National Unit Specification: general information

UNIT Automotive: Steering, Suspension and Braking Systems (Intermediate 2)

NUMBER DE45 11

COURSE Scottish Progression Award (SPA) in Vehicle Maintenance and Repair

SUMMARY
This unit will be suitable for candidates who need to develop the basic skills and knowledge associated with the repair, servicing and maintenance of vehicles at Intermediate 2 level. The unit will enable the candidate to acquire essential skills in the identification of the main steering, suspension and braking components and develop an understanding of the operation of these components and their routine maintenance requirements.

The unit is derived from Automotive Skills' National Occupational Standards units:

Unit 10 – Remove and replace units and components
Unit 11 – Carry out routine vehicle maintenance
Unit 19 – Inspect vehicles

It also applies to the units relating to vehicle maintenance and repair S/NVQs and Modern Apprenticeships

It is designed to meet the knowledge requirements of Automotive Skills' Technical Certificate specification (Phase 1):

LV15 – Steering Systems (1)
LV16 – Suspension Systems (1)
LV17 – Wheels and Tyres (1)
LV18 – Braking Systems (1)

and to provide progression towards the related S/NVQs and Modern Apprenticeships.

Administrative Information

Superclass: XS

Publication date: August 2003

Source: Scottish Qualifications Authority

Version: 01

National Unit Specification: general information (cont)

OUTCOMES

1. Identify the components of the steering, suspension and braking systems.
2. Explain the operation of steering, suspension and braking systems.

RECOMMENDED ENTRY

Entry is at the discretion of the centre but a good standard in communication skills would be desirable. It would also be beneficial for candidates to have a practical aptitude for vehicle maintenance and repair.

CREDIT VALUE

1 credit at Intermediate 2 (6 SCQF 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.*

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, publication code BA0906).

National Unit Specification: statement of standards

UNIT Automotive: Steering, Suspension and Braking Systems (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
Identify the components of the steering, suspension and braking systems.

Performance criteria
a) Correctly identify the components of a steering system.
b) Correctly identify the components of a suspension system.
c) Correctly identify the components of a braking system.

OUTCOME 2
Explain the operation of steering, suspension and braking systems.

Performance criteria
a) Correctly explain the operation of a steering system.
b) Correctly explain the operation of a suspension system.
c) Correctly explain the operation of a braking system.

EVIDENCE REQUIREMENTS FOR THE UNIT
Written evidence of the candidate's ability to identify components and explain the operation of the steering, suspension and braking systems.

The candidate should produce sufficient correct responses to achieve an overall pass of 70% for the unit.

National Unit Specification: support notes

UNIT Automotive: Steering, Suspension and Braking Systems (Intermediate 2)

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 has been designed to provide the underpinning knowledge for Phase 1 of Automotive Skills' Modern Apprenticeship (MA), and to operate in conjunction with the SVQ level II, Vehicle Mechanical, building the underpinning knowledge which will assist in the attainment of the SVQ.

Outcome 1
Identify:
Steering:

- Rack and pinion
- Steering box
- Steering columns
- Track rod end.

Suspension:

- Leaf spring
- Coil spring
- Torsion bar
- Damper
- Trailing arm
- Wishbone
- Swivel joint
- Track control arm
- Bump stop
- Macpherson strut
- Anti-roll bar

Wheels and Tyres:

- Wheels light alloy
- Wheels pressed steel
- Radial
- Cross-ply
- Tyre markings
- Speed rating
- Direction of rotation
- Aspect ratio
- Ply rating
- Tread wear indicators

National Unit Specification: support notes

UNIT Automotive: Steering, Suspension and Braking Systems (Intermediate 2)

Braking:
- Master cylinder
- Brake pad
- Brake lining and shoe
- Wheel cylinder
- Pipe
- Cable
- Servo
- Calliper
- Back plate
- Hand brake lever

Outcome 2
Explanation of the operation of:
The steering system:
- Rack and pinion
- Steering box

The suspension system:
- Non-independent suspension
- Independent front suspension (IFS)
- Independent rear suspension (IRS)
- Leaf spring
- Coil spring
- Torsion bar
- Damper
- Trailing arms
- Wishbone
- Swivel joint
- Track control arm
- Bump stop
- Macpherson strut
- Anti-roll bar

The braking system:
- Master cylinder
- Brake pad
- Brake lining and shoe
- Wheel cylinder
- Pipe
- Cable
- Servo
- Calliper
- Back plate
- Handbrake lever.

National Unit Specification: support notes

UNIT Automotive: Steering, Suspension and Braking Systems (Intermediate 2)

Advantages and disadvantages of:
- disc brake systems
- drum brake systems.

Explain routine maintenance requirements for braking systems
- acceptable levels of component wear.

Explain divided systems, braking efficiency and kinetic energy.

Checks required:
- components for wear and serviceability
- fluid levels
- fluid for contamination and security of fittings.
- times for replacement of components as detailed by routine maintenance schedules.

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

Corresponding to all outcomes:

The candidate could be given the opportunity in a practical situation / location, working on vehicles and actual components / assemblies, experiencing practical demonstrations in order to examine the components and develop the knowledge of operation of the systems.
A "hands on" approach by the candidate would reinforce their knowledge and develop the practical skills required in the maintenance routines of these systems.

Explain the common terms: slip angles, oversteer, understeer, neutral steer, self-aligning torque.

Explain the principles of wheel alignment and steering geometry: castor, camber, kingpin inclination, toe in/toe out, toe out on turns. The effects that wheel alignment has on tyre wear and the legal requirements governing use of tyres.

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

Assessment of the knowledge could take the form of a multiple choice test to cover all the outcomes.

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 Arrangements* (SQA, publication code AA0645).