National Unit Specification: General Information

UNIT Automotive: Fuel Systems (Intermediate 2)

NUMBER 2210228

COURSE

SUMMARY
This unit provides the candidate with a knowledge of S.I. and C.I. fuel system components fitted to a vehicle, how they operate, the areas of potential failure or wear, the need for settings and adjustment including removal and replacement techniques.

OUTCOMES
1 Identify the main components of S.I. and C.I. fuel systems.
2 Explain the operation of S.I. fuel injection and C.I. fuel systems.
3 Explain the procedures for service adjustments and pressure testing of S.I. systems.
4 Explain the procedures for service adjustments and venting of air from C.I. systems.
5 Explain the hazards to the person when dealing with S.I. and C.I. fuel systems.
6 Demonstrate the procedure for the removal and fitting of a fuel system component.

RECOMMENDED ENTRY
Access to this unit is at the discretion of the centre, however no entry prerequisites are envisaged.

CREDIT VALUE
1.5 Credit at Intermediate 2.

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: XS

Publication date: Session 1998-99

Source: Scottish Qualifications Authority

Version: 1

National unit specification: statement of standards

UNIT Automotive: Fuel 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 main components of S.I. and C.I. fuel systems.

Performance Criteria
a) The identification of the main components of an S.I. fuel injection system is correct.
b) The identification of the main components of a C.I. fuel system is correct.
c) The identification of the air intake and exhaust system components is correct.

Evidence Requirements
Written and/or oral evidence of the candidate's ability to identify components from each of S.I, C.I, air and exhaust systems.

Satisfactory achievement will be evidenced by the candidate producing for:

PC (a) correct identification of 5 S.I. fuel injection system components.
PC (b) correct identification of 7 C.I. fuel system components.
PC (c) correct Identification of 3 air intake and 3 exhaust system components.

OUTCOME 2
Explain the operation of S.I. fuel injection and C.I. fuel systems.

Performance Criteria
a) The explanation of the operation of an S.I. fuel injection system is correct.
b) The explanation of the operation of fuel pump is correct.
c) The explanation of the operation of an S.I. injector is correct.
d) The explanation of the operation of a C.I. injector is correct.
e) The explanation of the operation of a C.I. fuel system is correct.
f) The explanation of the operation of a catalytic converter is correct.

National unit specification: statement of standards (cont)

UNIT Automotive: Fuel Systems (Intermediate 2)

Evidence Requirements
Written and/or oral evidence to show the candidate's ability to explain S.I and C.I. component operation.

Satisfactory achievement will be evidenced by the candidate producing for:

PC (a) correct explanation of an S.I. fuel injection system operation.
PC (b) correct explanation of fuel pump operation.
PC (c) correct explanation of S.I. fuel injection operation.
PC (d) correct explanation of C.I. fuel injection operation.
PC (e) correct explanation of C.I. fuel system.
PC (f) correct explanation of a catalytic converter operation.

OUTCOME 3
Explain the procedures for service adjustments and pressure testing of S.I. systems.

Performance Criteria
a) The explanation of the procedures for service adjustments on S.I. fuel systems is correct.
b) The explanation of the procedures for pressure testing S.I. fuel systems is correct.

Evidence Requirements
Written and/or oral evidence of the candidate's ability to explain the need for service adjustment and pressure testing of S.I. systems.

Satisfactory achievement will be evidenced by the candidate producing for:

PC (a) correct explanation of procedures for service adjustment.
PC (b) correct explanation of procedures for pressure testing.

OUTCOME 4
Explain the procedures for service adjustments and venting of air from C.I. systems.

Performance Criteria
a) The explanation of the procedures for service adjustments on C.I. fuel systems is correct.
b) The explanation of the procedures for venting air from C.I. fuel systems is correct.

Evidence Requirements
Written and/or oral evidence of the candidate's ability to explain the procedures for service adjustment and venting of air from C.I. systems.

National unit specification: statement of standards (cont)

UNIT Automotive: Fuel Systems (Intermediate 2)

Satisfactory achievement will be evidenced by the candidate producing for:

PC (a) correct explanation of the procedures for service adjustment.
PC (b) correct explanation of the procedures for venting air from the system.

OUTCOME 5
Explain the hazards to the person when dealing with S.I. and C.I. fuel systems.

Performance Criteria
a) The explanation of the health and safety implications to the person when working with S.I. systems is correct.
b) The explanation of the health and safety implications to the person when working with C.I. systems is correct.

Evidence Requirements
Written and/or oral evidence of the candidate's ability to explain the health and safety implications when working with fuel systems.

Satisfactory achievement will be evidenced by the candidate producing for:

PC (a) correct explanation of health and safety implications for an S.I. system.
PC (b) correct explanation of health and safety implications for a C.I. system.

OUTCOME 6
Demonstrate the procedure for the removal and fitting of a fuel system component.

Performance Criteria
a) The tools/equipment are used in accordance with manufacturer's or companies' set procedures.
b) The removal and fitting task is carried out correctly.
c) The torque setting to set specifications for the given task is carried out correctly.
d) The alignment of components is correct.
e) The relevant safety requirements are adhered to for the given task.

Evidence requirements
Evidence of actual performance of the candidate's ability to follow instructions (manufacturer's or company set procedures), use tools, observe relevant/set safety requirements for the given task and meet set time scales within defined criteria.

National unit specification: support notes

UNIT Automotive: Fuel Systems (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

This unit is designed to operate in conjunction with the SVQ Level II 'Vehicle Mechanical: Unit Replacement', building the underpinning theory which will assist in the attainment of the SVQ, the PDA Certificate in Motor Vehicle Systems, Intermediate 2 of the Higher Still programme or as a Freestanding unit.

1 The main components could be identified from the following:

S.I. system - Single point, multi-point, fuel pump and tank.
C.I system - Injector pump, injectors, filter, tank and fuel supply.
Air filter, resonators, traps, manifolds, exhausts and catalysts.

2 The operation of the systems main components could comprise the following:

S.I. system - Single point, multi-point, fuel pump and tank.
C.I. system - Injector pump, injectors, filter, tank and fuel supply.
Air filter, resonators, traps, manifolds, exhausts and catalysts.

The operation of a petrol injection system, from the tank to the injector and return. The operation of the system components under running conditions. The operation of a C.I. system from the tank to the injector and return. The operation of the system components under running conditions should be taught.

3 & 4 The service adjustments, pressure testing and venting air could include:

Idle, CO and throttle adjustments, sealing of fuel exhaust and air piping, testing fuel delivery pressure and venting air from C.I fuel systems.

5 Explain the health and safety implications when dealing with fuel systems could include: fire hazards, exhaust fumes, running engines, hot components and P.P.E.

6 The system components removed and fitted could include filters, supply pumps, injectors, exhaust system, fuel and air pipes.

GUIDANCE ON TEACHING AND LEARNING APPROACHES

Candidates should be given the opportunity to examine in a practical location fuel systems on a range of vehicles/rigs to identify the systems main components.
Component function could be demonstrated using actual vehicles/units in conjunction with visual aids, diagrams and video.

National unit specification: support notes (cont)

UNIT Automotive: Fuel Systems (Intermediate 2)

Service adjustments and component replacement could be demonstrated on vehicles/rigs using recommended operating procedures.

Fuel leaks, filter blocked, idle or CO incorrect, air in system, low fuel delivery, air leaks, air restriction, exhaust leak and restriction.

GUIDANCE ON APPROACHES TO ASSESSMENT

Outcome 1

Written and/or oral evidence which may be in the form of multi choice type questions, a matching exercise, from diagrams, slides, video or actual units and or vehicles, which allows the candidate to identify the main components of S.I. and C.I. fuel systems.

Outcome 2

Written and/or oral evidence which may be in the form of multi choice type questions, short answer or gapped responses could be used which allows the candidate to explain the operation of an S.I. fuel an S.I. fuel injection and C.I. fuel system.

Outcome 3

Written and/or oral evidence which may be in the form of multi choice type questions, short answer or gapped responses could be used which allows the candidate to explain the procedures for service adjustment and pressure testing of S.I. systems.

Outcome 4

Written and/or oral evidence which may be in the form of multi choice type questions, short answer or gapped responses could be used which allows the candidate to explain the procedures for service adjustments and venting of air from C.I. systems.

Outcome 5

Written and/or oral evidence which may be in the form of multi choice type questions, short answer or gapped responses could be used which allows the candidate to identify the hazards when dealing with S.I. and C.I. fuel systems.

Outcome 6

A practical exercise, either in the candidate's normal workplace, when being assessed during his/her SVQ, or in the centre on actual units or vehicles, with access to all relevant tools, equipment, data and a clean and safe work area.