



## National Unit Specification: general information

**UNIT**        Pattern Development (SCQF level 5)

**CODE**        F5EX 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 will develop the candidate's ability to use the parallel line, radial line, and triangulation methods to complete component patterns in right cylinders, right and oblique cones (cut on parallel and inclined planes respectively), and transition pieces on-centre and between parallel planes. On completion of this Unit, the candidate will be able to interpret and translate drawings, instructions and specifications into a set of templates.

### OUTCOMES

- 1 Complete patterns for fabricated components and assemblies using the parallel line method.
- 2 Complete patterns for fabricated components and assemblies using the radial line method.
- 3 Complete patterns for fabricated components and assemblies using the method of triangulation.

### RECOMMENDED ENTRY

While entry is at the discretion of the centre it would be beneficial if candidates had some basic knowledge of Graphical Communications.

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#### Administrative Information

**Superclass:**        XD

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## **National Unit Specification: general information (cont)**

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### **CREDIT VALUE**

1 credit at Intermediate 2 (6 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 *Numeracy* and *Information Technology* 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**

Complete patterns for fabricated components and assemblies using the parallel line method.

##### **Performance Criteria**

- (a) Setting out of the required views, construction lines and joint lines of fabricated components is correct in terms of the given dimensions and instructions.
- (b) Development of patterns for specified parts of fabricated assemblies is correct, and includes user information.

#### **OUTCOME 2**

Complete patterns for fabricated components and assemblies using the radial line method.

##### **Performance Criteria**

- (a) Setting out of the required views, construction lines and joint lines of fabricated components is correct in terms of the given dimensions and instructions.
- (b) Development of patterns for specified parts of fabricated assemblies is correct, and includes user information.

#### **OUTCOME 3**

Complete patterns for fabricated components and assemblies using the method of triangulation.

##### **Performance Criteria**

- (a) Setting out of the required views, construction lines and joint lines of fabricated components is correct in terms of the given dimensions and instructions.
- (b) Development of patterns for specified parts of fabricated assemblies is correct, and includes user information.

## **National Unit Specification: statement of standards (cont)**

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#### **EVIDENCE REQUIREMENTS FOR THIS UNIT**

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

Product evidence will be required to demonstrate that the candidate has achieved all the Outcomes and Performance Criteria. This can be produced during one or more assessment occasions throughout the duration of the Unit and should last no more than two hours in total.

This evidence will be produced under supervised conditions and will comprise 5 drawings to be completed with layouts, joint lines, developed templates and user instructions as detailed below:

- ◆ Tee piece in equal diameter pipes
- ◆ Tee piece in unequal diameter pipes
- ◆ Right cone cut inclined to the base
- ◆ Oblique cone cut inclined to the base
- ◆ Square to round on-centre transition piece, between parallel planes

Satisfactory achievement of the Unit is based on all templates being within a tolerance of  $\pm 2\%$ .

The Assessment Support Pack (ASP) for this Unit provides samples of assessment materials 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

### UNIT      Pattern Development (SCQF level 5)

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 40 hours.

#### **GUIDANCE ON THE CONTENT AND CONTEXT FOR THIS UNIT**

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

On completion of this Unit the candidate will be able to interpret and translate drawings, instructions and specifications into a set of templates, taking account of the various parameters which may affect them, the accuracy of which has been checked and tested.

The candidate should achieve the level of competence of someone who is required to produce joint positions, check the accuracy and furnish full, clear and concise instructions for using the template.

This could be carried out initially in the classroom environment by visual aids, ie scaled items, but predominantly by hands-on examination of drawings and specifications to ascertain functional dimensions and correct joint positions.

Full use should be made of integrating geometry, calculations and software wherever possible. Candidates can proceed to work on individual artefacts or drawings/information sheets under the supervision of the tutor/trainer who will correct any errors or faults as they occur.

Dimensional checks should be carried out on all templates and candidates would be expected to add forming/folding instructions.

The dimensional accuracy of flat templates can be checked using software profile templates or tracing sheets. Guidance may need to be given to candidates.

The delivery of the Unit can be supplemented by the explanation and definition of the technical terminology used.

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

- ◆ Lecturing
- ◆ Case studies
- ◆ Practical activities
- ◆ Group discussions
- ◆ Tutorials
- ◆ Directed study

## National Unit Specification: support notes

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#### **GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT**

The delivery of the Unit could be organised in such a way that the interpretation of drawings, use of software, appropriate books, numerical checks and scale templates are dealt with prior to the candidates setting out their templates from the given instruction sheets. Candidates can then proceed to work individually. It should be the tutor's aim to constantly integrate all the aspects of the Outcomes into one coherent whole. The production of templates is of critical importance, including that of checking instructions and accuracy, and it must constantly be stated that the quality level of a component starts (and may finish) with the template(s) produced. "Hands-on" candidates' activities and support material can, and should, be used throughout all the Outcomes. Any practical work required in the Unit would be best managed by the production of a finished template within the context of worksheets and/or support sheets.

#### **OPPORTUNITIES FOR CORE SKILL DEVELOPMENT**

Candidates have to understand and apply graphic and numerical data to complete patterns for fabricated components. The ability to interpret and translate drawings, instructions and specifications into a set of templates is critical to achievement. Practical calculations must be accurate with all templates being within a tolerance of  $\pm 2\%$ . Exercises to support development of skills will be part of formative work across the award, with an emphasis on *Numeracy* as a tool to be used and applied efficiently in working contexts. On line facilities may be useful to provide additional support to some candidates. Current examples of commercial materials should be available as models and for evaluation as to effectiveness. Appropriate access to software, wherever possible, could also encourage interpretation and presentation of materials to acceptable industry standards.

#### **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)*.

Assessment is by means of practical graphical exercises on a series of pre-drawn sheets on which the candidate has to produce a joint line, and the necessary pattern development.

The assessment of this Unit could also be approached with worksheets covering Outcomes 1–3 developed as one assessment exercise.

## National Unit Specification: support notes (cont)

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Examples of Instruments of Assessment, which could be used, are as follows:

**Outcome 1** — Graphical questions for Performance Criteria (a) and (b) since they are practical activities could best be carried out with calculations, layover sheets and software wherever possible.

The number of templates would be two, comprising:

- ◆ Equal diameter branch pipes, (template and true shape of section)
- ◆ Unequal diameter branch pipes, (template and true shape of section)

**Outcome 2** — Graphical questions for Performance Criteria (a) and (b) since they are practical activities could best be carried out with calculations, layover sheets and software wherever possible.

The number of templates would be two, comprising:

Truncated right cone cut by a inclined plane. (template only) and true shape of section.

Truncated oblique cone (vertical side type only). (template and true shape of section) cut on an inclined plane.

**Outcome 3** — Graphical questions for Performance Criteria (a) and (b) since they are practical activities could best be carried out with calculations, layover sheets and software wherever possible.

The suggested number of templates would be one, comprising:

- ◆ Square to round (on centre) between parallel planes (template only)

### 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](http://www.sqa.org.uk)).