

National Unit Specification: general information

UNIT	Fabrication and Welding: Basic
CODE	DH5D 10
COURSE	Scottish Progression Award in Engineering

SUMMARY

This unit applies the basic principles of mechanical, non-fusion and fusion joining processes.

OUTCOMES

1. Join materials using mechanical, non-fusion and fusion techniques.
2. Demonstrate an awareness of the hazards associated with joining techniques.

RECOMMENDED ENTRY

While entry is at the discretion of the centre, candidates are not expected to have previous experience in joining techniques. It would be beneficial however to have achieved 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.*

Administrative Information

Superclass:	XE
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National Unit Specification: general information (cont)

UNIT Fabrication and Welding: Basic

CORE SKILLS

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

Information on the automatic certification of any core skills in this unit is published in *Automatic Certification of Core Skills in National Qualifications* (SQA, 1999).

National Unit Specification: statement of standards

UNIT Fabrication and Welding: Basic

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

Join materials using mechanical, non-fusion and fusion techniques.

Performance Criteria

- a) The selection of hand and power tools is appropriate for mechanical joining.
- b) The selection of equipment is appropriate for fusion and non-fusion joining techniques.
- c) Fusion and non-fusion joining techniques are demonstrated correctly.
- d) Regulations, procedures and safe working practices for equipment and work areas are complied with correctly.

Evidence Requirements

Performance evidence to demonstrate that the candidate can apply mechanical, fusion and non-fusion joining techniques to meet the stated performance criteria.

One example of joining materials using hand and power tools should be carried out. The use of a riveting set and/or other fixtures such as screws and nuts and bolts should be demonstrated.

Fusion joining should be demonstrated using Oxy-Acetylene Welding, Manual Metal Arc Welding (MMA) and Metal Arc Gas Shielded Welding (MAGS).

OUTCOME 2

Demonstrate an awareness of the hazards associated with joining techniques.

Performance Criteria

- a) The description of the relevant safety procedures relating to hand tools is correct.
- b) The description of the relevant safety procedures relating to power tools is correct.
- c) The description of the statutory safety regulations applicable to non-fusion and fusion processes is correctly stated.

Evidence Requirements

Oral and performance evidence that demonstrates the candidate's ability to identify and demonstrate the safe use of tools and equipment and clearly understand the range of statutory safety regulations for non-fusion and fusion welding.

National Unit Specification: support notes

UNIT Fabrication and Welding: Basic

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.

GUIDANCE ON THE CONTENT AND CONTEXT FOR THIS UNIT

Content

- Preparation; marking out; drilling.
- The use of rivet pliers and types of pop rivets
- The use of screws and nuts and bolts fixtures.
- Non fusion processes using brazing, soldering or spot welding.
- Fusion processes (MMA),(MAGS) oxy-acetylene welding.

This unit is practical in nature and requires an understanding in:-

- using power tools such as a portable drill to prepare material for riveting
- how to apply simple soldering; brazing and weld techniques to join materials.
- adhering to safe working practices at all times with particular reference to power tools safety; oxy-acetylene flame and equipment; clear understanding of the need for eye protection; ventilation, protective clothing, circuit polarity and work holding will be required.

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

The development of joining techniques.

With reference to the history of joining techniques it would be useful to introduce candidates to methods such as casting and forging dating back to the 19th century and how the industrial revolution provided the incentive which led to the introduction on a commercial scale of bolting, riveting, soldering and finally welding.

National Unit Specification: support notes (cont)

UNIT Fabrication and Welding: Basic

This introduction might well be served by showing a video explaining terminology, equipment and applications in an industrial context.

Knowing, understanding and applying simple mechanical and thermal techniques to join materials.

This aspect of the unit would be best undertaken as a group initially with the intention of candidates having hands on activities regarding the mechanical joining.

The joining of components by manual metal arc (MMA), metal arc gas shielded (MAGS) and by resistance (SPOT) welding are prescribed to allow an insight into a permanent method of joining metals and to give some practice in using one of the techniques. Oxy-acetylene welding, brazing and soldering may be demonstrated as alternative methods.

Adhering to safe working practices at all times.

The mechanical methods require observation of defects that can occur to welding tools. They have their own safety practices and procedures including personal protective equipment to be worn, ventilation equipment checks and work holding. These should be fully covered and firmly enforced.

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

The candidate should be aware that certain performances are being monitored constantly and recorded on an observation checklist and that finished artefacts will be tested against the stated criteria for accuracy and quality. Lengthy written tests are not required for tools, process or equipment recognition and use.

APPROACHES TO GENERATING EVIDENCE

Examples of artefacts that could be produced for only this unit might be an all welded ***hanging basket bracket***. An example of an integrative artefact dealing with areas from elsewhere in the course might be a simple ***candelabra*** where power tools such as drills and the use of pop rivets are utilised.

Observation checklists are required as instruments of assessments for both 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).