



National Unit Specification: general information

UNIT Turf Maintenance Machinery (SCQF level 5)

CODE F6TS 11

SUMMARY

The Unit describes the working principles, operation and maintenance of a range of turf and grounds care machinery and compares the performance of selected machinery and equipment.

The Unit is aimed at candidates pursuing a career in sports turf and grounds care and will give them basic knowledge of the use and maintenance of machinery.

OUTCOMES

- 1 Describe internal combustion engines, and other power units, drive paths and working principles of turf maintenance machinery.
- 2 Select and use appropriate machinery for given tasks in sports turf or grounds care.
- 3 Compare specifications and work rates of turf maintenance machinery.

RECOMMENDED ENTRY

Entry is at the discretion of the centre.

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.*

Administrative Information

Superclass: SF

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National Unit Specification: general information (cont)

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CORE SKILLS

Achievement of this Unit gives automatic certification of the following:

Complete Core Skill None

Core Skill component Critical Thinking at SCQF Level 5

There are also opportunities to develop aspects of Core Skills which are highlighted in the Support Notes of this Unit Specification.

National Unit Specification: statement of standards

UNIT Turf Maintenance Machinery (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

Describe internal combustion engines, and other power units, drive paths and working principles of turf maintenance machinery.

Performance Criteria

- (a) Identify and describe internal combustion engines and alternatives used in sports turf machinery.
- (b) Identify and describe drive paths and the drive path components.
- (c) Identify the working principles and components of grass cutting and turf aeration machinery.

OUTCOME 2

Select and use appropriate machinery for given tasks in sports turf or grounds care.

Performance Criteria

- (a) Select machines for a range of turf and grounds care operations.
- (b) Set and adjust machines according to performance requirement.
- (c) Carry out pre-start checks as described in operator manual.
- (d) Identify common starting faults and describe remedies.
- (e) Operate machines correctly adhering to health and safety and industry requirements.
- (f) Complete tasks to accepted industry standards.
- (g) Carry out post-use cleaning and pre-storage checks on turf maintenance machines.
- (h) Store machines according to operator manual requirements.

OUTCOME 3

Compare specifications and work rates of turf maintenance machinery.

Performance Criteria

- (a) Compare specifications and identify differences in turf and grounds care machines used for similar purposes.
- (b) Calculate potential work rates and performance based on differences in specification.

National Unit Specification: statement of standards (cont)

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EVIDENCE REQUIREMENTS FOR THIS UNIT

All relevant operational procedures undertaken in this Unit must adhere to current legislation, regulations, codes of practice and manufacturers' recommendations where appropriate.

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

Outcome 1 — Written and/or recorded oral evidence and Performance evidence

The candidate must:

- ◆ label diagrams
- ◆ name components
- ◆ match components to function.
- ◆ answer a minimum of five short answer questions for each Performance Criteria

Outcome 2 — Performance evidence

Candidates must:

- ◆ select and operate a minimum of three turf maintenance machines
- ◆ set up and adjust machines appropriately
- ◆ carry out pre-start checks
- ◆ identify common starting and operating faults
- ◆ identify solutions for common starting and operating faults
- ◆ complete post-use cleaning and maintenance
- ◆ return machines to store

Observation checklist covering all of the above.

Outcome 3 — Written and/or recorded oral evidence and Performance evidence

The candidate must produce a report which covers the following topics:

- ◆ Selection of machinery for comparison
- ◆ Identification of similarities and differences between machines
- ◆ Use of technical data and specifications to calculate differences in work rate
- ◆ Use of technical data and specifications to calculate differences in performance

Centres must be satisfied that the evidence submitted is the work of individual candidates.

When using Performance Evidence, assessor observation checklists and other assessment records should be maintained and kept up to date to keep track of candidate progress and to provide evidence for internal and external verification purposes.

National Unit Specification: support notes (cont)

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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 is a mandatory Unit of the National Certificate in Greenkeeping, but may also be taken as a free-standing Unit.

This Unit is aligned to the following Lantra, Sector Skills Council's National Occupational Standard (NOS) Units:

- ◆ (CU2) Monitor and Maintain Health and Safety
- ◆ (L27) Use and maintain equipment and machines
- ◆ (CU11) Prepare and operate a tractor with attachments
- ◆ (CU5) Develop personal performance and maintain working relationships

Outcome 1

The principles and operation of a range of turf care machinery can be explored. This could include:

- ◆ Pedestrian operated powered and non-powered machinery
- ◆ Ride-on machines and
- ◆ Towed, mounted or trailed equipment

The internal combustion engine continues to be the major motive power source and various forms are used in the turf care industry. The differences between two stroke and four stroke engines can be described. Fuel options are stated and choices explained. Alternatives to I.C. engines may include electrical power (both battery and mains). Drive paths (the transmission of power from engine or motor to wheels or other driven components such as blades, reels or rollers) can be traced and components identified (chains and sprockets; belts and pulleys; shafts and gears; clutches and hydraulic systems may feature here). The relationship between pulley, sprocket and gear sizes between drive and driven components can be explored in relation to rotation speed. Clutch systems to disengage drive and driven components can be identified.

Outcome 2

Turf maintenance machines may include powered pedestrian operated or ride-on machines for given turf maintenance tasks, eg cutting machines for different sports turf and grounds-care scenarios. The choice may involve trimmer, flail, reciprocating, rotary and reel mowers. Equipment for surface and sub-surface aeration including scarifier, verti-cutter, and equipment for spiking, tining, slitting and hollow coring may also be selected. Other options could include machines for sweeping, blowing, spreading, load carrying and litter management etc.

National Unit Specification: support notes (cont)

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Outcome 3

Many opportunities may be found here to compare and calculate the efficiency of different machines used for the same purpose. Comparisons could include the time taken to work a given area or complete a task, fuel consumption, purchase price, operating and maintenance requirements etc.. Machine specifications may be extracted from advertisers' literature, manufacturers' data sheets or other published or internet sources. Information on cutting and swathe widths, ground speed, power Unit type, engine size and fuel usage, noise levels etc. could be surveyed.

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

Outcome 1

Visits to machinery stores, workplaces and trade shows would give the candidates the opportunity to discover and explore a wide range of turf and grounds care machinery and equipment. Components and working principles can be demonstrated using working and static machines. Diagrams and animations can reinforce learning. Diagrams and sketches may be labelled and components and function can be identified and their purpose explained. Covers and guards may be removed from static exhibits to show workings. This could provide opportunities for candidates to use workshop tools and exhibit safe work practices. The need to use correct terminology to name and describe parts can be encouraged. Differences between components having a comparable function can be identified and their principles explained (eg cutting mechanisms on rotary and reel mowers, engine types, mechanical and hydraulic drive systems etc.) Properties of fuels and alternative power systems (eg I.C. engines and electric motors) can be explored.

Outcome 2

Practical activities to select, prepare and use a range of machinery and equipment. An industry quality standard of work and finish would be expected after practice. Best practice for cleaning and storage would also be demonstrated by candidates. All operations should be completed according to operator manual guidelines and current Health and Safety legislation including up to date risk assessments.

Outcome 3

Candidates can select machines for any greenkeeping or grounds care scenario. They can investigate alternative models that are fit for purpose and can select preferred options from a range of criteria. This gives opportunities for critical examination of advertising literature and machine data. The merits of competing claims can be compared and their relevance discussed in terms of performance, efficiency, 'green' credentials, eg carbon footprint, noise levels, noxious wastes, recyclable disposal etc and convenience. These could be in addition to those outlined in content/context above.

National Unit Specification: support notes (cont)

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OPPORTUNITIES FOR CORE SKILL DEVELOPMENT

In the Unit, candidates may have the opportunity to develop aspects of the following Core Skills:

- ◆ *Communication* (SCQF level 4) through technical information from operator manuals, data sheets and advertising publications.
- ◆ *Numeracy* (SCQF level 4) will be required to evaluate machine efficiency when ground speed, swathe widths or fuel consumption is compared. Also the relationship between the sizes (and number of teeth) on drive and driven components is investigated. Graphical skills may be enhanced when drive paths are explained or machine data compared.
- ◆ *Information Technology* (SCQF level 4).

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

Assessment should cover all Performance Criteria and may consist of a range of written, graphical, numerical, observation checklists and oral instruments. These should include a minimum of five short answer questions to interrogate knowledge requirements for each Outcome and observation checklists for operational competences.

Time should be allowed for any necessary re-assessment.

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