

Practical Workbook

Vehicle Systems Maintenance

Assessment Recording Forms

3902-11 Level 1
3902-74 SCQF Level 4

3902 - Level 1/SCQF Level 4

Candidate's unit tracking assessment and verification page



Candidate's name: _____

City & Guilds registration/ID number: _____

Date enrolled at centre: ___/___/_____

Date registered with City & Guilds: ___/___/_____

Unit number and title

Practical work
tick when
complete

Knowledge
tick when
complete

Assessor/signature/date

Unit 101/(SCQF Unit 401): Vehicle Engine Lubrication Systems			
Unit 102/(SCQF Unit 402): Vehicle Engine Cooling Systems			
Unit 103/(SCQF Unit 403): Vehicle Fuel and Exhaust Systems			
Unit 104/(SCQF Unit 404): Vehicle Spark ignition Systems			
Unit 105/(SCQF Unit 405): Vehicle Electrical Systems			
Unit 106/(SCQF Unit 406): Vehicle Braking Systems			
Unit 107/(SCQF Unit 407): Vehicle Transmission Systems			
Unit 108/(SCQF Unit 408): Vehicle Steering and Suspension Systems			
Unit 109/(SCQF Unit 409): Vehicle Wheel and Tyre Systems			
Unit 112/(SCQF Unit 412): Vehicle Hand Skills and Manufacturing Techniques			

Internal verifier sampling	Units sampled	Document reference	Name signature and date
Qualification Consultant (EV) sampling	Units sampled	Document reference	Name signature and date

Information

All the unit tasks can be completed as stand alone units or as a complete qualification made up of a combination of units.

The 3902 Level 1/SCQF Level 4 qualification units are about what the learner can achieve practically, these are competence based units which are designed to support hand skills and provide a clearer and better understanding of vehicle types they are working upon.

The vehicle types

The units are flexible and are designed in a way to support all types of vehicles; examples include:

Light vehicle

Heavy vehicles

Motorcycles and scooters

Quad and land-based

Tractors

Assessment

The vehicles used for assessment should have a realistic resemblance to current vehicles. Centres can use whole vehicles and specially prepared realistic vehicle rigs for training and assessment. It is expected that the technology used is similar to that used today.

Tools and equipment

Providers should have the tools and equipment to facilitate the vehicle types and units being worked upon; they should be in a safe condition to support learning and assessment.

Evidence submitted for assessment and verification

All units have a simple one page assessment document to cover the practical content. The knowledge element can be supported by a number of methods. Unit questions should be in a written or word processed format with supporting sketches and drawings where applicable; centre devised questions may also be used to support other vehicle types. Oral questions may also be used, however evidence of these needs to be shown. Photographic, video, audio tape and other recorded evidence is acceptable, including product; evidence of components made during the assessment.

Candidates need to demonstrate by direct observation and written or oral questioning the correct procedures for:

1. dismantling a static engine
2. identifying basic wear and faults
3. reassembling the engine

Candidate's name:

Date: / /

Candidates **must**:

1. observe correct legislative and organisational procedures
2. know how and where to locate relevant sources of information
3. understand how the vehicle system operates
4. select appropriate tools and equipment
5. carry out the unit task activities

Vehicle details and relevant information: include data source

Vehicle make model		Oil capacity	
Engine type: 2/4 stroke-cylinders		Valve clearance	
Cylinder head bolt torque/angle		Sump bolt torque	
Crank-pin and main bearing bolt torque		Type of fuel used	

Tools equipment and procedural activities used and carried out correctly. Tick areas completed ✓

Torque wrench	Health and Safety/organisational procedures	Engine dismantled following correct procedures	
Feeler blade	Tools cleaned, checked and stored	Basic wear and faults identified	
General sockets/spanners	Recycling and disposal	Engine reassembled following correct procedures	

Candidate knowledge questions: written answers should be attached to this work sheet: oral questions may also be used ✓

1. What are the main moving components of the engine you are working on
2. State the purpose of the following components: piston rings, crankshaft, flywheel, camshaft and manifolds
3. What method of valve clearance adjustment is available with this engine
4. How have you supported correct waste procedures for disposal and recycling for: oils, filters and gaskets
5. State any wear or faults identified during the engine strip down activity

Assessor's feedback on practical and knowledge elements

Signature:

Date:

Candidates need to demonstrate by direct observation and written or oral questioning the correct procedures for:

1. removing and checking cooling system electrical/electronic components
2. removing checking and refitting a cooling system thermostat
3. checking cooling system for frost protection

Candidate's name:

Date: / /

Candidates **must**:

1. observe correct legislative and organisational procedures
2. know how and where to locate relevant sources of information
3. understand how the vehicle system operates
4. select appropriate tools and equipment
5. carry out the unit task activities

Vehicle details and relevant information: include data source

Vehicle make model		Thermistor resistance @ temperature	
Coolant capacity		Position of cooling fan switch	
Recommended frost protection		Material used for thermostat gasket	
Thermostat opening temperature		Torque wrench settings used	

Tools equipment and procedural activities used and carried out correctly. Tick areas completed

✓

Torque wrench	Health and Safety/organisational procedures	Electrical sensor checks completed	
Multi-meter: ohms and volts	Tools cleaned, checked and stored	Thermostat gasket made and all assembled	
General sockets/spanners	Recycling and disposal	Antifreeze/coolant checked	

Candidate knowledge questions: written answers should be attached to this work sheet: oral questions may also be used

✓

1. State the purpose of the following components: cooling system thermostat, thermistor, radiator fan switch, antifreeze
2. Sketch the thermostat and label the main components
3. State the symptoms of a faulty cooling fan switch and cooling system thermistor
4. What additional substances are often used to support effective gasket sealing
5. How have you supported correct waste procedures for disposal and recycling

Assessor's feedback on practical and knowledge elements

Signature:

Date:

Candidates need to demonstrate by direct observation and written or oral questioning the correct procedures for:

1. removing a fuel injector
2. removing a lambda sensor, taking exhaust gas reading
3. removing a section of exhaust with a catalytic convertor

Candidate's name:

Date: / /

Candidates **must**:

1. observe correct legislative and organisational procedures
2. know how and where to locate relevant sources of information
3. understand how the vehicle system operates
4. select appropriate tools and equipment
5. carry out the unit task activities

Vehicle details and relevant information: include data source

Vehicle make model		Exhaust emission regulation	
Engine/fuel type		Exhaust pipe external and internal diameter	
Exhaust bolt torque		Number of wires on the lambda	
Lambda fitting torque		Position of lambda sensor	

Tools equipment and procedural activities used and carried out correctly. Tick areas completed

✓

Torque wrench		Health and Safety/organisational procedures		Components removed following correct procedures	
General sockets		Tools cleaned, checked and stored		Components fitted following correct procedures	
Spanners		Recycling and disposal		Exhaust gas reading taken	

Candidate knowledge questions: written answers should be attached to this work sheet: oral questions may also be used

✓

1. State the position of the vehicle main ECU
2. State a symptom of a faulty lambda sensor
3. Why must a technician not use a hammer on a catalytic convertor
4. How have you supported correct waste procedures for disposal
5. What are the harmful gasses emitted from the exhaust

Assessor's feedback on practical and knowledge elements

Signature:

Date:

Candidates need to demonstrate by direct observation and written or oral questioning the correct procedures for:

1. removing an ignition coil
2. removing an engine position sensor
3. identifying engine fault codes

Candidate's name:

Date: / /

Candidates **must**:

1. observe correct legislative and organisational procedures
2. know how and where to locate relevant sources of information
3. understand how the vehicle system operates
4. select appropriate tools and equipment
5. carry out the unit task activities

Vehicle details and relevant information: include data source

Vehicle make model		Fault code for engine position sensor	
Engine type/layout		Fault code for lambda sensor	
Number of engine cylinders		Fault code for ignition coil	
Position of engine position sensor		Position of diagnostic plug	

Tools equipment and procedural activities used and carried out correctly. Tick areas completed

✓

Fault code reader		Health and Safety/organisational procedures		Engine dismantled following correct procedures	
General sockets/spanners		Tools cleaned, checked and stored		Fault code identified	
Screwdriver (flat/cross)		Recycling and disposal		Engine reassembled following correct procedures	

Candidate knowledge questions: written answers should be attached to this work sheet: oral questions may also be used

✓

1. What is the expected firing voltage at the spark plug
2. What does the term 'limp-home mode' mean
3. Where did you obtain the fault code data from
4. How have you supported correct waste procedures for disposal
5. State the fault found in the system and what was the outcome

Assessor's feedback on practical and knowledge elements

Signature:

Date:

Candidates need to demonstrate by direct observation and written or oral questioning the correct procedures for:

1. checking battery voltages
2. removing and refitting a starter motor
3. removing and refitting an alternator

Candidate's name:

Date: / /

Candidates **must**:

1. observe correct legislative and organisational procedures
2. know how and where to locate relevant sources of information
3. understand how the vehicle system operates
4. select appropriate tools and equipment
5. carry out the unit task activities

Vehicle details and relevant information: include data source

Vehicle make		Battery voltage fully charged	
Vehicle model		Regulated battery voltage	
Number of battery cells		Condition of drive belt	
Liquid used to top up battery cells		Starter bench operation	

Tools equipment and procedural activities used and carried out correctly. Tick areas completed

✓

Voltmeter		Health and Safety/organisational procedures		Battery voltages checked on and off charge	
General sockets/spanners		Tools cleaned, checked and stored		Starter motor removed and fitted correctly	
Drive belt type fitted		Recycling and disposal as appropriate		Alternator removed and fitted correctly	

Candidate knowledge questions: written answers should be attached to this work sheet: oral questions may also be used

✓

1. What method is used to tension the drive belt
2. State the purpose of the alternator
3. Which component does the starter motor drive to turn the engine
4. Give a brief description of how you checked the regulated charging voltage
5. Give a brief description of how you carried out the starter motor bench test

Assessor's feedback on practical and knowledge elements

Signature:

Date:

Candidates need to demonstrate by direct observation and written or oral questioning the correct procedures for:

1. removing and fitting brake pads and disc assembly
2. fabricating a brake pipe
3. carrying out a brake fluid test

Candidate's name:

Date: / /

Candidates **must**:

1. observe correct legislative and organisational procedures
2. know how and where to locate relevant sources of information
3. understand how the vehicle system operates
4. select appropriate tools and equipment
5. carry out the unit task activities

Vehicle details and relevant information: include data source

Vehicle make model		Minimum pad wear limit	
Brake caliper mounting bolt torque		Maximum disc run-out	
Brake fluid type		Wheel nut torque	
Material used for brake pipe		Type of brake disc used	

Tools equipment and procedural activities used and carried out correctly. Tick areas completed

✓

Torque wrench	Health and Safety/organisational procedures	Brakes removed and fitted correctly	
Dial test indicator (DTI)	Tools cleaned, checked and stored	Brake fluid tested and disc run-out checked	
General sockets/spanners	Recycling and disposal	Brake pipe made to specification as agreed	

Candidate knowledge questions: written answers should be attached to this work sheet: oral questions may also be used

✓

1. State the correct procedure when dealing with brake dust
2. How should a torque wrench be left after use
3. State the reason why brake fluid needs changing regularly
4. How have you supported correct waste procedures for disposal and recycling for brake dust and components
5. Describe a symptom of excessive brake disc run-out

Assessor's feedback on practical and knowledge elements

Signature:

Date:

Candidates need to demonstrate by direct observation and written or oral questioning the correct procedures for:

1. removing and fitting a transmission unit (gearbox or similar unit)
2. examining a clutch and identifying the components
3. topping up a transmission unit with oil

Candidate's name:

Date: / /

Candidates **must**:

1. observe correct legislative and organisational procedures
2. know how and where to locate relevant sources of information
3. understand how the vehicle system operates
4. select appropriate tools and equipment
5. carry out the unit task activities

Vehicle details and relevant information: include data source

Vehicle make model		Transmission oil capacity	
Transmission unit to be removed		Condition of clutch plate	
Type of oil used in transmission unit		Condition of clutch pressure plate	
Transmission nut/bolt torque		Condition of clutch release bearing	

Tools equipment and procedural activities used and carried out correctly. Tick areas completed ✓

Torque wrench	Health and Safety/organisational procedures	Transmission unit remove and fitted correctly	
Oil filler device	Tools cleaned, checked and stored	Clutch parts identified and examined	
General sockets/spanners	Recycling and disposal	Transmission oil level checked and topped up	

Candidate knowledge questions: written answers should be attached to this work sheet: oral questions may also be used ✓

1. State the main purpose of the transmission unit you have removed
2. Describe the condition of the clutch components you have examined
3. State a symptom of lack of oil in the transmission unit
4. How have you supported correct waste procedures for disposal and recycling for: oils and transmission components
5. Sketch a line diagram of the transmission unit in relation to other main components in the vehicle

Assessor's feedback on practical and knowledge elements

Signature:

Date:

Candidates need to demonstrate by direct observation and written or oral questioning the correct procedures for:

1. removing a suspension or steering unit (examples include: strut, spring, steering head, forks, rack unit)
2. dismantling the unit and examining components
3. checking final suspension/steering alignment and making adjustments as necessary

Candidate's name:

Date: / /

Candidates **must**:

1. observe correct legislative and organisational procedures
2. know how and where to locate relevant sources of information
3. understand how the vehicle system operates
4. select appropriate tools and equipment
5. carry out the unit task activities

Vehicle details and relevant information: include data source

Vehicle make model		Faults or wear identified during dismantling unit operation	
Component to be removed			
Torque wrench settings		Final alignment setting	
Alignment information		Wheel nut/bolts torque	

Tools equipment and procedural activities used and carried out correctly. Tick areas completed

✓

Torque wrench	Health and Safety/organisational procedures	Suspension/steering removed and fitted correctly	
Alignment equipment used	Tools cleaned, checked and stored	Dismantling and reassembling completed correctly	
General sockets/spanners	Recycling and disposal	Alignment carried out correctly	

Candidate knowledge questions: written answers should be attached to this work sheet: oral questions may also be used

✓

1. State the purpose of the unit removed and fitted
2. Describe briefly how you safely lifted the vehicle
3. State a symptom of the steering/suspension unit not in correct alignment after fitting
4. How have you supported correct waste procedures for disposal and recycling

Assessor's feedback on practical and knowledge elements

Signature:

Date:

Candidates need to demonstrate by direct observation and written or oral questioning the correct procedures for:

1. removing a wheel and changing a tyre
2. identifying tyre faults and uneven wear
3. carrying out a puncture repair activity and balancing the wheel and tyre

Candidate's name:

Date: / /

Candidates **must**:

1. observe correct legislative and organisational procedures
2. know how and where to locate relevant sources of information
3. understand how the vehicle system operates
4. select appropriate tools and equipment
5. carry out the unit task activities

Vehicle details and relevant information: include data source

Vehicle make model		Type of wheel weights used	
Tyre size		Minimum tyre tread limit	
Wheel nut/bolt torque		Type of wheel and tyre	

Tools equipment and procedural activities used and carried out correctly. Tick areas completed

✓

Wheel balance equipment		Health and Safety/organisational procedures		Tyre removed/fitted following correct procedures	
Electric drill/stones		Tools cleaned, checked and stored		Puncture repair activity carried out correctly	
Tyre change equipment		Recycling and disposal		Wheel balanced following correct procedures	

Candidate knowledge questions: written answers should be attached to this work sheet: oral questions may also be used

✓

1. Describe the safe vehicle lifting procedure carried out
2. Describe the procedure used to identify and repair a puncture
3. Describe how you balanced the wheel and tyre assembly
4. How have you supported correct waste procedures for disposal and recycling
5. State any wear or faults identified during the wheel and tyre strip down activity

Assessor's feedback on practical and knowledge elements

Signature:

Date:

Candidates need to demonstrate by direct observation and written or oral questioning the correct procedures for:

1. understanding simple drawings and sketches
2. using engineering tools and equipment to manufacture components
3. demonstrating joining techniques used in engineering manufacturing (examples include threads, weld, adhesive)

Candidate's name:

Date: / /

Candidates **must**:

1. observe correct legislative and organisational procedures
2. know how and where to locate relevant sources of information
3. understand how the vehicle system operates
4. select appropriate tools and equipment
5. carry out the unit task activities

Tools equipment, materials and procedural activities used and carried out correctly. Tick areas as appropriate



Hacksaw		Centre punch		Vice		Welding		Steel	
Hammer		Taps/dies		Rule		Braze		Brass	
Files		Drill/bits		Micrometer		Solder		Copper	

Candidate knowledge: written work/drawings should be attached to this work sheet: oral methods may also be used

Show or attach a small sketch of the component/s/ made and give a brief description of how you used the equipment and materials.

Assessor's feedback on practical and knowledge elements

Signature:

Date: