxy-gas cutting operations</i>	<b>8</b>	<b>15</b>		<b>6</b>
PC11. start the gas cutting machine for cutting operations	1	2		1
PC12. adjust cylinder valves and regulator for operating pressure to achieve required specifications	1	2		1
PC13. perform oxy-gas cutting process as per SOP and produce items/cut shapes to the dimensions and profiles specified in WPS and drawing	2	4		1
PC14. perform various cutting operations correctly and produce thermal cuts in various forms of material (metal of 3mm and above)	2	4		2
PC15. recognize and correct burn-back and flashback	1	1		1



PC16. measure the final workpiece and compare with the dimensions as prescribed in the WPS and engineering drawing	1	2		
<i>Perform post-cutting operations</i>	<b>9</b>	<b>16</b>		<b>4</b>
PC17. check the work pieces as per the work instructions for product quality	2	3		1
PC18. identify defects in the completed workpiece by using appropriate methods and equipment	1	2		1
PC19. separate the defective pieces which can be repaired/ reworked and pieces which are beyond repair and maintain records of each category	1	2		
PC20. tag and store the right quality pieces by following organisational policies and procedures	1	2		
PC21. clean and store all the tools, machine and equipment after completion of work	1	2		1
PC22. check the machine operations for any malfunctions/defects in the component and immediately inform the supervisor/maintenance team for correction	1	2		1
PC23. remove chips from different machine areas and dispose scrap or waste material in accordance with the company policies and environmental regulations	1	2		
PC24. report to the supervisor about any problems faced or anticipated during the complete process	1	1		
<b>NOS Total</b>	<b>30</b>	<b>50</b>	<b>-</b>	<b>20</b>

## National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	ISC/N0910
<b>NOS Name</b>	Perform oxy-gas cutting and post-cutting operations
<b>Sector</b>	Iron & Steel
<b>Sub-Sector</b>	Steel, Sponge iron, Ferro Alloys, Re-Rollers, Refractory, Foundry
<b>Occupation</b>	Iron Making
<b>NSQF Level</b>	4
<b>Credits</b>	TBD
<b>Version</b>	2.0
<b>Last Reviewed Date</b>	
<b>Next Review Date</b>	
<b>NSQC Clearance Date</b>	

## Assessment Guidelines and Assessment Weightage

### Assessment Guidelines

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) (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 center (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 these criteria.
5. In case of successfully passing only certain number of NOSs, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack.
6. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

**Minimum Aggregate Passing % at QP Level : 70**

### Assessment Weightage

#### Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
ISC/N0008. Use basic health and safety practices at the work place	30	50	0	20	100	15
ISC/N0009. Work effectively with others	30	50	0	20	100	15
ISC/N0909. Manually cut metal materials using plasma arc	30	50	0	20	100	35
ISC/N0910. Perform oxy-gas cutting and post-cutting operations	30	50	0	20	100	35
<b>Total</b>	<b>120</b>	<b>200</b>	<b>0</b>	<b>80</b>	<b>400</b>	<b>100</b>

## Acronyms

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training

## Glossary

<b>Sector</b>	Sector is a conglomeration of different business operations having similar business and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
<b>Sub-sector</b>	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
<b>Occupation</b>	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
<b>Job role</b>	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
<b>Occupational Standards (OS)</b>	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the Knowledge and Understanding (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
<b>Performance Criteria (PC)</b>	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
<b>National Occupational Standards (NOS)</b>	NOS are occupational standards which apply uniquely in the Indian context.
<b>Qualifications Pack (QP)</b>	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code.
<b>Unit Code</b>	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
<b>Unit Title</b>	Unit title gives a clear overall statement about what the incumbent should be able to do.
<b>Description</b>	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
<b>Scope</b>	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.
<b>Knowledge and Understanding (KU)</b>	Knowledge and Understanding (KU) are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.

<b>Organisational Context</b>	Organisational context includes the way the organisation is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
<b>Technical Knowledge</b>	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
<b>Core Skills/Generic Skills (GS)</b>	Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.
<b>Electives</b>	Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.
<b>Options</b>	Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.