

National Unit Specification: General Information

UNIT Tractor Operations 2 (Intermediate 2)

NUMBER D901 11

COURSE

SUMMARY

This is a specialist unit which extends the candidate's practical skills and associated knowledge in the context of a range of activities associated with tractor use and maintenance.

OUTCOMES

- 1 Describe the layout, function and basic operating principles of the components of a tractor.
- 2 Carry out operations which require the use of all external services on a tractor.
- 3 Carry out operator adjustments, maintenance and service tasks within the 250 hour service requirements of a tractor.
- 4 Explain the factors which affect the efficiency of tractor operation.

RECOMMENDED ENTRY

Access to this unit is at the discretion of the centre, however it would be beneficial if the candidate had gained Tractor Operations 1.

CREDIT VALUE

1.0 Credit at Intermediate 2 level.

CORE SKILLS

Information on the automatic certification of any core skills in this unit is published in *Automatic Certification of Core Skills in National Qualifications* (SQA, 1999).

Administrative Information

Superclass: SK

Publication date: December 1998

Source: Scottish Qualifications Authority

Version: 02 (*Version 01 is National Certificate Module 68061*)

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National unit specification: statement of standards

UNIT Tractor Operations 2 (Intermediate 2)

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 the Scottish Qualifications Authority.

OUTCOME 1

Describe the layout, function and basic operating principles of the components of a tractor.

Performance Criteria

- a) The layout, function and basic working principles of the fuel system are correctly described.
- b) The layout, function and basic working principles of the cooling system are correctly described.
- c) The layout, function and basic working principles of the electrical system are correctly described.
- d) The layout, function and basic working principles of the transmission and brakes are correctly described.
- e) The layout, function and basic working principles of the hydraulic systems are correctly described.
- f) The layout, function and basic working principles of the lubrication system are correctly described.

Evidence Requirements

Written and/or oral evidence of the candidate's ability to produce descriptions as detailed in performance criteria (a) to (f).

OUTCOME 2

Carry out operations which require the use of all external services on a tractor.

Performance Criteria

- a) The implement is operated correctly using the position control.
- b) The material is moved correctly using the fore/rear end loader.
- c) The trailer is filled and tipped correctly.
- d) The implement is operated correctly with draft control.
- e) The PTO driven mounted/trailed implement is operated correctly.
- f) The implement is operated correctly using a range of external hydraulic services.
- g) The implement is operated correctly using external hydraulic services.

Evidence Requirements

Practical performance evidence of the candidate's ability to satisfy performance criteria (a) to (g).

National unit specification: statement of standards (cont)

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OUTCOME 3

Carry out operator adjustments, maintenance and service tasks within the 250 hour service requirements of a tractor.

Performance Criteria

- a) The tasks within a 250 hour service for the fuel system are identified and carried out in accordance with technical standards and instructions.
- b) The tasks within a 250 hour service for the cooling system are identified and carried out in accordance with technical standards and instructions.
- c) The tasks within a 250 hour service for the lubrication of a tractor are identified and carried out in accordance with technical standards and instructions.
- d) The tasks within a 250 hour service for the electrical system are identified and carried out in accordance with technical standards and instructions.
- e) The tasks within a 250 hour service for the transmission system are identified and carried out in accordance with technical standards and instructions.
- f) The tasks within a 250 hour service for the braking system are identified and carried out in accordance with technical standards and instructions.
- g) The tasks within a 250 hour service for the steering system including front wheel bearing adjustment are identified and carried out in accordance with technical standards and instructions.
- h) The tasks within a 250 hour service for the adjustment to tractor wheel track are identified and carried out in accordance with technical standards and instructions.

Evidence Requirements

Practical performance evidence of the candidate's ability to satisfy the performance criteria (a) to (h).

OUTCOME 4

Explain the factors which affect the efficiency of tractor operation.

Performance Criteria

- a) Two diverse tractor operations are identified and described correctly.
- b) A tractor suitable for each work operation is correctly selected.
- c) Each tractor is accurately described in terms of type, power output, size and weight.
- d) Methods of improving stability and traction are explained correctly.
- e) Suitable optional equipment and safety features are correctly identified.

Evidence Requirements

Written and/or oral evidence of the candidate's ability to produce explanations and descriptions as detailed in performance criteria (a) to (e).

National unit specification: support notes

UNIT Tractor Operations 2 (Intermediate 2)

This part of the unit specification is offered as guidance. None of the sections of the support notes is mandatory.

GUIDANCE ON CONTENT AND CONTEXT

Corresponding to outcomes:

1 Constructional layout of a tractor (including the function and basic working principles of the components), to a level which will give an understanding to the operation and maintenance required of the unit.

2 Attaching and detaching implements as required. Moving material with fore or rear end loader. Filling and tipping trailers.

Operating a power take off (PTO) driven, mounted and/or trailed implement. Use of spool valves, position, draft controls and other sophisticated uses of external services.

Achieving a reasonable succession of bouts in the field.

During practice the candidate should operate the differential lock and independent brakes. A regard for the stability and instability of tractors should be developed along with an appreciation of inertia and momentum.

3 Use of necessary data to service a tractor beyond that carried out in unit Tractor Operations 1 to operator level as defined in the Operators Handbook, up to and including the 250hr service. This should include changing filters, bleeding fuel system, selecting/changing oil, adjusting fan belt, mixing antifreeze, battery servicing (including charging), adjusting clutch free play, adjusting and balancing brakes, adjusting wheel bearing, changing a tractor light bulb and fuse.

Familiarity with the sources of information for the correct adjustment and servicing of tractors such as operators manuals, tyre pressure charts and lubricant recommendations.

Altering wheel widths to given settings.

4 The main factors affecting operator efficiency of a tractor including power ratings, gear selection, traction and optional equipment.

National unit specification: support notes (cont)

UNIT Tractor Operations 2 (Intermediate 2)

GUIDANCE ON TEACHING AND LEARNING APPROACHES

The candidate is required to use operators manuals and other instructions to make fitting and adjustments and carry out service tasks on the tractor. The tractor should be maintained and operated in optimum functioning condition with a variety of implements and attachments using external services.

Much of this unit should be covered in the practical situation, with the candidate developing independence. Much of the learning should therefore be candidate centred with occasional reference to the tutor. Clearly candidates may be brought together from time to time for demonstrations of particular issues.

Given that the candidate will learn primarily from candidate centred activities, the tutor should have time to sustain a programme of formative assessment despite the fact that candidates may be dispersed for some of the practical work. The formative assessment must be closely defined and relate to the individual candidates' activities. It should be used on a regular basis for de-briefing candidates and may influence the nature of demonstrations given by the tutor.

The tutor could also draw on observations made during formative assessment to establish discussion groups/tutorial groups using video tapes/films, charts and notes to reinforce and recall points raised in practical work.

Short range radio communication with trainee drivers would be a great asset under field conditions, but comments should be kept to a minimum; the driver should do the thinking and make adjustments as appropriate.

Remediation should be an inherent part of the teaching approach.

N.B. Observance of the safety regulations and codes of practice in relation to tractor driving and maintenance is paramount.

GUIDANCE ON APPROACHES TO ASSESSMENT

All Outcomes must be validly assessed.

The candidate must be informed of the tasks which contribute to summative assessment. Any unsatisfactory aspects of performance should, if possible, be discussed with the candidate as and when they arise.

Acceptable performance in the unit will be satisfactory achievement of the performance criteria specified for each Outcome.

National unit specification: support notes (cont)

UNIT Tractor Operations 2 (Intermediate 2)

Where cutting scores are stated these are intended to be for guidance. The precise cutting score for a test will depend on the difficulty of the test and will have to be decided by the Tutor aided by the Assessor.

Outcome 1

Written test consisting of three multiple choice and one short answer question, for each of the main areas of the tractor covered.

The candidate knows the layout, function and basic working principles of the following:

- i) fuel system;
- ii) cooling system;
- iii) electrical system;
- iv) lubrication system;
- v) transmission and brakes;
- vi) hydraulic systems.

The depth of knowledge will be to the level necessary to undertake the operation and servicing required in Outcomes 2 and 3 of this unit.

Outcome 2

Practical exercises used with observation checklist including the following:

- i) moving material with fore/rear end loader;
- ii) filling and tipping a trailer;
- iii) operate an implement with position control;
- iv) operate an implement with draft control;
- v) operate a PTO driven mounted/trailed implement;
- vi) operate an implement using a range of external hydraulic services;
- vii) operate an implement using external electric services.

The candidate, for each task:

- i) undertakes the operation safely;
- ii) correctly attaches the implement to the tractor before undertaking the operation;
- iii) correctly uses the external services;
- iv) achieves a reasonable level of success whilst operating the equipment;
- v) shows a regard for the stability/ instability of the tractor.

National unit specification: support notes (cont)

UNIT Tractor Operations 2 (Intermediate 2)

Outcome 3

Practical exercises used with observation checklist - the candidate undertakes the necessary tasks up to 250 hour service requirements on the:

- i) fuel system;
- ii) cooling system;
- iii) lubrication of tractor;
- iv) electrical system;
- v) transmission system;
- vi) braking system;
- vii) steering system including front wheel bearing adjustment;
- viii) adjustment to tractor wheel track.

The candidate:

- i) undertakes the tasks safely;
- ii) carries out the tasks in a satisfactory manner;
- iii) correctly uses tools;
- iv) accurately interprets and follows written technical instructions.

Outcome 4

Written assignment.

For two diverse tractor operations from either stock or arable options, the candidate:

- a) selects the most appropriate tractor, from a given range, taking into account type, power rating, size and weight;
- b) for the tractor selected, identifies:
 - i) factors to improve stability and traction (where required);
 - ii) suitable optional equipment and operational safety features.

SPECIAL NEEDS

This unit specification is intended to ensure that there are no artificial barriers to learning or assessment. Special needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering alternative outcomes for units. For information on these, please refer to the SQA document *Guidance on*