

National Unit Specification: general information



UNIT Land-based Engineering: General Ground Care Machinery (SCQF level 6)

CODE F91J 12

SUMMARY

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

This largely practical Unit is designed to provide candidates with knowledge, understanding and skills to assess and maintain general ground care machinery. During the delivery of this Unit candidates will learn the purpose of general ground care machinery. They will develop the knowledge and skills to understand the working principles of general ground care machinery.

Candidates will develop practical skills and safe working practices while assessing serviceability and maintaining general ground care machinery.

This Unit is suitable for candidates training to be horticultural service engineers or technicians but may also be delivered to candidates who are being introduced to general ground care machinery for the first time.

OUTCOMES

- 1 Describe the purpose, layout and working principles of general ground care machinery
- 2 Demonstrate the techniques required to assess and record the serviceability of general ground care machinery.
- 3 Demonstrate the techniques required to maintain the serviceability of general ground care machinery

Administrative Information

Superclass: SK

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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 some knowledge and experience of working in a practical engineering environment where ground care machinery has been used would be an advantage. Candidates would normally be expected to have attained one of the following, or equivalent:

- ◆ Power Units at SCQF level 5
- ◆ Small Engine Powered Machines at 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 may be opportunities to develop the following Core Skills:

- ◆ Communication (SCQF level 5)
- ◆ Numeracy (SCQF level 5)
- ◆ ICT (SCQF level 5)
- ◆ Working with Others (SCQF level 5)
- ◆ Problem Solving (SCQF level 5)

There is no automatic certification of Core Skills 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

Describe the purpose, layout and working principles of general ground care machinery.

Performance Criteria

- (a) State correctly the purpose of general ground care machinery.
- (b) Describe correctly the operational layout of general ground care machinery.
- (c) Describe correctly the working principles of general ground care machinery.

OUTCOME 2

Demonstrate the techniques required to assess and record the serviceability of general ground care machinery.

Performance Criteria

- (a) Correctly assess the serviceability of the machines
- (b) Complete an inspection report in accordance with current industrial practice.
- (c) Carry out all serviceability inspections in accordance with safe working procedures and recognised industry practices.

OUTCOME 3

Demonstrate the techniques required to maintain the serviceability of general ground care machinery.

Performance Criteria

- (a) Service general ground care machines according to manufacturers' recommendations and in compliance with current safe working practices.
- (b) Repair/overhaul a variety of general ground care machines in accordance with manufacturers' recommendations and in compliance with current safe working practices.
- (c) Test the serviced general ground care machines in accordance with manufacturers' recommendations and in compliance with current safe working practices.
- (d) Accurately complete a job card for one machine in a time and standard in accordance with manufacturer's specifications and standards.

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.

Written and/or recorded oral, product and performance evidence supplemented with an assessor observation checklist(s) should be produced to demonstrate that a candidate has achieved all Outcomes and Performance Criteria.

Outcome 1 may be assessed on an individual basis. Outcomes 2 and 3 may be assessed together.

Outcome 1 (Written and/or Recorded Oral Evidence)

The total time for Outcome 1 assessment should not exceed 1 hour. The assessment should be carried out under supervised, closed-book conditions.

With regard to Outcome 1

- ◆ candidates must correctly state the purpose of 4 machines from the suggested list of general ground care machinery, from the following list:
 - ploughs
 - non-powered cultivators
 - powered cultivators rotary cultivators
 - horizontal and horizontal axis types
 - plant establishment equipment
 - hedge-cutters/trimmers
 - knapsack sprayers
 - tractor-mounted blowers shredders
- ◆ candidates must correctly describe the constructional layout of 4 machines from the suggested list above
- ◆ candidates must correctly describe the working principles of 4 machines from the suggested list above

Outcome 2 and 3 (Written and/or Recorded Oral Evidence)

Centres may choose to integrate the assessment of Outcome 2 and 3 so that there is a logical flow to assessment. The candidate on completion of assessing serviceability of the machine should be able to proceed with the repairs/overhaul of the machine indentified from the serviceability assessment of Outcome 2.

Assessment of Health and Safety and safe working practice in Outcomes 2 and 3 must be integrated into the practical assessments for these Outcomes.

With regard to Outcome 2

- ◆ candidates must correctly assess the serviceability of 3 listed general ground care machinery
- ◆ candidates must correctly complete an inspection sheet for the 3 machines inspected

National Unit Specification: statement of standards (cont)

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Outcome 3

With regard to Outcome 3.

- ◆ candidates must correctly service 3 of the listed general ground care machinery
- ◆ candidates must correctly complete one repair/overhaul worksheet/job-card

Candidates must undertake assessment on their own. Assessment must be conducted under supervised conditions.

An observation checklist must be used to record whether candidates have satisfied all the Performance Criteria in the Outcome or not and include the assessment of the Health and Safety and safe working practice.

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 Unit forms part of a National Qualification Group Award in Land-based Engineering at SCQF level 6, but may also be offered on a free standing basis.

The aim of this Unit is to allow candidates to develop a basic knowledge, understanding and skills in the repair and maintenance of general ground care machinery. On successful completion of the Unit candidates will be able to understand the functional purpose of a range of general ground care machinery. They will also have developed the knowledge and skills to describe the operating principles of a range of general ground care machinery. Candidates should be encouraged to represent the operational drivelines using appropriate manufacturers' symbols.

Candidates will be able to assess the serviceability of the machines to accepted industry standards and will have developed the skills to maintain a range of general ground care machinery.

Outcome 1

Candidates should be encouraged to learn how to interpret drivelines in the range of general ground care machinery. Machines could include, ploughs, non-powered cultivators, powered cultivators rotary cultivators, horizontal and horizontal axis types, plant establishment equipment, hedge-cutters/trimmers, knapsack sprayers, tractor-mounted blowers shredders.

Candidates should be instructed in the skills to set-up machines where applicable for field operation in compliance with manufacturers' instructions.

Outcome 2

Candidates should learn how to look for faults logically and systematically following the drive line which was constructed in the assessment for Outcome 1. An emphasis should be placed on the candidate's ability to identify the cause of the fault.

Outcome 3

Candidates should learn how to service, repair/overhaul a range of general ground care machinery.

Centres are encouraged to integrate the delivery of Outcomes 2 and 3 as far as possible so that there is a logical flow in assessing serviceability, ie fault finding to rectifying faults. In Outcomes 2 and 3 the application of good Health and Safety procedures and practices should be emphasised during the inspection for serviceability, repairing and testing of the machines.

For candidates in employment, machines may be related and represent a candidate's work environment and be representative of the actual machines found at a candidate's place of work.

National Unit Specification: support notes (cont)

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Health , Safety and the Environment

As Outcomes 2–3 require candidates to practically service and repair equipment either onsite or in workshop situations, it is strongly recommended that candidates are inducted into current legislation, regulation and safe working procedures and practices before starting practical work.

A safe system of work should be established in line with the Health, Safety and the Environment Unit guidelines while taking cognisance of the candidate's previous experience and abilities prior to the commencement of practical activities. The storage and handling of materials and methods of disposal of waste materials produced during the servicing of land-based equipment should comply with current legislation and good practice. Health, safety and environmental issues associated with this Unit **should be taught with the subject topics and not separately** in the Land-based Engineering: Health, Safety and the Environment Unit.

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

It is recommended that the Unit be delivered in the same sequence the Outcomes are presented in the National Unit Specification: statement of standards section of the Unit. The Unit may be delivered by a combination of lectures and candidate access to the Internet for Outcome 1.

It is also recommended that a range of general ground care machines should be demonstrated to the candidates for Outcome 1.

Manufacturers' literature provides product information for the user and is suitable for Outcome 1. The Internet contains a rich source of materials on general ground care machinery. Manufacturers' web sites can offer video presentation to support the literature. Manufacturers provide DVD/CDs for users and are useful sources of learning.

For Outcomes 2 and 3 it is recommended that the Unit be delivered in a service engineering workshop environment which is representative of current industry standards

OPPORTUNITIES FOR CORE SKILL DEVELOPMENT

Problem Solving

The Critical Thinking component of *Problem Solving* at SCQF level 5 may be developed in Outcomes 1, 2, and 3 while candidates interpret machine drive lines for Outcome 1 and while candidates are involved in comparing component condition and system performance with manufacturers' specifications and fault finding in Outcome 2.

The Planning and Organising component of *Problem Solving* at SCQF level 5 may be developed in Outcome 3 while candidates are involved with practical tasks, as they may need to organise how they allocate resources for the repair tasks.

The Reviewing and Evaluating components will be addressed during report writing at the conclusion of practical activities undertaken in Outcomes 2 and 3.

National Unit Specification: support notes (cont)

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Working with Others

The *Working with Others* Core Skill at SCQF level 5 may be developed in Outcomes 2 and 3 while candidates engage in practical work as they have to interact with their lecturers, support staff and other candidates, for example, while sharing engineering areas, tools and equipment.

The Reviewing Co-operative Contribution at SCQF level 5 may be developed in Outcomes 1, 2 and 3 while candidates engage in practical work as they have to interact with their lecturers, support staff and other candidates, for example; while sharing engineering workshop areas, tools and equipment or in developing a plan and completion of the intended testing, diagnosing and replacement of components on horticultural machinery.

Communication

The Written Communication Core Skill at SCQF level 5 may be developed in Outcome 1 while candidates understand and evaluate manufacturers' descriptions of their machines' operating principles.

Numeracy

The Using Number Core Skill at SCQF level 5 may be addressed in Outcome 1 through calculation involved in the principles of machinery drive lines and in using measurements and assessing the rotational drive speeds of machinery drive systems.

The Using Graphical Information Core Skill at SCQF level 5 may be presented using manufacturers' Power and Torque Graphs.

ICT

The Accessing Information Core Skill at SCQF level 5 may be developed in Outcome 1 through the retrieval of manufacturers' information and data and the use of diagnostic equipment.

The Processing Information Core Skill at SCQF level 5 may be developed in Outcomes 1, 2 and 3 through the presentation of assessments and reports.

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

Health and Safety and Environment Regulation Compliance

Assessment of health, safety and environmental issues associated with this Unit should be cross-matched and assessed in the Land-Based Engineering: Health, Safety and the Environment Unit.

National Unit Specification: support notes (cont)

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Outcome 1

The candidate will complete a written exercise on 4 machines. The exercise will test the candidate's knowledge and understanding in three parts: a) the purpose of the machine b) the working principles of the machine and c) the layout and operational drivelines of the machine.

The assessment exercise will be conducted under closed-book, supervised conditions within a time limit of one hour. Achievement can be decided by the use of a cut-off score.

Outcome 2 and 3

Although Outcome 2 and 3 may be assessed separately there is the opportunity to combine the Outcomes. The candidate may assess the serviceability of a machine and then continue with repairs on the same machine which were identified in the assessment of serviceability. The instrument of assessments for Outcome 2 and 3 therefore could be combined to suit both Outcome 2 and 3.

Outcome 2

Two observation checklists, one for each of Performance Criteria (a) and (c).

The candidate will complete an inspection sheet for each of the 3 machines for PC (b).

Outcome 3

Three observation checklists, one for each of Performance Criteria (a), (b) and (c).

The candidate will complete one repair/overhaul job-card for Performance Criterion (d).

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)*.

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