

National Unit Specification: general information

UNIT	Bench Skills – Metal (Intermediate 1)
NUMBER	D178 10
COURSE	Engineering Craft Skills (Intermediate 1)

SUMMARY

This unit develops the candidates' abilities in reading simple working drawings and producing products using metalworking tools.

OUTCOMES

- 1 Use marking-out tools and equipment to mark out simple components.
- 2 Demonstrate knowledge of common bench tools and equipment.
- 3 Use a range of metalworking hand tools and equipment.
- 4 Manufacture artefacts from working drawings.

RECOMMENDED ENTRY

While entry is at the discretion of the centre, candidates would normally be expected to have attained some previous experience of Craft Skills.

CREDIT VALUE

1 credit at Intermediate 1.

Administrative Information

Superclass:	XF
Publication date:	December 1999
Source:	Scottish Qualifications Authority
Version:	03

© Scottish Qualifications Authority 1999

This publication may be reproduced in whole or in part for educational purposes provided that no profit is derived from reproduction and that, if reproduced in part, the source is acknowledged.

Additional copies of this unit specification can be purchased from the Scottish Qualifications Authority. The cost for each unit specification is £2.50 (minimum order £5).

National Unit Specification: general information (cont)

UNIT Bench Skills – Metal (Intermediate 1)

CORE SKILLS

This unit gives automatic certification of the following:

Complete core skills for the unit	None
Core skills components for the unit	Planning and Organising Int 1

Additional information about core skills is published in *Automatic Certification of Core Skills in National Qualifications* (SQA, 1999).

National Unit Specification: statement of standards

UNIT Bench Skills – Metal (Intermediate 1)

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

Use marking-out tools and equipment to mark out simple components.

Performance criteria

- (a) Datums are located correctly.
- (b) Workpiece is marked out correctly.
- (c) Functional dimensions are marked out correctly within prescribed limits of accuracy.

Note on range for the outcome

Equipment: scribe, rule, square, dividers, oddleg callipers, centre punch.

Evidence requirements

Performance and observed evidence that the candidate can use tools and equipment to mark out a workpiece to meet the performance criteria. Evidence should show a minimum of three functional sizes, with tolerances of ± 1 mm on two linear sizes.

OUTCOME 2

Demonstrate knowledge of common bench tools and equipment.

Performance criterion

- (a) Identification of common bench tools and equipment is correct.

Evidence requirements

Written and/or oral evidence to demonstrate that the candidate can correctly identify at least 12 items from a selection of bench tools and equipment.

OUTCOME 3

Use a range of metal-working hand tools and equipment.

Performance criteria

- (a) Common bench tools and equipment are selected correctly.
- (b) Hand tools and equipment are used correctly.

Evidence requirements

Performance evidence that the candidate can select and use a minimum of four fitting tools, two sheet-metal tools and two measuring tools.

National Unit Specification: statement of standards (cont)

UNIT Bench Skills – Metal (Intermediate 1)

OUTCOME 4

Manufacture artefacts from working drawings.

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 stated standards.
- (d) All safety practices and procedures are observed correctly in the use of tools and in the manufacture of the artefacts.

Note on range for the outcome

Artefacts: one artefact from sheet-metal, one artefact using fitting skills.

Evidence requirements

Performance evidence that the candidate can manufacture an artefact to meet the PCs (a), (b) and (c).
Observed adherence to safe working practices for PC (d).

The artefact should show evidence of three functional sizes within tolerances of ± 1 mm for two linear dimensions in fitting work, and ± 2 mm for sheet-metal work and ± 3 mm for bending.

National Unit Specification: support notes

UNIT Bench Skills – Metal (Intermediate 1)

This part of the unit specification is offered as guidance. The support notes are not mandatory.

While the time allocated to this unit is at the discretion of the centre, the notional design length is 40 hours.

This unit develops knowledge and skills in reading and interpreting working drawings, hand-fitting skills and some basic sheet-metalworking.

Candidates attempting this unit will mainly be in post-16 education, although it may also be undertaken by some adult returners and perhaps some candidates in the 14 to 16 curriculum.

Candidates require little prior experience, but will be expected to produce good practical work. Artefacts produced should have a personal appeal to the client group, but must provide challenge and stimulation.

Apart from developing basic engineering hand skills, this unit should emphasise the need for safe working practices and a disciplined approach to achieving quality work. As part of a course in the post-16 curriculum, the candidates should be required to act and perform as adults and, accordingly, the tasks set should be challenging to the candidates at the level at which they are working. As the course develops, the candidates will be required to operate machinery and equipment to a code of practice, with a degree of independence, and it is essential that ground rules for acceptable standards are set and applied throughout this unit.

GUIDANCE ON CONTENT AND CONTEXT FOR THIS UNIT

Content:

- simple engineering drawings: orthographic, pictorial, assembly drawings
- measuring tools to include rules, squares and callipers, and centre punches
- common bench tools: fitting tools, sheet-metal tools, measuring tools
- fitting tools to include hammers, chisels, files, saws, taps and dies, and riveting sets
- sheet-metal tools to include folding bars, hide mallets, tin snips, pop riveters and spot welders

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

- reading and interpreting simple workshop drawings
- using basic marking-out tools to mark out one simple sheet-metal and one fitting artefact
- using a range of sheet-metal tools to manufacture a sheet-metal artefact
- using a range of fitting tools to manufacture a fitting-type artefact
- adhering to safe working practices at all times

National Unit Specification: support notes (cont)

UNIT Bench Skills – Metal (Intermediate 1)

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

Using basic marking-out tools

The marking-out of a model sports pitch could serve to introduce datums in a familiar context. On metal the datums would first be established by filing two adjacent edges straight and at 90° and using basic marking-out equipment – rule, square, oddlegs, scribe, centre punch, dividers – to achieve the required accuracy. More sophisticated apparatus such as scribing blocks and surface tables might be introduced if applications warrant them, although their use would only be assessed at Intermediate 2 level.

Using a range of sheet-metal tools to manufacture a sheet-metal artefact

Depending on the experience of the candidates some practice work will normally be carried-out. This may take the form of a cardboard mock-up or the manufacture of an introductory artefact. This will help the candidates appreciate the finer points and problems involved in manufacturing in sheet-metal. By doing this, candidates should develop the necessary personal experience to manufacture the unit artefact.

At this stage it will be necessary to amply cover all stages by demonstration and constantly supervise activities. Safety in general, and that specific to the unit, must be stressed and firmly enforced.

Using a range of fitting tools to manufacture an artefact

Emphasis should be given to the desire for accuracy and quality rather than speed in manufacturing this item.

The type of artefact produced could require the candidates to use equipment and processes from other units in the course.

Drilling, though generally a machine process, would most likely be covered at this time. Accuracy would be determined by rule in conjunction with callipers if necessary, but there is no reason why devices such as digital vernier callipers cannot be used at this time. Assembly/joining methods should be covered, as should finishing with no major flaws, though there is scope here for additional support.

Candidates should have practice of reading and interpreting drawings containing the required range of features. It would assist candidates at this level if orthographic and pictorial views were provided together. Candidates should be aware of the importance of datums, and references for BS PP7308 should be provided for candidates to use as required.

Adhering to safe working practices at all times

Safe working practices will be demonstrated and highlighted by the teacher/lecturer throughout the course, but the opportunity should be taken here to ensure that the candidates are aware that their approach to this topic is being monitored and will continue to be monitored throughout the course.

Care of tools and the recognition of the dangers of tool defects with regard to quality of work and possible hazard will be a recurrent theme in the course, and the topic should be broached in this unit.

National Unit Specification: support notes (cont)

UNIT Bench Skills – Metal (Intermediate 1)

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

Whenever possible, the dynamic nature of this course should not be hindered by overburdening assessment of the candidate.

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 tool, process or equipment recognition and use. Short-answer tests that are mainly of a visual nature will be provided.

Approaches to generating evidence

Assessment evidence for this unit should be able to be drawn from the manufacture of two artefacts – one sheet-metal and one fitting artefact. In situations where candidates fail to achieve the required standard of performance in one area, this weakness can be targeted in the next part of the course, when the next artefact is manufactured.

In situations where candidates fail to achieve the required standard of performance in more than one area, it may be necessary to provide tasks aimed specifically at the areas to be reassessed.

Some candidates may require additional support and help to ensure success in the manufacturing process, but candidates must also be aware that the overall course assessment takes into account the amount of practical assistance given by the teacher/lecturer and that ultimately a degree of independence is expected from the candidate.

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 alternative outcomes for units. For information on these, please refer to the SQA document *Guidance on Special Assessment and Certification Arrangements for Candidates with Special Needs/Candidates whose First Language is not English* (SQA, 1998).