



Mechanisms and Structures (National 4)

SCQF: level 4 (6 SCQF credit points)

Unit code: H23D 74

Unit outline

The general aim of this Unit is to develop a basic understanding of simple mechanisms and structures. Learners will, with guidance, explore simple mechanical and pneumatic systems, and design, simulate, construct and test mechanical or pneumatic solutions to straightforward engineering problems.

Learners who complete this Unit will be able to:

- 1 Investigate a range of simple mechanical and pneumatic systems
- 2 Develop mechanical or pneumatic solutions to solve straightforward problems

This Unit is a mandatory Unit of the Engineering Science (National 4) Course and is also available as a free-standing Unit. The Unit Specification should be read in conjunction with the *Unit Support Notes*, which provides advice and guidance on delivery, assessment approaches and development of skills for learning, skills for life and skills for work. Exemplification of the standards in this Unit is given in *Unit Assessment Support*.

The *Added Value Unit Specification* for the Engineering Science (National 4) Course gives further mandatory information on Course coverage for learners taking this Unit as part of the Engineering Science (National 4) Course.

Recommended entry

Entry to this Unit is at the discretion of the centre. However, learners would normally be expected to have attained the skills, knowledge and understanding required by one or more of the following or equivalent qualifications and/or experience:

- ◆ Numeracy (National 3)
- ◆ Constructing and Testing (National 3)

In terms of prior learning and experience, relevant experiences and outcomes may also provide an appropriate basis for doing this Unit.

Equality and inclusion

This Unit Specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence. For further information, please refer to the *Unit Support Notes*.

Standards

Outcomes and assessment standards

Outcome 1

The learner will:

- 1 Investigate a range of simple mechanical and pneumatic systems by:**
 - 1.1 Producing diagrams of simple force systems
 - 1.2 Describing, or producing diagrams of, a range of simple pneumatic systems
 - 1.3 Describing, or producing diagrams of, a range of simple mechanical drive systems
 - 1.4 Carrying out simple calculations involving energy, power and efficiency, using given formulae

Outcome 2

The learner will:

- 2 Develop mechanical or pneumatic solutions to solve straightforward problems by:**
 - 2.1 Identifying key aspects of the problem
 - 2.2 Applying basic knowledge of structures, pneumatics and/or mechanical drive systems
 - 2.3 Simulating or building simple mechanical or pneumatic systems
 - 2.4 Testing solutions against a specification

Evidence Requirements for the Unit

Assessors should use their professional judgement, subject knowledge and experience, and understanding of their learners, to determine the most appropriate ways to generate evidence and the conditions and contexts in which they are used.

For this Unit, learners will be required to demonstrate technological skills, knowledge and understanding in the context of mechanical and pneumatic systems.

Evidence of Outcomes may take many forms, including oral or written evidence, or may be demonstrated by carrying out practical tasks. Evidence of Outcomes and assessment standards may be generated during one or more activities. Although learners are expected to develop a range of mechanical or pneumatic solutions for Outcome 2, evidence is only required for one.

Exemplification of assessment is provided in *Unit Assessment Support*. Advice and guidance on possible approaches to assessment is provided in the *Unit Support Notes*.

Assessment standard thresholds

If a candidate successfully meets the requirements of the specified number of Assessment Standards they will be judged to have passed the Unit overall and no further re-assessment will be required.

The specific requirements for this Unit is as follows:

- ◆ 6 out of 8 Assessment Standards must be achieved.

It should be noted that there will still be the requirement for candidates to be given the opportunity to meet all Assessment Standards. The above threshold has been put in place to reduce the volume of re-assessment where that is required.

Development of skills for learning, skills for life and skills for work

It is expected that learners will develop broad, generic skills through this Unit. The skills that learners will be expected to improve on and develop through this Unit are based on SQA's *Skills Framework: Skills for Learning, Skills for Life and Skills for Work* and drawn from the main skills areas listed below. These must be built into the Unit where there are appropriate opportunities.

2 Numeracy

- 2.1 Number processes
- 2.3 Information handling

4 Employability, enterprise and citizenship

- 4.2 Information and communication technology (ICT)

5 Thinking skills

- 5.1 Remembering
- 5.2 Understanding

Amplification of these is given in SQA's *Skills Framework: Skills for Learning, Skills for Life and Skills for Work*. The level of these skills should be at the same SCQF level of the Unit and be consistent with the SCQF level descriptor. Further information on building in skills for learning, skills for life and skills for work is given in the *Unit Support Notes*.

Administrative information

Published: September 2018 (version 1.1)

Superclass: XH

History of changes to National Unit Specification

| Version | Description of change | Authorised by | Date |
|---------|-------------------------------------|------------------------|----------------|
| 1.1 | Assessment standard threshold added | Qualifications Manager | September 2018 |
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Note: readers are advised to check SQA's website: www.sqa.org.uk to ensure they are using the most up-to-date version of the Unit Specification.

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