



# Assistant - Machinist - Iron and Steel

QP Code:ISC/Q0909

Version: 2.0

NSQF Level: 3

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

## Contents

ISC/Q0907: Assistant - Machinist - Iron and Steel .....	3
<i>Brief Job Description</i> .....	3
Applicable National Occupational Standards (NOS) .....	3
<i>Compulsory NOS</i> .....	3
<i>Qualification Pack (QP) Parameters</i> .....	3
ISC/N0008: Use basic health and safety practices at the work place .....	5
ISC/N0009: Work effectively with others .....	11
ISC/N0901: Prepare for fabrication activities .....	15
ISC/N0902: Perform fabrication activities .....	19
ISC/N0903: Perform post-fabrication operations .....	24
ISC/N0904: Perform maintenance activities.....	29
Assessment Guidelines and Weightage.....	27
Assessment Guidelines .....	33
Assessment Weightage .....	33
Acronyms .....	34
Glossary .....	35

## ISC/Q0909: Assistant - Machinist - Iron and Steel

### Brief Job Description

This individual is primarily involved in various machining and inspection work on conventional/manual machines such as quality verification, minor repair work, change of worn out tools, re-setting of the tools, etc.

### Personal Attributes

The person should be patient, organised, team-oriented and have the ability to work for long hours in adverse conditions. They must be able to plan and prioritise tasks effectively 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 work place](#)
2. [ISC/N0009: Work effectively with others](#)
3. [ISC/N0901: Prepare for fabrication activities](#)
4. [ISC/N0902: Perform fabrication activities](#)
5. [ISC/N0903: Perform post - fabrication activities](#)
6. [ISC/N0904: Perform maintenance activities](#)

### 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>	Mechanical Maintenance
<b>Country</b>	India
<b>NSQF Level</b>	3
<b>Aligned to NCO/ISCO/ISIC Code</b>	NCO-2015/7233.0102
<b>Minimum Educational Qualification &amp; Experience</b>	8th Class Pass with 1 years of relevant experience OR 10th Class Pass
<b>Minimum Level of Education for Training in School</b>	

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/N0901: Prepare for fabrication activities

### Description

This unit is about preparing for fabrication activities as per the given work instructions and the standards specified by the organisation.

### Scope

This unit/task covers the following:

- Identify work requirements
- Prepare for fabrication work

### Elements and Performance Criteria

#### *Identify work requirements*

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

- PC1. identify the work to be done by interpreting the engineering drawings/blueprints/SOPs
- PC2. compute dimensions, sizes, shapes and tolerances of sub-assemblies of the machine based on the specifications as mentioned in the drawings/blueprints
- PC3. report and rectify cases of any inappropriate information in design documents as per organizational procedures
- PC4. identify the tools, dies, measuring instruments, machines (lathes, milling machines, grinders etc.) and input material (metal) required for the job
- PC5. select and arrange the right input material, dies, tools, measuring instruments and machines as per the SOP and job requirements

#### *Prepare for fabrication work*

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

- PC6. use appropriate Personal Protective Equipment (PPE) for safe working in workshop
- PC7. plan sequence of activities need to perform for fabrication work
- PC8. check the tools, dies, measuring instruments and machines are cleaned, free from any defects and functioning properly
- PC9. check and calibrate the tools and equipment before use
- PC10. check that input material is cleaned i.e. free from rust or any contaminants and as per the required quality standard
- PC11. ensure availability of correct quantity metal work pieces and other materials required for fabrication in the workshop
- PC12. smoothen out the metal work piece prior to fabrication by using grinding machine
- PC13. measure and mark reference points/cutting lines on the work pieces by using compass, callipers, rulers and other measuring tools
- PC14. set the conventional or computer numerically controlled machines and its parameters as per the design requirements and SOP

## Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1. relevant standards and procedures followed in the company
- KU2. importance of identifying non-conforming material and storage of the same
- KU3. risk and impact of not following defined procedures/work instructions
- KU4. various metal fabrication processes such as forging, rolling, extrusion, bending, spinning, drawing, drilling, sawing, boring, threading, grinding, cutting, etc.
- KU5. SOP recommended by the manufacturer for using tools, jigs, fixtures, measuring instruments etc., required during the fabrication work
- KU6. the impact of various machining parameters on the final product
- KU7. the use of various cutting tools for different machining operations
- KU8. how to read engineering drawings and their symbols
- KU9. fundamentals of the CNC/conventional machine
- KU10. SOP recommended by the organisation for operating CNC and conventional machine
- KU11. the metal properties and metallurgy
- KU12. safety requirements for CNC and conventional machine during the machining 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>Identify work requirements</i>	<b>11</b>	<b>14</b>	-	<b>9</b>
PC1. identify the work to be done by interpreting the engineering drawings/blueprints/SOPs	1	2		1
PC2. compute dimensions, sizes, shapes and tolerances of sub-assemblies of the machine based on the specifications as mentioned in the drawings/blueprints	2	3		2
PC3. report and rectify cases of any inappropriate information in design documents as per organizational procedures	1	2		1
PC4. identify the tools, dies, measuring instruments, machines (lathes, milling machines, grinders etc.) and input material (metal) required for the job	5	3		3
PC5. select and arrange the right input material, dies, tools, measuring instruments and machines as per the SOP and job requirements	2	4		2
<i>Prepare for fabrication work</i>	<b>19</b>	<b>36</b>	-	<b>11</b>
PC6. use appropriate Personal Protective Equipment (PPE) for safe working in workshop	1	2		1
PC7. plan sequence of activities need to perform for fabrication work	1	2		
PC8. check the tools, dies, measuring instruments and machines are cleaned, free from any defects and functioning properly	3	6		2
PC9. check and calibrate the tools and equipment before use	2	5		1
PC10. check that input material is cleaned i.e. free from rust or any contaminants and as per the required quality standard	3	5		2
PC11. ensure availability of correct quantity metal work pieces and other materials required for fabrication in the workshop	1	2		
PC12. smoothen out the metal work piece prior to fabrication by using grinding machine	2	4		1

PC13.measure and mark reference points/cutting lines on the work pieces by using compass, callipers, rulers and other measuring tools	2	4		1
PC14.set the conventional or computer numerically controlled machines and its parameters as per the design requirements and SOP	4	6		3
<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/N0901
<b>NOS Name</b>	Prepare for fabrication activity
<b>Sector</b>	Iron & Steel
<b>Sub-Sector</b>	Steel, Sponge iron, Ferro Alloys, Re-Rollers, Refractory, Foundry
<b>Occupation</b>	Mechanical Maintenance
<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/N0902: Perform fabrication activities

### Description

This unit is about performing fabrication of components to ensure that the final products manufactured is as per the quality, cost and production norms set by the organisation.

### Scope

This unit/task covers the following:

- Setting up machine
- Perform machining on the component

### Elements and Performance Criteria

#### *Setting up machine*

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

- PC1. adjust the machine controls to ensure conformance with the specified tolerances
- PC2. mount, install and align tools, attachments and fixtures on machine by using hand tools and precision measuring instruments
- PC3. lift the work piece/metal stock manually or by hoist, position the same securely on the machine bed by using work holding devices and verify their positions with measuring instruments if required

#### *Perform machining on the component*

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

- PC4. cut the metal blocks into required size by using power operated/manual/automatic cutting tools as per the requirement
- PC5. start the machine for machining operations
- PC6. ensure that the right programme is selected in the CNC machine as defined in the SOP
- PC7. perform various machining operations on the metal block to get the shape and dimension as per the drawing/work order
- PC8. cut, shape and trim the metal block to specified lengths and shapes by using conventional/CNC machines
- PC9. monitor the process parameters by reading the various gauges and correct them if not within standards
- PC10. monitor the machine operations for any malfunctions/defects in the component and inform the supervisor/maintenance team for correction
- PC11. measure the machined pieces and compare with the dimensions as prescribed in the work order and engineering drawing
- PC12. follow the do's and don'ts of the manufacturing process as defined in SOPs/Work Instructions or

given by supervisors

PC13. escalate the problems faced during machining to the supervisor

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

The individual on the job needs to know and understand:

- KU1. relevant standards and procedures followed in the company
- KU2. impact of not following defined procedures/ work instructions
- KU3. various types of machining processes such as drilling, boring, turning etc.
- KU4. SOP recommended by the manufacturer for using tools, jigs, fixtures, measuring instrumentsetc., required during the fabrication work
- KU5. fundamentals of the CNC/conventional machine
- KU6. SOP recommended by the organisation for operating CNC and conventional machine
- KU7. safety requirements during the fabrication 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>Setting up machine</i>	<b>7</b>	<b>11</b>	-	<b>6</b>
PC1. adjust the machine controls to ensure conformance with the specified tolerances	2	3		2
PC2. mount, install and align tools, attachments and fixtures on machine by using hand tools and precision measuring instruments	3	5		3
PC2. lift the work piece/metal stock manually or by hoist, position the same securely on the machine bed by using work holding devices and verify their positions with measuring instruments if required	2	3		1
<i>Perform machining on the component</i>	<b>23</b>	<b>39</b>		<b>14</b>
PC4. cut the metal blocks into required size by using power operated/manual/automatic cutting tools as per the requirement	2	3		2
PC5. start the machine for machining operations	1	2		
PC6. ensure that the right programme is selected in the CNC machine as defined in the SOP	2	3		2
PC7. perform various machining operations on the metal block to get the shape and dimension as per the drawing/work order	6	10		4
PC8. cut, shape and trim the metal block to specified lengths and shapes by using conventional/CNC machines	4	7		3
PC9. monitor the process parameters by reading the various gauges and correct them if not within standards	2	3		1
PC10. monitor the machine operations for any malfunctions/defects in the component and inform the supervisor/maintenance team for correction	1	2		
PC11. measure the machined pieces and compare with the dimensions as prescribed in the work order and engineering drawing	3	5		1
PC12. follow the do's and don'ts of the manufacturing process as defined in SOPs/Work Instructions or given by supervisors	1	2		1
PC13. escalate the problems faced during machining to the supervisor	1	2		
<b>NOS Total</b>	<b>30</b>	<b>50</b>	-	<b>20</b>

## National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	ISC/N0902
<b>NOS Name</b>	Perform fabrication activities
<b>Sector</b>	Iron & Steel
<b>Sub-Sector</b>	Steel, Sponge iron, Ferro Alloys, Re-Rollers, Refractory, Foundry
<b>Occupation</b>	Mechanical Maintenance
<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/N0903: Perform post-fabrication activities

### Description

This unit is about performing post - fabrication activities such as inspection, quality check, cleaning etc.

### Scope

This unit/task covers the following:

- Perform de- burring activity on the machined components
- Quality check of the machined component
- Carry out housekeeping and documentation

### Elements and Performance Criteria

#### *Perform de- burring activity on the machined components*

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

- PC1. remove the workpieces from the machine as per company procedure
- PC2. conduct de-burring operations with the help of correct tool to remove extra burrs, sharp edges, rust and chips from the metal surface
- PC3. conduct shot blasting/vibro processes for completing de-burring operations
- PC4. clean machine parts as per the defined process and quality control standards

#### *Quality check of the machined component*

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

- PC5. check the component as per the control plan, WI for product quality
- PC6. ensure use of calibrated equipment to check the workpiece for conformance to the required specifications and standards
- PC7. note down the observations of the basic inspection process and identify pieces which are as per the specified standards
- PC8. separate the completed pieces into Ok pieces and defective pieces which can be repaired/reworked and pieces which are beyond repair and maintain records of each category

#### *Carry out housekeeping and documentation*

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

- PC9. clean and store all the tools, machine and equipment after completion of work
- PC10. dispose scrap or waste material into the disposal area in accordance with the company's policies and environmental regulations
- PC11. maintain and update all the records and reports related to fabrication work done as per the organisational guidelines



## Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1. Standard Operating Procedures (SOP) recommended by the manufacturer for using tools and measuring instruments used after the machining processes
- KU2. the post machining processes like deburring, cleaning, quality check etc.
- KU3. the impact of presence of burrs, edges, chips on the final product quality
- KU4. the various inspection methods for inspecting the quality of machined product
- KU5. SOP recommended by the organisation for checking defects in the product/work piece
- KU6. various type of defects in final products
- KU7. impact of non-conformities on final product and their causes to quality assurance standards
- KU8. escalation matrix for reporting identified problem
- KU9. records to be maintained and implications of non-maintenance of the same

## 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>Perform de- burring activity on the machined components</i>	<b>12</b>	<b>20</b>	-	<b>8</b>
PC1. remove the workpieces from the machine as per company procedure	2	3		1
PC2. conduct de-burring operations with the help of correct tool to remove extra burrs, sharp edges, rust and chips from the metal surface	4	7		3
PC3. conduct shot blasting/vibro processes for completing de-burring operations	4	7		3
PC4. clean machine parts as per the defined process and quality control standards	2	3		1
<i>Quality check of the machined component</i>	<b>11</b>	<b>19</b>		<b>8</b>
PC5. check the component as per the control plan, WI for product quality	4	8		3
PC6. ensure use of calibrated equipment to check the workpiece for conformance to the required specifications and standards	2	3		2
PC7. note down the observations of the basic inspection process and identify pieces which are as per the specified standards	2	3		1
PC8. separate the completed pieces into Ok pieces and defective pieces which can be repaired/reworked and pieces which are beyond repair and maintain records of each category	3	5		2
<i>Carry out housekeeping and documentation</i>	<b>7</b>	<b>11</b>	-	<b>4</b>
PC9. clean and store all the tools, machine and equipment after completion of work	3	5		2
PC10. dispose scrap or waste material into the disposal area in accordance with the company's policies and environmental regulations	2	3		1

PC11.maintain and update all the records and reports related to fabrication work done as per the organisational guidelines	2	3		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/N0903
<b>NOS Name</b>	Perform post-fabrication activities
<b>Sector</b>	Iron & Steel
<b>Sub-Sector</b>	Steel, Sponge iron, Ferro Alloys, Re-Rollers, Refractory, Foundry
<b>Occupation</b>	Mechanical Maintenance
<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/N0904: Perform maintenance activities

### Description

This unit is about performing maintenance of equipment used for fabrication.

### Scope

This unit/task covers the following:

- Perform Preventive maintenance of machines

### Elements and Performance Criteria

#### *Perform preventive maintenance of machines*

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

- PC1. identify and arrange necessary inspection and repairing tools required during maintenance work
- PC2. observe the machines or equipment to diagnose machine malfunction and determine need for adjustment or repair
- PC3. maintain the machine as per proper operational condition/daily maintenance check list
- PC4. clean and oil the machine and its components as per checklist
- PC5. clean the hydraulic tank/gauge/tools/fixtures as per the cleaning schedule provided in Work Instruction/SOP manual
- PC6. check coolant and lubricant level in the machine as per standards
- PC7. apply appropriate lubricant as per manufacturer specification
- PC8. remove chips from different machine areas and dispose scrap or waste material into the disposal area in accordance with the company policies and environmental regulations
- PC9. carry out minor repairs and adjustments of the machine and report any malfunctions/repairs in the machine beyond own scope to the concerned person
- PC10. replace worn out tools timely and safely with new tools
- PC11. maintain and update all the records and reports related to maintenance work done as per the organisational guidelines

### Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1. checks to be done during preventive maintenance and importance of the same
- KU2. types of documentation in organization and importance of the same
- KU3. records to be maintained and implications of non-maintenance of the same
- KU4. procedure of assemble/ dis-assemble an equipment with a given design
- KU5. use of equipment such as thermometer, tachometer and vibration monitoring tools to perform preventive maintenance
- KU6. normal running characteristics of machines
- KU7. basic troubleshooting and repairing of machines

KU8. potential problems with machines, their causes and remedies

### **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>Perform preventive maintenance of machines</i>	<b>30</b>	<b>50</b>	-	<b>20</b>
PC1. identify and arrange necessary inspection and repairing tools required during maintenance work	4	4		2
PC2. observe the machines or equipment to diagnose machine malfunction and determine need for adjustment or repair	3	5		2
PC3. maintain the machine as per proper operational condition/daily maintenance check list	2	3		1
PC4. clean and oil the machine and its components as per checklist	2	5		2
PC5. clean the hydraulic tank/gauge/tools/fixtures as per the cleaning schedule provided in Work Instruction/SOP manual	3	5		2
PC6. check coolant and lubricant level in the machine as per standards	3	5		2
PC7. apply appropriate lubricant as per manufacturer specification	3	5		2
PC8. remove chips from different machine areas and dispose scrap or waste material into the disposal area in accordance with the company policies and environmental regulations	3	5		2
PC9. carry out minor repairs and adjustments of the machine and report any malfunctions/repairs in the machine beyond own scope to the concerned person	3	7		3
PC10. replace worn out tools timely and safely with new tools	2	3		1
PC11. maintain and update all the records and reports related to maintenance work done as per the organisational guidelines	2	3		1
<b>NOS Total</b>	<b>30</b>	<b>50</b>	-	<b>20</b>

## National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	ISC/N0904
<b>NOS Name</b>	Perform preventive maintenance of machines
<b>Sector</b>	Iron & Steel
<b>Sub-Sector</b>	Steel, Sponge iron, Ferro Alloys, Re-Rollers, Refractory, Foundry
<b>Occupation</b>	Mechanical Maintenance
<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>	



## 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	10
ISC/N0009. Work effectively with others	30	50	0	20	100	10
ISC/N0901. Prepare for fabrication activities	30	50	0	20	100	15
ISC/N0902. Perform fabrication activities	30	50	0	20	100	25
ISC/N0903. Perform post-fabrication activities	30	50	0	20	100	25
ISC/N0904. Perform maintenance activities	30	50	0	20	100	15
<b>Total</b>	<b>180</b>	<b>300</b>	<b>0</b>	<b>120</b>	<b>600</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.