Operator - Plasma Cutter

QP Code: ISC/Q0910
Version: 2.0
NSQF Level: 4
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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

<table>
<thead>
<tr>
<th>Sector</th>
<th>Iron &amp; Steel</th>
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<tbody>
<tr>
<td>Sub-Sector</td>
<td>Steel, Sponge iron, Ferro Alloys, Re-Rollers, Refractory, Foundry</td>
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<td>Occupation</td>
<td>Iron Making</td>
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<td>Country</td>
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<td>Minimum Educational Qualification &amp; Experience</td>
<td>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</td>
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### Qualification Pack

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<th>Minimum Level of Education for Training in School</th>
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<tr>
<td>Pre-Requisite License or Training</td>
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<td>Minimum Job Entry Age</td>
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</table>
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
Qualification Pack

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

<table>
<thead>
<tr>
<th>Assessment Criteria for Outcomes</th>
<th>Theory Marks</th>
<th>Practical Marks</th>
<th>Project Marks</th>
<th>Viva Marks</th>
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<tr>
<td><strong>Maintain safe and secure working environment</strong></td>
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<td>PC2. follow safe working practices while dealing with hazards to ensure safety of self and others</td>
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<td>PC3. use appropriate protective clothing/equipment for specific tasks and work</td>
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<td>PC4. follow appropriate safety practices while working in and around trenches, elevated places and confined areas</td>
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<td>PC5. lift heavy objects safely using correct procedures</td>
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<tr>
<td>PC6. carry out routine check of the machine for identifying potential hazards</td>
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<td>PC7. report any identified breaches in health, safety and security policies and procedures to the designated person</td>
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<td><strong>Emergencies, rescue and first aid procedures</strong></td>
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<td>PC8. use appropriate type of fire extinguisher</td>
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<td>PC9. apply appropriate rescue techniques during fire hazard</td>
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<td>PC10. provide appropriate first aid procedure to victims wherever required eg. in case of bleeding, burns, choking, electric shock etc.</td>
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<td>PC11. follow emergency procedures such as raising alarm, safe evacuation etc.</td>
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<td>PC12. attend safety training and fire drills to respond promptly during an emergency</td>
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<td>PC13. follow regular cleaning and disinfection practices at work place using appropriate techniques and materials</td>
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<td>PC14. follow hand hygiene practices at workplace using appropriate techniques and materials</td>
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<td>PC15. report regarding the contagious illness of self or people in close contact</td>
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<td>PC16. avoid contact with ill people and self-isolate in a similar situation</td>
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**Housekeeping and waste management**

| 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 |

**Material and energy conservation**

| 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. plug 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 | - | - |

**NOS Total**

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# National Occupational Standards (NOS) Parameters

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<td>Use basic health and safety practices at the work place</td>
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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

<table>
<thead>
<tr>
<th>Assessment Criteria for Outcomes</th>
<th>Theory Marks</th>
<th>Practical Marks</th>
<th>Project Marks</th>
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<td>PC4. respect all colleagues and co-workers</td>
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<td>PC5. resolve conflicts by communicating with colleagues and other departments</td>
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<td>Interact with supervisor</td>
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<td>PC7. escalate problems to supervisors that cannot be handled</td>
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<td>3</td>
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<td>PC8. report the completed work</td>
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<td>PC9. interact with the reporting supervisor about any possible hazards and safety concerns</td>
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<td>Follow appropriate behaviour at workplace</td>
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<td>PC11. empathize with people with disability</td>
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<td>PC12. adopt a gender neutral behavior</td>
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<td>PC13. adopt responsible and disciplined behaviours at the workplace</td>
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<td><strong>NOS Name</strong></td>
<td>Work effectively with others</td>
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<td><strong>Sector</strong></td>
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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

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

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

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

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

<table>
<thead>
<tr>
<th>Assessment Criteria for Outcomes</th>
<th>Theory Marks</th>
<th>Practical Marks</th>
<th>Project Marks</th>
<th>Viva Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preparing for cutting operations</strong></td>
<td>13</td>
<td>19</td>
<td>-</td>
<td>10</td>
</tr>
<tr>
<td>PC1. identify the cutting work to be done by interpreting the engineering drawing, Welding Procedure Specification (WPS) and job orders</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>PC2. identify the tools, cutting torch, machine, measuring instruments, accessories, consumables and input materials as per the requirements mentioned in WPS or drawing</td>
<td>3</td>
<td>2</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>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</td>
<td>2</td>
<td>3</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>PC4. select the correct type of nozzle, consumables, gases and oxy-gas cutting equipment required for the job by following the WPS and drawing</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>PC5. check the input material, tools, equipment and accessories for any defects, leakages and that they are as per the required quality standards</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>PC6. set the oxy-gas cutting apparatus and its parameters as per the WPS and SOP</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>PC7. ensure that a flashback arrestor is fitted with the apparatus</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>PC8. use correct technique for lighting, adjusting and extinguishing the arc</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>PC9. adjust torch valve for type of flame such as neutral, carburizing and oxidizing</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>PC10. mark the correct measurements on the workpiece by using appropriate tools and measuring instruments as specified in drawing or WPS</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td><strong>Perform oxy-gas cutting operations</strong></td>
<td>8</td>
<td>15</td>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td>PC11. start the gas cutting machine for cutting operations</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>PC12. adjust cylinder valves and regulator for operating pressure to achieve required specifications</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>PC13. perform oxy-gas cutting process as per SOP and produce items/cut shapes to the dimensions and profiles specified in WPS and drawing</td>
<td>2</td>
<td>4</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>PC14. perform various cutting operations correctly and produce thermal cuts in various forms of material (metal of 3mm and above)</td>
<td>2</td>
<td>4</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>PC15. recognize and correct burn-back and flashback</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>PC</td>
<td>Description</td>
<td>1</td>
<td>2</td>
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<tr>
<td>----</td>
<td>-----------------------------------------------------------------------------</td>
<td>----</td>
<td>--------</td>
<td></td>
</tr>
<tr>
<td>PC16</td>
<td>measure the final workpiece and compare with the dimensions as prescribed in the WPS and engineering drawing</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>PC17</td>
<td>check the work pieces as per the work instructions for product quality</td>
<td>2</td>
<td>3</td>
<td></td>
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<tr>
<td>PC18</td>
<td>identify defects in the completed workpiece by using appropriate methods and equipment</td>
<td>1</td>
<td>2</td>
<td></td>
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<tr>
<td>PC19</td>
<td>separate the defective pieces which can be repaired/ reworked and pieces which are beyond repair and maintain records of each category</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>PC20</td>
<td>tag and store the right quality pieces by following organisational policies and procedures</td>
<td>1</td>
<td>2</td>
<td></td>
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<tr>
<td>PC21</td>
<td>clean and store all the tools, machine and equipment after completion of work</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>PC22</td>
<td>check the machine operations for any malfunctions/defects in the component and immediately inform the supervisor/maintenance team for correction</td>
<td>1</td>
<td>2</td>
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<tr>
<td>PC23</td>
<td>remove chips from different machine areas and dispose scrap or waste material in accordance with the company policies and environmental regulations</td>
<td>1</td>
<td>2</td>
<td></td>
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<tr>
<td>PC24</td>
<td>report to the supervisor about any problems faced or anticipated during the complete process</td>
<td>1</td>
<td>1</td>
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</tr>
<tr>
<td>NOS Total</td>
<td></td>
<td>30</td>
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## National Occupational Standards (NOS) Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOS Code</td>
<td>ISC/N0910</td>
</tr>
<tr>
<td>NOS Name</td>
<td>Perform oxy-gas cutting and post-cutting operations</td>
</tr>
<tr>
<td>Sector</td>
<td>Iron &amp; Steel</td>
</tr>
<tr>
<td>Sub-Sector</td>
<td>Steel, Sponge iron, Ferro Alloys, Re-Rollers, Refractory, Foundry</td>
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<tr>
<td>Occupation</td>
<td>Iron Making</td>
</tr>
<tr>
<td>NSQF Level</td>
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</tr>
<tr>
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<td>Last Reviewed Date</td>
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<td>Next Review Date</td>
<td></td>
</tr>
<tr>
<td>NSQC Clearance Date</td>
<td></td>
</tr>
</tbody>
</table>
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) 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

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

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOS</td>
<td>National Occupational Standard(s)</td>
</tr>
<tr>
<td>NSQF</td>
<td>National Skills Qualifications Framework</td>
</tr>
<tr>
<td>QP</td>
<td>Qualifications Pack</td>
</tr>
<tr>
<td>TVET</td>
<td>Technical and Vocational Education and Training</td>
</tr>
</tbody>
</table>
## Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sector</td>
<td>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.</td>
</tr>
<tr>
<td>Sub-sector</td>
<td>Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.</td>
</tr>
<tr>
<td>Occupation</td>
<td>Occupation is a set of job roles, which perform similar / related set of functions in an industry.</td>
</tr>
<tr>
<td>Job role</td>
<td>Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.</td>
</tr>
<tr>
<td>Occupational Standards (OS)</td>
<td>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.</td>
</tr>
<tr>
<td>Performance Criteria (PC)</td>
<td>Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.</td>
</tr>
<tr>
<td>National Occupational Standards (NOS)</td>
<td>NOS are occupational standards which apply uniquely in the Indian context.</td>
</tr>
<tr>
<td>Qualifications Pack (QP)</td>
<td>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.</td>
</tr>
<tr>
<td>Unit Code</td>
<td>Unit code is a unique identifier for an Occupational Standard, which is denoted by an ‘N’.</td>
</tr>
<tr>
<td>Unit Title</td>
<td>Unit title gives a clear overall statement about what the incumbent should be able to do.</td>
</tr>
<tr>
<td>Description</td>
<td>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.</td>
</tr>
<tr>
<td>Scope</td>
<td>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.</td>
</tr>
<tr>
<td>Knowledge and Understanding (KU)</td>
<td>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.</td>
</tr>
<tr>
<td>Organisational Context</td>
<td>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.</td>
</tr>
<tr>
<td>------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Technical Knowledge</td>
<td>Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.</td>
</tr>
<tr>
<td>Core Skills/Generic Skills (GS)</td>
<td>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.</td>
</tr>
<tr>
<td>Electives</td>
<td>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.</td>
</tr>
<tr>
<td>Options</td>
<td>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.</td>
</tr>
</tbody>
</table>