



## National Unit Specification: general information

**UNIT** Inspection and Testing of Electrical Installations (SCQF level 5)

**CODE** F5FS 11

### SUMMARY

This Unit is intended for candidates with little or no prior knowledge of inspection and testing of electrical installations but who wish to gain a basic understanding of how such measures are carried out to provide an assurance that electrical systems are fit for purpose and comply with the appropriate regulations.

The aim of this Unit is to raise candidate awareness of the need to inspect and test new electrical installations and/or additions and alterations to these in order to ensure that the work carried out is of a suitable standard and the materials used meet industry recognised requirements.

The candidate will be made aware that electrical installations should comply with the requirements of the Wiring Regulations BS7671 and able to distinguish between the inspection and the testing requirements set out in these regulations.

Candidates will be presented with opportunities to carry out simple inspection and testing exercises on a low voltage electrical installation.

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

### OUTCOMES

- 1 Identify the basic requirements of inspection and testing of low voltage electrical installations.
- 2 Perform a visual inspection on a low voltage electrical installation in terms of the requirements of the BS7671 Wiring Regulations.
- 3 Perform the tests required for a low voltage electrical installation prior to connection of the supply, in terms of the requirements of the BS7671 Wiring Regulations.

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### Administrative Information

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

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### **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 — General Level
- ◆ Standard Grade Technological Studies — General Level
- ◆ Standard Grade Physics/Science — General Level

### **CREDIT VALUE**

1 credit at SCQF level 5 (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 is no automatic certification of Core Skills in this Unit.

The Unit provides opportunities for candidates to develop aspects of the following Core Skill:

- ◆ Problem Solving (SCQF level 5)

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

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

### **UNIT**      Inspection and Testing of Electrical Installations (SCQF level 5)

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**

Identify the basic requirements of inspection and testing of low voltage electrical installations.

##### **Performance Criteria**

- (a) Describe correctly the difference between inspection and testing of electrical installations.
- (b) Identify correctly the items of an electrical installation which require inspection.
- (c) Identify correctly the basic tests to be carried out on an electrical installation.

#### **OUTCOME 2**

Perform a visual inspection on a low voltage electrical installation in terms of the requirements of the BS7671 Wiring Regulations.

##### **Performance Criteria**

- (a) Remove correctly all inspection covers and accessories of the installation.
- (b) Produce a checklist showing all items for visual inspection of the installation.
- (c) Perform a complete visual inspection of the installation.
- (d) Record the inspection results correctly on the checklist and interpret these accurately.

#### **OUTCOME 3**

Perform the tests required for a low voltage electrical installation prior to connection of the supply, in terms of the requirements of the BS7671 Wiring Regulations.

##### **Performance Criteria**

- (a) Identify correctly the tests to be carried out on an installation prior to connection of the supply.
- (b) Identify correctly the test instruments to be used in carrying out the pre-energised installation tests.
- (c) Perform correctly the pre-energised installation tests on the installation in the correct sequence.
- (d) Record correctly the test results and interpret these accurately.

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

### UNIT Inspection and Testing of Electrical Installations (SCQF level 5)

#### EVIDENCE REQUIREMENTS FOR THIS UNIT

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

Performance evidence supplemented with an assessor observation checklist and 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 in a practical environment throughout the duration of the Unit.

An appropriate form of assessment could be a single, holistic practical assignment which incorporates all the Outcomes and Performance Criteria.

Candidates should be presented with a low voltage electrical installation which includes wiring (including a ring circuit), accessories (including single-pole switches) joint-box, circuit protection devices, pipes of other services.

From this information the candidate should:

- ◆ remove all inspection covers and accessories of the installation
- ◆ produce a checklist showing all items for visual inspection of the installation
- ◆ perform a visual inspection of the installation
- ◆ record the inspection results on the checklist and interpret these
- ◆ identify the basic tests ('protective conductor continuity', 'ring final circuit continuity', 'insulation resistance' and 'polarity') to be carried out on an installation prior to connection of the supply
- ◆ identify the test instruments to be used in carrying out the pre-energised installation tests
- ◆ perform the 'protective conductor continuity', 'ring final circuit continuity', 'insulation resistance' and 'polarity' tests on the installation in the correct sequence
- ◆ record the test results and interpret these

The presentation of test results should be accompanied by a written or recorded oral report in which the candidate:

- ◆ describes the difference between inspection and testing of electrical installations
- ◆ identifies the items of an electrical installation which require inspection
- ◆ identifies the basic tests to be carried out on an electrical installation

Assessors should use a checklist to record candidate's achievement as they demonstrate the knowledge and skills set out in the Performance Criteria of each Outcome.

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

### **UNIT        Inspection and Testing of Electrical Installations (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**

This is an optional Unit within the National Certificate in Electrical Engineering at SCQF level 5. This Unit can also be delivered on free-standing basis.

This Unit is will raise candidate awareness of the need to inspect and test new electrical installations and/or additions and alterations to these in order to ensure that the work carried out is of a suitable standard and the materials used meet industry recognised requirements.

The dangers of using electrical energy should be highlighted along with the need to ensure that wiring systems are installed to a high standard of workmanship using the proper materials. Also that the installation meets the requirements of BS 7671 with regard to inspection and testing.

Candidates should be provided with practical examples showing the consequences of bad workmanship and materials in electrical installations.

Although the Unit content does not require detailed study of the BS7671 requirements, these should set a context within which the Unit should be delivered.

A distinction should be made between the ‘Inspection’ and the ‘Testing’ aspects of the content and candidates should be given opportunities to practice both these requirements on an actual low voltage installation. It is not intended that the inspection and testing exercises be carried out on a ‘real’ installation but that a dedicated ‘Test and Inspection’ board be used for this purpose.

Having obtained results from the inspection and test exercises, candidates should be made aware of the expected results and be able to interpret their results with acceptable values.

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

This Unit should be delivered in a practical environment having appropriate test equipment and should encourage candidates to become familiar with the techniques and terminology of Inspection and Testing.

Candidates should be presented with a test and inspection board having all the relevant components to allow them to participate fully in the exercise. The inspection and testing exercises should be based on the requirements of BS7671 although candidates should not be expected to study this in any great depth.

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 reinforce the appropriate requirements of BS7671.

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

## **UNIT      Inspection and Testing of Electrical Installations (SCQF level 5)**

The Outcomes should be delivered in the sequence given in the ‘statement of standards’. The practical aspects of these Outcomes should be demonstrated to candidates with the reasons for particular techniques being fully explained. Candidates should then be given opportunities to practice these techniques as appropriate.

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

*Problem Solving* skills will be naturally developed and enhanced as candidates undertake inspection and testing of electrical installations. Candidates have to apply their knowledge and understanding of regulations to identify and take account of requirements for safety and best working practice. They must complete inspections and tests efficiently, recording results to current industry standards. Group discussion during formative work could encourage review and evaluation of the effectiveness of approaches taken.

### **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 ‘Practical Assignment’ which extends over the duration of the Unit.

This assignment could contain the three elements specified in the Unit Outcomes ie:

- ◆ identification of the basic requirements of inspection and testing of low voltage electrical installations
- ◆ visual inspection exercise on a low voltage electrical installation
- ◆ testing of a low voltage electrical installation prior to connection of the supply

These three elements could be integrated into one practical assignment with the achievements of each element being clearly recorded for each candidate.

The practical assignment could be conducted in a workshop environment under supervised and controlled conditions.

Candidates should be allowed access to the Wiring Regulations BS7671 for reference purposes.

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

**UNIT**      Inspection and Testing of Electrical Installations (SCQF level 5)

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