



National Unit specification: general information

Unit title: Water Supply (SCQF Level 6)

Unit code: H005 12

Superclass: TL

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Summary

This is a mandatory Unit within the National Progression Award in Water Operations at SCQF level 6.

The purpose of this Unit is to provide candidates with an opportunity to develop knowledge and understanding of the water supply processes and systems employed within the water industry.

This Unit is intended for candidates who have recently joined the water industry and provides an opportunity to develop an understanding of the procedures involved in the distribution of water for supply. The Unit is also suitable for candidates who have joined the water industry as an apprentice or at a similar level.

Outcomes

- 1 Demonstrate an understanding of the key features and function of service reservoirs and water towers in a water distribution system.
- 2 Describe the functions and requirements of a basic water network distribution system.
- 3 Demonstrate an understanding of the method of main laying, fittings and maintenance of pipelines.
- 4 Demonstrate knowledge and understanding of the methods of detecting, repairing and monitoring leakage in a water supply zone.
- 5 Prepare working drawings of basic domestic hot and cold plumbing installations.
- 6 Prepare working drawing of domestic sanitary pipework and below ground drainage systems.

General information (cont)

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Recommended entry

Entry is at the discretion of the centre. Candidates doing this Unit do not need any prior knowledge or experience of the Water Industry. Good skills in Communication and ICT will be an advantage.

Credit points and level

2 credit(s) at SCQF level 6 (12 SCQF credit points at SCQF level 6*)

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

Core Skills

Opportunities to develop aspects of Core Skills are highlighted in the Support Notes of this Unit Specification.

There is no automatic certification of Core Skills or Core Skill component in this Unit.

National Unit specification: statement of standards

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Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

Outcome 1

Demonstrate an understanding of the key features and function of service reservoirs and water towers in a water distribution system.

Performance Criteria

- (a) Briefly describe the functions of a service reservoir.
- (b) Describe the basic design position of a service reservoir.
- (c) Correctly describe the design features of a typical water tower.
- (d) Correctly list the ancillary equipment associated with a water tower.

Outcome 2

Describe the functions and requirements of a basic water network distribution system.

Performance Criteria

- (a) Identify the basic mains requirements of pipelines in a distribution system.
- (b) List the key factors to be considered for perceived demand when sizing mains.
- (c) List the fundamental pumping requirements in a water distribution system.
- (d) Explain the function of a water supply zone correctly.
- (e) Describe correctly how a basic water network distribution system functions.

Outcome 3

Demonstrate an understanding of the method of main laying, fittings and maintenance of pipelines.

Performance Criteria

- (a) Identify correctly the key factors considered in the laying of pipes.
- (b) Correctly describe the standard requirements of testing a pipeline.
- (c) Correctly describe how disinfection of a pipeline is achieved.
- (d) Correctly describe maintenance procedures for a pipeline.

National Unit specification: statement of standards (cont)

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Outcome 4

Demonstrate knowledge and understanding of the methods of detecting repairing and monitoring leakage in a water supply zone.

Performance Criteria

- (a) Describe the standard methods of detecting leakage in a water distribution system.
- (b) Correctly describe basic methods of repairing leakage in a water distribution system.
- (c) Correctly describe basic method of monitoring leakage in a water distribution system.

Outcome 5

Prepare working drawings of basic domestic hot and cold plumbing installations.

Performance Criteria

- (a) Complete and annotate layouts clearly and correctly in terms of connection to components and appliances.
- (b) Accurately locate components and controls in terms of system performance.
- (c) Identify components and controls of pipework using correct terminology.
- (d) Ensure layouts comply with current plumbing standards.

Outcome 6

Prepare working drawing of domestic sanitary pipework and below ground drainage systems.

Performance Criteria

- (a) Complete and annotate a primary ventilated stack system.
- (b) Complete and annotate a partially separate system of below ground drainage.
- (c) Correctly identify system components using appropriate terminology.
- (d) Produce a system design and layout for a given brief.

National Unit specification: statement of standards (cont)

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Evidence Requirements for this Unit

Evidence is required to demonstrate that the candidates have achieved all of the Outcomes and Performance Criteria.

Written, oral, diagrammatical or electronic form of evidence should be produced to demonstrate that the candidate has achieved all of the Outcomes and Performance Criteria. The evidence should be produced under supervised conditions to a given brief.

Outcome 1 — Written and/or Oral Evidence

Candidates will need to provide evidence to demonstrate their understanding of the key features and function of service reservoirs and water towers by showing that they can:

- ◆ describe four functions of a service reservoir
- ◆ describe basic design of a high positioned and low positioned service reservoir
- ◆ describe the design of a typical service reservoir in terms of depth and shape
- ◆ describe and list the basic structure and equipment associated with a water tower

Evidence may in written, oral, diagrammatical or electronic form but must be the individual's own response.

Outcome 2 — Written and/or Oral Evidence

Candidates will need to provide evidence to describe the functions and requirements of a basic water network distribution system by meeting all the Performance Criteria and showing that they can:

- ◆ identify three categories of mains requirements and explain their use.
- ◆ list four factors to be considered when sizing mains for perceived demand and list four factors to be considered for likely demand.

Evidence may in written, oral, diagrammatical or electronic form but must be the individual's own response.

Outcome 3 — Written and/or Oral Evidence

Candidates will need to provide evidence to demonstrate an understanding of the method of main laying, fittings and maintenance of pipelines.

- ◆ identify four key factors considered in the laying of pipes to include: storing, stacking, handling, inspection, laying, jointing or reinstatement
- ◆ standard requirements of testing a pipeline should include: pressure testing
- ◆ disinfection of a pipeline, description should include: flush/swab, disinfect and bacteriological test
- ◆ maintenance procedures for a pipeline, key points are: timescale and best practice.

National Unit specification: statement of standards (cont)

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Outcome 4 — Written and/or Oral Evidence

Candidates will need to provide evidence of knowledge and understanding of two methods of detecting repairing and monitoring leakage in a water distribution system.

Outcome 5 — Product Evidence

Candidates will need to produce graphical evidence to demonstrate the knowledge and skill required to complete working drawings.

- ◆ The candidate will be set a task to complete and annotate a typical hot and cold water installation within a two storey dwelling comprising of: kitchen sink, washing machine, bath, WC and wash hand basin.
- ◆ The candidate will be required to complete and annotate the drawing to show pipework layouts for an indirect system of cold water and direct system of hot water.

Outcome 6 — Product Evidence

The candidate will be set two graphical exercises to demonstrate the comprehension of knowledge and skill required to complete working drawings.

- ◆ The candidate will be set a task to complete and annotate a typical primary ventilated stack system installation within a two storey dwelling comprising of: kitchen sink, washing machine and cloak room on the ground floor and a bath, WC. and wash hand basin on the first floor.
- ◆ The candidate will provide on the drawing elevations: falls, pipe diameters, access points and method of connection to main drains.
- ◆ The candidate will be set a task to complete and annotate a typical partially separate system of drainage for a two storey dwelling and garage comprising of: kitchen sink, washing machine and cloak room on the ground floor and a bath, WC and wash hand basin on the first floor.
- ◆ The candidate will provide on the drawing: methods of combining rainwater and foul water to current standards, access points to the system and gully connections.

National Unit specification: support notes

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This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 80 hours.

Guidance on the content and context for this Unit

This is a mandatory Unit within the National Progression Award in Water Operations at SCQF level 6.

This Unit is designed to give the candidates a basic understanding of water supply, from a service reservoir through the distribution system to the customer. This will also include methods of laying, jointing and maintenance of pipes within the system, as well as leakage detection and repair. A basic understanding of domestic plumbing at the customer end is also included.

It is suitable for those who are currently employed in, or who are seeking employment in the water industry or related occupational areas, or for those wishing to progress to more advanced study.

The industry has developed, with Energy and Utility Skills and industry regulators, a framework based on National Occupational Standards for 'competent operators' which all UK water undertakers have agreed to adopt. This Unit has been developed to align with specific element of these National Occupational Standards:

- ◆ Distribution Control
 - operate safely on the distribution network
 - carry out valve operations
 - determine location of water loss
 - cleanse water mains
 - disinfect water mains
 - carry out simple sampling
- ◆ Leakage Detection and Control
 - determine leakage detection methods and techniques in response to water loss
 - resolve leakage related issues
 - implement and validate leakage control
- ◆ Maintain Water Supply Network
 - carry out operational planning for network activities
 - develop an understanding of techniques for minimum disruption of the distribution network during operational activities
 - maintain budgetary and regulatory requirements for network activities
- ◆ Water Fittings Regulations/Byelaws/Enforcement
 - secure compliance with water fittings regulations/byelaw

National Unit specification: support notes (cont)

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Guidance on learning and teaching approaches for this Unit

Tutorial delivery methods include a variety of teaching methods which will enhance the learning experience, including face to face tutorials, field trips, group discussion and networking candidate's industrial experience and expertise, visiting industry specialists, work related project activities, etc.

It is recommended that candidates have access to actual fixtures and fittings of a distribution system as well as access to workplace practice in some or all of the Outcomes. It is also recommended that candidates have practical teaching in a workshop environment in plumbing and drainage.

Guidance on approaches to assessment for this Unit

Outcomes could be assessed by candidates producing a report combined with a closed-book assessment. Questions could take the form of an appropriate balance of multiple choice and/or restricted response. The evidence for the report should if possible be drawn from a water distribution system that the candidate has personal experience of. However if for practical reasons the candidate has no experience, evidence could be provided by means of a desk top study and/or literature search and review of an appropriate location as long as the Evidence Requirements are met. As part of the NPA in Water Operations at SCQF level 6 this Unit can be assessed as part of an integrated examination in the form of an extended response paper and/or an assignment on a given topic.

Opportunities for the use of e-assessment

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all candidate evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. Further advice is available in *SQA Guidelines on Online Assessment for Further Education (AA1641, March 2003)*, *SQA Guidelines on e-assessment for Schools (BD2625, June 2005)*.

National Unit specification: support notes (cont)

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Opportunities for developing Core Skills

In this Unit candidates will develop aspects of Core Skills at SCQF level 6 through contextualised activities designed to support the candidate develop their knowledge and understanding of the water supply process and system employed within the water industry.

Development of Core Skills elements will take place through learning and teaching activities as well as through practical activities which candidates will be involved in planning and delivering and reflection of such activities.

In this Unit candidates will through development of their knowledge and understanding of the key aspects of the water supply, be provided the opportunity to develop the following Core Skills:

- 1 *Communication* — both oral and written
 - ◆ small group working, discussion
 - ◆ verbal and written instructions
 - ◆ written responses to a wide range of questioning techniques
- 2 *Problem Solving* — Critical Thinking; Planning and Organisation; Reviewing and Evaluating
 - ◆ applying knowledge and understanding to a series of tasks relating to water supply and drainage systems
 - ◆ completing assignments through effective planning and organising within groups and individually
 - ◆ self-evaluation
- 3 *ICT* — Accessing and Processing Information
 - ◆ conducting research on current practices within the water industry
 - ◆ using technology to present findings
- 4 *Numeracy* — Using Grapical Information; Using Number
 - ◆ extracting information from graphs and applying related skills in analysis of water supply and drainage systems identified in Outcomes 5 and 6.
- 5 *Working with Others*
 - ◆ participating in group activities and discussion

National Unit specification: support notes (cont)

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Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website www.sqa.org.uk/assessmentarrangements

History of changes to Unit

| Version | Description of change | Date |
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