

Qualification Pack



Draughtsman - Piping

QP Code: CSC/Q0403

Version: 3.0

NSQF Level: 4

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Qualification Pack

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CSC/Q0403: Draughtsman - Piping

Brief Job Description

A Draughtsman Piping is responsible for selecting the appropriate equipment and drawing software to create and edit isometric and spool drawings, along with drawings for process flows, and Piping and Instrumentation (P&ID) diagrams. It also includes orthogonal single and double line arrangement drawings of pipe installation systems and piping layouts.

Personal Attributes

The individual must have attention to detail and problem-solving skills. The person must also have numerical and computational abilities along with good communication skills in both verbal and written communication. The individual must be able to work in coordination with others to achieve work efficiency.

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/N0403: Create and edit 2D piping drawings using the computer - Aided Design \(CAD\)](#)
- [4. DGT/VSQ/N0102: Employability Skills \(60 Hours\)](#)

Qualification Pack (QP) Parameters

| | |
|--------------------------------------|--|
| Sector | Capital Goods |
| Sub-Sector | Machine Tools, Plastics Manufacturing Machinery, Textile Manufacturing Machinery, Process Plant Machinery, Electrical and Power Machinery, Light Engineering Goods |
| Occupation | Design |
| Country | India |
| NSQF Level | 4 |
| Credits | 16 |
| Aligned to NCO/ISCO/ISIC Code | NCO-2015/3118.0402 |



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| | |
|---|--|
| Minimum Educational Qualification & Experience | 10th grade pass with 2 Years of experience OR 11th grade pass with 1 Year of experience OR 10th grade pass and pursuing continuous schooling OR 8th grade pass plus 2-year NTC plus 1 Year NAC (plus 1 year CITS) OR 10th grade pass (with two years of any combination of NTC/NAC/CITS or equivalent) OR Completed 2nd year of the 3-year diploma after 10 (OR Pursuing 2nd year of 3-year regular Diploma (after 10th) OR 12th grade Pass (OR Operator - CAM Operator of NSQF Level 3.0 with 3 years of relevant experience) |
| Minimum Level of Education for Training in School | |
| Pre-Requisite License or Training | NA |
| Minimum Job Entry Age | 18 Years |
| Last Reviewed On | NA |
| Next Review Date | 31/03/2025 |
| NSQC Approval Date | 31/03/2022 |
| Version | 3.0 |
| Reference code on NQR | QG-04-CG-00177-2023-V1.1-CGSC |
| NQR Version | 1 |



Qualification Pack

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



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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



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- 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



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- 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

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Assessment Criteria

| Assessment Criteria for Outcomes | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|---|--------------|-----------------|---------------|------------|
| <i>Maintain personal health and safety</i> | 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 | - | - |
| <i>Assist in hazard management</i> | 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 | - | - |
| <i>Check the first aid box, firefighting and safety equipment</i> | 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 | - | - |

Qualification Pack

| 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 | - | - |
| <i>Assist in waste management</i> | 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 | - | - |
| <i>Follow the fire safety guidelines</i> | 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 | - | - |
| <i>Follow the emergency and first-aid procedures</i> | 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 | - | - |



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| Assessment Criteria for Outcomes | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|---|--------------|-----------------|---------------|------------|
| <i>Carry out relevant documentation and review</i> | 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 | - | - |



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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 | 26/05/2022 |
| Next Review Date | 31/03/2024 |
| NSQC Clearance Date | 31/03/2021 |



Qualification Pack

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)



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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



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- 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

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Assessment Criteria

| Assessment Criteria for Outcomes | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|---|--------------|-----------------|---------------|------------|
| <i>Work effectively with co-workers</i> | 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 | - | - |
| <i>Communicate effectively with co-workers</i> | 6 | 15 | - | - |

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| 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 | - | - |
| <i>Practice inclusion at work</i> | 4 | 12 | - | - |
| PC15. empathise with Persons with Disabilities (PwD) | 2 | 6 | - | - |
| PC16. adopt gender-neutral behaviour at work | 2 | 6 | - | - |
| NOS Total | 30 | 70 | - | - |



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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 | 26/05/2022 |
| Next Review Date | 31/03/2024 |
| NSQC Clearance Date | 31/03/2021 |



Qualification Pack

CSC/N0403: Create and edit 2D piping drawings using the computer - Aided Design (CAD)

Description

This OS unit is about creating and editing 2D detailed and isometric drawings for piping and piping systems used in mechanical engineering systems, using the Computer-Aided Design (CAD) system.

Scope

The scope covers the following :

- Determine the work requirements
- Prepare for creating and editing 2D piping drawings
- Create and edit 2D piping drawings
- Use resources optimally

Elements and Performance Criteria

Determine the work requirements

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

- PC1.** determine the work requirements and technical specifications by referring to the relevant documents such as the drawing brief, sketches, design brief, etc.
- PC2.** check the available technical information to ensure it is correct and complete
- PC3.** coordinate with the relevant personnel for the rectification of any incorrect and inconsistent information in the job specification documents
- PC4.** analyse the piping and instrumentation diagrams and specifications
- PC5.** determine the drawing requirements from the data and information received

Prepare for creating and editing 2D piping drawings

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

- PC6.** select the appropriate drawing method
- PC7.** set up the computer, its peripherals and other relevant equipment for use, such as light pen, digitizer, scanner, printer, plotter, etc.
- PC8.** select the relevant 2D drawing software and drafting equipment appropriate to the selected drawing method
- PC9.** set the drawing datum at an appropriate point in the software as per the user manual
- PC10.** set the appropriate drawing parameters, such as layers, lines, colour, text style, according to the drawing requirements
- PC11.** set the vertical and horizontal offsets and hand wheel orientation appropriately

Create and edit 2D piping drawings

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

- PC12.** customise system variables, menus and drawing defaults to produce the drawing to the appropriate scale
- PC13.** develop macros following the approved procedures

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- PC14.** follow the appropriate drafting principles to create drawings consistent with the applicable standards
- PC15.** create drawings using first angle orthographic projections, isometric/oblique projections, third angle orthographic projections, sectional elevations, etc.
- PC16.** incorporate the specifications of piping systems and equipment in the drawing
- PC17.** design pipes, valves and auxiliary equipment, applying the relevant operating principles
- PC18.** ensure the applicable health, safety and environmental factors are considered and incorporated in the drawing
- PC19.** ensure the drawing/model accurately reflects specifications, and contains all the relevant information
- PC20.** create a drawing template following the applicable process, including all the necessary details, such as title, scale, material, date, etc.
- PC21.** use the appropriate techniques, terminologies, and codes while creating drawings in the required formats, ensuring the drawing is detailed with the necessary information
- PC22.** use various commands and menus available in the CAD system, as required
- PC23.** create process flows, piping and instrumentation (P&ID) diagrams, and isometric and spool drawings
- PC24.** create orthogonal single and double line arrangement drawings of pipe installation systems, according to the engineer sketches
- PC25.** draw piping layouts and dimensions, and label the drawing as per the approved procedures
- PC26.** coordinate with the relevant personnel to get the drawings checked and approved, or resolve any issues encountered during the designing process
- PC27.** follow the organisational procedure for saving the approved drawings to an appropriate storage medium and taking prints to be shared with the stakeholders, ensuring the drawings are correctly titled and referenced

Use resources optimally

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

- PC28.** optimise the usage of electricity and other resources in various tasks and processes
- PC29.** connect the electrical tools and equipment safely, and turn them off when not in use

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** applicable documentation requirements in the job role
- KU2.** the organisational procedures for retrieving and storing drawing data using the relevant information systems
- KU3.** relevant system variables that can be customised and the process of doing that
- KU4.** applicable drafting standards and procedures
- KU5.** the need and process of customising menus and system defaults
- KU6.** the need and process of developing macros
- KU7.** how to project relevant ideas by using drawing
- KU8.** the process of selecting an appropriate projection



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- KU9.** the benefit of including auxiliary views in drawings
- KU10.** the process for producing components, layout and assembly drawings
- KU11.** how to interpret the common symbols used in drawings
- KU12.** how to interpret different types of 2D drawings, designs and sketches
- KU13.** the relevant technical specifications to be extracted from the drawing brief, such as overall dimensions, limits and fits, contraction allowances, tolerances, etc.
- KU14.** use of the reference documents
- KU15.** the importance of selecting the appropriate materials for piping
- KU16.** the importance of maintaining the appropriate operating environment, quality, aesthetics, interfaces, physical space, ergonomics, tolerances, etc.
- KU17.** standard specifications of different types of pipes, fittings, components and flanges
- KU18.** the use of standard valves and auxiliary equipment in industrial piping
- KU19.** the principles of producing orthogonal and isometric piping drawings
- KU20.** different types of industrial pipe systems and the relevant terminology
- KU21.** the functions and uses of various pipe components, fittings and flanges, such as ball, gate, angle, cocks, flanges, t-pieces, elbows, plugs, caps, unions, connectors, reducers, etc.
- KU22.** the function and uses of various valves and auxiliary equipment
- KU23.** the occupational health and safety factors applicable to piping systems
- KU24.** how to protect a computer from virus attacks and the appropriate action to be taken in case of a virus attack
- KU25.** how to set up and use a computer and its peripherals such as light pen, digitizer/tablet, scanner, printer, plotter, etc.
- KU26.** how to use the relevant 2D drawing software according to the user manual provided by the software developer
- KU27.** the basic principles of engineering manufacturing operations
- KU28.** the kinematics principles relevant to the manufacturing of machinery
- KU29.** different types of drawings that may be produced using a 2D software, such as piping systems drawings, installation drawings, etc.
- KU30.** how to set up the viewing screen to show multiple views of the drawing
- KU31.** the relevant standards, conventions and codes of practice applicable to making piping drawings using CAD software
- KU32.** the importance of adhering to the applicable health, safety and environment protection regulations
- KU33.** how to set up the 2D drawing template parameters, such as title, drawing number, scale, material, date, etc.
- KU34.** the use of various drawing features, such as straight lines, curves and circles, hatching and shading, dimensions and text, layers, etc.
- KU35.** how to access, identify and use a wide range of standard components and symbol libraries from the CAD equipment
- KU36.** how to save and store drawings safely
- KU37.** the importance of maintaining document version control
- KU38.** how to create and maintain safe backup copies of drawings



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- KU39.** how to produce hard copies of the drawings, and the advantages and disadvantages of printers and plotters
- KU40.** the benefits and methods of resource optimisation

Generic Skills (GS)

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

- GS1.** maintain work-related notes and records
- GS2.** read the relevant literature to get the latest updates about the field of work
- GS3.** listen attentively to understand the information or instructions being shared
- GS4.** communicate politely and professionally
- GS5.** perform work-related calculations
- GS6.** coordinate with co-workers to achieve the work objectives
- GS7.** plan and schedule tasks to ensure timely completion
- GS8.** identify possible disruptions to work and take appropriate preventive measures
- GS9.** take quick decisions to deal with workplace emergencies and accidents
- GS10.** evaluate all possible solutions to a problem to select the best one

Qualification Pack

Assessment Criteria

| Assessment Criteria for Outcomes | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|---|--------------|-----------------|---------------|------------|
| <i>Determine the work requirements</i> | 5 | 13 | - | - |
| PC1. determine the work requirements and technical specifications by referring to the relevant documents such as the drawing brief, sketches, design brief, etc. | 1 | 3 | - | - |
| PC2. check the available technical information to ensure it is correct and complete | 1 | 2 | - | - |
| PC3. coordinate with the relevant personnel for the rectification of any incorrect and inconsistent information in the job specification documents | 1 | 3 | - | - |
| PC4. analyse the piping and instrumentation diagrams and specifications | 1 | 3 | - | - |
| PC5. determine the drawing requirements from the data and information received | 1 | 2 | - | - |
| <i>Prepare for creating and editing 2D piping drawings</i> | 6 | 13 | - | - |
| PC6. select the appropriate drawing method | 1 | 2 | - | - |
| PC7. set up the computer, its peripherals and other relevant equipment for use, such as light pen, digitizer, scanner, printer, plotter, etc. | 1 | 3 | - | - |
| PC8. select the relevant 2D drawing software and drafting equipment appropriate to the selected drawing method | 1 | 2 | - | - |
| PC9. set the drawing datum at an appropriate point in the software as per the user manual | 1 | 2 | - | - |
| PC10. set the appropriate drawing parameters, such as layers, lines, colour, text style, according to the drawing requirements | 1 | 2 | - | - |
| PC11. set the vertical and horizontal offsets and hand wheel orientation appropriately | 1 | 2 | - | - |
| <i>Create and edit 2D piping drawings</i> | 17 | 40 | - | - |

Qualification Pack

| Assessment Criteria for Outcomes | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|--|--------------|-----------------|---------------|------------|
| PC12. customise system variables, menus and drawing defaults to produce the drawing to the appropriate scale | 1 | 3 | - | - |
| PC13. develop macros following the approved procedures | 1 | 2 | - | - |
| PC14. follow the appropriate drafting principles to create drawings consistent with the applicable standards | 1 | 2 | - | - |
| PC15. create drawings using first angle orthographic projections, isometric/oblique projections, third angle orthographic projections, sectional elevations, etc. | 1 | 3 | - | - |
| PC16. incorporate the specifications of piping systems and equipment in the drawing | 1 | 2 | - | - |
| PC17. design pipes, valves and auxiliary equipment, applying the relevant operating principles | 1 | 2 | - | - |
| PC18. ensure the applicable health, safety and environmental factors are considered and incorporated in the drawing | 1 | 2 | - | - |
| PC19. ensure the drawing/model accurately reflects specifications, and contains all the relevant information | 1 | 2 | - | - |
| PC20. create a drawing template following the applicable process, including all the necessary details, such as title, scale, material, date, etc. | 2 | 4 | - | - |
| PC21. use the appropriate techniques, terminologies, and codes while creating drawings in the required formats, ensuring the drawing is detailed with the necessary information | 1 | 2 | - | - |
| PC22. use various commands and menus available in the CAD system, as required | 1 | 2 | - | - |
| PC23. create process flows, piping and instrumentation (P&ID) diagrams, and isometric and spool drawings | 1 | 3 | - | - |

Qualification Pack

| Assessment Criteria for Outcomes | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|--|--------------|-----------------|---------------|------------|
| PC24. create orthogonal single and double line arrangement drawings of pipe installation systems, according to the engineer sketches | 1 | 3 | - | - |
| PC25. draw piping layouts and dimensions, and label the drawing as per the approved procedures | 1 | 2 | - | - |
| PC26. coordinate with the relevant personnel to get the drawings checked and approved, or resolve any issues encountered during the designing process | 1 | 3 | - | - |
| PC27. follow the organisational procedure for saving the approved drawings to an appropriate storage medium and taking prints to be shared with the stakeholders, ensuring the drawings are correctly titled and referenced | 1 | 3 | - | - |
| <i>Use resources optimally</i> | 2 | 4 | - | - |
| PC28. optimise the usage of electricity and other resources in various tasks and processes | 1 | 2 | - | - |
| PC29. connect the electrical tools and equipment safely, and turn them off when not in use | 1 | 2 | - | - |
| NOS Total | 30 | 70 | - | - |



Qualification Pack

National Occupational Standards (NOS) Parameters

| | |
|----------------------------|--|
| NOS Code | CSC/N0403 |
| NOS Name | Create and edit 2D piping drawings using the computer - Aided Design (CAD) |
| Sector | Capital Goods |
| Sub-Sector | Machine Tools, Process Plant Machinery, Plastics Manufacturing Machinery, Electrical and Power Machinery, Textile Manufacturing Machinery, Light Engineering Goods |
| Occupation | Design |
| NSQF Level | 4 |
| Credits | 9 |
| Version | 3.0 |
| Last Reviewed Date | NA |
| Next Review Date | 31/03/2025 |
| NSQC Clearance Date | 31/03/2022 |



Qualification Pack

DGT/VSQ/N0102: Employability Skills (60 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
- Career Development & Goal Setting
- 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.** identify employability skills required for jobs in various industries
- PC2.** identify and explore learning and employability portals

Constitutional values - Citizenship

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

- PC3.** recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.
- PC4.** follow environmentally sustainable practices

Becoming a Professional in the 21st Century

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

- PC5.** recognize the significance of 21st Century Skills for employment
- PC6.** practice the 21st Century Skills such as Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life

Basic English Skills

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



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- PC7.** use basic English for everyday conversation in different contexts, in person and over the telephone
- PC8.** read and understand routine information, notes, instructions, mails, letters etc. written in English
- PC9.** write short messages, notes, letters, e-mails etc. in English

Career Development & Goal Setting

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

- PC10.** understand the difference between job and career
- PC11.** prepare a career development plan with short- and long-term goals, based on aptitude

Communication Skills

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

- PC12.** follow verbal and non-verbal communication etiquette and active listening techniques in various settings
- PC13.** work collaboratively with others in a team

Diversity & Inclusion

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

- PC14.** communicate and behave appropriately with all genders and PwD
- PC15.** escalate any issues related to sexual harassment at workplace according to POSH Act

Financial and Legal Literacy

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

- PC16.** select financial institutions, products and services as per requirement
- PC17.** carry out offline and online financial transactions, safely and securely
- PC18.** identify common components of salary and compute income, expenses, taxes, investments etc
- PC19.** identify relevant rights and laws and use legal aids to fight against legal exploitation

Essential Digital Skills

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

- PC20.** operate digital devices and carry out basic internet operations securely and safely
- PC21.** use e-mail and social media platforms and virtual collaboration tools to work effectively
- PC22.** use basic features of word processor, spreadsheets, and presentations

Entrepreneurship

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

- PC23.** identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research
- PC24.** develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion
- PC25.** identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity

Customer Service

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

- PC26.** identify different types of customers
- PC27.** identify and respond to customer requests and needs in a professional manner.



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PC28. follow appropriate hygiene and grooming standards

Getting ready for apprenticeship & Jobs

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

PC29. create a professional Curriculum vitae (Résumé)

PC30. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively

PC31. apply to identified job openings using offline /online methods as per requirement

PC32. answer questions politely, with clarity and confidence, during recruitment and selection

PC33. identify apprenticeship opportunities and register for it as per guidelines and requirements

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. need for employability skills and different learning and employability related portals

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 English language for effective verbal (face to face and telephonic) and written communication in formal and informal set up

KU6. importance of career development and setting long- and short-term goals

KU7. about effective communication

KU8. POSH Act

KU9. Gender sensitivity and inclusivity

KU10. different types of financial institutes, products, and services

KU11. how to compute income and expenditure

KU12. importance of maintaining safety and security in offline and online financial transactions

KU13. different legal rights and laws

KU14. different types of digital devices and the procedure to operate them safely and securely

KU15. how to create and operate an e- mail account and use applications such as word processors, spreadsheets etc.

KU16. how to identify business opportunities

KU17. types and needs of customers

KU18. how to apply for a job and prepare for an interview

KU19. apprenticeship scheme and the process of registering on apprenticeship portal

Generic Skills (GS)

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

GS1. read and write different types of documents/instructions/correspondence

GS2. communicate effectively using appropriate language in formal and informal settings



Qualification Pack

- GS3.** behave politely and appropriately with all
- GS4.** how to work in a virtual mode
- GS5.** perform calculations efficiently
- GS6.** solve problems effectively
- GS7.** pay attention to details
- GS8.** manage time efficiently
- GS9.** maintain hygiene and sanitization to avoid infection

Qualification Pack

Assessment Criteria

| Assessment Criteria for Outcomes | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|--|--------------|-----------------|---------------|------------|
| <i>Introduction to Employability Skills</i> | 1 | 1 | - | - |
| PC1. identify employability skills required for jobs in various industries | - | - | - | - |
| PC2. identify and explore learning and employability portals | - | - | - | - |
| <i>Constitutional values - Citizenship</i> | 1 | 1 | - | - |
| PC3. recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc. | - | - | - | - |
| PC4. follow environmentally sustainable practices | - | - | - | - |
| <i>Becoming a Professional in the 21st Century</i> | 2 | 4 | - | - |
| PC5. recognize the significance of 21st Century Skills for employment | - | - | - | - |
| PC6. practice the 21st Century Skills such as Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life | - | - | - | - |
| <i>Basic English Skills</i> | 2 | 3 | - | - |
| PC7. use basic English for everyday conversation in different contexts, in person and over the telephone | - | - | - | - |
| PC8. read and understand routine information, notes, instructions, mails, letters etc. written in English | - | - | - | - |
| PC9. write short messages, notes, letters, e-mails etc. in English | - | - | - | - |
| <i>Career Development & Goal Setting</i> | 1 | 2 | - | - |

Qualification Pack

| Assessment Criteria for Outcomes | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|---|--------------|-----------------|---------------|------------|
| PC10. understand the difference between job and career | - | - | - | - |
| PC11. prepare a career development plan with short- and long-term goals, based on aptitude | - | - | - | - |
| <i>Communication Skills</i> | 2 | 2 | - | - |
| PC12. follow verbal and non-verbal communication etiquette and active listening techniques in various settings | - | - | - | - |
| PC13. work collaboratively with others in a team | - | - | - | - |
| <i>Diversity & Inclusion</i> | 1 | 2 | - | - |
| PC14. communicate and behave appropriately with all genders and PwD | - | - | - | - |
| PC15. escalate any issues related to sexual harassment at workplace according to POSH Act | - | - | - | - |
| <i>Financial and Legal Literacy</i> | 2 | 3 | - | - |
| PC16. select financial institutions, products and services as per requirement | - | - | - | - |
| PC17. carry out offline and online financial transactions, safely and securely | - | - | - | - |
| PC18. identify common components of salary and compute income, expenses, taxes, investments etc | - | - | - | - |
| PC19. identify relevant rights and laws and use legal aids to fight against legal exploitation | - | - | - | - |
| <i>Essential Digital Skills</i> | 3 | 4 | - | - |
| PC20. operate digital devices and carry out basic internet operations securely and safely | - | - | - | - |
| PC21. use e- mail and social media platforms and virtual collaboration tools to work effectively | - | - | - | - |
| PC22. use basic features of word processor, spreadsheets, and presentations | - | - | - | - |

Qualification Pack

| Assessment Criteria for Outcomes | Theory Marks | Practical Marks | Project Marks | Viva Marks |
|--|--------------|-----------------|---------------|------------|
| <i>Entrepreneurship</i> | 2 | 3 | - | - |
| PC23. identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research | - | - | - | - |
| PC24. develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion | - | - | - | - |
| PC25. identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity | - | - | - | - |
| <i>Customer Service</i> | 1 | 2 | - | - |
| PC26. identify different types of customers | - | - | - | - |
| PC27. identify and respond to customer requests and needs in a professional manner. | - | - | - | - |
| PC28. follow appropriate hygiene and grooming standards | - | - | - | - |
| <i>Getting ready for apprenticeship & Jobs</i> | 2 | 3 | - | - |
| PC29. create a professional Curriculum vitae (Résumé) | - | - | - | - |
| PC30. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively | - | - | - | - |
| PC31. apply to identified job openings using offline /online methods as per requirement | - | - | - | - |
| PC32. answer questions politely, with clarity and confidence, during recruitment and selection | - | - | - | - |
| PC33. identify apprenticeship opportunities and register for it as per guidelines and requirements | - | - | - | - |
| NOS Total | 20 | 30 | - | - |



Qualification Pack

National Occupational Standards (NOS) Parameters

| | |
|----------------------------|---------------------------------|
| NOS Code | DGT/VSQ/N0102 |
| NOS Name | Employability Skills (60 Hours) |
| Sector | Cross Sectoral |
| Sub-Sector | Professional Skills |
| Occupation | Employability |
| NSQF Level | 4 |
| Credits | 2 |
| Version | 1.0 |
| Last Reviewed Date | 31/08/2023 |
| Next Review Date | 31/08/2026 |
| NSQC Clearance Date | 31/08/2023 |

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.



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 | 20 |
| CSC/N1336.Coordinate with co-workers to achieve work efficiency | 30 | 70 | - | - | 100 | 20 |
| CSC/N0403.Create and edit 2D piping drawings using the computer - Aided Design (CAD) | 30 | 70 | - | - | 100 | 50 |
| DGT/VSQ/N0102.Employability Skills (60 Hours) | 20 | 30 | 0 | 0 | 50 | 10 |
| Total | 110 | 240 | 0 | 0 | 350 | 100 |



Qualification Pack

Acronyms

| | |
|-----------------|---|
| NOS | National Occupational Standard(s) |
| NSQF | National Skills Qualifications Framework |
| QP | Qualifications Pack |
| TVET | Technical and Vocational Education and Training |
| P&ID | Piping And Instrumentation Diagram |
| CAD | Computer Aided Design |
| 2D | 2 Dimensional |
| 3D | 3 Dimensional |
| CO2 | Carbon Dioxide |
| CPR | Cardiac Pulmonary Resuscitation |
| PPE | Personal Protective Equipment |
| ISO | International Organization For Standardization |

Qualification Pack

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. |

Qualification Pack

| | |
|---|--|
| 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. |