

## National Unit Specification: general information

**UNIT** Automotive: Transmission Systems (Higher)

**NUMBER** EG3S 12

### COURSE

### SUMMARY

A unit designed to develop knowledge of the transmission system fitted to a vehicle 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 transmission system main components.
- 2 Identify for a given transmission system symptom the possible fault(s).

### 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).

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## Administrative Information

**Superclass:** XR

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## National Unit Specification: statement of standards

### UNIT Automotive: 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 transmission system main components.

##### Performance criteria

- a) The explanation of the operation of the clutch assembly main components is correct.
- b) The explanation of the operation of the clutch mechanism's main components is correct.
- c) The explanation of the operation of the gearbox main components is correct.
- d) The explanation of the operation of the gear selection mechanism main components is correct.
- e) The explanation of the operation of the drive shaft and propeller shaft main components is correct.
- f) The explanation of the operation of the final drive and differential main components is correct.

##### Note on range for the outcome

###### Operation of components:

Clutch assembly: pressure plate; driven plate.

Clutch mechanism: release mechanism; master cylinder; slave cylinder; automatic adjustment.

Gearbox: synchromesh unit.

Gear selection mechanism: interlock; remote; rod and fork.

Drive shaft and propeller shaft: constant velocity joint; hookes joint; sliding joint.

Final drive and differential: hypoid bevel; worm and wheel; differential action on cornering.

##### Evidence requirements

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

#### OUTCOME 2

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

##### Performance criteria

- a) Identify correctly for a given symptom, clutch assembly fault(s).
- b) Identify correctly for a given symptom, clutch mechanism fault(s).
- c) Identify correctly for a given symptom, gearbox fault(s).
- d) Identify correctly for a given symptom, gearbox mechanism fault(s).
- e) Identify correctly for a given symptom drive shaft/propeller shaft fault(s).
- f) Identify correctly for a given symptom final drive and differential fault(s).

## National Unit Specification: statement of standards (cont)

**UNIT** Automotive: Transmission Systems (Higher)

### Note on range for the outcome

#### Symptoms:

Clutch assembly: slip; judder; drag.

Clutch mechanism: spongy pedal; heavy pedal; failure to disengage.

Gearbox: noisy in neutral with the engine running; noisy in a particular gear; jumping out of gear.

Gear selection mechanism: difficulty engaging gears; jumping out of gear.

Drive shaft/propeller shaft: clicking noise on turns; vibration on acceleration or deceleration.

Final drive and differential: whine on drive or overrun.

### 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 transmission system main components.

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

PC (a) correct explanation of the operation of 2 clutch assembly main components;

PC (b) correct explanation of the operation of 3 clutch mechanism main components;

PC (c) correct explanation of the operation of 1 gearbox main component;

PC (d) correct explanation of the operation of 2 gear selection mechanism main components;

PC (e) correct explanation of the operation of 2 drive shaft and propeller shaft main components;

PC (f) correct explanation of the operation of 2 final drive and differential main components.

### Outcome 2

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

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

PC (a) correct identification of a possible clutch assembly fault for 2 given symptoms;

PC (b) correct identification of a possible clutch mechanism fault for 2 given symptoms;

PC (c) correct identification of a possible gearbox fault for 2 given symptoms;

PC (d) correct identification of a possible gear selection mechanism fault for 2 given symptoms;

PC (e) correct identification of a possible drive shaft and propeller shaft fault for 2 given symptoms;

PC (f) correct identification of a possible final drive and differential fault for 1 given symptom.

## National Unit Specification: support notes

**UNIT** Automotive: 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 candidate successfully completing this unit will require skills and knowledge relating to the operation of transmission system components, the symptoms experienced when the units are not operating to specification, the likely faults which can produce the symptoms and the ability to carry out system and component tests which will assist in the diagnosis of the faults. The unit is intended primarily for candidates who have a knowledge of transmission systems up to Intermediate 2 level, and, who wish to attain the ability to test and diagnose both system and component faults.

### **GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT**

#### **Outcomes 1 and 2**

Candidates could be given the opportunity to examine, in a practical location, transmission system components, mountings, flexi-joints and centre bearings to identify the relationship of the main components to each other. The operation of the transmission system components could be demonstrated in a practical situation/location with video and other aids used as reinforcement.

Candidates could be given the opportunity to examine, in a practical location, transmission systems fitted in vehicles and/or transmission component rigs which are capable of being operated with built in faults which produce the symptoms listed within the unit range. They could be given the opportunity to carry out the necessary tests using test equipment on faulty components and component test specifications to assist in accurate diagnosis of faults.

Workshop manuals, diagnostic equipment and special tools required for the removal, replacement, adjustment and testing of components should be available to candidates.

### **GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT**

#### **Outcome 1**

Written/graphical exercise.

#### **Outcome 2**

Written/graphical exercise.

### **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).