

National Unit Specification: general information

UNIT	Mechanical Fastening Methods
CODE	DH57 10
COURSE	Scottish Progression Award in Engineering

SUMMARY

This unit develops the candidate's abilities in reading simple working and assembly drawings, producing components and assembling with the use of permanent and non-permanent fastenings.

OUTCOMES

1. Produce internal and external mating thread forms.
2. Produce a riveted joint.
3. Produce artefacts consisting of parts joined by threaded fastenings and by rivets.

RECOMMENDED ENTRY

While entry is at the discretion of the centre, candidates would normally be expected to have attained the unit Bench Skills – Metal (D178 10).

CREDIT VALUE

0.5 credits at Intermediate 1 (3 SCQF credit points at SCQF level 4*)

**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

There is no automatic certification of core skills or core skill components in this unit.

Administrative Information

Superclass:	XE
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National Unit Specification: statement of standards

UNIT Mechanical Fastening Methods

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 the Scottish Qualifications Authority.

OUTCOME 1

Produce internal and external mating thread forms.

Performance Criteria

- a) The correct equipment is selected.
- b) Internal threads are correctly formed.
- c) External threads are correctly formed.

Note on range for the outcome

Equipment: taps; dies; drills; centre punch; hammer; files.

Thread types: metric; Whitworth; B.S.F.; BA.

Tapping sizes and clearance sizes.

Tape types: taper; intermediate; plug.

Die types: split; adjustable.

Die nuts.

Screw thread terminology: major diameter; minor diameter; pitch; root; crest.

Evidence Requirements

Performance and observed evidence to demonstrate that the candidate can select and use tools and equipment to produce internal and external mating thread forms. Evidence should show a minimum of 2 examples.

OUTCOME 2

Produce a riveted joint.

Performance Criteria

- a) The correct equipment is selected.
- b) Secure riveted joints are completed correctly.

Note on range for the outcome

Equipment: hammer centre; punch; drills; hammer; files; rivet sets.

Types of rivet: countersunk; round head.

National Unit Specification: statement of standards (cont)

UNIT Mechanical Fastening Methods

Evidence Requirements

Performance and observed evidence to demonstrate that the candidate can select and use tools and equipment to produce riveted joints. Evidence should show a minimum of 2 examples.

OUTCOME 3

Produce artefacts consisting of parts joined by threaded fastenings and by rivets.

Performance Criteria

- a) Artefacts are produced in accordance with given working drawings.
- b) Functional dimensions are within prescribed limits.
- c) The quality of the finish complies with the stated standards.
- d) All safety practices and procedures are observed in the use of the tools and in the manufacture of the artefacts.

Note on range from the outcome

Artefacts: joined by threaded fastening; joined by rivets.

Evidence Requirements

Performance evidence to demonstrate that the candidate can manufacture artefacts in accordance with PC's (a), (b) and (c). Observed evidence of safe working practices for PC (d) should be recorded on an observation checklist.

National Unit Specification: support notes

UNIT Mechanical Fastening Methods

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 20 hours.

This unit develops the basic skills in reading and interpreting working and assembly drawings, hand fitting skills and metal joining using permanent and non-permanent fastenings.

Candidates attempting this unit will mainly be candidates in the 14-16 curriculum and in post-16 education.

Candidates should preferably have completed the unit Bench Skills – Metal (D178 10) prior to attempting this unit.

Apart from developing hand skills, this unit should emphasise the need for safe working practices at all times within the workshop environment. Induction to the unit should include a brief overview of HASAW practices and the necessity for a disciplined attitude.

GUIDANCE ON THE CONTENT AND CONTEXT FOR THIS UNIT

Content:

- engineering drawings: orthographic and assembly.
- tools: rule, scribe, engineer's square, odd-leg callipers, dividers, hammer, centre punch, drills, files, hacksaw, taps, dies, etc.

This unit is practical in nature and requires candidates to develop skills in:

- reading and interpreting engineering drawings.
- using marking out tools.
- manufacturing components.
- assembling and fastening components to complete artefacts.
- adhering to safe working practices at all times.

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

This unit should be taught in a workshop environment with the use of wall charts to illustrate the screw thread forms and terminology.

The skills required for marking out and manufacturing components having been acquired in previous units should release the time to concentrate on the fastening processes.

The importance of safe working practices and procedures should be emphasised at every opportunity and the fact that these are an assessable component within the unit stressed.

National Unit Specification: support notes (cont)

UNIT Mechanical Fastening Methods

Outcome 1

The candidate will be presented with a range of tools to perform the function of:

- drilling
- tapping
- forming external threads

From the range of tools given the candidate will select the most appropriate for the given application and produce the mating thread forms.

Outcome 2

The candidate will be presented with a range of tools to perform the function of:

- drilling and countersinking
- producing riveted joints

From the range of tools given the candidate will select the most appropriate for the given application and produce the riveted joints.

Outcome 3

The candidate will be presented with 2 practical exercises to manufacture artefacts, one with screwed fastenings the other with a joint formed with rivets.

The candidate will manufacture 2 artefacts in accordance with the specification and comply with all safety practices and procedures.

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

Candidates should be aware that certain performance criteria are monitored constantly and recorded on an observation checklist. The quality and accuracy of the artefacts will be measured against the stated criteria.

Outcomes 1 and 2 could be integrated into outcome 3 for the purpose of collecting evidence. For example an artefact produced for outcome 3 with 2 threaded fastenings would also satisfy outcome 1. Or an artefact with 2 rivets forming a joint would also satisfy outcome 2. An artefact with 2 threaded fastenings and a joint formed with 2 rivets would satisfy all 3 outcomes.

SPECIAL NEEDS

This Unit Specification is intended to ensure that there are no artificial barriers to learning or assessment. Special needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering special alternative Outcomes for Units. For information on these, please refer to the SQA document *Guidance on Special Assessment Arrangements* (SQA, September 2003).