National Unit Specification: general information

UNIT Installation of PVC Sheathed Wiring Systems (SCQF level 5)

CODE F5HW 11

SUMMARY

This Unit is intended for candidates with little or no prior knowledge of PVC sheathed wiring systems but who wish to gain some experience in the installation of these with a view to developing their skills in terms of a career choice.

The aim of this Unit is to introduce candidates to PVC sheathed wiring systems. They will be able to identify the various types and sizes of PVC sheathed cables and accessories and to demonstrate the correct techniques of measuring, cutting, bending, fixing and terminating PVC sheathed wiring systems to given specifications.

Candidates will install multi-core PVC cables on various surfaces to produce a simple one-way controlled lighting circuit and ring circuit of 13A socket-outlets.

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

OUTCOMES

1 Identify multi-core PVC sheathed cables and their accessories.
2 Install and operate a simple one-way lighting circuit using multi-core PVC sheathed cables.
3 Install and operate a ring circuit of 13A socket-outlets using multi-core PVC sheathed cables.

Administrative Information

Superclass: XJ

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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 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.

This 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

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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 multi-core PVC sheathed cables and their accessories.

Performance Criteria

(a) Identify correctly twin and three-core PVC sheathed cables (with c.p.c.) of various sizes.
(b) Identify correctly accessories used with PVC sheathed wiring systems.
(c) Identify correctly the colour coding of cores in multi-core PVC sheathed cables.

OUTCOME 2

Install and operate a simple one-way lighting circuit using multi-core PVC sheathed cables.

Performance Criteria

(a) Draw clearly and correctly the wiring diagram for a one-way lighting arrangement, using multi-core PVC cables, from a given circuit diagram.
(b) Install correctly a one-way lighting arrangement using multi-core PVC sheathed cables.
(c) Terminate accurately electrical accessories to the wiring of a one-way lighting circuit.
(d) Operate a one-way lighting circuit in a safe and correct manner.

OUTCOME 3

Install and operate a ring circuit of 13A socket-outlets using multi-core PVC sheathed cables.

Performance Criteria

(a) Draw clearly and correctly the wiring diagram for a ring circuit of 13A socket-outlets, using multi-core PVC sheathed cable, from a given circuit diagram.
(b) Install correctly a ring circuit of 13A socket-outlets, using multi-core PVC sheathed cables.
(c) Terminate accurately electrical accessories to the wiring of a 13A socket-outlet ring circuit.
(d) Operate a 13A socket-outlet ring circuit in a safe and correct manner.

National Unit Specification: statement of standards (cont)

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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 an 'installation specification' giving the requirements for the installation of a one-way controlled lighting circuit and a ring circuit of 13A socket-outlets using multi-core PVC cable. Circuit diagrams should be included in the specification, these being for the lighting circuit, having one light controlled by a one-way switch, and the ring circuit having five twin 13A switched socket-outlets. The specification should also show the lighting circuit to be installed on a wooden surface and the ring circuit.

The wiring system should be connected to the energy supply through a consumer's Unit having appropriate circuit protection.

The assessment parameters are as follows:

With regard to Outcome 1:

- five sizes of twin and three-core PVC sheathed cables (with c.p.c.) should be identified, including the identification of cores by their colour
- ten accessories used with PVC wiring systems should be identified

With regard to Outcome 2:

- draw an appropriate wiring diagram for the one-way lighting control arrangement from the circuit diagram provided
- carry out a wiring exercise, to given dimensions, to install the lighting circuit using multi-core PVC cables onto a wooden surface
- terminate the wiring into the appropriate accessories and have the lecturer test the wiring installations and connect the supply voltage
- operate the lighting control switch to ensure correct operation of the circuit

With regard to Outcome 3:

- draw an appropriate wiring diagram for the 13A socket-outlet ring arrangement from the circuit diagram provided
- carry out a wiring exercise, to given dimensions, to install the ring circuit using multi-core PVC cables
- terminate the wiring into the appropriate accessories and have the lecturer test the wiring installations and connect the supply voltage
- connect an appliance to the socket-outlets, using a plug-top connection, and ensure correct operation of the circuit

National Unit Specification: support notes

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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 a free-standing basis.

The aim of this Unit is to introduce candidates to multi-core PVC sheathed cables as a means of providing an electrical wiring installation for lighting and socket-outlet circuits in premises. It will allow candidates to develop their wiring and terminating skills using multi-core PVC cable systems.

The Unit will enable candidates to identify types and sizes of PVC sheathed cables and their accessories and to develop various installation skills and techniques.

It will also introduce candidates to circuits including a simple lighting circuit having one-way control, and a ring circuit of 13A switched socket-outlets, which they will install in a safe manner using multi-core PVC cables on wooden and/or brick/block surfaces as appropriate.

The lecturer MUST ensure that the candidate works safely at all times and that the wiring arrangements have been tested and are correct, prior to energising the circuit.

This Unit has links with the technology Units in the National Certificate in Electrical Engineering at SCQF level 5 and may be delivered as part of the suite of ‘Wiring System’ Units.

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 terminology of multi-core PVC wiring systems.

Candidates should be provided with opportunities to become familiar with ‘specifications’ for basic multi-core PVC sheathed wiring installations and the transfer of this information into practical systems.

Opportunities should be provided to allow candidates to develop their practical skills in measuring, cutting, stripping, bending and terminating PVC sheathed cables and installing the wiring systems to given dimensions.

This practical approach should be continued to allow candidates to develop their skills in reading and interpreting circuit diagrams and how these are translated into wiring arrangements which are capable of being installed.

Candidates should be able to identify the hand tools used in the installation of multi-core PVC sheathed wiring systems and be taught the correct use of hand tools in this context.

It is important that all THREE Outcomes of this Unit are delivered in a practical manner which develops the candidate’s hand and assembly skills and an understanding of circuit and wiring diagrams and how these are brought together in a PVC sheathed wiring system.

National Unit Specification: support notes (cont)

UNIT Installation of PVC Sheathed Wiring Systems (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.

Lecturers MUST always ensure that candidates work in a safe manner and the Health and Safety workshop procedures of the Centre should be continually emphasized and implemented.

Lecturers MUST also ensure that they have inspected and tested ALL circuit wiring produced by candidates in accordance with the requirements of BS7671 and that circuits are connected to the supply voltage only after these conditions have been satisfied.

It is recommended that the supply voltage used to energise candidate circuits is of a suitable safe value and that the connection of this voltage is carried out by the Lecturer.

OPPORTUNITIES FOR CORE SKILL DEVELOPMENT

Aspects of the Core Skill of *Problem Solving*, that is, critical thinking, planning and organising and reviewing and evaluating, will be naturally developed in this Unit, which requires the interpretation of an installation specification. PVC sheathed wiring systems have to be installed on the required surface type in the appropriate position. Selecting the tools and techniques and demonstration of safe working practice as the task is completed is essential. Discussion and review of approaches taken during practical work will help to develop skills in evaluation.

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 Exercise' which extends over the duration of the Unit.

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

- identification of multi-core PVC sheathed cables and accessories
- installation and operation of a simple lighting circuit
- installation and operation of a ring circuit of socket outlets

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

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

National Unit Specification: support notes (cont)

UNIT Installation of PVC Sheathed Wiring Systems (SCQF level 5)

The Health and Safety of candidates must be paramount at all times and the lecturer must be responsible for ensuring that all wiring carried out for assessment purposes is of a sufficiently high standard that it meets all the necessary BS7671 requirements prior to connection of the supply voltage.

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**