



Higher National Unit specification

General information for centres

Unit title: Bricklaying: Arch Construction

Unit code: F8MC 34

Unit purpose: This Unit is designed to enable the candidate to develop their knowledge, understanding and skills relevant to the geometry of setting out and building arches. The candidate will also enhance their practical experience in setting out, building and maintaining arches.

On completion of the Unit the candidate should be able to:

- 1 Explain geometry and techniques used to set out and maintain arches.
- 2 Set out and build arches.

Credit points and level: 1 HN credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

**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.*

Recommended prior knowledge and skills: Access to this Unit is at the discretion of centres. However it is recommended that candidates have completed the Professional Development Award in Bricklaying at SCQF level 6 or have the equivalent level of industrial experience and prior learning.

Core Skills: There are opportunities to develop the Core Skills of *Communication, Numeracy, Working with Others* and *Problem Solving* all at SCQF level 5 and *Information and Communication Technology* at SCQF level 4 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

Context for delivery: If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed in the subject area of the Group Award to which it contributes. This Unit forms part of the Professional Development Award in Bricklaying at SCQF level 7 and is aimed at candidates following a career in brickwork and with current industrial experience.

Higher National Unit specification: General information for centres (cont)

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Assessment: The candidate will be given the opportunity to enhance their skills and knowledge in bricklaying by learning about advanced arch construction. Techniques and practices used to set out and maintain arches should be integrated to the practical tasks undertaken. The geometric principles and techniques should be explained throughout the practical activities. This learning and teaching approach should ensure the candidate acquires the underpinning knowledge required for the Unit.

This Unit is assessed on the candidates' performance of setting out and building arch brickwork including Gothic, Three-Centred and Bull's eye arches and the ability to meet the Evidence Requirements in all Outcomes.

In order to achieve this Unit, candidates are required to present sufficient evidence that they have met all the knowledge and/or skills elements for each Outcome. Details of these requirements are given for each Outcome.

The assessment instruments used should follow the general guidance offered by the Scottish Qualifications Authority (SQA) assessment model and an integrative approach to assessment is encouraged. (See references at the end of support notes).

Evidence will be gathered through the production of an assignment for Outcome 1 and observation of work processes and assessment of completed work. Assessment should be carried out under controlled, supervised conditions. Candidates must achieve all of the Knowledge and/or Skills and Evidence Requirements specified for each Outcome to gain this Unit. Centres may use the instrument of assessment which they consider to be most appropriate but are advised to use the Bricklaying Training and Assessment Programme (TAP) which has been developed centrally by SQA. Any other instruments of assessment used must be comparable to the TAP and have been through prior verification.

Accurate records should be made of the assessment instruments used showing how evidence is generated for each Outcome and giving marking schemes, checklists and recorded candidate feedback. Records of candidates' achievements should be retained. These records must be made available for external verification.

Higher National Unit specification: statement of standards

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The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

Outcome 1

Explain geometry and techniques used to set out and maintain arches

Knowledge and/or Skills

- ◆ Geometry of arches
- ◆ Construction of axed arches
- ◆ Safe Working Practices
- ◆ Sustainability/Site Waste Management
- ◆ Modern arch forming Techniques

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- ◆ explain the sequence of operations to traverse axed arches
- ◆ outline the principles used to maintain the face of an arch, explaining the safe erection and dismantling procedures required for traditional arch work support and cutting procedures whilst using hand cutting tools and masonry table saws
- ◆ outline methods used to minimise waste during construction of arches and give examples of how manufacturers are providing products which are more sustainable
- ◆ compare and contrast modern arch forming techniques to traditional methods

All the Evidence Requirements must be met and all items in the Knowledge and Skills covered. Evidence should be gathered through an assignment outlining the processes, techniques, health and safety and sustainability requirements related to setting out and maintaining arches. Assessment should be conducted under open-book supervised conditions.

Assessment Guidelines

In the assessment candidates will be required to complete an assignment based on drawings and specifications for an actual work project. This could be conducted as an in class assignment lasting up to three hours.

Higher National Unit specification: statement of standards (cont)

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Outcome 2

Set out and build arches

Knowledge and/or Skills

- ◆ Geometrical setting out techniques for arches
- ◆ Templates and or/trammels for axed arch work
- ◆ Construct arches
- ◆ Safe Working Practices
- ◆ Sustainability/Site Waste Management
- ◆ Working to specifications/tolerances

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- ◆ set out in full size, produce templates, cut voussoirs and build axed arch work to include Gothic, Three-centred and Bull's eye arches
- ◆ produce suitable templates for marking out the voussoirs for the arches
- ◆ construct the arches
- ◆ follow safe working practices
- ◆ minimise the waste of resources throughout practical tasks and dispose of waste in line with procedures
- ◆ work to specified tolerances identified in the specification

The following specification will assist the assessor in judging candidate performance against the Evidence Requirements for Outcome 2.

Bulls-eye window opening	
Establishes the shape of template	as specified
Voussoirs cut to shape of template	± 2 mm
Plumb in overall height	± 3 mm
Setting out opening	± 5 mm
Setting out overall length	± 5 mm
Gauge in overall height	± 5 mm
Level in overall length	± 5 mm
Joint thickness	± 3 mm
Perpends plumb	± 5 mm
Faceplane	± 5 mm
Facework	clean-no smudging
Pointing	acceptable finish neat and full to all arisses
Set up temporary supports	acceptable standard
Remove temporary supports	in line with safe working practices
Cut main walling to extrados of Bull's-eye	± 4 mm through width of wall
Curvature of intrados	± 3 mm of true shape

Higher National Unit specification: statement of standards (cont)

Unit title: Bricklaying: Arch Construction

Regular straight joints	± 3 mm
Trammel	as specified
Minimises waste and dispose of it appropriately	suitable level and method
Wears appropriate Personal Protective Equipment (PPE)	at all times
Current Health and Safety legislation	complies at all times
Gothic arch	
Lay out on a flat surface	as specified
Plumb of arch face	± 3 mm
Joint thickness	± 3 mm
Facework	clean-no smudging
Pointing	acceptable finish neat and full to all arrises
Set up temporary supports	acceptable standard
Remove temporary supports	in line with safe working practices
Faceplane of arch	± 3 mm
Equal mitres at crown of arch	± 3 mm
Regular joints	± 3 mm
Minimises waste and dispose of it appropriately	suitable level and method
Wears appropriate Personal Protective Equipment (PPE)	at all times
Current Health and Safety legislation	complies at all times
Three-centred arch	
Establishes the shape of template	as specified
Voussoirs cut to shape of template	± 2 mm
Setting out dry on a flat surface	as specified
Plumb of arch face	± 3 mm
Joint thickness	± 3 mm
Facework	clean-no smudging
Pointing	acceptable finish neat and full to all arrises
Set up temporary supports	acceptable standard
Remove temporary supports	in line with safe working practices
Faceplane of arch	± 3 mm
Regular straight joints	± 3 mm
Minimises waste and dispose of it appropriately	suitable level and method
Wears appropriate Personal Protective Equipment (PPE)	at all times
Current Health and Safety legislation	complies at all times

Evidence will be gathered through observation of work processes and assessment of the completed work. Assessment should be carried out under controlled supervised conditions. In order to achieve this Outcome, candidates are required to present sufficient evidence that they have met all the Knowledge and/or Skills elements. An assessor observation checklist should be completed to ensure that the candidate has met the required specification and tolerances and the observation checklist should be retained as evidence.

Candidates should work in pairs wherever possible to complete this Outcome.

Higher National Unit specification: statement of standards (cont)

Unit title: Bricklaying: Arch Construction

Assessment Guidelines

This Outcome is assessed on the candidates' actual performance of setting out and constructing three arches to a given specification and required tolerances.

Candidates should be provided with drawings and specifications for the practical task. Assessment should be carried out in a suitable workshop environment. Timing for this assessment should be determined prior to commencement. An observation checklist should be completed to ensure the candidate has evidenced all the knowledge and skills included in this Outcome to the specifications and tolerances required.

Administrative Information

Unit code: F8MC 34

Unit title: Bricklaying: Arch Construction

Superclass category: TG

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Higher National Unit specification: support notes

Unit title: Bricklaying: Arch Construction

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

This Unit has been developed as a mandatory Unit in the Professional Development Award in Bricklaying at SCQF level 7 and may be delivered in a sequence suitable to individual candidates and centres.

This Unit is designed to enable the candidate to develop, knowledge, understanding and skills relevant to the geometry of setting out and building arches.

Candidates following a career in brickwork and with current industrial experience will benefit from undertaking this Unit.

The knowledge and skills for this Unit should be incorporated with modern arch forming techniques and applied where possible.

Terminology commonly associated with bricklaying should be used throughout this Unit.

It is vitally important that candidates gain an understanding and knowledge of the sequencing of operations with regard to setting out and building of arches.

Current Health and Safety, sustainability and waste management issues should be fully emphasised throughout the delivery of this Unit.

Working to specified tolerances and methods of checking completed work should be demonstrated and undertaken by the candidate.

Guidance on the delivery and assessment of this Unit

The geometric principles and methods of setting out arches should be demonstrated to the candidate before summative assessment takes place.

The differing techniques and constraints candidates could encounter on site with various construction methods with regard to setting out and constructing arches should be fully explained.

Health and Safety and Sustainability are integral and key to the Construction Industry therefore throughout the Unit emphasis will be placed where appropriate on the application of Health and Safety and Sustainability. Safe working practices should be looked at in accordance with current safety codes of practice and regulations. Sustainability should include reference to criteria affecting sustainability, impact of not implementing sustainability on the environment and the legislation promoting sustainability.

Working tolerances should be explained as being the minimum standard which will be accepted and candidates should be encouraged to evaluate their own work.

Higher National Unit specification: support notes (cont)

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Opportunities for developing Core Skills

Communications skills at SCQF level 5 may be developed by the completion of the assignment for Outcome 1 and formative assessments undertaken prior to summative assessment.

Working with others at SCQF level 5 could be developed working in pairs to construct the arches. Candidates can agree responsibilities and provide support and information to each other during assessments. After assessment, they should be encouraged to consider how effectively they supported each other.

Information and Communication Technology at SCQF level 4 may be developed by the candidates' carrying out individual research of modern and traditional arch construction techniques, Health and Safety legislation and sustainability relating to the task.

Problem solving at SCQF level 5 could be developed as candidates compare and contrast modern and traditional arch construction techniques. Candidates will need to take account of a range of factors in order to work efficiently and safely, such as the choice of tools, appropriate materials, safety issues, safety equipment and sustainability. Individual discussions with assessors will enhance the evaluation of efficient working practices.

Numeracy will be developed at SCQF level 5 when taking off dimensions from working drawings, measuring, calculating and setting out.

Open learning

Although this Unit could be delivered by distance learning, it would require a considerable degree of planning by the centre to ensure the sufficiency and authenticity of candidate evidence. Arrangements would have to be made to ensure that:

- ◆ the practical activity in Outcome 2 is supervised by a responsible person and clearly recorded (using an assessment checklist, or on video) for the assessor
- ◆ the assessor is, at some point able to question the candidate on the performance (face to face, by telephone, online)
- ◆ the open-book assignment for Outcome 1 is conducted in a supervised environment

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website

www.sqa.org.uk/assessmentarrangements

General information for candidates

Unit title: Bricklaying: Arch Construction

This Unit is designed to develop your practical skills and knowledge of complex arch construction. You will develop your understanding of modern and traditional practices and techniques and comply with sustainability issues and current Health and Safety legislation throughout the Unit.

You will have to demonstrate the required techniques in setting out arches and demonstrate your understanding of the traditional and modern techniques of setting out and constructing arches.

You will learn about sustainability issues and how new materials, techniques and systems can have an impact on improving the sustainability in general and you will comply with current Health and Safety regulations and legislation throughout.

Outcome 1

Explain geometry and techniques used to set out and maintain arches

You will be assessed by the completion of an assignment in which you will be required to describe in detail and illustrate the methods used to set out and construct arches. You will give detailed sequence of operations required to set out and construct arches.

The assessment for this Outcome will be open-book and will be carried out in a supervised environment and you will have access to your own notes that you have prepared personally for your own use. You will not be permitted to bring textbooks, handouts or other materials that you have not prepared yourself.

Outcome 2

Set out and build arches.

You will be assessed in your ability to:

- ◆ produce templates
- ◆ set out and construct arches
- ◆ work in a safe manner at all times
- ◆ meet specifications and tolerances
- ◆ minimise waste and dispose of it in line with procedures

You will be assessed in supervised workshop conditions to specified tolerances contained in an observation checklist. These tolerances should be fully explained and available prior to you commencing the assessment. You will be required to whenever possible work in pairs to complete these assessments. You will receive both oral and written feedback on your performance from the assessor.

There are opportunities to develop the Core Skills of *Communication*, *Numeracy*, *Working with Others* and *Problem Solving* all at SCQF level 5 and *Information and Communication Technology* at SCQF level 4 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.