



National Unit Specification: general information

UNIT Fabrication Skills (SCQF level 5)

CODE F5FG 11

SUMMARY

This Unit can be delivered as part of a National Qualification Group Award but can also be taken as a free-standing Unit by candidates who wish to enhance their skills in a fabrication environment. The Unit is also suitable for those who are studying the subject for the first time.

The Unit covers practical fabrication activities at a basic level. The candidate will develop the ability to select and use tools correctly and safely in different activities in the Unit. Basic safe working practices will be included in the content as it is important to adhere to these at all times.

Candidates will gain practical skills in interpreting drawings, marking out, cutting, forming, assembling and inspection of completed assemblies, which can be in either sheet or plate.

OUTCOMES

- 1 Interpret instructions and identify dimensions from drawings for the manufacture of a fabricated component.
- 2 Demonstrate the use of tools and equipment required to manufacture the component.
- 3 Perform a dimensional and quality check on the manufactured component.
- 4 Observe safe working practices in all practical activities.

RECOMMENDED ENTRY

While entry is at the discretion of the centre, candidates would normally be expected to have some workshop experience and knowledge of welding, joining, engineering skills such as marking out, materials and graphical communications.

Administrative Information

Superclass: XD

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National Unit Specification: general information (cont)

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CREDIT VALUE

2 credits at Intermediate 2 (12 SCQF credit points at SCQF level 5*).

**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 are opportunities to develop the Core Skills of *Problem Solving* and *Numeracy* at SCQF level 5 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

National Unit Specification: statement of standards

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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 SQA.

OUTCOME 1

Interpret instructions and identify dimensions from drawings for the manufacture of a fabricated component.

Performance Criteria

- (a) Identification of the functional dimensions and the use of tolerances are identified correctly.
- (b) The operations sheet is completed to ensure the correct sequence of operations for the manufacture of the fabricated component.

OUTCOME 2

Demonstrate the use of tools and equipment required to manufacture the component.

Performance Criteria

- (a) Selection and use of tools and equipment to mark out to the required specification is correct.
- (b) Selection and use of tools and equipment to cut and bend or form to the required specifications is correct.
- (c) Selection and use of tools and equipment to fasten and join to the required specifications is correct.

OUTCOME 3

Perform a dimensional and quality check on the manufactured component.

Performance Criteria

- (a) Inspection of all functional dimensions is correct.
- (b) Workmanship and jointing faults are identified correctly and suitable rectification measures are applied where necessary.
- (c) Workmanship and finishing faults are identified correctly, and suitable rectification measures are applied where necessary.

National Unit Specification: statement of standards (cont)

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OUTCOME 4

Observe safe working practices in all practical activities.

Performance Criteria

- (a) A tidy workplace is maintained at all times.
- (b) Appropriate personal protective equipment is worn at all times.
- (c) Tools are used in a safe and correct manner.
- (d) Health and safety awareness is constantly demonstrated.

EVIDENCE REQUIREMENTS FOR THIS UNIT

Evidence is required to demonstrate that the candidates have achieved all of the Outcomes and Performance Criteria.

An integrated approach to the generation of assessment evidence is required with evidence being gathered at appropriate points under supervised conditions throughout the delivery of the Unit.

Written and/or recorded oral evidence and performance evidence supplemented by assessor observation checklists is required to demonstrate that the candidate has prepared, planned and manufactured an artefact in a safe manner.

The candidate will be required to:

- ◆ interpret engineering drawings and specifications.
- ◆ construct a planning sheet.
- ◆ identify, select and use appropriate materials.
- ◆ select and use appropriate cutting techniques to cut materials.
- ◆ select and use appropriate forming techniques.
- ◆ select and use appropriate joining techniques.
- ◆ carry out quality checks on the artefact at various stages of manufacture.
- ◆ keep a tidy workplace, and wear the correct Protective Personal Equipment (PPE)
- ◆ use tools and equipment correctly and safely

The Assessment Support Pack (ASP) for this Unit provides samples of assessor observation checklists and details of questions which exemplify the national standard. Centres wishing to develop their own assessments should refer to the ASP to ensure a comparable standard.

National Unit Specification: support notes

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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 80 hours.

GUIDANCE ON THE CONTENT AND CONTEXT FOR THIS UNIT

The Unit is an optional Unit in the National Qualification Group Award (NQGA) in *Fabrication and Welding Engineering* but can also be taken on a free-standing basis.

On completion of this Unit the candidate should be able to produce artefacts that conform to specifications as required by the steelwork/fabrication industry.

A typical fabricated structure containing straight and curved profiles, flanged and rolled plates and sections and simple developed work should be drawn up to a suitable scale and used as artefacts to be produced by the candidates.

This Unit covers practical fabrication activities at a basic level. The candidate will develop the ability to select and use tools correctly and safely in different activities in the Unit. It is therefore important that the learning takes place in a supervised workshop environment. Basic safe working practices will be included in the content as it is important to adhere to these at all times

Candidates will work on a range of practical fabrication tasks, which will enable to become familiar with a variety of tools and materials in the workshop. Lecturers/teachers may include a wide range of short practical activities to equip candidates with the skills to complete the manufacture of an artefact. During the process of practical work the candidate will become accustomed to engineering terminology in everyday practice. Candidates should learn good working practices at each stage and how to carry out quality checks on their own work.

The context for learning should include the requirement to be clean, presentable and appropriately dressed for the workshop. Wearing the necessary protective equipment (PPE) including protective clothing where required.

Relevant aspects of current health and safety legislation, including COSHH (Control of Substances Hazardous to Health) Regulation and any systems of work relevant to the candidate's workshop/workplace should be explained and adhered to as part of the work of this Unit.

National Unit Specification: support notes (cont)

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GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

It is important that there is an induction to the Unit which includes health and safety awareness. This Unit involves experiential learning through the various practical experiences and activities. Candidates should experience workshop conditions and be encouraged to perform tasks in a manner appropriate to the workplace. General vocational skills, such as selecting and maintaining tools and equipment, are integrated with practical fabrication activities within the Unit.

As well as carrying out practical tasks, candidate will also learn from brief lessons on health and safety and workshop protocol. Approaches will also include demonstrations of practical work by tutors. Short lessons on specific aspects of industrial practice and the correct use of tools will prove invaluable at intervals throughout the learning experience. These may be followed by brief practical sessions in which the candidates practice the skill emphasised by the demonstration.

In order to raise the candidate's awareness of local industries and the realities of the workplace visits to local engineering firms could be arranged if appropriate. Additional useful employment opportunities can be resourced from the research of local firms.

The main objective of the Unit is the development and acquisition of practical skills and as such this topic should be allocated the majority of the notional design length of the Unit

This Unit should be delivered by a combination of teaching and learning approaches which could include:

- ◆ Practical activities
- ◆ Group discussions
- ◆ Tutorials
- ◆ Site visits
- ◆ Audio visual

OPPORTUNITIES FOR CORE SKILL DEVELOPMENT

All elements of the Core Skill of *Problem Solving*: critical thinking, planning and organising, reviewing and evaluating, can be developed in work-related contexts as candidates undertake the Unit. As they apply theory to a practical task they will select and demonstrate use of tools and equipment required in manufacture. Health and safety implications will be considered and observed throughout. Group discussion could be used to evaluate achievement.

The ability to understand and interpret drawings will underpin competence and also develop skills in *Numeracy*. Candidates have to focus on practical calculation using graphic and numerical data to mark out, cut, and inspect completed assemblies, ensuring accuracy, quality and safety. Practical exercises to support development of skills under guided supervision are undertaken as part of formative work across the award, with an emphasis on *Numeracy* as a tool to be used and applied efficiently and critically in working contexts.

National Unit Specification: support notes (cont)

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GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

Opportunities for the use of e-assessment

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by information and communications technology (ICT), such as e-testing or the use of e-portfolios or e-checklists. Centres which wish to use e-assessment must ensure that the national standard is applied to all candidate evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. Further advice is available in *SQA Guidelines on Online Assessment for Further Education (AA1641, March 2003)*, *SQA Guidelines on e-assessment for Schools (BD2625, June 2005)*.

The assessment of the fabrication skills should be evidenced by a practical assignment involving the manufacture of an artefact.

Candidates can, if appropriate, work in teams of no more than three to produce an assembled artefact. It is essential that the artefact produced by such a team will be of sufficient complexity and scope to allow all members of the team to make a contribution equal to the manufacture and assembly of an artefact by an individual candidate.

Where this occurs the assessor must be satisfied that each individual candidate has produced evidence to demonstrate achievement of all Outcomes and Performance Criteria.

A suitable artefact may be the manufacture of a piece of ducting involving at least two component parts in thin material or a support bracket or portal knee in thick plate.

It is recommended that assessors check the quality of the candidate's work against prescribed standards and tolerances. Candidates themselves are required to carry out quality checks against these same standards. Candidates must carry out their quality check prior to the assessor check.

CANDIDATES WITH DISABILITIES AND/OR ADDITIONAL SUPPORT NEEDS

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. Further advice can be found in the SQA document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs* (www.sqa.org.uk).