

Higher National Unit Specification

General information for centres

Unit title: Pipework 1: Construction and Site Installation

Unit code: DR29 34

Unit purpose: This Unit is designed to enable candidates to develop knowledge and understanding of piping systems, pressure vessels, safety procedures and costing within the construction, power generation, petro-chemical and offshore industries.

On completion of the Unit the candidate should be able to:

- 1 Demonstrate an understanding of pressure vessel, heat exchanger and storage vessel construction.
- 2 Demonstrate an understanding of maintenance systems on vessels and pipelines.
- 3 Outline site safety requirements and current regulations.
- 4 Outline the various stages when estimating a project.

Credit points and level: 1 HN Credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

**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.*

Recommended prior knowledge and skills: : It would be advantageous but not essential for the candidate to have experience in this or a similar field.

Core skills: There may be opportunities to gather evidence towards the Core Skills of Communication, Numeracy and Problem Solving in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

Context for delivery: If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

Assessment: The assessment of this Unit should take the form of one assessment paper in which all Outcomes are combined and should last no longer than two hours. The assessment paper could be composed of a case study or structured questions. The assessment should be conducted under controlled, supervised conditions.

Higher National Unit specification: statement of standards

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The sections of the Unit stating the Outcomes, knowledge and/or skills, and evidence requirements are mandatory.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the knowledge and/or skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Demonstrate an understanding of pressure vessel, heat exchanger and storage vessel construction.

Knowledge and/or skills

- ◆ construction of heat exchangers
- ◆ functions of heat exchangers
- ◆ bundles
- ◆ shell
- ◆ conduction properties of industrial material
- ◆ pressure vessels
- ◆ statutory requirements
- ◆ safety equipment

Evidence requirements

Evidence for the knowledge and/or skills in this Outcome will be provided on a sample basis. The evidence may be presented in response to specific questions. Each candidate will need to demonstrate that they can answer questions based on a sample of the items shown above. In any assessment of this Outcome at least 60% of the knowledge and/or skills items should be sampled.

A different sample question should be asked each time the Outcome is assessed. Candidates must provide a satisfactory response to assessed questions.

Outcome 2

Demonstrate an understanding of maintenance systems on vessels and pipelines.

Knowledge and/or skills

- ◆ pipe coatings
- ◆ pipe linings

Higher National Unit specification: statement of standards (cont)

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- ◆ cathodic protection
- ◆ inspection methods
- ◆ maintenance
- ◆ N.D.T

Evidence requirements

Evidence for the knowledge and/or skills in this Outcome will be provided on a sample basis. The evidence may be presented in response to specific questions. Each candidate will need to demonstrate that they can answer questions based on a sample of the items shown above. In any assessment of this Outcome at least 60% of the knowledge and/or skills items should be sampled.

A different sample question should be asked each time the outcome is assessed. Candidates must provide a satisfactory response to assessed questions.

Outcome 3

Outline site safety requirements and current regulations.

Knowledge and/or skills

- ◆ permit to work systems
- ◆ knowledge of current regulations being correct
- ◆ Health and Safety at Work Act
- ◆ A.C.O.P.S
- ◆ competent person
- ◆ site layout

Evidence requirements

Evidence for the knowledge and/or skills in this Outcome will be provided on a sample basis. The evidence may be presented in response to specific questions. Each candidate will need to demonstrate that they can answer questions based on a sample of the items shown above. In any assessment of this Outcome at least 60% of the knowledge and/or skills items should be sampled.

A different sample question should be asked each time the outcome is assessed. Candidates must provide a satisfactory response to assessed questions.

Outcome 4

Outline the various stages when estimating a project.

Knowledge and/or skills

- ◆ site drawings
- ◆ specifications
- ◆ bills of quantities
- ◆ unit rate of calculations
- ◆ statutory regulations

Higher National Unit specification: statement of standards (cont)

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- ◆ site conditions
- ◆ site location
- ◆ availability of labour
- ◆ plant and material transportation

Evidence requirements

Evidence for the knowledge and/or skills in this Outcome will be provided on a sample basis. The evidence may be presented in response to specific questions. Each candidate will need to demonstrate that they can answer questions based on a sample of the items shown above. In any assessment of this Outcome at least 60% of the knowledge and/or skills items should be sampled.

A different sample question should be asked each time the Outcome is assessed. Candidates must provide a satisfactory response to assessed questions.

Administrative Information

Unit code:	DR29 34
Unit title:	Pipework 1: Construction and Site Installation
Superclass category:	XH
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Higher National Unit specification: support notes

Unit title: Pipework 1: Construction and Site Installation

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 40 hours.

Guidance on the content and context for this Unit

In delivering this unit centres should be aware of current HASWA regulations. It is important candidates have access to this material.

Outcome 1

This Outcome concentrates on construction and site installations within the petro-chemical, power generation and offshore industry.

The Outcome should be taught in two parts — Heat Exchangers and Air Receivers (pressure vessels).

Heat Exchangers: The candidate will be expected to select suitable material for this construction and should consult the periodic table to select a material for the tube bundle that will provide good conduction properties suited to the product.

Air Receiver (pressure vessel): As this is a pressure vessel the candidate should also be taught the relevant regulation covering the inspection period, the benefits of cylindrical vessels and dished ends and the required safety devices (ie pressure safety valves, fusible plugs and automatic drains).

Outcome 2

Specify the protection and inspection for pipeline maintenance.

This Unit requires that the college/centre have access to the current materials literature used for internal linings and external coatings available to this industry.

Inspection methods should also be covered: NDT Single Wall Single Image (SWSI), Double Wall Double Image (DWDI). The intelligent pig, which is used for internal inspecting and reporting of the condition of the pipeline, should be included together with general maintenance philosophy.

Outcome 3

Advise on safe working practices for site organisation and layout.

It would be advisable that this outcome is taught together with HASWA as the candidate should possess knowledge of this act and its regulations. It is also important to be aware of the possible consequences of failing to appreciate the regulations.

Higher National Unit specification: support notes (cont)

Unit title: Pipework 1: Construction and Site Installation

Outcome 4

Estimating the cost of pipe-work installations

To complete a contract /tender document a knowledge of the following would be required: Site Drawings, Specifications, Bills of Quantities, Unit Rates, Statutory Regulations, Site Conditions, Site Location, Labour Availability and Material Transportation.

The candidate should be expected to gain knowledge of the above components.

Guidance on the delivery and assessment of this Unit

It would be advantageous for the candidate to receive feedback on progress through this Unit on a regular basis by formative tutorials.

Final assessment for this Unit will be an end test as detailed in the section on assessment.

Opportunities for developing Core Skills

There may be opportunities to gather evidence towards the Core Skills of Communication, Numeracy and Problem Solving in this Unit.

Open learning

This Unit is essentially a technology based Unit. Opportunities could be made available for open/flexible learning and the opportunity should be available for assessment on demand.

Candidates with additional support needs

This Unit specification is intended to ensure that there are no artificial barriers to learning or assessment. The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering alternative Outcomes for Units. For information on these, please refer to the SQA document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs*, which is available on the SQA website **www.sqa.org.uk**.

General information for candidates

Unit title: Pipework 1: Construction and Site Installation

This Unit has been designed to enable you to develop knowledge and understanding of:

- ◆ piping systems, pressure vessels, safety procedures and costing within the construction, power generation, petro-chemical and off-shore industries
- ◆ the function of heat exchangers and pressure vessels and their safety requirements
- ◆ the methods of maintenance available, and their application
- ◆ safety requirements for the industry, and their implementation
- ◆ the various aspects required to successfully complete a tender document

You will undertake formative assessment tutorials that will not affect the result of the final assessment.

Assessment of this Unit will be in a closed-book end test lasting no longer than two hours. The test will be in the form of structured questions, related to a case study where a pass mark is set at 50% of the available marks.