सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

Qualification Pack

Welding Technician - Oil & Gas/Shipbuilding/Railways

Options: Perform AR-guided Oil & Gas Welding Scenario & Performance Evaluation/ Perform AR-guided SMAW/GMAW in Railways/ Perform AR-guided SMAW/GMAW in Shipbuilding

QP Code: CSC/Q0214

Version: 1.0

NSQF Level: 4

Capital Goods & Strategic Skill Council || 1st Floor, L-29, Outer Circle, Connaught Place
New Delhi – 110001 || email:technicaladvisors@cgsc.in

Contents

CSC/Q0214: Welding Technician - Oil & Gas/Shipbuilding/Railways

Brief Job Description

A Welding Technician is responsible for executing welding operations in various industries such as Oil & Gas, Shipbuilding & Railways, utilizing augmented reality (AR) technology to enhance precision, efficiency, and safety. This role involves performing high-quality welding on a variety of materials and components while adhering to industry standards and regulations.

Personal Attributes

A strong understanding of welding techniques, materials, and Oil & Gas Industry processes is essential. Familiarity with AR technologies and their applications in manufacturing can further enhance performance. Proficient in using augmented reality tools, welding equipment, and related technology to enhance productivity and accuracy.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. CSC/N1335: Follow the health and safety practices at the work
2. CSC/N1336: Coordinate with co-workers to achieve work efficiency
3. CSC/N0204: Manually weld carbon and low alloy steels by using Metal Arc Welding (MMAW)/ Shielded Metal Arc Welding (SMAW)
4. CSC/N0209: Manually weld metals by using MIG/MAG welding
5. DGT/VSQ/N0101: Employability Skills (30 Hours)

Options*(Not mandatory)*:

Option 1: Perform AR-guided Oil & Gas Welding Scenario & Performance Evaluation

This toolkit should leverage AR to overlay instructions, measurements and visual cues onto the real world welding environments , improving accuracy & safety.

1. CSC/N0215: Perform AR-guided SMAW/GMAW in Oil & Gas Industry

Option 2: Perform AR-guided SMAW/GMAW in Railways

An AR welding simulator provides a virtual, interactive training experience that enhances learning & skill development in welding. It overlays digital welding techniques onto real world environment allowing learners to practice and refine their skills in a safe controlled setting.

1. CSC/N0216: Perform AR-guided SMAW/GMAW in Railways

Option 3: Perform AR-guided SMAW/GMAW in Shipbuilding

An AR welding simulator provides a virtual, interactive training experience that enhances learning & skill development in welding. It overlays digital welding techniques onto real world environment allowing learners to practice and refine their skills in a safe controlled setting. An AR based toolkit for SMAW/GMAW welding in shipbuilding should include tools and accessories for both welding processes, including power sources, welding guns/electrodes, safety equipment and inspection finishing tools all integrated with an AR application.

1. CSC/N0217: Perform AR-guided SMAW/GMAW in Shipbuilding

Qualification Pack (QP) Parameters

Sector	Capital Goods
Sub-Sector	Process Plant Machinery, Strategic Manufacturing
Occupation	Welding and Cutting
Country	India
NSQF Level	4
Credits	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7212.0302
Minimum Educational Qualification & Experience	12th Class (or equivalent) OR Completed 2nd year of the 3-year diploma after 10 (or equivalent) OR 10th grade pass with 3 Years of experience relevant OR 11th grade pass with 1.5 years of experience relevant OR Previous relevant Qualification of NSQF Level (3.5) with 1.5 years of experience relevant OR Previous relevant Qualification of NSQF Level (3) with 3 Years of experience relevant
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	08/05/2028
NSQC Approval Date	08/05/2025
Version	1.0
Reference code on NQR	QG-04-IT-04205-2025-V1-CGSC
NQR Version	1.0

CSC/N1335: Follow the health and safety practices at the work

Description

This OS unit is about following the appropriate health and safety practices at work. It covers responsibilities towards self and others to ensure a safe work environment.

Scope

The scope covers the following :

- Maintain personal health and safety
- Assist in hazard management
- Check the first aid box, firefighting and safety equipment
- Assist in waste management
- Follow the fire safety guidelines
- Follow the emergency and first-aid procedures
- Carry out relevant documentation and review

Elements and Performance Criteria

Maintain personal health and safety

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

PC1. follow the recommended practices to ensure protection from infections and transmission to others, such as the use of hand sanitiser and face mask

PC2. check the work conditions, assess the potential health and safety risks, and take appropriate measures to mitigate them

PC3. select and use the appropriate Personal Protective Equipment (PPE) relevant to the task and work conditions

PC4. follow the recommended techniques while lifting and moving heavy objects to avoid injury

PC5. follow the manufacturer's instructions and workplace safety guidelines while working on heavy machinery, tools and equipment

Assist in hazard management

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

PC6. identify existing and potential hazards at work

PC7. assess the potential risks and injuries associated with the identified hazards

PC8. coordinate with the supervisor or other relevant personnel to prevent or minimise the identified hazards

PC9. handle hazardous materials safely and store them in the designated storage

Check the first aid box, firefighting and safety equipment

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

PC10. check the first aid box to ensure it is updated with the relevant first aid supplies

PC11. check and test the firefighting and various safety equipment to ensure they are in usable condition

PC12. coordinate with the supervisor for the repair and replacement of firefighting and safety equipment

Assist in waste management

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

PC13. segregate waste into appropriate categories

PC14. recycle the recyclable waste appropriately

PC15. dispose of the non-recyclable waste in an environment-friendly manner, complying with the applicable regulations

Follow the fire safety guidelines

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

PC16. use the appropriate type of fire extinguisher to extinguish different types of fires safely

PC17. follow the recommended practices for a safe rescue during a fire emergency

PC18. coordinate with the fire department to request assistance to extinguish a serious fire

Follow the emergency and first-aid procedures

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

PC19. follow the organisational health and safety guidelines during workplace emergencies to ensure own and co-workers' safety

PC20. follow the recommended practices to minimise loss to organisational property during an emergency

PC21. follow the recommended procedure to free a person from electrocution

PC22. administer appropriate first aid to the injured personnel

PC23. perform Cardiopulmonary Resuscitation (CPR) on a potential victim of cardiac arrest

PC24. coordinate with the emergency services to request medical assistance for seriously injured/ ill personnel requiring professional medical attention or hospitalisation

Carry out relevant documentation and review

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

PC25. carry out appropriate documentation following a health and safety incident at work, including all the required information

PC26. coordinate with the relevant personnel to review health and safety conditions at work regularly or following an incident

PC27. assist in implementing appropriate changes to improve the health and safety conditions at work

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. the recommended practices to be followed to ensure protection from infections and transmission to others, such as the use of hand sanitiser and face mask

KU2. the importance and process of checking the work conditions, assessing the potential health and safety risks, and take appropriate measures to mitigate them

KU3. the importance and process of selecting and using the appropriate PPE relevant to the task and work conditions

KU4. the recommended techniques to be followed while lifting and moving heavy objects to avoid injury

KU5. the importance of following the manufacturer's instructions and workplace safety guidelines while working on heavy machinery, tools and equipment

KU6. the importance and process of identifying existing and potential hazards at work

KU7. the process of assessing the potential risks and injuries associated with the various hazards

KU8. how to prevent or minimise different types of hazards

KU9. how to handle and store hazardous materials safely

KU10. the importance of ensuring the first aid box is updated with the relevant first aid supplies

KU11. the process of checking and testing the firefighting and various safety equipment to ensure they are in a usable condition

KU12. the criteria for segregating waste into appropriate categories

KU13. the appropriate methods for recycling the recyclable waste

KU14. the process of disposing of the non-recyclable waste safely and the applicable regulations

KU15. Use of different types of fire extinguishers to extinguish different types of fires

KU16. the recommended practices to be followed for a safe rescue during a fire emergency

KU17. how to request assistance from the fire department to extinguish a serious fire

KU18. the appropriate practices to be followed during workplace emergencies to ensure safety and minimise loss to organisational property

KU19. common health and safety hazards present in a work environment, associated risks, and how to mitigate them

KU20. safe working practices to be followed while working at various hazardous sites and using electrical equipment

KU21. the importance of ensuring easy access to firefighting and safety equipment

KU22. the appropriate preventative and remedial actions to be taken in the case of exposure to toxic materials, such as poisonous chemicals and gases

KU23. various causes of fire in different work environments and the recommended precautions to be taken to prevent fire accidents

KU24. different methods of extinguishing fire

KU25. different materials used for extinguishing fire, such as sand, water, foam, CO2, dry powder, etc.

KU26. the applicable rescue techniques to be followed during a fire emergency

KU27. the importance of placing safety signs and instructions at strategic locations in a workplace and following them

KU28. different types of first aid treatment to be provided for different types of injuries

KU29. potential injuries associated with incorrect manual handling

KU30. how to move an injured person safely

KU31. various hazards associated with the use of various machinery, tools, implements, equipment and materials

KU32. the importance of ensuring no obstruction and free access to fire exits

KU33. how to free a person from electrocution safely

KU34. how to administer appropriate first aid to an injured person

KU35. how to perform Cardiopulmonary Resuscitation (CPR)

KU36. the importance of coordinating with the emergency services to request urgent medical assistance for persons requiring professional medical attention or hospitalisation

KU37. the appropriate documentation to be carried out following a health and safety incident at work, and the relevant information to be included

KU38. the importance and process of reviewing the health and safety conditions at work regularly or following an incident

KU39. the importance and process of implementing appropriate changes to improve the health and safety conditions at work

Generic Skills (GS)

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

GS1. maintain work-related notes and records

GS2. communicate clearly and politely with co-workers and clients

GS3. read the relevant literature to get the latest updates about the field of work

GS4. listen attentively to understand the information being shared

GS5. plan and prioritise tasks to ensure timely completion

GS6. take quick decisions to deal with workplace emergencies and accidents

GS7. identify possible disruptions to work and take appropriate preventive measures

GS8. coordinate with the co-workers to achieve the work objectives

GS9. evaluate all possible solutions to a problem to select the best one

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Maintain personal health and safety	7	12	-	-
PC1. follow the recommended practices to ensure protection from infections and transmission to others, such as the use of hand sanitiser and face mask	2	3	-	-
PC2. check the work conditions, assess the potential health and safety risks, and take appropriate measures to mitigate them	1	2	-	-
PC3. select and use the appropriate Personal Protective Equipment (PPE) relevant to the task and work conditions	1	2	-	-
PC4. follow the recommended techniques while lifting and moving heavy objects to avoid injury	1	3	-	-
PC5. follow the manufacturer's instructions and workplace safety guidelines while working on heavy machinery, tools and equipment	2	2	-	-
Assist in hazard management	4	10	-	-
PC6. identify existing and potential hazards at work	1	1	-	-
PC7. assess the potential risks and injuries associated with the identified hazards	1	3	-	-
PC8. coordinate with the supervisor or other relevant personnel to prevent or minimise the identified hazards	1	3	-	-
PC9. handle hazardous materials safely and store them in the designated storage	1	3	-	-
Check the first aid box, firefighting and safety equipment	3	7	-	-
PC10. check the first aid box to ensure it is updated with the relevant first aid supplies	1	2	-	-
PC11. check and test the firefighting and various safety equipment to ensure they are in usable condition	1	3	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. coordinate with the supervisor for the repair and replacement of firefighting and safety equipment	1	2	-	-
Assist in waste management	3	8	-	-
PC13. segregate waste into appropriate categories	1	3	-	-
PC14. recycle the recyclable waste appropriately	1	3	-	-
PC15. dispose of the non-recyclable waste in an environment-friendly manner, complying with the applicable regulations	1	2	-	-
Follow the fire safety guidelines	3	12	-	-
PC16. use the appropriate type of fire extinguisher to extinguish different types of fires safely	1	4	-	-
PC17. follow the recommended practices for a safe rescue during a fire emergency	1	4	-	-
PC18. coordinate with the fire department to request assistance to extinguish a serious fire	1	4	-	-
Follow the emergency and first-aid procedures	7	12	-	-
PC19. follow the organisational health and safety guidelines during workplace emergencies to ensure own and co-workers' safety	1	2	-	-
PC20. follow the recommended practices to minimise loss to organisational property during an emergency	1	3	-	-
PC21. follow the recommended procedure to free a person from electrocution	1	2	-	-
PC22. administer appropriate first aid to the injured personnel	1	2	-	-
PC23. perform Cardiopulmonary Resuscitation (CPR) on a potential victim of cardiac arrest	1	2	-	-
PC24. coordinate with the emergency services to request medical assistance for seriously injured/ ill personnel requiring professional medical attention or hospitalisation	2	1	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Carry out relevant documentation and review	3	9	-	-
PC25. carry out appropriate documentation following a health and safety incident at work, including all the required information	1	3	-	-
PC26. coordinate with the relevant personnel to review health and safety conditions at work regularly or following an incident	1	3	-	-
PC27. assist in implementing appropriate changes to improve the health and safety conditions at work	1	3	-	-
NOS Total	**30**	**70**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	CSC/N1335
NOS Name	Follow the health and safety practices at the work
Sector	Capital Goods
Sub-Sector	Machine Tools, Process Plant Machinery, Dies, Moulds and Press Tools, Electrical and Power Machinery, Plastics Manufacturing Machinery, Light Engineering Goods, Textile Manufacturing Machinery
Occupation	Machining
NSQF Level	3
Credits	TBD
Version	2.0
Last Reviewed Date	01/10/2025
Next Review Date	01/10/2028
NSQC Clearance Date	01/10/2025

CSC/N1336: Coordinate with co-workers to achieve work efficiency

Description

This OS unit is about working in coordination with co-workers to achieve the work objectives efficiently. It also covers practising inclusion at work.

Scope

The scope covers the following :

- Work effectively with co-workers
- Communicate effectively with co-workers
- Practice inclusion at work

Elements and Performance Criteria

Work effectively with co-workers

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

PC1. plan daily tasks at work to ensure their timely completion and efficient use of time

PC2. carry out work responsibilities adhering to the limits of authority

PC3. follow the supervisor's instructions to ensure adherence to the applicable quality standards and timescales

PC4. coordinate with the co-workers to achieve the work objectives efficiently

PC5. prepare the relevant documents and reports as per the supervisor's instructions, providing appropriate information clearly and systematically

PC6. coordinate with the supervisor or relevant personnel to deal with out of authority tasks and concerns

PC7. mentor and assist subordinates in the execution of their work responsibilities

PC8. identify possible disruptions to work through coordination with the relevant stakeholders and take appropriate preventive measures

PC9. use various resources efficiently to ensure maximum utilisation and minimum wastage

PC10. follow the recommended practices to avoid and resolve conflicts at work

PC11. follow the relevant organisational policies to ensure disciplined behaviour with maximum productivity at work

Communicate effectively with co-workers

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

PC12. follow the organisational policy for the efficient and timely dissemination of information to the authorised personnel

PC13. communicate clearly and politely to ensure effective communication with co-workers

PC14. follow the appropriate techniques for active listening during interactions

Practice inclusion at work

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

PC15. empathise with Persons with Disabilities (PwD)

PC16. adopt gender-neutral behaviour at work

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. the importance and process of effective communication in the workplace
KU2. the barriers to effective communication and how to overcome them
KU3. the importance of teamwork in an organisation's and individual's success
KU4. the importance of active listening in the work environment
KU5. the appropriate techniques to be followed for active listening
KU6. importance of avoiding casual expletives and unpleasant terms while communicating professional circles
KU7. the importance of maintaining discipline and ethical behaviour at work
KU8. the common reasons for interpersonal conflict and how to resolve them
KU9. the importance of developing effective work relationships for professional success
KU10. how expressing and addressing grievances appropriately and effectively
KU11. the importance and process of planning daily tasks to ensure their timely completion and efficient use of time
KU12. the importance of adhering to the limits of authority at work
KU13. the importance of following the applicable quality standards and timescales at work
KU14. the importance of coordinating with the co-workers to achieve the work objectives efficiently
KU15. the relevant documentation requirements
KU16. the importance of providing appropriate information clearly and systematically in work documents
KU17. the escalation matrix to be followed to deal with out of authority tasks and concerns
KU18. the importance and process of mentoring and assisting subordinates in the execution of their work responsibilities
KU19. how to identify possible disruptions to work prevent them
KU20. how to use various resources efficiently to ensure maximum utilisation and minimum wastage
KU21. the recommended practices to be followed at work to avoid and resolve conflicts at work
KU22. the importance and process of efficient and timely dissemination of information to the authorised personnel
KU23. how to communicate clearly and politely to ensure effective communication
KU24. the importance of following the recommended practices to ensure an inclusive environment for PwD and all genders at work

Generic Skills (GS)

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

GS1. maintain work-related notes and records

GS2. read work-related and other relevant literature
GS3. communicate politely and -professionally
GS4. listen attentively to understand the information or instructions being shared
GS5. plan and prioritise tasks to ensure timely completion
GS6. take prompt decisions to deal with workplace emergencies and accidents
GS7. evaluate all possible solutions to a problem to select the best one

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Work effectively with co-workers	20	43	-	-
PC1. plan daily tasks at work to ensure their timely completion and efficient use of time	2	4	-	-
PC2. carry out work responsibilities adhering to the limits of authority	2	4	-	-
PC3. follow the supervisor's instructions to ensure adherence to the applicable quality standards and timescales	2	4	-	-
PC4. coordinate with the co-workers to achieve the work objectives efficiently	2	4	-	-
PC5. prepare the relevant documents and reports as per the supervisor's instructions, providing appropriate information clearly and systematically	2	4	-	-
PC6. coordinate with the supervisor or relevant personnel to deal with out of authority tasks and concerns	2	4	-	-
PC7. mentor and assist subordinates in the execution of their work responsibilities	2	4	-	-
PC8. identify possible disruptions to work through coordination with the relevant stakeholders and take appropriate preventive measures	2	4	-	-
PC9. use various resources efficiently to ensure maximum utilisation and minimum wastage	2	4	-	-
PC10. follow the recommended practices to avoid and resolve conflicts at work	1	4	-	-
PC11. follow the relevant organisational policies to ensure disciplined behaviour with maximum productivity at work	1	3	-	-
Communicate effectively with co-workers	6	15	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. follow the organisational policy for the efficient and timely dissemination of information to the authorised personnel	2	5	-	-
PC13. communicate clearly and politely to ensure effective communication with co-workers	2	5	-	-
PC14. follow the appropriate techniques for active listening during interactions	2	5	-	-
Practice inclusion at work	4	12	-	-
PC15. empathise with Persons with Disabilities (PwD)	2	6	-	-
PC16. adopt gender-neutral behaviour at work	2	6	-	-
NOS Total	**30**	**70**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	CSC/N1336
NOS Name	Coordinate with co-workers to achieve work efficiency
Sector	Capital Goods
Sub-Sector	Machine Tools, Dies, Moulds and Press Tools, Plastics Manufacturing Machinery, Textile Manufacturing Machinery, Process Plant Machinery, Electrical and Power Machinery, Light Engineering Goods
Occupation	Machining
NSQF Level	3
Credits	TBD
Version	2.0
Last Reviewed Date	01/10/2025
Next Review Date	01/10/2028
NSQC Clearance Date	01/10/2025

CSC/N0204: Manually weld carbon and low alloy steels by using Metal Arc Welding (MMAW)/ Shielded Metal Arc Welding (SMAW)

Description

This unit is about performing manual metal arc welding (MMAW) for producing various types of joints on carbon and low alloy steels as per the given specifications and standards specified by the organisation.

Scope

The scope covers the following :

- Prepare for welding operations
- Perform MMAW/SMAW operations
- Perform post-welding operations

Elements and Performance Criteria

Prepare for welding operations

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

PC1. identify the work to be done and product specifications by interpreting the product drawing, Welding Procedure Specification (WPS) and job orders

PC2. identify the tools, welding machines, measuring instruments, accessories, consumables and input materials (i.e. carbon, low alloy steel etc.) as per the requirements mentioned in WPS or drawing

PC3. select and arrange the right material, equipment, fixtures, accessories, welding torch and consumables i.e. electrode, filler wire, shielding gas etc. as per the SOP and job requirements

PC4. check the input material, tools and equipment for any defects and that they are as per the required quality standards

PC5. prepare the work area for the welding activities

PC6. prepare the materials (i.e. plate(1.5 - 24mm)/ sheet (1.5mm)) and joint for welding process

PC7. set the MMAW machine and its parameters as per the WPS and SOP

PC8. re-dry electrodes as per electrode classification requirement

PC9. install the work pieces and fixture on the apparatus and align them with the electrodes as per the job requirements

PC10. verify set up by running test weld specimen (scrap plate)

Perform MMAW/SMAW operations

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

PC11. follow safety precautions during welding work as per SOP and organizational guidelines

PC12. start the MMAW machine for welding operations

PC13. strike and maintain a stable arc by applying correct technique (i.e. scratch start, tapping techniques) and to avoid welding defects

PC14. perform MMAW welding process as per SOP and tack weld the joint at appropriate intervals to produce joints of the specified quality, dimensions and profile

PC15. produce fillet and grove joints in 1F/1G, 2F/2G and 3F/ 3G welding positions as specified in WPS by using single or multi-run welds

PC16. ensure correct angle of torch, travel speed, direction of weld and feed during the welding operation

PC17. maintain proper bead sequence with respect to groove/fillet configurations and positions

PC18. monitor the welding process parameters (air pressure, electrode force, electrode distance, gas flow etc.) are within standards by reading the various gauges and correct them if not within standards

PC19. measure the final welded piece and compare with the dimensional and geometrical aspects of the weld as prescribed in the WPS and engineering drawing

PC20. remove extra material, slag etc. by using brush, chipping hammers, grinders etc., from the welded piece

PC21. hammer the work piece to get the desired shape, if there are any welding bulges/distortions

PC22. shut down the welding equipment and remove the workpiece after completion of welding activities

Perform post-welding operations

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

PC23. check the work pieces as per the work instructions for product quality

PC24. identify various weld defects by conducting visual inspection, destructive and non-destructive tests on the work pieces

PC25. separate the defective pieces which can be repaired/ reworked and pieces which are beyond repair

PC26. clean and store all the tools, machine and equipment after completion of work

PC27. dispose scrap or waste material in accordance with the company policies and environmental regulations

PC28. report to the supervisor about any problems faced or anticipated during the complete process

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. relevant legislation, standards, policies, and procedures followed in the organization

KU2. the basic principle of welding process

KU3. MMAW welding and its process flow

KU4. various types of welding joints (i.e. fillet lap joints, tee fillet joints, corner joints, butt joints (square, single, vee, double vee)) and welding positions (i.e. flat (PA) IG/1F, horizontal vertical (PB)2F, horizontal (PC)2G, vertical upwards (PF) 3F / 3G, vertical downwards (PG) 3F / 3G, Plate to Pipe (Fixed) 5F)

KU5. how to read and interpret WPS, welding drawings and symbols

KU6.
- welding specific equipment requirements for MMAW/SMAW welding
- MMAW equipment: transformers, rectifiers, generators, invertors;
- Consumables – electrodes, dyes;
- Welding accessories - holders, cables, welding torch and accessories;
- Ancillary equipment - power saw, angle, pedestal and straight grinders, tong tester; etc.

KU7. SOP recommended by the manufacturer for using tools, measuring instruments, accessories, MMAW welding machine etc. during the welding process

KU8. main components and controls of welding equipment

KU9. type of current used and implication

KU10. ISO colour codes for welding apparatus such as gas cylinder, hoses, electric cables, etc.

KU11. joint preparation process: made rust free; cleaned – free from scaling, paint, oil/grease; made dry and free from moisture; edges to be welded prepared as per job requirement - such as flat, square or bevelled; use various machines and techniques for the above (e.g. chamfering machine, grinding and stripping, gas or plasma cutting, etc.); correctly positioned (positioning: devices and techniques; jigs and fixtures; setting up joint in correct position & alignment)

KU12. Impact of various welding parameters like voltage, current, gas flow rate, speed, pressure, torch angle, cycle time, electrode distance etc. on the quality and quantity of welding

KU13. welding techniques i.e. drag, weave, whip

KU14. various materials used for MMAW welding and their properties

KU15. SOP recommended by the organisation for operating MMAW welding machine and its accessories

KU16. purpose and importance of pre-heating requirements for base metals

KU17. • factors that determine weld bead shape
• Factors: electrode angles and welding technique (push, perpendicular, drag); arc length; thickness of base metal; travel speed (slow, normal, fast)

KU18. • types of beads, characteristics and uses (stringer, weave, weave patterns)
• Bead characteristics: spatter deposits, roughness, evenness, fill, crater, overlap

KU19. SOP recommended by the organisation for checking irregularities in the product/work piece

KU20. • factors that affect weld quality standards
• Quality standards: required parameters for dimensional accuracy; weld finishes are built up to the full section of the weld; joins at stop/start positions merge smoothly; weld surface is (free from cracks; substantially free from porosity; free from any pronounced hump or crater; substantially free from shrinkage cavities; substantially free from trapped slag; substantially free from arcing or chipping marks); fillet welds are (equal in leg length, slightly convex in profile (where applicable), size of the fillet equivalent to the thickness of the material welded); weld contour is (of linear and of uniform profile; smooth and free from excessive undulations; regular and has an even ripple formations); welds are adequately fused, and there is minimal undercut, overlap and surface inclusions etc.

KU21. • various defects associated with the MMAW/SMAW welding process
• Weld defects: lack of continuity of the weld; uneven and irregular ripple formation; excessive spatter; incorrect weld size or profile; burn through; undercutting; overlap; inclusions; distortion; porosity; internal cracks; surface cracks; lack of fusion or incomplete fusion; lack of penetration; excessive penetration; gouges; stray arc strikes; sharp edges; excessive convexity

KU22. how to control distortion (such as welding sequence; deposition technique)

KU23. magnetic arc blow or arc deflection, causes and methods to avoid or compensate

KU24. Various testing techniques like visual, destructive and non-destructive

KU25. common welder testing codes i.e. ASME section IX, EN 287, ISO 9606, IS 7310 and their purpose

KU26. safety requirements during the welding work

Generic Skills (GS)

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

GS1. read and interpret drawings, work instructions, equipment manuals and process documents
GS2. communicate the welding process requirements to the supervisor and co-workers
GS3. attentively listen and comprehend the information given by the supervisor/team members
GS4. write any 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 organize tools, machines and consumables for carrying out welding job
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
Prepare for welding operations	13	19	-	7
PC1. identify the work to be done and product specifications by interpreting the product drawing, Welding Procedure Specification (WPS) and job orders	1	2	-	1
PC2. identify the tools, welding machines, measuring instruments, accessories, consumables and input materials (i.e. carbon, low alloy steel etc.) as per the requirements mentioned in WPS or drawing	3	2	-	2
PC3. select and arrange the right material, equipment, fixtures, accessories, welding torch and consumables i.e. electrode, filler wire, shielding gas etc. as per the SOP and job requirements	2	3	-	1
PC4. check the input material, tools and equipment for any defects and that they are as per the required quality standards	2	4	-	1
PC5. prepare the work area for the welding activities	1	1	-	-
PC6. prepare the materials (i.e. plate(1.5 - 24mm)/ sheet (1.5mm)) and joint for welding process	1	1	-	1
PC7. set the MMAW machine and its parameters as per the WPS and SOP	1	2	-	1
PC8. re-dry electrodes as per electrode classification requirement	1	1	-	-
PC9. install the work pieces and fixture on the apparatus and align them with the electrodes as per the job requirements	1	2	-	-
PC10. verify set up by running test weld specimen (scrap plate)	-	1	-	-
Perform MMAW/SMAW operations	11	20	-	8
PC11. follow safety precautions during welding work as per SOP and organizational guidelines	-	1	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. start the MMAW machine for welding operations	1	2	-	-
PC13. strike and maintain a stable arc by applying correct technique (i.e. scratch start, tapping techniques) and to avoid welding defects	1	2	-	1
PC14. perform MMAW welding process as per SOP and tack weld the joint at appropriate intervals to produce joints of the specified quality, dimensions and profile	2	4	-	2
PC15. produce fillet and grove joints in 1F/1G, 2F/2G and 3F/ 3G welding positions as specified in WPS by using single or multi-run welds	2	4	-	2
PC16. ensure correct angle of torch, travel speed, direction of weld and feed during the welding operation	1	1	-	1
PC17. maintain proper bead sequence with respect to groove/fillet configurations and positions	-	1	-	-
PC18. monitor the welding process parameters (air pressure, electrode force, electrode distance, gas flow etc.) are within standards by reading the various gauges and correct them if not within standards	1	1	-	1
PC19. measure the final welded piece and compare with the dimensional and geometrical aspects of the weld as prescribed in the WPS and engineering drawing	1	1	-	1
PC20. remove extra material, slag etc. by using brush, chipping hammers, grinders etc., from the welded piece	1	1	-	-
PC21. hammer the work piece to get the desired shape, if there are any welding bulges/distortions	1	1	-	-
PC22. shut down the welding equipment and remove the workpiece after completion of welding activities	-	1	-	-
Perform post-welding operations	**6**	**11**	**-**	**5**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC23. check the work pieces as per the work instructions for product quality	1	2	-	1
PC24. identify various weld defects by conducting visual inspection, destructive and non-destructive tests on the work pieces	2	4	-	2
PC25. separate the defective pieces which can be repaired/ reworked and pieces which are beyond repair	1	1	-	1
PC26. clean and store all the tools, machine and equipment after completion of work	1	2	-	1
PC27. dispose scrap or waste material in accordance with the company policies and environmental regulations	1	1	-	-
PC28. report to the supervisor about any problems faced or anticipated during the complete process	-	1	-	-
NOS Total	**30**	**50**	**-**	**20**

National Occupational Standards (NOS) Parameters

NOS Code	CSC/N0204
NOS Name	Manually weld carbon and low alloy steels by using Metal Arc Welding (MMAW)/ Shielded Metal Arc Welding (SMAW)
Sector	Capital Goods
Sub-Sector	Machine Tools, Dies, Moulds and Press Tools, Plastics Manufacturing Machinery, Textile Manufacturing Machinery, Process Plant Machinery, Electrical and Power Machinery
Occupation	Welding and Cutting
NSQF Level	3
Credits	TBD
Version	2.0
Last Reviewed Date	08/05/2025
Next Review Date	08/05/2028
NSQC Clearance Date	08/05/2025

CSC/N0209: Manually weld metals by using MIG/MAG welding

Description

This unit is about performing MIG/MAG welding for producing various types of joints on metal and metal alloys as per the given specifications and standards specified by the organisation.

Scope

The scope covers the following :

- Prepare for welding operations
- Perform MIG/MAG welding operations
- Perform post-welding operations

Elements and Performance Criteria

Prepare for welding operations

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

PC1. identify the work to be done and product specifications by interpreting the product drawing, Welding Procedure Specification (WPS) and job orders

PC2. identify the tools, MIG welding machines, measuring instruments, accessories, consumables and input materials (i.e. ferrous metals/materials: carbon steel, stainless steel etc.) as per the requirements mentioned in WPS or drawing

PC3. select and arrange the right material, equipment, fixtures, accessories, welding torch and consumables i.e. electrode, filler wire, shielding gas etc. as per the SOP and job requirements

PC4. check the input material, tools and equipment for any defects and that they are as per the required quality standards

PC5. prepare the work area for welding activities

PC6. prepare the materials (i.e. sheet (less than 1.5 mm), plate, structural section, pipe/tube, other forms) and joint for welding process

PC7. clean wire feeder and torch tip

PC8. set the MIG welding machine and its parameters i.e. wire feed rate, amperage, gas flow rate etc. as per the WPS and SOP

PC9. connect and adjust regulators and flow meters to cylinders

PC10. choose appropriate mode of metal transfer

PC11. set pre-purge with shielding gas as required

PC12. install the work pieces and fixture on the apparatus and align them with the electrodes as per the job requirements

PC13. verify set up by running test weld on the specimen (scrap plate)

Perform MIG/MAG welding operations

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

PC14. follow safety precautions during welding work as per SOP and organizational guidelines

PC15. start the MIG welding machine for welding operations

PC16. perform MIG welding process in all welding positions as per SOP and tack weld the joint at appropriate intervals to produce joints of the specified quality, dimensions and profile

PC17. adjust wire stick-out as per requirement

PC18. produce joints of the required quality and of specified dimensional accuracy which achieve a weld quality equivalent to Level C of ISO 5817

PC19. ensure correct angle of torch, travel speed, direction of weld and feed during the welding operation

PC20. monitor the welding process parameters (air pressure, electrode force, electrode distance, gas flow etc.) are within standards by reading the various gauges and correct them if not within standards

PC21. measure the final welded piece and compare with the dimensions as prescribed in the WPS and engineering drawing

PC22. remove extra material, slag etc. by using brush, chipping hammers, grinders etc., from the welded piece

PC23. shut down the welding equipment and remove the workpiece after completion of welding activities

Perform post-welding operations

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

PC24. check the work pieces as per the work instructions for product quality

PC25. identify various weld defects by conducting visual inspection, destructive and non-destructive tests on the work pieces

PC26. separate the defective pieces which can be repaired/ reworked and pieces which are beyond repair

PC27. clean and store all the tools, machine and equipment after completion of work

PC28. dispose scrap or waste material in accordance with the company policies and environmental regulations

PC29. check the machine operations for any malfunctions/defects in the component and immediately inform the supervisor/maintenance team for correction

PC30. report to the supervisor about any problems faced or anticipated during the complete process

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. relevant legislation, standards, policies, and procedures followed in the organization

KU2. MIG welding and its process flow

KU3. various types of welding joints i.e. fillet lap joints, tee fillet joints, corner joints, butt joints (square, single, vee, double vee)

KU4. various welding positions i.e. flat (PA) IG/1F, horizontal vertical (PB)2F, horizontal (PC)2G, vertical upwards (PF) 3F / 3G, vertical downwards (PG) 3F / 3G, Plate to Pipe (Fixed) 5F

KU5. how to read and interpret WPS, welding drawings and symbols

KU6. • welding specific equipment requirements for MIG/MAG welding
• MIG equipment: rectifier (diode, thyristor/transistor), inverter, generator; wire feed system; measurement equipment for measuring; electrical output and continuity (voltmeter/multi-meter, ammeter/shunts/coils, tong tester); welding cables - wire feed to torch (air cooled, harness construction); welding guns/torches (air cooled, construction, types [push, pull, reel-on-gun] swan neck design, pistol design); nozzles (dip, spray); return clamps (types, clamping mechanisms) and cables; solenoid valves (shielding gas); jog-feed control, gas purge control; ancillary equipment (angle grinders, wire brushes, linishers, hammer, power saw, angle, pedestal and straight grinders, chisel); other tools and equipment such as wrenches, wire cutters and MIG pliers

KU7. SOP recommended by the manufacturer for using tools, measuring instruments, accessories, MMAW welding machine etc. during the welding process

KU8. main components and controls of welding equipment

KU9. ISO colour codes for welding apparatus such as gas cylinder, hoses, electric cables, etc.

KU10. joint preparation process: made rust free; cleaned – free from scaling, paint, oil/grease; made dry and free from moisture; edges to be welded prepared as per job requirement - such as flat, square or bevelled; use various machines and techniques for the above (e.g. chamfering machine, grinding and stripping, gas or plasma cutting, etc.); correctly positioned (positioning: devices and techniques; jigs and fixtures; setting up joint in correct position & alignment)

KU11. impact of various welding parameters like voltage, current, gas flow rate, speed, pressure, torch angle, cycle time, electrode distance etc. on the quality and quantity of welding

KU12. relationship between wire feed, speed control and welding current

KU13. MIG/MAG welding technique: e.g. fine adjustment of parameters, correct manipulation of the torch, blending in stops/starts, tack welds, angle of the torch, setting of individual parameters like wire feed speed, voltage, gas flow rate, stick-out, etc. various materials used for GMAW welding and their properties

KU14. SOP recommended by the organisation for operating MIG welding machine and its accessories

KU15. current and polarity required for GMAW

KU16. types, selection and application of filler wires and welding electrodes

KU17. • reasons for using shielding gases, and the types and application of the various gases
• Shielding gases: applications for shielding gases/gas mixtures (argon, mixture, helium, argon/helium mixtures, helium/argon mixtures, argon/hydrogen mixtures, nitrogen argon/nitrogen mixtures, CO2 and CO2 mixtures); flow rates for applications; identify percentage of purity and mixture with respect to WPS/PQR

KU18. • use, impact and importance of gas pressures and flow rates (in relationship to the type of material being welded)
• Types of ferrous metals/materials: carbon steel, stainless steel

KU19. • methods/modes of metal transfer and their uses
• Methods: globular, short circuit transfer, spray arc, pulse, surface tension transfer (STT)

KU20. purpose and correct use of anti-spatter compound

KU21. importance and procedure to clean torch tip and liner

KU22. • factors that determine weld bead shape
• Factors: gun angles and weld bead profiles (push, perpendicular, drag); electrode extensions stick out (short, normal, long); fillet weld electrode extension stick out (short, normal, long); gun travel speed (slow, normal, fast); current and voltage

KU23. • types of beads, characteristics and uses (stringer, weave, weave patterns)
• Bead characteristics: spatter deposits, roughness, evenness, fill, crater, overlap

KU24. • weld bead quality characteristics
• Bead characteristics: spatter deposits, roughness, evenness, fill, crater, overlap, contour – convex, concave, mitre

KU25. SOP recommended by the organisation for checking irregularities in the product/work piece

KU26. • factors that affect weld quality standards
• Quality standards: required parameters for dimensional accuracy; weld finishes are built up to the full section of the weld; joins at stop/start positions merge smoothly; weld surface is (free from cracks; substantially free from porosity; free from any pronounced hump or crater; substantially free from shrinkage cavities; substantially free from trapped slag; substantially free from arcing or chipping marks); fillet welds are (equal in leg length, slightly convex in profile (where applicable), size of the fillet equivalent to the thickness of the material welded); weld contour is (of linear and of uniform profile; smooth and free from excessive undulations; regular and has an even ripple formations); welds are adequately fused, and there is minimal undercut, overlap and surface inclusions etc.

KU27. various defects associated with the MIG welding process

KU28. how to control distortion (such as welding sequence; deposition technique)

KU29. various testing techniques like visual, destructive and non-destructive

KU30. safety requirements during the welding work

Generic Skills (GS)

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

GS1. read and interpret drawings, work instructions, equipment manuals and process documents

GS2. communicate the welding process requirements to the supervisor and co-workers

GS3. attentively listen and comprehend the information given by the supervisor/team members

GS4. write any 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 organize tools, machines and consumables for carrying out welding job

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
Prepare for welding operations	15	21	-	7
PC1. identify the work to be done and product specifications by interpreting the product drawing, Welding Procedure Specification (WPS) and job orders	1	2	-	1
PC2. identify the tools, MIG welding machines, measuring instruments, accessories, consumables and input materials (i.e. ferrous metals/materials: carbon steel, stainless steel etc.) as per the requirements mentioned in WPS or drawing	3	2	-	1
PC3. select and arrange the right material, equipment, fixtures, accessories, welding torch and consumables i.e. electrode, filler wire, shielding gas etc. as per the SOP and job requirements	2	3	-	1
PC4. check the input material, tools and equipment for any defects and that they are as per the required quality standards	2	3	-	1
PC5. prepare the work area for welding activities	1	1	-	-
PC6. prepare the materials (i.e. sheet (less than 1.5 mm), plate, structural section, pipe/tube, other forms) and joint for welding process	1	1	-	1
PC7. clean wire feeder and torch tip	-	1	-	-
PC8. set the MIG welding machine and its parameters i.e. wire feed rate, amperage, gas flow rate etc. as per the WPS and SOP	1	2	-	1
PC9. connect and adjust regulators and flow meters to cylinders	1	1	-	-
PC10. choose appropriate mode of metal transfer	1	1	-	-
PC11. set pre-purge with shielding gas as required	1	1	-	1
PC12. install the work pieces and fixture on the apparatus and align them with the electrodes as per the job requirements	1	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC13. verify set up by running test weld on the specimen (scrap plate)	-	1	-	-
Perform MIG/MAG welding operations	8	17	-	8
PC14. follow safety precautions during welding work as per SOP and organizational guidelines	-	1	-	-
PC15. start the MIG welding machine for welding operations	1	2	-	-
PC16. perform MIG welding process in all welding positions as per SOP and tack weld the joint at appropriate intervals to produce joints of the specified quality, dimensions and profile	2	4	-	2
PC17. adjust wire stick-out as per requirement	1	1	-	1
PC18. produce joints of the required quality and of specified dimensional accuracy which achieve a weld quality equivalent to Level C of ISO 5817	1	4	-	2
PC19. ensure correct angle of torch, travel speed, direction of weld and feed during the welding operation	1	1	-	1
PC20. monitor the welding process parameters (air pressure, electrode force, electrode distance, gas flow etc.) are within standards by reading the various gauges and correct them if not within standards	1	1	-	1
PC21. measure the final welded piece and compare with the dimensions as prescribed in the WPS and engineering drawing	1	1	-	1
PC22. remove extra material, slag etc. by using brush, chipping hammers, grinders etc., from the welded piece	-	1	-	-
PC23. shut down the welding equipment and remove the workpiece after completion of welding activities	-	1	-	-
Perform post-welding operations	7	12	-	5
PC24. check the work pieces as per the work instructions for product quality	1	2	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC25. identify various weld defects by conducting visual inspection, destructive and non-destructive tests on the work pieces	2	3	-	2
PC26. separate the defective pieces which can be repaired/ reworked and pieces which are beyond repair	1	1	-	1
PC27. clean and store all the tools, machine and equipment after completion of work	1	2	-	1
PC28. dispose scrap or waste material in accordance with the company policies and environmental regulations	1	1	-	-
PC29. check the machine operations for any malfunctions/defects in the component and immediately inform the supervisor/maintenance team for correction	1	2	-	-
PC30. report to the supervisor about any problems faced or anticipated during the complete process	-	1	-	-
NOS Total	**30**	**50**	**-**	**20**

National Occupational Standards (NOS) Parameters

NOS Code	CSC/N0209
NOS Name	Manually weld metals by using MIG/MAG welding
Sector	Capital Goods
Sub-Sector	Machine Tools, Dies, Moulds and Press Tools, Plastics Manufacturing Machinery, Textile Manufacturing Machinery, Process Plant Machinery, Electrical and Power Machinery, Light Engineering Goods
Occupation	Welding and Cutting
NSQF Level	4
Credits	TBD
Version	2.0
Last Reviewed Date	08/05/2025
Next Review Date	08/05/2028
NSQC Clearance Date	08/05/2025

DGT/VSQ/N0101: Employability Skills (30 Hours)

Description

This unit is about employability skills, Constitutional values, becoming a professional in the 21st Century, digital, financial, and legal literacy, diversity and Inclusion, English and communication skills, customer service, entrepreneurship, and apprenticeship, getting ready for jobs and career development.

Scope

The scope covers the following :

- Introduction to Employability Skills
- Constitutional values - Citizenship
- Becoming a Professional in the 21st Century
- Basic English Skills
- Communication Skills
- Diversity & Inclusion
- Financial and Legal Literacy
- Essential Digital Skills
- Entrepreneurship
- Customer Service
- Getting ready for Apprenticeship & Jobs

Elements and Performance Criteria

Introduction to Employability Skills

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

PC1. understand the significance of employability skills in meeting the job requirements

Constitutional values - Citizenship

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

PC2. identify constitutional values, civic rights, duties, personal values and ethics and environmentally sustainable practices

Becoming a Professional in the 21st Century

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

PC3. explain 21st Century Skills such as Self-Awareness, Behavior Skills, Positive attitude, self-motivation, problem-solving, creative thinking, time management, social and cultural awareness, emotional awareness, continuous learning mindset etc.

Basic English Skills

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

PC4. speak with others using some basic English phrases or sentences

Communication Skills

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

PC5. follow good manners while communicating with others

PC6. work with others in a team

Diversity & Inclusion

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

PC7. communicate and behave appropriately with all genders and PwD

PC8. report any issues related to sexual harassment

Financial and Legal Literacy

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

PC9. use various financial products and services safely and securely

PC10. calculate income, expenses, savings etc.

PC11. approach the concerned authorities for any exploitation as per legal rights and laws

Essential Digital Skills

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

PC12. operate digital devices and use its features and applications securely and safely

PC13. use internet and social media platforms securely and safely

Entrepreneurship

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

PC14. identify and assess opportunities for potential business

PC15. identify sources for arranging money and associated financial and legal challenges

Customer Service

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

PC16. identify different types of customers

PC17. identify customer needs and address them appropriately

PC18. follow appropriate hygiene and grooming standards

Getting ready for apprenticeship & Jobs

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

PC19. create a basic biodata

PC20. search for suitable jobs and apply

PC21. identify and register apprenticeship opportunities as per requirement

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. need for employability skills

KU2. various constitutional and personal values

KU3. different environmentally sustainable practices and their importance

KU4. Twenty first (21st) century skills and their importance

KU5. how to use basic spoken English language

KU6. Do and dont of effective communication

KU7. inclusivity and its importance

KU8. different types of disabilities and appropriate communication and behaviour towards PwD

KU9. different types of financial products and services

KU10. how to compute income and expenses
KU11. importance of maintaining safety and security in financial transactions
KU12. different legal rights and laws
KU13. how to operate digital devices and applications safely and securely
KU14. ways to identify business opportunities
KU15. types of customers and their needs
KU16. how to apply for a job and prepare for an interview
KU17. apprenticeship scheme and the process of registering on apprenticeship portal

Generic Skills (GS)

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

GS1. communicate effectively using appropriate language
GS2. behave politely and appropriately with all
GS3. perform basic calculations
GS4. solve problems effectively
GS5. be careful and attentive at work
GS6. use time effectively
GS7. maintain hygiene and sanitisation to avoid infection

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Introduction to Employability Skills	1	1	-	-
PC1. understand the significance of employability skills in meeting the job requirements	-	-	-	-
Constitutional values - Citizenship	1	1	-	-
PC2. identify constitutional values, civic rights, duties, personal values and ethics and environmentally sustainable practices	-	-	-	-
Becoming a Professional in the 21st Century	1	3	-	-
PC3. explain 21st Century Skills such as Self-Awareness, Behavior Skills, Positive attitude, self-motivation, problem-solving, creative thinking, time management, social and cultural awareness, emotional awareness, continuous learning mindset etc.	-	-	-	-
Basic English Skills	2	3	-	-
PC4. speak with others using some basic English phrases or sentences	-	-	-	-
Communication Skills	1	1	-	-
PC5. follow good manners while communicating with others	-	-	-	-
PC6. work with others in a team	-	-	-	-
Diversity & Inclusion	1	1	-	-
PC7. communicate and behave appropriately with all genders and PwD	-	-	-	-
PC8. report any issues related to sexual harassment	-	-	-	-
Financial and Legal Literacy	3	4	-	-
PC9. use various financial products and services safely and securely	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10. calculate income, expenses, savings etc.	-	-	-	-
PC11. approach the concerned authorities for any exploitation as per legal rights and laws	-	-	-	-
Essential Digital Skills	4	6	-	-
PC12. operate digital devices and use its features and applications securely and safely	-	-	-	-
PC13. use internet and social media platforms securely and safely	-	-	-	-
Entrepreneurship	3	5	-	-
PC14. identify and assess opportunities for potential business	-	-	-	-
PC15. identify sources for arranging money and associated financial and legal challenges	-	-	-	-
Customer Service	2	2	-	-
PC16. identify different types of customers	-	-	-	-
PC17. identify customer needs and address them appropriately	-	-	-	-
PC18. follow appropriate hygiene and grooming standards	-	-	-	-
Getting ready for apprenticeship & Jobs	1	3	-	-
PC19. create a basic biodata	-	-	-	-
PC20. search for suitable jobs and apply	-	-	-	-
PC21. identify and register apprenticeship opportunities as per requirement	-	-	-	-
NOS Total	**20**	**30**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	DGT/VSQ/N0101
NOS Name	Employability Skills (30 Hours)
Sector	Cross Sectoral
Sub-Sector	Professional Skills
Occupation	Employability
NSQF Level	2
Credits	1
Version	1.0
Next Review Date	07/10/2028

CSC/N0215: Perform AR-guided SMAW/GMAW in Oil & Gas Industry

Description

This toolkit should leverage AR to overlay instructions, measurements and visual cues onto the real world welding environments , improving accuracy & safety.

Scope

The scope covers the following :

- Prepare for AR-Guided Oil & Gas Setup
- Perform AR Based Oil & Gas Welding operations
- Perform post-AR Guided welding operations

Elements and Performance Criteria

Prepare for AR-Guided Oil & Gas Setup

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

PC1. Get awareness regarding working of simulator which integrates 3D models of pipes, oil & gas pipeleines

PC2. Ensure accurate measurements and angles during welding preparation and execution using AR tools.

PC3. Install and open AR software that provides welding instructions, visual aids, and measurement tools specific to the Oil & Gas Industrial project.

PC4. Perform calibration on AR devices to ensure accurate alignment of digital overlays with physical components.

PC5. Perform AR overlays that show the weld beep and formation of heat etc.

Perform AR Based Oil & Gas Welding operations

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

PC6. Charge and test AR devices (e.g., smart glasses, tablets) and ensure that software applications are updated and functioning properly.

PC7. Access project-specific data, such as welding specifications, diagrams, and AR-guided instructions relevant to the task.

PC8. Follow AR-guided instructions to properly clean, fit, and align the surfaces to be welded.

PC9. Utilize AR overlays that provide step-by-step guidance on welding techniques, acceptable angles, and movement patterns.

PC10. Ensure accurate measurements during welding preparations and executions using AR tools.

Perform post-AR Guided welding operations

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

PC11. Allow welded joints to cool naturally or use appropriate cooling methods following the welding process to prevent warping or cracking.

PC12. Perform a preliminary visual inspection of the welds for burn-through, undercuts, or other visible defects.

PC13. Follow step by step instructions through AR overlays and get real time feedback to welding parameters/techniques.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. Technical Knowledge of Welding Processes
KU2. Types of oil & Gas welding (e.g., SMAW, TIG, MIG, FCAW)
KU3. Welding materials and consumables
KU4. Heat control and metallurgy in welding
KU5. Pre-weld and post-weld procedures
KU6. Pipe Welding Specifics
KU7. Basic rail track components (rails, sleepers, joints, fasteners)
KU8. Understanding of Pipe alignment and leveling
KU9. Knowledge Materials & Metallurgy
KU10. Safety Protocols and Hazard Awareness
KU11. Personal Protective Equipment (PPE) requirements
KU12. Fire and chemical handling safety (especially with Thermit welding)
KU13. Emergency procedures in a welding environment
KU14. AR System Operation and Interpretation
KU15. How to use AR devices (HoloLens, AR headsets, or tablets)
KU16. Understanding of AR overlays, prompts, and virtual guides
KU17. Ability to follow step-by-step digital instructions
KU18. Tool and Equipment Familiarity
KU19. Identification and correct use of welding tools (grinders, clamps, crucibles)
KU20. Maintenance and inspection of tools before/after use
KU21. Virtual simulation of tool use via AR
KU22. AR Software Proficiency: Skills in navigating AR applications for accessing and manipulating welding instructions and project data

Generic Skills (GS)

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

GS1. read and interpret drawings, work instructions, equipment manuals and process documents
GS2. communicate the welding process requirements to the supervisor and co-workers
GS3. attentively listen and comprehend the information given by the supervisor/team members
GS4. write any work related information in English/regional language
GS5. recognize a workplace problem and take suitable action
GS6. analyze and apply the information gathered from observation, experience, reasoning or communication to act efficiently

GS7. plan and organize tools, machines and consumables for carrying out welding job

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
Prepare for AR-Guided Oil & Gas Setup	10	15	-	7
PC1. Get awareness regarding working of simulator which integrates 3D models of pipes, oil & gas pipeleines	1	1	-	-
PC2. Ensure accurate measurements and angles during welding preparation and execution using AR tools.	2	4	-	2
PC3. Install and open AR software that provides welding instructions, visual aids, and measurement tools specific to the Oil & Gas Industrial project.	2	4	-	2
PC4. Perform calibration on AR devices to ensure accurate alignment of digital overlays with physical components.	3	4	-	2
PC5. Perform AR overlays that show the weld beep and formation of heat etc.	2	2	-	1
Perform AR Based Oil & Gas Welding operations	10	15	-	8
PC6. Charge and test AR devices (e.g., smart glasses, tablets) and ensure that software applications are updated and functioning properly.	2	2	-	3
PC7. Access project-specific data, such as welding specifications, diagrams, and AR-guided instructions relevant to the task.	2	4	-	2
PC8. Follow AR-guided instructions to properly clean, fit, and align the surfaces to be welded.	2	4	-	1
PC9. Utilize AR overlays that provide step-by-step guidance on welding techniques, acceptable angles, and movement patterns.	2	3	-	2
PC10. Ensure accurate measurements during welding preparations and executions using AR tools.	2	2	-	-
Perform post-AR Guided welding operations	10	20	-	5

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC11. Allow welded joints to cool naturally or use appropriate cooling methods following the welding process to prevent warping or cracking.	4	5	-	1
PC12. Perform a preliminary visual inspection of the welds for burn-through, undercuts, or other visible defects.	3	8	-	3
PC13. Follow step by step instructions through AR overlays and get real time feedback to welding parameters/techniques.	3	7	-	1
NOS Total	**30**	**50**	**-**	**20**

National Occupational Standards (NOS) Parameters

NOS Code	CSC/N0215
NOS Name	Perform AR-guided SMAW/GMAW in Oil & Gas Industry
Sector	Capital Goods
Sub-Sector	
Occupation	Welding and Cutting
NSQF Level	4
Credits	1
Version	1.0
Last Reviewed Date	08/05/2025
Next Review Date	08/05/2028
NSQC Clearance Date	08/05/2025

CSC/N0216: Perform AR-guided SMAW/GMAW in Railways

Description

An AR welding simulator provides a virtual, interactive training experience that enhances learning & skill development in welding. It overlays digital welding techniques onto real world environment allowing learners to practice and refine their skills in a safe controlled setting.

Scope

The scope covers the following :

- Prepare for AR-Guided Oil & Gas Setup
- Perform AR Based Oil & Gas Welding operations
- Perform post-AR Guided welding operations

Elements and Performance Criteria

Weld Preparation & Set Up

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

PC1. Utilize the AR enabled Tablet/Headset overlays for instruction, measurements & visual cues for joint preparation (eg; bevel angles, root gap etc.).

PC2. Perform real time measurements of weld joint dimensions using AR tools.

PC3. Follow AR guidelines for setting up of welding equipment.

PC4. Utilize AR tools to identify & mark areas required for cleaning & grinding

PC5. Follow AR guidelines for application of appropriate flux cleansing agents

PC6. Utilize AR overlays to ensure correct alignment of weld joints and components

Welding Execution

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

PC7. Utilize AR overlays for welding parameters (eg: voltage, amperage, wire speed) and settings onto welding environment.

PC8. Utilize AR overlays that provide step-by-step guidance on welding techniques, acceptable angles, and movement patterns.

PC9. Ensure accurate measurements during welding preparations and executions using AR tools.

Perform post-AR Guided welding operations

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

PC10. Allow welded joints to cool naturally or use appropriate cooling methods following the welding process to prevent warping or cracking.

PC11. Utilize AR inspection tools overlay for visual inspection of welds (inspection points & reference lines).

PC12. Utilize AR overlay measurement tools to accurately measure weld dimensions (eg: weld height, width).

PC13. Follow step by step instructions through AR overlays and get real time feedback to welding parameters/techniques.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. Technical Knowledge of Welding Processes
KU2. Types of Railways welding (e.g., SMAW, TIG, MIG, FCAW)
KU3. Welding materials and consumables
KU4. Heat control and metallurgy in welding
KU5. Pre-weld and post-weld procedures
KU6. Purpose of visual cues and benefits of AR guided welding
KU7. Basic rail track components (rails, sleepers, joints, fasteners)
KU8. Understanding of Pipe alignment and leveling
KU9. Knowledge Materials & Metallurgy
KU10. Safety Protocols and Hazard Awareness
KU11. Personal Protective Equipment (PPE) requirements
KU12. Fire and chemical handling safety (especially with Thermit welding)
KU13. Emergency procedures in a welding environment
KU14. AR System Operation and Interpretation
KU15. How to use AR devices (HoloLens, AR headsets, or tablets)
KU16. Understanding of AR overlays, prompts, and virtual guides
KU17. Ability to follow step-by-step digital instructions
KU18. Tool and Equipment Familiarity
KU19. Identification and correct use of welding tools (grinders, clamps, crucibles)
KU20. Maintenance and inspection of tools before/after use
KU21. Virtual simulation of tool use via AR
KU22. AR Software Proficiency: Skills in navigating AR applications for accessing and manipulating welding instructions and project data.

Generic Skills (GS)

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

GS1. read and interpret drawings, work instructions, equipment manuals and process documents
GS2. communicate the welding process requirements to the supervisor and co-workers
GS3. attentively listen and comprehend the information given by the supervisor/team members
GS4. write any work related information in English/regional language
GS5. recognize a workplace problem and take suitable action
GS6. analyze and apply the information gathered from observation, experience, reasoning or communication to act efficiently
GS7. plan and organize tools, machines and consumables for carrying out welding job
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
Weld Preparation & Set Up	10	15	-	7
PC1. Utilize the AR enabled Tablet/Headset overlays for instruction, measurements & visual cues for joint preparation (eg; bevel angles, root gap etc.).	1	1	-	-
PC2. Perform real time measurements of weld joint dimensions using AR tools.	2	4	-	2
PC3. Follow AR guidelines for setting up of welding equipment.	2	4	-	2
PC4. Utilize AR tools to identify & mark areas required for cleaning & grinding	3	4	-	1
PC5. Follow AR guidelines for application of appropriate flux cleansing agents	1	1	-	1
PC6. Utilize AR overlays to ensure correct alignment of weld joints and components	1	1	-	1
Welding Execution	10	15	-	8
PC7. Utilize AR overlays for welding parameters (eg: voltage, amperage, wire speed) and settings onto welding environment.	4	5	-	3
PC8. Utilize AR overlays that provide step-by-step guidance on welding techniques, acceptable angles, and movement patterns.	4	6	-	3
PC9. Ensure accurate measurements during welding preparations and executions using AR tools.	2	4	-	2
Perform post-AR Guided welding operations	10	20	-	5
PC10. Allow welded joints to cool naturally or use appropriate cooling methods following the welding process to prevent warping or cracking.	2	2	-	-
PC11. Utilize AR inspection tools overlay for visual inspection of welds (inspection points & reference lines).	2	3	-	2

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. Utilize AR overlay measurement tools to accurately measure weld dimensions (eg: weld height, width).	3	8	-	2
PC13. Follow step by step instructions through AR overlays and get real time feedback to welding parameters/techniques.	3	7	-	1
NOS Total	**30**	**50**	**-**	**20**

National Occupational Standards (NOS) Parameters

NOS Code	CSC/N0216
NOS Name	Perform AR-guided SMAW/GMAW in Railways
Sector	Capital Goods
Sub-Sector	
Occupation	Welding and Cutting
NSQF Level	4
Credits	1
Version	1.0
Last Reviewed Date	08/05/2025
Next Review Date	08/05/2028
NSQC Clearance Date	08/05/2025

CSC/N0217: Perform AR-guided SMAW/GMAW in Shipbuilding

Description

An AR welding simulator provides a virtual, interactive training experience that enhances learning & skill development in welding. It overlays digital welding techniques onto real world environment allowing learners to practice and refine their skills in a safe controlled setting. An AR based toolkit for SMAW/GMAW welding in shipbuilding should include tools and accessories for both welding processes, including power sources, welding guns/electrodes, safety equipment and inspection finishing tools all integrated with an AR application.

Scope

The scope covers the following :

- Prepare for AR-Guided Ship Building Setup
- Perform AR Based Ship Building Welding operations
- Perform post-AR Guided welding operations

Elements and Performance Criteria

Weld Preparation & Set Up

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

PC1. Utilize the AR enabled Tablet/Headset overlays for instruction, measurements & visual cues for joint preparation.

PC2. Perform real time measurements of weld joint dimensions using AR tools.

PC3. Follow AR guidelines for setting up of welding equipment.

PC4. Follow AR guidelines for application of appropriate flux cleansing agents

PC5. Utilize AR equipment for performing welds in different positions (AR application should be adaptable to various welding positions & offer guidance accordingly).

Perform AR Based Shipbuilding Welding Operations

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

PC6. Utilize AR overlays for displaying ideal weld parameters, position and techniques.

PC7. Utilize AR overlays that provide step-by-step guidance on welding techniques, acceptable angles, and movement patterns.

PC8. Ensure accurate measurements during welding preparations and executions using AR tools on AR Based projections of weld joints, shapes & sizes for accurate placement.

Perform post-AR Guided welding operations

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

PC9. Allow welded joints to cool naturally or use appropriate cooling methods following the welding process to prevent warping or cracking.

PC10. Utilize AR inspection tools overlay for visual inspection of welds.

PC11. Utilize AR sensors & cameras for providing feedback on weld quality, heat input & other critical parameters and other feedback.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. Technical Knowledge of Welding Processes
KU2. Structural Components - Plates, hulls , bulkheads, frames
KU3. Alignment & Fit-Up - Importance of precision in joining large steel parts in marine structures.
KU4. Thermal Distortion & Control -Understanding heat effects on large metal surfaces and compensating techniques.
KU5. Pre-weld and post-weld procedures
KU6. Pipe Welding Specifics
KU7. Basic Shipbuilding components
KU8. Understanding of Pipe alignment and leveling
KU9. Knowledge Materials & Metallurgy
KU10. Safety Protocols and Hazard Awareness
KU11. Personal Protective Equipment (PPE) requirements
KU12. Fire and chemical handling safety (especially with Thermit welding)
KU13. Emergency procedures in a welding environment
KU14. AR System Operation and Interpretation
KU15. How to use AR devices (HoloLens, AR headsets, or tablets)
KU16. Understanding of AR overlays, prompts, and virtual guides
KU17. Ability to follow step-by-step digital instructions
KU18. Tool and Equipment Familiarity
KU19. Identification and correct use of welding tools (grinders, clamps, crucibles)
KU20. Maintenance and inspection of tools before/after use
KU21. Virtual simulation of tool use via AR
KU22. AR Software Proficiency: Skills in navigating AR applications for accessing and manipulating welding instructions and project data.

Generic Skills (GS)

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

GS1. read and interpret drawings, work instructions, equipment manuals and process documents
GS2. communicate the welding process requirements to the supervisor and co-workers
GS3. attentively listen and comprehend the information given by the supervisor/team members
GS4. write any work related information in English/regional language
GS5. recognize a workplace problem and take suitable action
GS6. analyze and apply the information gathered from observation, experience, reasoning or communication to act efficiently
GS7. plan and organize tools, machines and consumables for carrying out welding job
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
Weld Preparation & Set Up	10	15	-	7
PC1. Utilize the AR enabled Tablet/Headset overlays for instruction, measurements & visual cues for joint preparation.	1	1	-	1
PC2. Perform real time measurements of weld joint dimensions using AR tools.	2	4	-	2
PC3. Follow AR guidelines for setting up of welding equipment.	2	4	-	2
PC4. Follow AR guidelines for application of appropriate flux cleansing agents	3	4	-	1
PC5. Utilize AR equipment for performing welds in different positions (AR application should be adaptable to various welding positions & offer guidance accordingly).	2	2	-	1
Perform AR Based Shipbuilding Welding Operations	10	15	-	8
PC6. Utilize AR overlays for displaying ideal weld parameters, position and techniques.	4	5	-	3
PC7. Utilize AR overlays that provide step-by-step guidance on welding techniques, acceptable angles, and movement patterns.	4	6	-	3
PC8. Ensure accurate measurements during welding preparations and executions using AR tools on AR Based projections of weld joints, shapes & sizes for accurate placement.	2	4	-	2
Perform post-AR Guided welding operations	10	20	-	5
PC9. Allow welded joints to cool naturally or use appropriate cooling methods following the welding process to prevent warping or cracking.	4	4	-	1
PC10. Utilize AR inspection tools overlay for visual inspection of welds.	4	8	-	2

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC11. Utilize AR sensors & cameras for providing feedback on weld quality, heat input & other critical parameters and other feedback.	2	8	-	2
NOS Total	**30**	**50**	**-**	**20**

National Occupational Standards (NOS) Parameters

NOS Code	CSC/N0217
NOS Name	Perform AR-guided SMAW/GMAW in Shipbuilding
Sector	Capital Goods
Sub-Sector	
Occupation	Welding and Cutting
NSQF Level	4
Credits	1
Version	1.0
Last Reviewed Date	08/05/2025
Next Review Date	08/05/2028
NSQC Clearance Date	08/05/2025

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

1. Criteria for assessment for the Qualification Pack will be created by CGSC.

2. Performance Criteria (PC) have been assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.

3. The assessment for the theory part will/may be based on knowledge bank of questions approved CGSC.

4. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.

5. Assessment Agencies will create Assessor Guides comprising of Theory and Practical Assessment Set and Guidelines for each examination/training centre (as per assessment criteria below). The same will be approved by CGSC for adequacy.

6. To successfully attain Certification on the Qualification Pack, the trainee must score a minimum of 70% in each Core NOS and minimum of 70% in all non-core NOS. In addition, a candidate needs to attain a minimum overall pass percentage of 70% for certification.

7. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

Minimum Aggregate Passing % at QP Level : 70

(**Please note**: Every Trainee should score a minimum aggregate passing percentage as specified above, to successfully clear the Qualification Pack assessment.)

Assessment Weightage

Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
CSC/N1335.Follow the health and safety practices at the work	30	70	-	-	100	15
CSC/N1336.Coordinate with co-workers to achieve work efficiency	30	70	-	-	100	15
CSC/N0204.Manually weld carbon and low alloy steels by using Metal Arc Welding (MMAW)/ Shielded Metal Arc Welding (SMAW)	30	50	-	20	100	20
CSC/N0209.Manually weld metals by using MIG/MAG welding	30	50	-	20	100	30
DGT/VSQ/N0101.Employability Skills (30 Hours)	20	30	-	-	50	20
Total	**140**	**270**	**-**	**40**	**450**	**100**

Optional: 1 Perform AR-guided Oil & Gas Welding Scenario & Performance Evaluation

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
CSC/N0215.Perform AR-guided SMAW/GMAW in Oil & Gas Industry	30	50	0	20	100	40
Total	**30**	**50**	**-**	**20**	**100**	**40**

Optional: 2 Perform AR-guided SMAW/GMAW in Railways

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
CSC/N0216.Perform AR-guided SMAW/GMAW in Railways	30	50	0	20	100	30
Total	**30**	**50**	**-**	**20**	**100**	**30**

Optional: 3 Perform AR-guided SMAW/GMAW in Shipbuilding

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
CSC/N0217.Perform AR-guided SMAW/GMAW in Shipbuilding	30	50	0	20	100	30
Total	**30**	**50**	**-**	**20**	**100**	**30**

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.