



National Unit specification: general information

Unit title: Water Sources (SCQF Level 5)

Unit code: H001 11

Superclass: TL

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Summary

The purpose of this Unit is to provide candidates with a general understanding of the various sources of water for supply, their characteristics and abstraction methods. Candidates can also develop an understanding of the key aspects of water movement and how it is measured.

This is a mandatory Unit within the National Progression Award in Water Operations: An Introduction at SCQF level 5.

This Unit is suitable for candidates who currently work in the water industry or aspire to work within the water industry or are keen to improve their knowledge of how the water industry operates throughout the UK.

Outcomes

- 1 Desmonstrate an understanding of the main sources of water for supply and describe their characteristics.
- 2 Demonstrate knowledge of abstraction methods from main sources of water for supply.
- 3 Demonstrate knowledge of types of storage reservoirs.
- 4 Demonstrate knowledge and understanding of the principal movements of water in the hydrological cycle.
- 5 Demonstrate an understanding of structures and instruments used for measuring water movement.

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.

General information (cont)

Unit title: Water Sources (SCQF Level 5)

Credit points and level

1.5 credit(s) at SCQF level 5 (9 SCQF credit points at SCQF level 5*)

**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 components in this Unit.

National Unit specification: statement of standards

Unit title: Water Sources (SCQF Level 5)

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 main sources of water for supply and describe their characteristics.

Performance Criteria

- (a) Identify surface sources for water supply and describe each of their characteristics.
- (b) Identify groundwater sources for water supply and describe their characteristics.

Outcome 2

Demonstrate knowledge of abstraction methods from main sources of water for supply

Performance Criteria

- (a) Identify and describe abstraction methods of surface waters for supply.
- (b) Identify and describe abstraction methods of ground water for supply.

Outcome 3

Demonstrate knowledge of types of storage reservoirs.

Performance Criteria

- (a) Identify types of storage reservoirs within the water industry.
- (b) Describe the key design features of storage reservoirs used within the water industry.

Outcome 4

Demonstrate knowledge and understanding of the principle movements of water in the hydrological cycle.

Performance Criteria

- (a) Identify correctly the principal movements of surface water within the hydrological cycle
- (b) Identify correctly the principal movements of groundwater within the hydrological cycle.
- (c) Describe basic factors that impact on the hydrological cycle and explain these impacts.

National Unit specification: statement of standards (cont)

Unit title: Water Sources (SCQF Level 5)

Outcome 5

Demonstrate an understanding of structures and instruments used for measuring water movement.

Performance Criteria

- (a) Illustrate correctly the key design features of broad crested and sharp crested weirs.
- (b) Illustrate correctly the key design features of flumes used within the water industry.
- (c) Describe in general methods of measuring water movement applied in the water industry.

Evidence Requirements for this Unit

Evidence is required to demonstrate that candidates have achieved all 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

The evidence for this Outcome must be obtained under controlled, supervised conditions. The assessment will be closed-book.

Candidates will need to provide evidence to demonstrate an understanding of the main sources of water supply and the type of surface and sub-surface sources, including:

- ◆ rivers, reservoirs, groundwater and spring sources
- ◆ at least one characteristic of each source

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

Outcome 2 — Written and/or Oral Evidence

The evidence for this Outcome must be obtained under controlled, supervised conditions. The assessment will be closed-book.

Candidates will need to provide evidence to demonstrate an understanding of the abstraction methods employed. The candidates should:

- ◆ describe reservoir abstraction, side of bank and river bed abstraction.
- ◆ describe two methods of borehole drilling
- ◆ describe one method of spring water abstraction

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

National Unit specification: statement of standards (cont)

Unit title: Water Sources (SCQF Level 5)

Outcome 3 — Written and/or Oral Evidence

Candidates will need to provide evidence to demonstrate their knowledge of storage reservoir types, by:

- ◆ identifying 3 types of storage reservoirs
- ◆ identifying and describing the key features, including embankment and gravity dams

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

Outcome 4 — Written and/or Oral Evidence

Candidates will need to provide evidence to demonstrate their knowledge and understanding of the hydrological cycle, by:

- ◆ identifying the movement of water through the hydrological cycle from precipitation to sea, include all surface and sub-surface sources
- ◆ listing and describing four factors that impact on the hydrological cycle and explaining their impact in terms of pollution and yield, with reference to both surface and sub-surface sources

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

Outcome 5 — Written and/or Oral Evidence

Candidates will need to provide evidence to demonstrate their knowledge and understanding of structures and instruments used for measuring water movement.

- ◆ key design features to include: shape, control point, flow and measurement location.
- ◆ describe rain gauging instrument and method of streamflow measurement.

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

Outcomes can be assessed individually or holistically through an integrated exam or project based assignment.

National Unit specification: support notes

Unit title: Water Sources (SCQF Level 5)

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 60 hours.

Guidance on the content and context for this Unit

This is a mandatory Unit within the National Progression Award in Water Operations: An Introduction at SCQF level 5 but can also be taken as a free-standing Unit.

This Unit is a knowledge based Unit in which candidates are required to develop their knowledge and understanding of how the fundamental principles of water sources are applied within the operations and practices of the water industry. They will learn about sources of water for public supply, how they are impounded and abstracted, how they are protected and controlled. Candidates will also study external factors that impact on water sources.

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.

Guidance on learning and teaching approaches for this Unit

It is recommended that the Unit are delivered through the adoption of theoretical and practical approaches embracing the content identified from the statement of standards section of the Unit specification. This will include candidates researching and developing fundamental knowledge and understanding of the key aspects of the water sources.

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

It is intended that this Unit should be delivered as much as possible with reference to actual industry practices and processes. With this in mind, it would be beneficial if candidates had access to water industry installations and systems.

National Unit specification: support notes (cont)

Unit title: Water Sources (SCQF Level 5)

Guidance on approaches to assessment for this Unit

Outcomes could be assessed by candidates producing a report combined with a closed-book assessment. Questions used to elicit candidate response could take the form of an appropriate balance of multiple choice and/or restricted response or extended response questions. The evidence for the report should if possible be drawn from a water source that the candidate can get physical access to. However if for practical reasons the candidate cannot access a suitable water source, 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: An Introduction at SCQF level 5, 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)*.

Opportunities for developing Core Skills

In this Unit candidates will develop aspects of Core Skills at SCQF level 5 through contextualised activities designed to support the candidate develop their knowledge and understanding of the various sources of water for supply, their characteristics and abstraction methods. Also, develop an understanding of the key aspects of water movement and how it is measured.

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.

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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