



## National Unit Specification: general information

**UNIT** Electrical Installations in Hazardous Environments and Special Locations (SCQF level 6)

**CODE** F5HF 12

### SUMMARY

This Unit is intended for candidates with little or no prior knowledge of electrical installations in hazardous environments and special locations, but who wish to gain an understanding of the measures to protect personnel and property against the specific increased dangers to be found in such conditions.

The aim of this Unit is to provide the candidate with knowledge of the factors which define a 'hazardous environment' and a 'special location', to identify the 'Codes of Practice' and 'Regulations' relating to these situations.

Candidates will also be able to describe the measures required to reduce the risks to personnel and property when operating electrical equipment and installations in such environments.

This Unit may form part of an National Qualification Group Award or may be offered on a free-standing basis.

### OUTCOMES

- 1 Describe the features of 'hazardous environments' and 'special locations' in relation to electrical installations.
- 2 Outline the main requirements of BSEN60079-14, ATEX Directive 94/9/EC and BS7671, in terms of electrical installations in 'hazardous environments' and 'special locations'.
- 3 Describe the measures required to minimise danger from electrical equipment operating in 'hazardous environments'.
- 4 Describe the BS7671 measures required to minimise danger from electrical installations in 'special locations'.

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#### Administrative Information

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## National Unit Specification: general information (cont)

**UNIT**           Electrical Installations in Hazardous Environments and Special Locations (SCQF level 6)

### RECOMMENDED ENTRY

While entry is at the discretion of the centre, candidates would normally be expected to have attained one of the following or equivalent:

- ◆ Standard Grade Mathematics — Credit Level
- ◆ Standard Grade Technological Studies — Credit Level
- ◆ Standard Grade Physics — Credit Level

### CREDIT VALUE

1 credit at SCQF level 6 (6 SCQF credit points at SCQF level 6\*).

*\*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 is no automatic certification of Core Skills in this Unit.

This Unit provides opportunities for candidates to develop aspects of the following Core Skills:

- ◆ Problem Solving (SCQF level 6)
- ◆ Communication (SCQF level 6)

These opportunities are highlighted in the Support Notes of this Unit Specification.

## **National Unit Specification: statement of standards**

### **UNIT        Electrical Installations in Hazardous Environments and Special Locations (SCQF level 6)**

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**

Describe the features of ‘hazardous environments’ and ‘special locations’ in relation to electrical installations.

##### **Performance Criteria**

- (a) Identify clearly the environmental features which relate to ‘hazardous environments’.
- (b) Describe clearly the potential dangers of electrical installations in ‘hazardous environments’.
- (c) Identify clearly the features which relate to ‘special locations’ as defined in BS7671.
- (d) Describe clearly the potential dangers of electrical installations in ‘special locations’ as defined in BS7671.

#### **OUTCOME 2**

Outline the main requirements of BSEN60079-14, ATEX Directive 94/9/EC and BS7671, in terms of electrical installations in ‘hazardous environments’ and ‘special locations’.

##### **Performance Criteria**

- (a) Outline correctly the requirements of BSEN60079-14, Electrical Installations in Hazardous Areas.
- (b) Outline correctly, the requirements of the ATEX Directive 94/9/EC for hazardous location electrical equipment.
- (c) Outline correctly the requirements of BS7671 Wiring Regulations, in terms of electrical installations in ‘special locations’.

#### **OUTCOME 3**

Describe the measures required to minimise danger from electrical equipment operating in ‘hazardous environments’.

##### **Performance Criteria**

- (a) Describe clearly the measures used to protect electrical equipment operating in explosive environments.
- (b) Describe clearly the principle of ingress protection of equipment.
- (c) Describe clearly the principle of intrinsically safe protection of equipment.

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

**UNIT**        Electrical Installations in Hazardous Environments and Special Locations (SCQF level 6)

### **OUTCOME 4**

Describe the BS7671 measures required to minimise danger from electrical installations in ‘special locations’.

#### **Performance Criteria**

- (a) Outline clearly the BS7671 requirements for installations in locations containing a bath or shower.
- (b) Outline clearly the BS7671 requirements for construction and demolition site installations.
- (c) Outline clearly the BS7671 requirements for installations in agricultural and horticultural premises.

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

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

Written and/or recorded oral evidence should be produced to demonstrate that the candidate has achieved all the Outcomes and Performance Criteria. The evidence should be produced under supervised, controlled conditions.

Candidates should be permitted to use the following documents for reference during the assessment:

- ◆ Wiring Regulations BS7671
- ◆ BSEN60079-14
- ◆ ATEX Directive 94/9/EC

An appropriate form of assessment could be a single, holistic exercise incorporating all the Outcomes and Performance Criteria. Alternatively, a series of assessment exercises may be used to produce evidence for each Outcome or combination of Outcomes. The total assessment time should be no more than 2 hours irrespective of the Assessment approach used.

With regard to Outcome 1:

- ◆ three environmental features of ‘hazardous environments’ be identified
- ◆ two potential dangers of electrical installations in ‘hazardous environments’ to be described
- ◆ three features of ‘special locations’ to be described
- ◆ two dangers of electrical installations in ‘special locations’ to be described

With regard to Outcome 2:

- ◆ three main requirements of BSEN60079-14 to be outlined
- ◆ three main requirements of ATEX Directive 94/9/EC to be outlined
- ◆ three main requirements of BS7671 Wiring Regulations for ‘special locations’ to be outlined

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

### **UNIT**      Electrical Installations in Hazardous Environments and Special Locations (SCQF level 6)

With regard to Outcome 3:

- ◆ two protection measures to be outlined

With regard to Outcome 4:

- ◆ three BS7671 requirements for installations in locations containing a bath or shower to be described
- ◆ three BS7671 requirements for construction and demolition site installations to be described
- ◆ three BS7671 requirements for installations in locations in agricultural and horticultural premises to be described

## **National Unit Specification: support notes**

### **UNIT           Electrical Installations in Hazardous Environments and Special Locations (SCQF level 6)**

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 is an optional Unit within the National Qualification Group Award in Electrical Engineering at SCQF level 6 but may also be offered on a free-standing basis.

This Unit is will raise candidate awareness of the need to provide additional measures to minimise the dangers to personnel and property due to the operation of electrical equipment and installations in ‘hazardous environments’ and ‘special locations’.

The terms ‘hazardous environment’ and ‘special location’ should be clearly defined and the increased dangers when operating electrical equipment and installations should be highlighted.

The measures taken to minimise danger due to these increased risks should be clearly described and candidates should be made aware of the required and recommended practices.

Candidates should be provided with practical examples showing the consequences of non-conformance with the use of these practices and installation methods.

This Unit requires the candidate to study the BS7671 requirements for electrical installations in ‘special locations’ and BSEN60079 part 14 and the ATEX directive 94/9/EC with regard to electrical equipment in ‘hazardous environments’. These documents should set the context within which the Unit should be delivered.

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

Although much of the content of this Unit is of a descriptive nature, it should be delivered in an Electrical Installation environment. This could be in a classroom, laboratory or workshop in which the environmental emphasis is placed on electrical installation systems.

Delivery of the Unit content could utilize relevant industrial case studies, and drawings/layouts and specifications of electrical installations and equipment in special locations and/or hazardous environments. The use of relevant videos or DVD recordings illustrating the dangers of fire, explosion and increased shock due to the special operating conditions should be encouraged

The use of BS7671, BSEN60079 part 14 and the ATEX directive 94/9/EC as working documents should be encouraged and candidates should be given exercises which provide opportunities for them to use the relevant sections of these publications.

Candidates should be encouraged to discuss and debate the various issues raised by the subject content in order that this interaction might stimulate their thought processes and reinforce the learning.

## National Unit Specification: support notes (cont)

### UNIT            Electrical Installations in Hazardous Environments and Special Locations (SCQF level 6)

Case studies, discussion groups and practical exercises are some of the methods which could be used to engage with candidates to emphasise the importance of the topics included in this Unit and to reinforce the appropriate requirements of BS7671, BSEN60079 part 14 and the ATEX directive 94/9/EC.

It is recommended that the Outcomes of this Unit should be delivered in the sequence given in the ‘statement of standards’.

### OPPORTUNITIES FOR CORE SKILL DEVELOPMENT

Aspects of the Core Skill of *Problem Solving*, that is, Critical Thinking and Planning and Organising will be naturally developed in this Unit. Candidates identify and describe the measures required to reduce the risks to personnel and property when operating electrical equipment and installations in hazardous environments. Discussion of videos and industry case studies could develop skills in evaluating the effectiveness of approaches and enhance oral communication skills in a work related context.

Candidates must demonstrate the ability to understand complex legislation, and they could be encouraged to identify and evaluate a range of complex technical information to support underpinning knowledge. Written evidence produced should be accurate, coherent and 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)*.

The assessment of this Unit could take the form of a holistic exercise of short-answer, restricted response or structured questions, covering the Performance Criteria specified in the Unit Outcomes ie:

- ◆ the features of ‘hazardous environments’ and ‘special locations’ in relation to an electrical installation
- ◆ the main requirements of BSEN60079-14, ATEX Directive 94/9/EC and BS7671, in terms of electrical installations in ‘hazardous environments’ and ‘special locations’
- ◆ the measures required to minimise danger from electrical equipment operating in ‘hazardous environments’
- ◆ the BS7671 measures required to minimise danger from electrical installations in ‘special locations’

## **National Unit Specification: support notes (cont)**

### **UNIT           Electrical Installations in Hazardous Environments and Special Locations (SCQF level 6)**

Alternatively, four separate or any combination of exercises, may be produced, to cover all of the Performance Criteria contained within the Outcomes.

The total assessment time for this Unit should be no longer than two hours.

Candidates should be allowed access to the Wiring Regulations BS7671, BSEN60079 part 14 and the ATEX directive 94/9/EC for reference purposes.

### **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)).