

SQA Advanced Unit Specification

General information for centres

Unit title: Fire Safety in Buildings

Unit code: HR43 48

Unit purpose: This Unit seeks to provide the candidate with knowledge of the principles of combustion and the key stages in ignition, fire growth, development and decay of fire in buildings. It will also provide the candidate with the knowledge of the measures taken to contain fire and the provision made to allow building occupants to escape the effects of a fire. Skills will also be developed to allow candidates to be able to assess a building for compliance with fire safety legislation.

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

- 1 Explain fire safety theory and prevention measures.
- 2 Describe passive and active measures of fire containment.
- 3 Describe means of escape provision in buildings.
- 4 Appraise development proposals for compliance with current legislation.

Credit points and level: 1 SQA Credit at SCQF level 8: (8 SCQF credit points at SCQF level 8*).

**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 National 1 to Doctorates.*

Recommended prior knowledge and skills: It would be an advantage for candidates to have a basic knowledge of building science building materials and construction. Possession of basic knowledge and understanding may be evidenced by possession of appropriate NC, NQ or SQA Advanced Units.

Core Skills: There are opportunities to develop the Core Skills of Communication, Numeracy, IT and Problem Solving 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 within the subject area of the Group Award to which it contributes.

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Assessment: It is possible to assess candidates either on an individual Outcome basis, combinations of Outcomes or by a single holistic assessment combining all Outcomes. The assessment paper/s should be composed of an appropriate balance of short answer, restricted response and structured questions. Assessment should be conducted under supervised, controlled conditions. A single assessment covering all outcomes should not exceed 3 hours in duration. It should be noted that candidates must achieve all the minimum evidence specified for each Outcome in order to pass this Unit.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the knowledge and/or skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

An exemplar instrument of assessment and marking guidelines have been produced to provide an example of the type of evidence required to demonstrate achievement of the aims of this Unit and to indicate the national standard of achievement at SCQF level 8.

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.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the knowledge and/or skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Throughout the unit emphasis will be placed where appropriate on the application of Health and Safety and Sustainability. Safe working practises should be looked at in accordance with current safety codes of practise and regulations. Sustainability should include reference to criteria affecting sustainability, impact of not implementing sustainability on the environment and the legislation promoting sustainability.

Outcome 1

Explain fire safety theory and prevention measures.

Knowledge and/or skills

- ◆ Fire science
- ◆ Fire safety design
- ◆ Prevention measures

Evidence Requirements

Candidates will need evidence to demonstrate their knowledge and/or skills by showing that they can:

- ◆ explain the factors and principles in the establishment and development of fire
- ◆ describe fire safety design strategies
- ◆ identify fire prevention measures

In any assessment of this Outcome **all** knowledge and/or skills items should be included. Candidates must provide a satisfactory response to all items.

Evidence should be generated through assessment undertaken in controlled, supervised conditions. Assessment should be conducted under closed book conditions and as such candidates should not be allowed to bring textbooks, handouts or notes to the assessment.

Assessment guidelines

Questions used to elicit candidate evidence should take the form of an appropriate balance of short answer, restricted response and structured questions.

The assessment for this Outcome might be combined with that for Outcomes 2 and 3 to form a single assessment paper.

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Outcome 2

Describe passive and active measures of fire containment.

Knowledge and/or skills

- ◆ Passive measures
- ◆ Active measures.
- ◆ Fire service facilities and access requirements

Evidence Requirements

Candidates will need evidence to demonstrate their skills and/or knowledge by showing that they can:

- ◆ describe active and passive measures of fire containment and identify fire service facilities and access requirements

In any assessment of this Outcome **all** knowledge and/or skills items should be included. Candidates must provide a satisfactory response to all items.

Evidence should be generated through assessment undertaken in controlled, supervised conditions. Assessment should be conducted under closed book conditions and as such candidates should not be allowed to bring textbooks, handouts or notes to the assessment.

Assessment guidelines

Questions used to elicit candidate evidence should take the form of an appropriate balance of short answer, restricted response and structured questions.

The assessment for this Outcome might be combined with that for Outcomes 1 and 3 to form a single assessment paper.

Outcome 3

Describe provision for means of escape in buildings.

Knowledge and/or skills

- ◆ Building occupancy
- ◆ Travel distances
- ◆ Rescue
- ◆ Escape lighting

Evidence Requirements

Candidates will need evidence to demonstrate their knowledge and/or skills by showing that they can:

- ◆ identify the requirements and describe the provision for means of escape in a building

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Evidence for the knowledge and /or skills for this Outcome will be provided on a sample basis. In any assessment of this Outcome a minimum of **three out of four** knowledge and/or skills items should be sampled. In order to ensure that candidates will not be able to foresee what items they will be questioned on, a different sample of knowledge/skill items is required each time the Outcome is assessed. Candidates must provide a satisfactory response to all three items.

Evidence should be generated through assessment undertaken in controlled, supervised conditions. Assessment should be conducted under closed book conditions and as such candidates should not be allowed to bring textbooks, handouts or notes to the assessment.

Assessment guidelines

Questions used to elicit candidate evidence should take the form of an appropriate balance of short answer, restricted response and structured questions.

The assessment for this Outcome might be combined with that for Outcomes 1 and 2 to form a single assessment paper.

Outcome 4

Appraise building development proposals for compliance with current legislation.

Knowledge and/or skills

- ◆ Fire Safety Legislation
- ◆ Current Building (Scotland) Regulations
- ◆ Functional Standards Scottish Building Standards Agency Technical Handbooks (non domestic)

Evidence Requirements

Candidates will need evidence to demonstrate their knowledge and/or skills by showing that they can:

- ◆ differentiate between legislation referring to new buildings and existing buildings
- ◆ measure a drawing for compliance with current regulations
- ◆ assess development proposals for compliance with current regulations

In any assessment of this Outcome **all** knowledge and/or skills items should be included. Candidates must provide a satisfactory response to all three items.

Evidence should be generated through assessment undertaken in controlled, supervised conditions. Assessment should be conducted under open book conditions and as such candidates should not be allowed to bring a copy of the Scottish Building Standards Agency Guidance Document for non-domestic buildings to the assessment.

Assessment guidelines

The assessment for this Outcome should be a case study in which the candidate is asked to produce a vetting report on a proposed development for compliance with fire safety legislation.

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Administrative Information

Unit code:	HR43 48
Unit title:	Fire Safety in Buildings
Superclass category:	QJ
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Unit specification: support notes

Unit title: Fire Safety in Buildings

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 provides the candidate with the basic knowledge and understanding of fire safety in buildings. Attention should be paid in the delivery of this Unit to the syllabus content of the other units in the programme, particularly the units: Building Science, Construction Materials and Specifications, Construction Technology 2: Domestic Construction and Construction Technology 3: Industrial Commercial Superstructure.

The opportunity to provide evidence of the achievement of a range of key skills will feature strongly in both formative and summative assessments.

Recommended time allocations to each outcome are given as guidance towards the depth of treatment which might be applied to each topic. This guidance has been used in the design of the assessment exemplar material provided with the Unit.

1 Explains fire safety theory and prevention measures (7 hours)

Fire science:

Ignition sources, triangle of fire, flash point, fire point, spontaneous ignition
Fire growth, conduction, convection, radiation, fire growth curve, fuel load, smoke load

Fire safety design:

Design objectives — life safety and property protection
Tactics — prevention, communication, escape, extinguishment, containment
Traditional and fire engineering approaches

Prevention measures:

Ignition risks — natural, human carelessness, technological failure, deliberate fire raising
Fuel limitation — building fabric characteristics — ignitability, combustibility, fire propagation, surface spread of flame, smoke obscuration, fire resistance.

Fire safety management — fire strategy, audits, action plans

2 Describe passive and active measures of fire containment (5 hours)

Passive measures:

Protection of structural elements and fire resistance — wood, steel, concrete, brick, glass
Compartmentation — compartment walls and floors, subcompartments, protected shafts
Envelope protection

Active measures:

Pressurization, Venting

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Fire service facilities and access:

Facilities — bridgeheads, rising mains, dry risers, wet risers

Access — fire brigade vehicles

3 **Describe means of escape provision in buildings (5 hours)**

Occupancy:

Characteristics — sleeping risk, numbers, mobility, familiarity, response to fire alarm

Travel distances:

Stages — out of room of origin, out of compartment of origin, out of floor of origin, final escape at ground level

Rescue:

Fire Service access, Fire Service water supply and Fire Service facilities

Escape lighting:

BS 5499: Part 1: *Fire safety signs, notices and graphic symbols*

4 **Appraise development proposals for compliance with current legislation. (20 hours)**

Legislation:

Existing buildings — Fire Precautions Act, Fire Precautions (Workplace) Regulations, Health and Safety at Work, etc, Act

New buildings — the Building (Scotland) Act, Building (Scotland) Regulations

Building (Scotland) Regulations:

Section 0 — General

0.1 Introduction and Application

0.7 Measurement

0.9 Building Standards applicable to construction

Functional Standards — Scottish Building Standards Agency Technical Handbooks (non domestic):

Section 2 — Fire

2.0 Introduction

2.1 Compartmentation

2.2 Separation

2.3 Structural protection

2.4 Cavities

2.5 Internal linings

2.6 Spread to neighbouring buildings

2.7 Spread on external walls

2.8 Spread from neighbouring buildings

2.9 Escape

2.10 Escape lighting

2.11 Communications

2.12 Fire Service Access

2.13 Fire service water supply

2.14 Fire Service facilities

2.15 Automatic life safety fire suppression systems

Guidance on the delivery and assessment of this Unit

Since it is important that candidates have a sound understanding of the principles that underpin the planning and co-ordination of design of a construction project, this Unit should be studied early in the first year of a two-year programme in parallel with related technology.

Case studies should be used in order to develop a working knowledge of the design and planning processes used in the construction industry. The unit might usefully involve practitioners to deal with some aspects of the curriculum. Where appropriate, role-play should be encouraged to develop a better understanding of the application and the difficulties that are encountered in the design and the planning of a construction project.

Candidates will usually work individually and should be encouraged to provide oral presentations from their own studies or experiences. During a role-play, candidates would normally work in groups to present scenarios for discussion.

Appropriate attention must be given to health, safety and welfare arrangements and CDM (Construction, Design and Management) Regulations throughout the delivery of this Unit.

It is recommended that evidence for learning outcomes is achieved through well-planned course work, assignments and projects. Assessment may be formative and summative and both may feature as part of the process. Although assessments must be focused on the individual achievement of each candidate, group work and role-play activities may contribute to the assessment. Integrative assignments and project work will help to link this unit with other related Units.

The volume of evidence required for each assessment should take into account the overall number of assessments being contemplated within this unit and the design of the overall teaching programme. In designing the assessment instrument/s, opportunities should be taken to generate appropriate evidence to contribute to the assessment of Core Skills units.

Where available, evidence from the workplace can also be incorporated to enhance the learning outcomes, provided that this evidence is appropriate and authenticated as the candidate's own work. The volume of evidence required for each assessment should take into account the overall number of assessments being contemplated within this unit and the design of the overall teaching programme.

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Opportunities for developing Core Skills

The following grid provides a general guide to opportunities for the development of Core Skills in this Unit. Opportunities for the development of Core Skills at the output level are more fully identified in the Core Skills Signposting Guide.

Core Skill	Outcome 1	Outcome 2	Outcome 3	Outcome 4	Outcome 5
1 Communication					
Reading	3	3	3	3	
Writing	3	3	3	3	
Oral					
2 Numeracy					
Using Number					
Using Graphical Information					
3 IT					
Using Information Technology		3			
4 Problem Solving					
Critical Thinking	3	3	3	3	
Planning and Organising				3	
Reviewing and Evaluating	3	3	3	3	
5 Working with Others					

Open learning

Given that appropriate materials exist this unit could be delivered by distance learning, which may incorporate some degree of on-line support. However, with regard to assessment, planning would be required by the centre concerned to ensure the sufficiency and authenticity of candidate evidence. Arrangements would be required to be put in place to ensure that assessment/s were conducted under controlled, supervised conditions.

Equality and inclusion

This unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website www.sqa.org.uk/assessmentarrangements.

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- 3 Describe means of escape provision in buildings.
- 4 Appraise development proposals for compliance with current legislation.

Evidence that you can satisfy the knowledge and skill elements of this Unit will be obtained by assessment in controlled, supervised conditions to which you will not be allowed to bring textbooks, handouts or notes to the assessment with the exception of Outcome 4 where you will be allowed to use a copy of the Scottish Building Standards Agency Guidance Document for non-domestic buildings during the assessment.