



Assistant Mechanic - Instrumentation

QP Code:ISC/Q1102

Version: 2.0

NSQF Level: 3

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ISC/Q1102: Assistant Mechanic - Instrumentation

Brief Job Description

The individual in this role performs installation, maintenance, testing and calibration of measuring and control equipment.

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/N1102: Carry out maintenance of measuring and control equipment](#)
4. [ISC/N1103: Perform inspection and calibration of measuring equipment](#)

Qualification Pack (QP) Parameters

Sector	Iron & Steel
Sub-Sector	Steel, Sponge iron, Ferro Alloys, Re-Rollers, Refractory
Occupation	Electronics & Instrumentation Maintenance
Country	India
NSQF Level	3
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7311.0401
Minimum Educational Qualification & Experience	8th Class Pass with 1 year of relevant experience OR 10th Class Pass
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/N1102: Carry out maintenance of measuring and control equipment

Description

This OS unit is about assisting the “Technician Instrumentation” during maintenance of measuring and control equipment, in accordance with approved procedures.

Scope

The scope covers the following :

- Prepare for maintenance work
- Perform maintenance of measuring and control equipment
- Perform post-maintenance activities

Elements and Performance Criteria

Prepare for maintenance work

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

- PC1. identify the measuring and control equipment, its manufacturer's specifications and functioning from the user manual
- PC2. read maintenance schedule and checklist and plan the time and schedule for conducting the maintenance
- PC3. identify and arrange the tools, measuring instruments, equipment and spares required for the job

Perform maintenance of measuring and control equipment

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

- PC4. check from “Technician Instrumentation” that the measuring device is functioning within tolerance limits or not
- PC5. re-fix or re-position the measuring device until reading comes to the satisfying range, in case of errors in reading
- PC6. connect the linking device so that no transmission errors take place due to intermediate losses / interference
- PC7. perform basic health check-up of measuring and control equipment as specified in the maintenance checklist
- PC8. execute suitable re-routing of transmission system if need to achieve satisfactory results
- PC9. check the equipment parts for any wear and tear, damage, improper functioning etc.
- PC10. repair or replace damaged components as per the requirement
- PC11. re-connect or return the system after completion of maintenance activities
- PC12. report any instances where the maintenance activities cannot be fully met or where there are identified defects outside the planned schedule
- PC13. record all repairs carried out, time taken and unplanned tasks encountered during the maintenance activities

PC14. dispose off waste materials such as failed parts/aggregates, as per organisation's policies

Perform post-maintenance activities

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

PC15. re-position the pick-up / sensor to better location as advised by "Technician Instrumentation"

PC16. re-fix the pick-up / sensor with better fixing device / fastener as advised by "Technician Instrumentation"

PC17. monitor the problem and keep the superior informed about progress or any delays in resolving the problem

PC18. refer the problem to "Technician Instrumentation" or competent internal / external specialist if it cannot be resolved

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. relevant standards and procedures followed in the company

KU2. Standard Operating Procedures (SOP) recommended by the manufacturer for using hand tools, measuring instruments and equipment required during maintenance work

KU3. isolation and lock-off procedures or permit-to-work procedure that applies

KU4. functioning of different process plant and its measuring and control equipment

KU5. various equipment i.e. Pressure (e.g. absolute, gauge, vacuum), Flow (e.g. orifice plate, venturi tube, electromagnetic, ultrasonic, differential pressure cell, positive displacement), Level (e.g. floats, displacer, differential pressure cells, load cells, ultrasonic, conductivity), Temperature (e.g. bi-metallic, thermocouples, resistance, infra-red, thermal imaging), Weight (e.g. mechanical systems, load cells/strain gauges, transducers), Fiscal metering (e.g. gas, electricity, water, fuel), Detection and alarm (e.g. smoke, heat, gas, chemical, water, metal), Speed measurement (e.g. mechanical, electrical, stroboscopic), Emergency shutdown, Speed control (e.g. mechanical governors, electrical governors, DC speed controller, AC motor control systems, stepper motors, invertors), Vibration monitoring (e.g. vibration switches, proximity probes, seismic velocity transducer, linear variable differential transformers, portable data collectors), Analyzers (e.g. gas detection, spectroscopy, oxygen analyzer, water analysis, moisture measurement, density), Recorders and indicators, Telemetry systems (e.g. master station, outstation, standalone systems), Valves and valve mechanisms (e.g. control valves, valve actuators and positioners), Other specific instrumentation equipment

KU6. how to analyze evidence and evaluate possible characteristics and causes of specific faults/problems

KU7. how to relate previous reports/records of similar fault conditions

KU8. how to handle specific sensitive devices / sensors safely

KU9. precautions to be taken to prevent electrostatic discharge (ESD) damage to electronic circuits and components

KU10. basic principles of operation of the instrumentation and control equipment being maintained

KU11. correct way of fitting sensors to avoid faulty readings (caused by head correction, poor flow

past sensor, blockages, incorrect wiring, poor insulation or incorrect materials)

KU12. correct and tidy installation and connection of external wiring and components, to avoid electronic interference or mechanical damage

KU13. how to carry out visual checks of the instruments (e.g. checking for leaks, security of joints and physical damage)

KU14. safety requirements to be followed during the maintenance 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>Prepare for maintenance work</i>	5	6	-	4
PC1. identify the measuring and control equipment, its manufacturer's specifications and functioning from the user manual	1	2	-	1
PC2. read maintenance schedule and checklist and plan the time and schedule for conducting the maintenance	1	2	-	1
PC3. identify and arrange the tools, measuring instruments, equipment and spares required for the job	3	2	-	2
<i>Perform maintenance of measuring and control equipment</i>	17	32	-	11
PC4. check from "Technician Instrumentation" that the measuring device is functioning within tolerance limits or not	1	2	-	1
PC5. re-fix or re-position the measuring device until reading comes to the satisfying range, in case of errors in reading	2	3	-	1
PC6. connect the linking device so that no transmission errors take place due to intermediate losses / interference	1	2	-	1
PC7. perform basic health check-up of measuring and control equipment as specified in the maintenance checklist	3	5	-	2
PC8. execute suitable re-routing of transmission system if need to achieve satisfactory results	1	2	-	1
PC9. check the equipment parts for any wear and tear, damage, improper functioning etc.	2	5	-	1
PC10. repair or replace damaged components as per the requirement	3	5	-	2
PC11. re-connect or return the system after completion of maintenance activities	1	2	-	1
PC12. report any instances where the maintenance activities cannot be fully met or where there are identified defects outside the planned schedule	1	2	-	-
PC13. record all repairs carried out, time taken and unplanned tasks encountered during the maintenance activities	1	2	-	1

PC14.dispose off waste materials such as failed parts/aggregates, as per organisation's policies	1	2	-	-
<i>Perform post-maintenance activities</i>	8	12	-	5
PC15.re-position the pick-up / sensor to better location as advised by "Technician Instrumentation"	2	3	-	1
PC16.re-fix the pick-up / sensor with better fixing device / fastener as advised by "Technician Instrumentation"	2	3	-	1
PC17.monitor the problem and keep the superior informed about progress or any delays in resolving the problem	2	3	-	1
PC18.refer the problem to "Technician Instrumentation" or competent internal / external specialist if it cannot be resolved	2	3	-	2
NOS Total	30	50	-	20

National Occupational Standards (NOS) Parameters

NOS Code	ISC/N1102
NOS Name	Carry out maintenance of measuring and control equipment
Sector	Iron & Steel
Sub-Sector	Steel, Sponge iron, Ferro Alloys, Re-Rollers, Refractory
Occupation	Electronics & Instrumentation Maintenance
NSQF Level	3
Credits	TBD
Version	2.0
Last Reviewed Date	NA
Next Review Date	NA
NSQC Clearance Date	

ISC/N1103: Perform inspection and calibration of measuring equipment

Description

This OS unit is about testing and calibration of measuring and control equipment for correct operation in accordance with pre-determined procedures.

Scope

The scope covers the following :

- Testing of measuring and control equipment
- Calibrating measuring and control equipment

Elements and Performance Criteria

Testing of measuring and control equipment

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

PC1. identify the testing and calibration requirements by following standard operating procedures

PC2. prepare and update testing/calibration schedules and plans as per the WI

PC3. select the appropriate test equipment in accordance with defined requirements

PC4. select the correct test applications for testing of measuring and control equipment

PC5. check the components, leads, fasteners, etc. for any damage, wear and tear, loose connections and other faults

PC6. carry out testing of the measuring and control equipment i.e. sensors, transmitters, converters, indicators, analyzers, controllers, power supplies, circuit boards etc. to diagnose faults by using testing devices

PC7. apply appropriate testing procedures for assessing the operation of measuring and control equipment

PC8. record observations/ readings as per the parameters mentioned in the testing manual/Work Instructions

PC9. analyze the test results against specified operational specifications and localized faults and report to the supervisor about the potential faults identified

PC10. suggest and implement corrective actions to rectify the issues identified as per SOP

PC11. monitor and review the effectiveness of corrective actions planned for fault rectification and prepare reports for the regulatory authorities on the same

Calibrating measuring and control equipment

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

PC12. assess the calibration of measuring and control equipment w.r.t manufacturers' specifications and/or standard operating procedures

PC13. carry out calibration of each measuring and control equipment against appropriate physical standards by using correct calibration devices, equipment, techniques and predetermined procedures

- PC14. check zero error, span and range of the equipment on indicators/controllers by using correct and appropriate configuration
- PC15. prepare and update documents and records related to testing/calibration activities done
- PC16. carry out recommissioning of equipment in accordance with standard operating procedures
- PC17. report any instances where the testing/calibration activities cannot be fully met

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1. relevant standards and procedures followed in the company
- KU2. SOPs for checking and calibration of measuring equipment
- KU3. Standard Operating Procedures (SOP) recommended by OEM for using tools and equipment to check measuring equipment for faults
- KU4. correct operation of the instrumentation system including the procedures for isolating instrumentation systems
- KU5. various techniques to check the calibration of the measuring equipment for conformance to specifications
- KU6. how to inspect and test the instrumentation system
- KU7. various types of tests i.e. Visual inspection of the instrument for completeness and freedom from damage or foreign objects, Standard serviceability test/calibration, Equipment self-diagnostics, Leak/pressure test, Signal injection tests, Soak test, Special-to-type tests, Signal measurement and transmission, Operational/function checks, Five point calibration, Unit substitution etc. need to conduct
- KU8. various components i.e. Sensors, Transmitters, Converters, Indicators, Analyzers, Controllers, Power supplies, Removable circuit boards, Sensor units associated with determining/controlling density, level, flow, temperature, composition etc. of a range of materials need to be tested
- KU9. various equipment i.e. Pressure (e.g. absolute, gauge, vacuum), Flow (e.g. orifice plate, venturi tube, electromagnetic, ultrasonic, differential pressure cell, positive displacement), Level (e.g. floats, displacer, differential pressure cells, load cells, ultrasonic, conductivity), Temperature (e.g. bi-metallic, thermocouples, resistance, infra-red, thermal imaging), Weight (e.g. mechanical systems, load cells/strain gauges, transducers), Fiscal metering (e.g. gas, electricity, water, fuel), Detection and alarm (e.g. smoke, heat, gas, chemical, water, metal), Speed measurement (e.g. mechanical, electrical, stroboscopic), Emergency shutdown, Speed control (e.g. mechanical governors, electrical governors, DC speed controller, AC motor control systems, stepper motors, invertors), Vibration monitoring (e.g. vibration switches, proximity probes, seismic velocity transducer, linear variable differential transformers, portable data collectors), Analyzers (e.g. gas detection, spectroscopy, oxygen analyzer, water analysis, moisture measurement, density), Recorders and indicators, Telemetry systems (e.g. master station, outstation, standalone systems), Valves and valve mechanisms (e.g. control valves, valve actuators and positioners), Other specific instrumentation equipment
- KU10. various calibration tools used are Oscilloscopes, Pressure gauge, Standard test gauges, Temperature controllers, Temperature baths, Micrometer, Current injection devices, Voltmeter, All types of comparators, Jigs and fixtures, Templates and patterns, Insulation

testers, Calibrated weights, Pressure sources, Vernier calliper, Analogue and digital meters, Digital pressure indicators, Dead weight tester, Logic probes, Calibrated flow meters, Special purpose test equipment, System calibrators, Manometers, pH simulator/buffers, Wheatstone bridge, Potentiometers, Frequency/ signal generators, Logic probes, Multimeters, (analog/digital), Test gauges, Cathode ray oscilloscopes and other associated equipment

- KU11. procedures for checking and verifying the operational function of the instrumentation system/equipment
- KU12. specifications of each instrumentation system and acceptable deviations from specifications
- KU13. probable causes of faults in instrumentation system/equipment components
- KU14. procedures for repairing faulty instrumentation system
- KU15. procedures for zero error, span and range checks on instrumentation systems/equipment
- KU16. how to calibrate the measuring equipment against the appropriate physical standard
- KU17. how to re-commission the measuring equipment
- KU18. checks that are to be made on measuring equipment to identify faults
- KU19. common fault(s) that may be found in the measuring equipment
- KU20. effects of faults on the performance/accuracy of the measuring equipment
- KU21. purpose/operational function of instrumentation system
- KU22. functionality of the equipment and tolerance levels for calibration
- KU23. various instrumentation principles (e.g. controlling density, level, flow, temperature, composition of a range of materials)
- KU24. interpretation requirements of schematic, wiring and block diagrams and circuits
- KU25. principles of hydraulic, pneumatic and electrical flow

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>Testing of measuring and control equipment</i>	20	32	-	13
PC1. identify the testing and calibration requirements by following standard operating procedures	1	2	-	-
PC2. prepare and update testing/calibration schedules and plans as per the WI	1	2	-	1
PC3. select the appropriate test equipment in accordance with defined requirements	2	2	-	2
PC4. select the correct test applications for testing of measuring and control equipment	2	2	-	1
PC5. check the components, leads, fasteners, etc. for any damage, wear and tear, loose connections and other faults	2	3	-	1
PC6. carry out testing of the measuring and control equipment i.e. sensors, transmitters, converters, indicators, analyzers, controllers, power supplies, circuit boards etc. to diagnose faults by using testing devices	3	5	-	2
PC7. apply appropriate testing procedures for assessing the operation of measuring and control equipment	3	5	-	2
PC8. record observations/ readings as per the parameters mentioned in the testing manual/Work Instructions	1	2	-	1
PC9. analyze the test results against specified operational specifications and localized faults and report to the supervisor about the potential faults identified	2	4	-	1
PC10. suggest and implement corrective actions to rectify the issues identified as per SOP	2	3	-	1
PC11. monitor and review the effectiveness of corrective actions planned for fault rectification and prepare reports for the regulatory authorities on the same	1	2	-	1
<i>Calibrating measuring and control equipment</i>	10	18	-	7
PC12. assess the calibration of measuring and control equipment w.r.t manufacturers' specifications and/or standard operating procedures	2	3	-	1

PC13. carry out calibration of each measuring and control equipment against appropriate physical standards by using correct calibration devices, equipment, techniques and predetermined procedures	3	5	-	2
PC14. check zero error, span and range of the equipment on indicators/controllers by using correct and appropriate configuration	2	4	-	2
PC15. prepare and update documents and records related to testing/calibration activities done	1	2	-	1
PC16. carry out recommissioning of equipment in accordance with standard operating procedures	1	2	-	-
PC17. report any instances where the testing/calibration activities cannot be fully met	1	2	-	1
NOS Total	30	50	-	20

National Occupational Standards (NOS) Parameters

NOS Code	ISC/N1103
NOS Name	Perform inspection and calibration of measuring equipment
Sector	Iron & Steel
Sub-Sector	Steel, Sponge iron, Ferro Alloys, Re-Rollers, Refractory
Occupation	Electronics & Instrumentation Maintenance
NSQF Level	3
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/N1102. Carry out maintenance of measuring and control equipment	30	50	0	20	100	35
ISC/N1103. Perform inspection and calibration of measuring equipment	30	50	0	20	100	35
Total	120	200	0	80	400	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.