



National Unit Specification: general information

UNIT Diagnosing and Rectifying Faults in Plant and Equipment: An Introduction (SCQF level 6)

CODE F8T9 12

SUMMARY

This Unit provides candidates an introduction to diagnosing and rectifying faults in plant and equipment used in construction and allied industries, plant hire and tool hire industries. It will develop the candidate's understanding of the types of diagnostic tests to be carried out, the equipment involved and procedures to be followed.

On completion of this Unit candidates will be able to select and calibrate the correct instruments, conduct testing and analysis of results. This Unit is suitable for candidates working towards a Modern Apprenticeship in the Construction Craft Occupations suite.

OUTCOMES

- 1 Establish requirements for carrying out testing of plant and equipment following repair.
- 2 Carry out tests on plant or equipment.
- 3 Analyse and interpret the results of tests on plant or equipment.

RECOMMENDED ENTRY

Entry is at the discretion of the centre.

CREDIT VALUE

2 credits at SCQF level 6 (12 SCQF credits at 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.*

Administrative Information

Superclass: TK

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National Unit Specification: general information (cont)

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CORE SKILLS

Opportunities to develop aspects of Core Skills are highlighted in the Support Notes of this Unit Specification.

There is no automatic certification of Core Skills or Core Skill components in this Unit.

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

Establish requirements for carrying out testing of plant and equipment following repair.

Performance Criteria

- (a) Interpret accurately the engineering test specification for the plant or equipment.
- (b) Select the appropriate tools and equipment for the task.
- (c) Following manufacturer's procedures, calibrate all test instruments correctly.
- (d) Select appropriate personal protective equipment (PPE) for the specified task, in accordance with organisational requirements.

OUTCOME 2

Carry out tests on plant or equipment.

Performance Criteria

- (a) Set up appropriate tests according to organisational and manufacturer's procedures.
- (b) Conduct tests of performance and condition of plant or equipment.
- (c) Conduct tests in accordance with relevant quality standards, statutory requirements and Codes of Practice.
- (d) Complete the tests within the agreed time.
- (e) Accurately record the results of tests in the appropriate format.
- (f) Review test results against the engineering test specification.
- (g) Where appropriate, repeat tests.

OUTCOME 3

Analyse and interpret the results of tests on plant or equipment.

Performance Criteria

- (a) Gather and collate all necessary test data on which to perform analysis.
- (b) Where necessary and using appropriate techniques and procedures resolve inconsistencies in the data.
- (c) Analyse the data using approved methods and procedures.
- (d) Check the data analysis is accurate and takes into consideration the test conditions and previous service history.
- (e) Compare the analysis against the manufacturer's technical data and specifications.
- (f) Identify faults or variations from the plant or equipment specification.
- (g) Determine the implications of the fault for other work and for safety considerations.
- (h) Record and report test results according to organisational and legislative requirements.

National Unit Specification: statement of standards (cont)

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EVIDENCE REQUIREMENTS

Candidates are required to produce evidence to confirm that they have achieved all Outcomes and Performance Criteria outlined in this Unit.

Performance evidence is required to demonstrate the candidate has achieved the standard specified in the Outcomes and Performance Criteria for Outcomes. Performance evidence must be supplemented with an assessor observation/operational checklist and produced at an appropriate interval in training, under supervised conditions, once the candidate has developed the necessary skills and knowledge required to carry out the work.

Performance evidence should be demonstrated by the candidate conducting **one** of the following tests:

- ◆ diagnostic
- ◆ functional
- ◆ operational
- ◆ statutory
- ◆ monitoring
- ◆ substitution and elimination

On **one** of the following types of system:

- ◆ auxiliary (suspension, steering, braking)
- ◆ electronics
- ◆ hydraulics
- ◆ pneumatics
- ◆ power units
- ◆ transmission

On **three** of the following types of equipment:

- ◆ wheeled plant
- ◆ tracked plant
- ◆ static plant
- ◆ portable plant
- ◆ power tools
- ◆ attachments
- ◆ ancillary equipment

As part of the assessment for this Unit, the candidate will also submit written product evidence such as a works checklist or completed risk assessment form. Oral evidence of knowledge and understanding may be demonstrated by the candidate during practical assignments set for all Outcomes and noted at the time by the observer.

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 length allocated to this Unit is at the discretion of the centre, the notional design length is 80 guided learning hours.

GUIDANCE ON THE CONTENT AND CONTEXT FOR THIS UNIT

The Outcomes and Performance Criteria for this Unit can be demonstrated by the candidate knowing how to conduct **one** of the following tests:

- ◆ diagnostic
- ◆ functional
- ◆ operational
- ◆ statutory
- ◆ monitoring
- ◆ substitution and elimination

On **one** of the following types of system:

- ◆ auxiliary (suspension, steering, braking)
- ◆ electronics
- ◆ hydraulics
- ◆ pneumatics
- ◆ power units
- ◆ transmission

On **three** of the following types of equipment:

- ◆ wheeled plant
- ◆ tracked plant
- ◆ static plant
- ◆ portable plant
- ◆ power tools
- ◆ attachments
- ◆ ancillary equipment

The content and context of *Diagnosing and Rectifying Faults in Plant and Equipment: An Introduction* has been set at an introductory level so that the candidate can develop a basic knowledge and ability in diagnosing and rectifying faults in plant or equipment following repair within a construction environment.

Health and Safety are vital to working practices within the construction industry and therefore, emphasis will be placed wherever appropriate during the delivery of this Unit on the correct application of Health and Safety principles and processes, in accordance with current codes of practice and legislation.

National Unit Specification: support notes

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GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

These notes are for guidance purposes only, and are not to be considered as a complete training package for centres to follow.

Opportunities for integrated delivery of this Unit may be possible with all mandatory Units.

The introductory training for this Unit should take place in a separate training area independent of the productive work environment and using dedicated equipment and resources. This should cover theoretical and practical principles before any practical application of knowledge is carried out by candidates.

Delivery of this Unit will be focused on enabling candidates to develop the knowledge required to diagnose and rectify faults in plant and equipment following repair safely before they are given the opportunity to do so within the workplace environment. Candidates should learn and be encouraged to communicate the theories and principles behind good testing techniques. Delivery of this Unit should also ensure candidates learn about different materials, are able to use correct terminology and understand the correct tools, equipment and materials to be used for specified systems, before any practical work takes place. Emphasis will also be placed on the importance of candidates accurately understanding and interpreting the information provided within work specifications and drawings.

During delivery of the practical components of this Unit, candidates should understand the importance of ensuring good visibility at all times when operating tools and machinery. Candidates should also know to adhere to relevant Health and Safety regulations and legislation relating both to working practices within the construction environment, as well as those specific to any practical task they are requested to carry out (such as emphasising the importance of selecting and using the correct PPE at all times).

E-learning approaches may be appropriate to help tailor delivery to suit the individual needs or learning styles of candidates. This might include, for example, encouraging learners to use electronic resources to conduct research into a specific knowledge area.

OPPORTUNITIES FOR CORE SKILL DEVELOPMENT

Candidates will be need to apply the Core Skill of *Numeracy* (SCQF level 4) when interpreting the measurements and other information provided in the work drawings and specification (Outcomes 1 and 2). The interpretation of work specifications and drawings will also require candidates to think critically, plan and organise the task accordingly — key aspects of the Core Skill of *Problem Solving* (SCQF level 4).

The opportunity for the Core Skill *Working with Others* (SCQF level 4) will be provided as candidates ensure the safety of others as they comply with codes of practice and working regulations (all Outcomes). Throughout this Unit, candidates will be expected to develop the Core Skill of *Communication* (SCQF level 4) within the work environment, for example to inform others of any safety considerations, using the correct terminology and a tone appropriate to the workplace environment. In addition, assessment processes may provide candidates with the opportunity to develop their Written Communication skills.

National Unit Specification: support notes (cont)

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GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

Centres may use the Instruments of Assessment they consider to be most appropriate, and the following notes are given as guidance only.

Opportunities for integrated assessment of this Unit may be possible with all mandatory Units.

Underpinning knowledge of confirming the occupational work method should be assessed before any practical assignments are carried out by candidates. This will include assessment of a candidate's ability to select the correct equipment and techniques for a specified task. Assessment of practical performance should take place under supervised conditions and confirm a candidate's ability to confirm the occupational work method using the correct techniques and accessories, whilst adhering to Health and Safety regulations and legislation.

For Outcomes 1 and 2, candidates may be assessed by centres setting a series of technical or theoretical questions designed to ensure candidates have developed the required standard of knowledge for this Unit. Any oral responses given by candidates will be recorded by an observer at the time of assessment — this may be an appropriate method when the candidate carries out any practical assignments.

Outcomes 2 and 3 may be assessed by centres setting candidates a series of appropriate practical assignments carried out under supervised conditions and recorded in an assessor's observation/operational checklist. Practical assignments undertaken by a candidate will be assessed according to their ability to carry out the task safely, using appropriate machinery according to manufacturer's guidelines.

Adherence to appropriate working regulations and Health and Safety procedures will be observed during the practical exercise carried out by the candidates towards all Outcomes.

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 Communication 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)*.

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