



## National Unit Specification: general information

**UNIT** Inspection and Testing of Electrical Installations (SCQF level 6)

**CODE** F5FT 12

### SUMMARY

This practically-based Unit is suitable for candidates with little or no prior knowledge of inspection and testing of electrical installations but who wish to gain an 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 in order to ensure that the work undertaken and the materials used meet industry recognised standards.

The candidate will study the requirements of the Wiring Regulations BS7671 in relation to inspection and testing and able to distinguish between these as set out in the Regulations.

On successful completion of this Unit candidates will recognise the different forms of documentation and reports provided in BS7671 and will carry out inspection and testing procedures and complete the appropriate documentation.

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

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### Administrative Information

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## National Unit Specification: general information (cont)

**UNIT**      Inspection and Testing of Electrical Installations (SCQF level 6)

### OUTCOMES

- 1 Identify the inspection items and tests to be carried out on low voltage electrical installations in compliance with BS7671.
- 2 Perform a visual inspection exercise on a low voltage electrical installation to the requirements of the BS7671 Wiring Regulations and interpret the results.
- 3 Perform the tests required for a low voltage electrical installation both before and after connection of the supply, in terms of the requirements of the BS7671 Wiring Regulations and interpret the results.
- 4 Complete the appropriate inspection and test documentation as provided in the BS7671 Wiring Regulations.

### 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 Technology — Credit level
- ◆ Standard Grade Science — Credit level
- ◆ NQ Unit *Inspection and Testing of Electrical Installations* (SCQF level 5)

### 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.

The 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        Inspection and Testing of Electrical Installations (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**

Identify the inspection items and tests to be carried out on low voltage electrical installations in compliance with BS7671.

##### **Performance Criteria**

- (a) State correctly the impact of good workmanship and proper materials on electrical installations.
- (b) State correctly the difference between the inspection and the testing of electrical installations.
- (c) Identify correctly the items of an electrical installation, listed in BS7671, which require inspection.
- (d) Identify correctly and in the correct sequence, the pre and post connection-of-supply tests to be
- (e) carried out on an electrical installation as listed in BS7671.

#### **OUTCOME 2**

Perform a visual inspection exercise on a low voltage electrical installation to the requirements of the BS7671 Wiring Regulations and interpret the results.

##### **Performance Criteria**

- (a) Remove correctly all inspection covers and accessories of the installation.
- (b) Perform a complete visual inspection of the installation, in terms of the standard checklist provided.
- (c) Record the inspection results on the checklist and interpret these correctly.

#### **OUTCOME 3**

Perform the tests required for a low voltage electrical installation both before and after connection of the supply, in terms of the the requirements of the BS7671 Wiring Regulations and interpret the results.

##### **Performance Criteria**

- (a) Identify correctly the pre and post connection-of-supply tests to be carried out on an installation to satisfy the requirements of BS7671.
- (b) Identify correctly the test instruments to be used in carrying out the range of installation tests.
- (c) Identify correctly and take the necessary precautions prior to testing the installation.
- (d) Perform correctly and safely the tests required to be carried out on an electrical installation.
- (e) Record the test results and interpret these correctly.

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

**UNIT**      Inspection and Testing of Electrical Installations (SCQF level 6)

### **OUTCOME 4**

Complete the appropriate inspection and test documentation as provided in the BS7671 Wiring Regulations.

#### **Performance Criteria**

- (a) Identify correctly the requirements of BS7671 in relation to certification and reporting on electrical installations.
- (b) Complete accurately an 'Electrical Installation Certificate'.
- (c) Complete accurately a 'Schedule of Test Results'.

### **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.

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.

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 a range of circuits (including a ring circuit), accessories (including single-pole switches) joint-boxes, a distribution board (including isolation and circuit protection devices), pipes of other services.

From this information the candidate should:

- ◆ remove all inspection covers and accessories of the installation
- ◆ carry out a visual inspection of the installation
- ◆ record the inspection results on the checklist and interpret these against good practice
- ◆ identify the pre and post connection-of-supply tests to be carried out on an installation
- ◆ identify correctly the test instruments to be used in carrying out the range of installation tests
- ◆ identify and take the necessary precautions prior to testing the installation
- ◆ carry out the 'protective conductor continuity', 'ring final circuit continuity', 'insulation resistance', 'polarity', 'earth fault loop impedance', 'prospective fault current' and functional tests on the installation
- ◆ record the test results and interpret these correctly against ideal values

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

### **UNIT**      Inspection and Testing of Electrical Installations (SCQF level 6)

The inspection and test results should be presented in the form of documentation to meet the requirements of BS7671 ie:

- ◆ an 'Electrical Installation Certificate'
- ◆ a 'Schedule of Test Results'

These documents should be accompanied by a written or recorded oral report in which the candidate:

- ◆ describe the impact of good workmanship and proper materials on electrical installations
- ◆ describes the difference between inspection and testing of electrical installations
- ◆ identifies the items of an electrical installation which require inspection
- ◆ identifies, in sequence, the tests to be carried out on an electrical installation

Note: Assessors **MUST** ensure that it is safe to connect the voltage supply for the post-connection tests and that these are carried out in a safe manner. A high level of candidate supervision is required during these tests.

The Assessment Support Pack for this Unit provides sample assessment material. Centres wishing to develop their own assessments should refer to the Assessment Support Pack to ensure a comparable standard.

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

### **UNIT      Inspection and Testing of Electrical Installations (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 a restricted core Unit within the National Qualification Group Award in Electrical Engineering at SCQF level 6 but can also be offered on a free-standing basis.

This Unit 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 BS7671 with regard to inspection and testing.

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

This Unit requires the candidate to study the BS7671 requirements with respect to inspection and testing, and to interpret these requirements in carrying out the inspection and test procedures. This should set the 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 'Inspection and Test' board be used for this purpose.

Candidates should also be provided with copies of the relevant inspection and testing documentation and should complete these after obtaining their inspection and test results.

Note: Tutors MUST ensure that it is safe to connect the voltage supply for the post-connection tests and that these are carried out in a safe manner. A high level of candidate supervision is required during these tests.

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

This Unit should be delivered in a practical environment and should encourage candidates to become familiar with the techniques and terminology of inspection and testing of electrical installations.

Candidates may be presented with an inspection and test board or an installation from one of the practical Units 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 and candidates should be expected to study and interpret these.

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

## **UNIT      Inspection and Testing of Electrical Installations (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 reinforce the appropriate requirements of BS7671.

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. A complex range of issues has to be examined and considered in depth to assure safety and to complete tests efficiently to current industry standards. Group discussion of approaches taken to the process could encourage candidates to review and evaluate the process and also to develop their oral Communication skills in a workplace environment.

Access to and evaluation of complex technical literature and current information, including health and safety requirements, should provide and support underpinning knowledge and understanding. The interpretation of complex technical information, including BS7671 requirements, and the need to translate it into practical inspection and testing exercises, will involve opportunities to develop both written and oral communication skills contextualised to workplace needs. Although skills in communication are not formally assessed candidates should be expected to present written responses accurately and objectively, using correct terminology and appropriate tone and style.

### **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 should take the form of a ‘Practical Assignment’ which extends over the duration of the Unit.

This assignment could contain the four elements specified in the Unit Outcomes ie

- ◆ identification of the inspection items and tests to be carried out on the installation
- ◆ a visual inspection exercise on the installation
- ◆ performing the tests required for the electrical installation
- ◆ completion of the appropriate inspection and test documentation

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

### **UNIT**      Inspection and Testing of Electrical Installations (SCQF level 6)

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

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

Note: Assessors **MUST** ensure that it is safe to connect the voltage supply for the post-connection tests and that these are carried out in a safe manner. A high level of candidate supervision is required during these tests.

Candidates should be allowed access to the Wiring Regulations BS7671 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)).