



Mechanic: Hydraulic & Pneumatic System

QP Code: ISC/Q0903

Version: 2.0

NSQF Level: 4

Indian Iron and Steel Sector Skill Council || Karigari Bhawan 5th Floor, Room No-509
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ISC/Q0903: Mechanic: Hydraulic & Pneumatic System

Brief Job Description

The individual in this role performs installation, assembling and maintenance of the hydraulic and pneumatic equipment available in the plant.

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/N0918: Prepare for fitting and assembly operations](#)
4. [ISC/N0919: Perform fitting and assembly of hydraulic and pneumatic equipment](#)
5. [ISC/N0920: Perform post-assembly activities](#)
6. [ISC/N0921: Perform maintenance of hydraulic and pneumatic equipment](#)

Qualification Pack (QP) Parameters

Sector	Iron & Steel
Sub-Sector	Steel, Sponge iron, Ferro Alloys, Re-Rollers, Refractory
Occupation	Mechanical Maintenance
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7233.2901
Minimum Educational Qualification & Experience	10th Class pass with 2 years of relevant experience OR 10th Class Pass + ITI (Fitter/Mechanical trade or in related trade) OR 12th Class Pass with 1 year of relevant experience

	OR Level - 3 (Rigger: Rigging of Heavy Material) with 1 year of relevant experience OR Level - 3 (Fitter - Levelling Alignment and Balancing) with 1 year of 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 work place

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>	10	14	-	6
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>	6	9	-	5
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>	2	6	-	2
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>	7	12	-	5
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>	5	9	-	2
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	-	-
NOS Total	30	50	-	20

National Occupational Standards (NOS) Parameters

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

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>	13	20	-	9
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>	8	14	-	6
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>	9	16	-	5
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
NOS Total	30	50	-	20

National Occupational Standards (NOS) Parameters

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

ISC/N0918: Prepare for fitting and assembly operations

Description

This OS unit is about preparing for the hydraulic and pneumatic equipment fitting and assembling work as per the given work instructions and standards specified by the organisation.

Scope

The scope covers the following :

- Identify work requirements
- Prepare for fitting and assembling activities

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. identify correct limits, tolerance and fits of rotating machine by interpreting the drawings properly
- PC3. identify the tools, measuring instruments, equipment and spares required for the job
- PC4. select and arrange the right tools, measuring instruments, equipment and spares as per the SOP and job requirements
- PC5. report to stores / supervisor in case of non-availability of tools, tackles and spares

Prepare for fitting and assembling activities

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 fitting and assembling of the equipment
- PC8. check the tools, measuring instruments and equipment for any defects and that they are as per the required quality standards
- PC9. ensure that tools match the desired specifications for working in hydraulic and pneumatic systems
- PC10. prepare tools, tackles, spares, lifting equipment etc. as per SOP/WI
- PC11. report damaged / defective components of equipment and tools as per the escalation matrix

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1. relevant standards and procedures followed in the company
- KU2. quality and damage checks to be done and importance of the same
- KU3. risk and impact of not following defined procedures/work instructions



- KU4. principle of fluid power technology
- KU5. working principle of hydraulic and pneumatic equipment
- KU6. functioning and use of various components of hydraulic and pneumatic unit e.g. -reservoir, suction strainer, pipe lines, oil level gauge, pressure gauge, breather filter, isolator, pumps, all kinds of valves, compressor, dryer etc.
- KU7. limits, fits and tolerances of the hydraulic and pneumatic equipment
- KU8. how to read circuit diagram of hydraulic and pneumatic equipment
- KU9. Standard Operating Procedures (SOP) recommended by the manufacturer for using hand tools, measuring instruments and equipment required during the fitting and assembly process
- KU10. safety requirements to be followed during the fitting and assembling 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>	15	20	-	9
PC1. identify the work to be done by interpreting the engineering drawings/blueprints/SOPs	2	3	-	1
PC2. identify correct limits, tolerance and fits of rotating machine by interpreting the drawings properly	2	3	-	2
PC3. identify the tools, measuring instruments, equipment and spares required for the job	5	4	-	3
PC4. select and arrange the right tools, measuring instruments, equipment and spares as per the SOP and job requirements	4	7	-	2
PC5. report to stores / supervisor in case of non-availability of tools, tackles and spares	2	3	-	1
<i>Prepare for fitting and assembling activities</i>	15	30	-	11
PC6. use appropriate Personal Protective Equipment (PPE) for safe working in workshop	2	3	-	1
PC7. plan sequence of activities need to perform fitting and assembling of the equipment	1	3	-	1
PC8. check the tools, measuring instruments and equipment for any defects and that they are as per the required quality standards	4	9	-	3
PC9. ensure that tools match the desired specifications for working in hydraulic and pneumatic systems	2	3	-	2
PC10. prepare tools, tackles, spares, lifting equipment etc. as per SOP/WI	4	9	-	3
PC11. report damaged / defective components of equipment and tools as per the escalation matrix	2	3	-	1
NOS Total	30	50	-	20

National Occupational Standards (NOS) Parameters

NOS Code	ISC/N0918
NOS Name	Prepare for fitting and assembly operations
Sector	Iron & Steel
Sub-Sector	Steel, Sponge iron, Ferro Alloys, Re-Rollers, Refractory
Occupation	Mechanical Maintenance
NSQF Level	4
Credits	TBD
Version	2.0
Last Reviewed Date	NA
Next Review Date	NA
NSQC Clearance Date	

ISC/N0919: Perform fitting and assembly of hydraulic and pneumatic equipment

Description

This OS unit is about performing fitting and assembly of hydraulic and pneumatic equipment by following organizational standard procedures.

Scope

The scope covers the following :

- Perform installation of equipment
- Perform assembling activities

Elements and Performance Criteria

Perform installation of equipment

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

- PC1. lift the equipment parts manually or by hoist and place the same securely on the designated place as indicated in the drawing/work instructions
- PC2. mount, align, adjust and level the components to be assembled as per the design/ manufacturers' specifications
- PC3. perform fitting operations as per equipment needs and prepare the components/parts and sub-assemblies of the equipment for assembly operations

Perform assembling activities

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

- PC4. perform assembly operations and assemble all the parts of equipment as mentioned in drawing/blueprint
- PC5. fasten the mechanical components/ subassemblies together by using specified screws, bolts, and collars
- PC6. set and adjust the linkages, tensions and clearances of assembled components to specified specifications by using fixed gauges and hand tools
- PC7. seal the required areas thoroughly to prevent penetration of water/air etc. during the usage of equipment
- PC8. set and adjust flow, pressure, speed, level of hydraulic medium / air
- PC9. follow the do's and don'ts of the manufacturing process as defined in SOPs/Work Instructions or given by supervisors
- PC10. check the joints, connections, etc. to ensure they are adequately tightened and joint
- PC11. escalate the problems faced during installation and assembly activities 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. quality and damage checks to be done and importance of the same
- KU3. risk and impact of not following defined procedures/work instructions
- KU4. functioning and use of various components of hydraulic and pneumatic unit e.g. -reservoir, suction strainer, pipe lines, oil level gauge, pressure gauge, breather filter, isolator, pumps, all kinds of valves, compressor, dryer etc.
- KU5. limits, fits and tolerances of the hydraulic and pneumatic equipment
- KU6. How to read circuit diagram of hydraulic and pneumatic equipment
- KU7. procedure to carry out various fitting operations such as filing, drilling, sawing, threading etc.
- KU8. procedure to carry out assembly operations such aligning, bending, fixing of hydraulic and pneumatic components
- KU9. Standard Operating Procedures (SOP) recommended by the manufacturer for using hand tools, measuring instruments and equipment required during the fitting and assembly process
- KU10. safety requirements to be followed during the fitting and assembling work
- KU11. how to align, adjust and level the equipment for fitting and assembling work
- KU12. application of various sealing compounds and adhesives
- KU13. linkages, tensions and clearances of various food processing equipment
- KU14. possible causes of common problems during assembly & their remedies

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>Perform installation of equipment</i>	10	17	-	6
PC1. lift the equipment parts manually or by hoist and place the same securely on the designated place as indicated in the drawing/work instructions	2	3	-	1
PC2. mount, align, adjust and level the components to be assembled as per the design/ manufacturers' specifications	3	5	-	2
PC3. perform fitting operations as per equipment needs and prepare the components/parts and sub-assemblies of the equipment for assembly operations	5	9	-	3
<i>Perform assembling activities</i>	20	33	-	14
PC4. perform assembly operations and assemble all the parts of equipment as mentioned in drawing/blueprint	5	9	-	3
PC5. fasten the mechanical components/ subassemblies together by using specified screws, bolts, and collars	3	5	-	2
PC6. set and adjust the linkages, tensions and clearances of assembled components to specified specifications by using fixed gauges and hand tools	3	5	-	2
PC7. seal the required areas thoroughly to prevent penetration of water/air etc. during the usage of equipment	2	3	-	2
PC8. set and adjust flow, pressure, speed, level of hydraulic medium / air	2	3	-	1
PC9. follow the do's and don'ts of the manufacturing process as defined in SOPs/Work Instructions or given by supervisors	1	2	-	1
PC10. check the joints, connections, etc. to ensure they are adequately tightened and joint	2	3	-	2
PC11. escalate the problems faced during installation and assembly activities to the supervisor	2	3	-	1
NOS Total	30	50	-	20

National Occupational Standards (NOS) Parameters

NOS Code	ISC/N0919
NOS Name	Perform fitting and assembly of hydraulic and pneumatic equipment
Sector	Iron & Steel
Sub-Sector	Steel, Sponge iron, Ferro Alloys, Re-Rollers, Refractory
Occupation	Mechanical Maintenance
NSQF Level	4
Credits	TBD
Version	2.0
Last Reviewed Date	NA
Next Review Date	NA
NSQC Clearance Date	

ISC/N0920: Perform post-assembly activities

Description

This OS unit is about performing post-assembly activities such as testing, trial run, housekeeping etc.

Scope

The scope covers the following :

- Conduct tests to ensure fitness of equipment
- Perform post-testing activities

Elements and Performance Criteria

Conduct tests to ensure fitness of equipment

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

- PC1. check the equipment as per the control plan, WI for proper working
- PC2. set the test apparatus as per the selected testing process and SOPs/WI
- PC3. connect the equipment and its components, various data capturing meters and gauges with the testing apparatus as per SOP/WI
- PC4. conduct functional tests of assembled equipment to ensure it performs as per desired performance criteria
- PC5. check abnormalities to ensure they are within desired limits (temperature, leakage, pressure, level, vibration, sound and RPM)
- PC6. identify non-conformities and their causes to quality assurance standards
- PC7. record observations/ readings as per the parameters mentioned in the testing manual/Work Instructions
- PC8. observe any deviation, noise or vibrations during the testing process and change or repair the equipment components as per the requirement
- PC9. conduct trials of the equipment to ensure that specified parameters are attained with no abnormalities
- PC10. record the test and trial results as per the organisation guidelines
- PC11. suggest and implement the corrective actions to address problems in machine/electric panels
- PC12. record adjustments not covered by established procedures for future reference

Perform post-testing activities

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

- PC13. clean and store all the tools, machine and equipment after completion of work
- PC14. dispose scrap or waste material into the disposal area in accordance with the company's policies and environmental regulations
- PC15. report to the supervisor about any problems faced or anticipated during the complete process
- PC16. maintain and update all the records and reports related to assembling activities done as per the organisational guidelines

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1. relevant standards and procedures followed in the company
- KU2. escalation matrix for reporting identified issues
- KU3. records to be maintained and implications of non-maintenance of the same
- KU4. Standard Operating Procedures (SOP) recommended by the manufacturer for using tools and measuring instruments used for quality check and testing process
- KU5. various tests for checking the functionality of hydraulic and pneumatic equipment
- KU6. quality and damage checks to be done and importance of the same
- KU7. effect of hydraulic oil temperature, pressure on hydraulic performance
- KU8. checks that need to be made to ensure that equipment is safe and ready to use
- KU9. the post-assembling processes like cleaning, quality check etc.
- KU10. SOP recommended by the organisation for checking defects in the hydraulic and pneumatic equipment
- KU11. impact of non-conformities on final assembly and their causes to quality assurance standards
- KU12. how to conduct trial of the equipment
- KU13. methods of storage and cleaning of tools and equipment
- KU14. documentation required regarding assembling activities performed

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>Conduct tests to ensure fitness of equipment</i>	25	41	-	19
PC1. check the equipment as per the control plan, WI for proper working	2	4	-	2
PC2. set the test apparatus as per the selected testing process and SOPs/WI	2	3	-	2
PC3. connect the equipment and its components, various data capturing meters and gauges with the testing apparatus as per SOP/WI	1	2	-	1
PC4. conduct functional tests of assembled equipment to ensure it performs as per desired performance criteria	4	7	-	3
PC5. check abnormalities to ensure they are within desired limits (temperature, leakage, pressure, level, vibration, sound and RPM)	2	3	-	1
PC6. identify non-conformities and their causes to quality assurance standards	2	3	-	1
PC7. record observations/ readings as per the parameters mentioned in the testing manual/Work Instructions	2	3	-	1
PC8. observe any deviation, noise or vibrations during the testing process and change or repair the equipment components as per the requirement	2	3	-	2
PC9. conduct trials of the equipment to ensure that specified parameters are attained with no abnormalities	2	4	-	2
PC10. record the test and trial results as per the organisation guidelines	2	3	-	1
PC11. suggest and implement the corrective actions to address problems in machine/electric panels	2	3	-	2
PC12. record adjustments not covered by established procedures for future reference	2	3	-	1
<i>Perform post-testing activities</i>	5	9	-	1
PC13. clean and store all the tools, machine and equipment after completion of work	2	3	-	1
PC14. dispose scrap or waste material into the disposal area in accordance with the company's policies and environmental	1	2	-	-



regulations				
PC15.report to the supervisor about any problems faced or anticipated during the complete process	1	2	-	-
PC16.maintain and update all the records and reports related to assembling activities done as per the organisational guidelines	1	2	-	-
NOS Total	30	50	-	20

National Occupational Standards (NOS) Parameters

NOS Code	ISC/N0920
NOS Name	Perform post-assembly activities
Sector	Iron & Steel
Sub-Sector	Steel, Sponge iron, Ferro Alloys, Re-Rollers, Refractory
Occupation	Mechanical Maintenance
NSQF Level	4
Credits	TBD
Version	2.0
Last Reviewed Date	NA
Next Review Date	NA
NSQC Clearance Date	



ISC/N0921: Perform maintenance of hydraulic and pneumatic equipment

Description

This OS unit is about performing routine maintenance and troubleshooting of hydraulic and pneumatic equipment.

Scope

The scope covers the following :

- Prepare for maintenance work
- Repair and maintain the hydraulic and pneumatic equipment

Elements and Performance Criteria

Prepare for maintenance work

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

- PC1. determine the work requirements such as type of tasks to be performed (repair, maintenance, etc.), equipment to be maintained from drawings, maintenance schedule, work instructions, process manuals, etc.
- PC2. identify tools, consumables, spare parts, etc. required for performing repair and maintenance
- PC3. communicate with the user/operator about any variances observed during functioning of the equipment and other performance issues
- PC4. clear the work area thoroughly to ensure no unwanted materials are present before starting the work

Repair and maintain the hydraulic and pneumatic equipment

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

- PC5. follow safety practices during maintenance activities as per organisational SOP
- PC6. perform basic health check-up of equipment as specified in the maintenance checklist
- PC7. dismantle the equipment components and replace/change the spare parts and consumables of the vehicle as per the schedule
- PC8. change/refill the hydraulic oil/compressor lube oil, lubricants and fluids
- PC9. check the internal conditions of equipment parts to test its working status and expected conditions
- PC10. check the systems of the equipment to find out root cause of the problems like any leakage, short circuit in parts, breakage of wires etc. and discuss the same with senior if required
- PC11. carry out minor repairs and adjustments of the equipment and report any malfunctions/repairs in the machine beyond own scope to the concerned person
- PC12. clean the various components of equipment such as reservoir, suction strainer, return line filter, breather filter, suction air filter of air compressor, suction/delivery valves of air compressor etc.
- PC13. assemble back the covers, guards, clamps, insulation etc. of the equipment after repair and maintenance
- PC14. change the maintenance due/status sticker on the equipment

- PC15. record all repairs carried out, parts disposed and replaced, time taken and other significant findings observed during the work process
- PC16. ensure that all maintenance activities are adequately addressed
- PC17. report information such as repair and maintenance work done, faults observed, action taken, parts replaced, next scheduled maintenance, etc. to the supervisors accurately

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1. relevant standards and procedures followed in the company
- KU2. how to read maintenance schedules and checklists recommended by the manufacturer
- KU3. functioning and use of associated systems, accessories and components of hydraulic and pneumatic equipment
- KU4. optimal working condition of hydraulic and pneumatic equipment
- KU5. Standard Operating Procedures (SOP) recommended by OEM for using tools and equipment required
- KU6. de-humidification process
- KU7. concept and factors affecting hydraulic oil contamination
- KU8. trouble shooting techniques of hydraulic and pneumatic system
- KU9. use of appropriate PPE, material handling equipment and tools for completing the maintenance tasks
- KU10. corrective actions for common faults and failures in conveyor system
- KU11. documentation required regarding repair, maintenance and service performed

Generic Skills (GS)

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

- GS10. read work instructions, equipment manuals and process documents
- GS11. communicate the process requirements to the supervisor and co-workers
- GS12. attentively listen and comprehend the information given by the supervisor/team members
- GS13. write work related information in English/regional language
- GS14. recognise a workplace problem and take suitable action
- GS15. analyse and apply the information gathered from observation, experience, reasoning or communication to act efficiently
- GS16. plan and organise work according to the work requirements
- GS17. complete the assigned tasks with minimum supervision
- GS18. 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>Prepare for maintenance work</i>	6	8	-	4
PC1. determine the work requirements such as type of tasks to be performed (repair, maintenance, etc.), equipment to be maintained from drawings, maintenance schedule, work instructions, process manuals, etc.	1	2	-	1
PC2. identify tools, consumables, spare parts, etc. required for performing repair and maintenance	3	2	-	2
PC3. communicate with the user/operator about any variances observed during functioning of the equipment and other performance issues	1	2	-	1
PC4. clear the work area thoroughly to ensure no unwanted materials are present before starting the work	1	2	-	-
<i>Repair and maintain the hydraulic and pneumatic equipment</i>	24	42	-	16
PC5. follow safety practices during maintenance activities as per organisational SOP	1	1	-	-
PC6. perform basic health check-up of equipment as specified in the maintenance checklist	3	5	-	2
PC7. dismantle the equipment components and replace/change the spare parts and consumables of the vehicle as per the schedule	2	3	-	1
PC8. change/refill the hydraulic oil/compressor lube oil, lubricants and fluids	2	3	-	1
PC9. check the internal conditions of equipment parts to test its working status and expected conditions	2	5	-	3
PC10. check the systems of the equipment to find out root cause of the problems like any leakage, short circuit in parts, breakage of wires etc. and discuss the same with senior if required	3	5	-	2
PC11. carry out minor repairs and adjustments of the equipment and report any malfunctions/repairs in the machine beyond own scope to the concerned person	3	5	-	2

PC12.clean the various components of equipment such as reservoir, suction strainer, return line filter, breather filter, suction air filter of air compressor, suction/delivery valves of air compressor etc.	2	4	-	1
PC13.assemble back the covers, guards, clamps, insulation etc. of the equipment after repair and maintenance	2	3	-	1
PC14.change the maintenance due/status sticker on the equipment	1	2	-	1
PC15.record all repairs carried out, parts disposed and replaced, time taken and other significant findings observed during the work process	1	2	-	1
PC16.ensure that all maintenance activities are adequately addressed	1	2	-	-
PC17.report information such as repair and maintenance work done, faults observed, action taken, parts replaced, next scheduled maintenance, etc. to the supervisors accurately	1	2	-	1
NOS Total	30	50	-	20

National Occupational Standards (NOS) Parameters

NOS Code	ISC/N0921
NOS Name	Perform maintenance of hydraulic and pneumatic equipment
Sector	Iron & Steel
Sub-Sector	Steel, Sponge iron, Ferro Alloys, Re-Rollers, Refractory
Occupation	Mechanical Maintenance
NSQF Level	4
Credits	TBD
Version	2.0
Last Reviewed Date	NA
Next Review Date	NA
NSQC Clearance Date	

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/N0918. Prepare for fitting and assembly operations	30	50	0	20	100	15
ISC/N0919. Perform fitting and assembly of hydraulic and pneumatic equipment	30	50	0	20	100	30
ISC/N0920. Perform post-assembly activities	30	50	0	20	100	10
ISC/N0921. Perform maintenance of the hydraulic and pneumatic equipment	30	50	0	20	100	15
Total	180	300	0	120	600	100

Acronyms

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

Glossary

Sector	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.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar / related set of functions in an industry.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
Occupational Standards (OS)	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.
Performance Criteria (PC)	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
National Occupational Standards (NOS)	NOS are occupational standards which apply uniquely in the Indian context.
Qualifications Pack (QP)	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.
Unit Code	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
Unit Title	Unit title gives a clear overall statement about what the incumbent should be able to do.
Description	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.
Scope	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.
Knowledge and Understanding (KU)	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.

Organisational Context	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.
Technical Knowledge	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills/Generic Skills (GS)	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.
Electives	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.
Options	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.