

National Unit Specification: general information

UNIT Automotive: Automatic Transmission Systems (Higher)

NUMBER D23E 12

COURSE

SUMMARY

A unit designed to develop knowledge of the light vehicle automatic transmission system and the operation of the main components within the system, and how to deliver constructive reasoning/interpretation of the faults from an identified symptom.

OUTCOMES

- 1 Explain the operation of the main components of an automatic transmission system.
- 2 Identify for a given automatic transmission system symptom the possible fault(s).
- 3 Demonstrate the procedures to establish correct automatic transmission system operation.

RECOMMENDED ENTRY

Access to this unit is at the discretion of the centre. However, it would be beneficial if the candidate had achieved the unit Automotive: Transmission Systems (Intermediate 2) (2210298).

CREDIT VALUE

1 Credit at Higher.

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: XR

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National Unit Specification: statement of standards

UNIT Automotive: Automatic Transmission Systems (Higher)

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

Explain the operation of the main components of an automatic transmission system.

Performance criteria

- a) Correctly explain the operation of the torque converter.
- b) Correctly explain the operation of a multi-plate clutch and brake band.
- c) Correctly explain the operation of the valves within the valve block.
- d) Correctly explain the operation of epicyclic gears.
- e) Correctly explain the operation of external control mechanisms.

Note on range for the outcome

Operation of Components:

Torque converter: turbine; stator; impeller; one-way clutch; lock-up.

Multi-plate clutch pack and brake band: servo; operating cylinder.

Valve block: manual valve; kickdown valve.

Epicyclic gears: sunwheel; planet wheel; annulus.

External control mechanisms: kick down; inhibitor.

Evidence requirements

Please refer to *Evidence requirements for the unit* at the end of the Statement of Standards.

OUTCOME 2

Identify for a given automatic transmission system symptom the possible fault(s).

Performance criteria

- a) Correctly identify for a given symptom, torque converter faults.
- b) Correctly identify for a given symptom, valve block faults.
- c) Correctly identify for a given symptom, multi-plate clutch and brakeband faults.
- d) Correctly identify for a given symptom, external control mechanism faults.

National Unit Specification: statement of standards (cont)

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Note on range for the outcome

Symptoms:

Torque converter: reduced maximum speed in all gears; overheating; cannot pull away on gradients.

Valve block: incorrect shift point; erratic kickdown.

Multi-plate clutch and brakeband: No 1st gear; no reverse gear; no forward gears.

External control mechanisms: starter operates in all positions; no kickdown action.

Evidence requirements

Please refer to *Evidence requirements for the unit* at the end of the Statement of Standards.

OUTCOME 3

Demonstrate the procedures to establish correct automatic transmission system operation.

Performance criteria

- a) Correctly carry out an automatic transmission stall test.
- b) Evaluate stall test results according to specifications.
- c) Correctly carry out an automatic transmission oil pressure test.
- d) Evaluate oil pressure test results according to specifications.

Evidence requirements

Please refer to *Evidence requirements for the unit* at the end of the Statement of Standards.

EVIDENCE REQUIREMENTS FOR THE UNIT

Outcome 1

Written and/or oral evidence of the candidate's ability to correctly explain the operation of automatic transmission system main components.

Satisfactory achievement of the outcome will be based on all the performance criteria being met. This will be demonstrated by the candidate producing for:

- PC (a) correct explanation of the operation of 3 torque converter components;
- PC (b) correct explanation of the operation of 1 multi-plate clutch and 1 brake band;
- PC (c) correct explanation of the operation of 2 valve block components;
- PC (d) correct explanation of the operation of an epicyclic gear;
- PC (e) correct explanation of the operation of 2 external control components.

National Unit Specification: statement of standards (cont)

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Outcome 2

Written and/or oral evidence of the candidate's ability to correctly identify the fault(s) for the given symptoms of an automatic transmission system.

Satisfactory achievement of the outcome will be based on all the performance criteria being met. This will be demonstrated by the candidate producing for:

- PC (a) correct identification of a possible torque converter fault for 3 given symptoms;
- PC (b) correct identification of a possible valve block fault for 2 given symptoms;
- PC (c) correct identification of possible multi-plate clutch and brake band faults for 3 given symptoms;
- PC (d) correct identification of a possible external control mechanism fault for 2 given symptoms.

Outcome 3

Practical evidence of the candidate's ability to demonstrate the procedures to establish correct automatic transmission system operation.

Satisfactory achievement of the outcome will be based on all the performance criteria being met. This will be demonstrated by the candidate's ability to:

- PC (a) correctly carry out an automatic transmission stall test;
- PC (b) evaluate stall test result according to specifications;
- PC (c) correctly carry out an automatic transmission oil pressure test;
- PC (d) evaluate oil pressure test results according to specifications.

National Unit Specification: support notes

UNIT Automotive: Automatic Transmission Systems (Higher)

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

The main types of transmissions to be considered could be taken from the following: rear wheel drive three and four speed; front wheel drive – three and four speed including electronic transmission management.

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

The candidate should be given the opportunity to examine models or vehicles and participate in practical examinations of vehicle automatic transmission systems. Opportunity to examine components which are outwith specification would be an advantage.

Demonstrations of methods/techniques used to determine wear, defects and measurement of pressurisation can be used to reinforce learning.

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

Outcome 1

Written/graphical exercise.

Outcome 2

Written/graphical exercise.

Outcome 3

Direct observation in conjunction with specified criteria for the task.

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 special alternative outcomes for units. For information on these, please refer to the SQA document *Guidance on Special Assessment and Certification Arrangements for Candidates with Special Needs/Candidates whose First Language is not English* (SQA, 1998).