

# SERVICE AND REPAIR VEHICLE ENGINE COMPONENTS

**UNIT CODE: ENG/OS/AUT/CR/2/6**

## **Unit description:**

This unit specifies competencies required to service and repair vehicle engine components. It involves troubleshooting and servicing vehicle engine components, performing vehicle engine overhaul, servicing vehicle engine cooling system, servicing vehicle engine exhaust system and lubricating vehicle engine system

## **ELEMENTS AND PERFORMANCE CRITERIA**

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
These describe the key outcomes which make the workplace function.	These are assessable statements which specify the required level of performance for each of the elements. <i><b>Bold and italicized terms are elaborated in the Range</b></i>
1. Troubleshoot vehicle <i><b>engine components</b></i> condition	1.1 Personal protective equipment (PPE) are used as per OSHA 2007 1.2 Health and safety regulations are observed as per OSH Act 2007 1.3 Engine is removed according to manufacturer's specification 1.4 Engine parts are dismantled according to manufacturer's specification 1.5 Engine parts are inspected and checked as per workplace procedures 1.6 Engine defective parts are replaced according to manufacturer's

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	specification 1.7 Engine parts are serviced according to manufacturer's specification 1.8 Vehicle engine parts are reassembled according to manufacturer's specification 1.9 Engine is fit back into the vehicle according to manufacturer's specification 1.10 Re-installation checks are performed according to manufacturer's specification
2. Perform vehicle engine overhaul	2.1 Engine oil seals are replaced according to manufacturer's specification 2.2 Engine oil rings/ piston gudgeon pin are replaced according to manufacturer's specification 2.3 Timing belts/chains are replaced according to manufacturer's specification 2.4 Engine bearings are replaced according to manufacturer's specification 2.5 Engine pulleys are replaced according to manufacturer's specification

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	<p>2.6 Engine V-belts are replaced according to manufacturer's specification</p> <p>2.7 Engine gaskets are replaced according to manufacturer's specification</p> <p>2.8 Engine blocks are serviced according to manufacturer's specification</p> <p>2.9 Water/oil pump is replaced according to manufacturer's specification</p> <p>2.10 Tappet clearance is adjusted according to manufacturer's specification</p> <p>2.11 Engine camshaft is replaced according to manufacturer's specification</p> <p>2.12 Valve seats are grinded according to manufacturer's specification</p> <p>2.13 Valve guides are replaced according to manufacturer's specification</p> <p>2.14 Oil sump/strainer/PCV is replaced according to manufacturer's specification</p> <p>2.15 Engine mountings are replaced according to manufacturer's specification</p> <p>2.16 Engine tune up is performed according to manufacturer's specification</p>

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<p>3. Service vehicle engine cooling system</p>	<p>3.1 Radiator cap is checked and tested according to manufacturer's specification</p> <p>3.2 Cooling radiator is checked and tested according to manufacturer's specification</p> <p>3.3 Cooling system hoses are checked and tested according to manufacturer's specification</p> <p>3.4 Thermostat operations are checked and tested according to manufacturer's specification</p> <p>3.5 Thermistor switches/ sensors are checked and tested according to manufacturer's specification</p> <p>3.6 Water pump is checked and tested according to manufacturer's specification</p> <p>3.7 Cooling fan operation is checked and tested according to manufacturer's specification</p> <p>3.8 Cooling system is pressure tested according to manufacturer's specification</p> <p>3.9 Cooling system is bled according to</p>

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	manufacturer's specification 3.10 Vehicle engine coolant is "read" according to manufacturer's specification 3.11 Coolant is replenished/ drained and replaced according to manufacturer's specification
4. Service vehicle engine exhaust system	4.1 Leakage is checked according to workplace procedures 4.2 Blockage is checked according to workplace procedures 4.3 Catalytic converter/ particulate filters is checked and tested according to workplace procedures 4.4 Exhaust system leaks are repaired according to manufacturer's specification 4.5 Exhaust system is installed and mounted according to manufacturer's specification 4.6 Oxygen sensor is checked and tested according to manufacturer's specification
	4.7 Draining and replacing engine oil

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	<p>4.8 Replacing engine transmission and hydraulic filters</p> <p>4.9 Greasing light vehicle components</p> <p>4.10 Greasing heavy commercial vehicle components</p> <p>4.11 Greasing Heavy machinery</p> <p>4.12 Reading Lubricants</p>
<p>5. lubricate vehicle engine system</p>	<p>5.1 engine oil is drained and replaced according to manufacturer’s specification</p> <p>5.2 engine transmission and hydraulic filters are replaced according to manufacturer’s specification</p> <p>5.3 light vehicle components are greased according to manufacturer’s specification</p> <p>5.4 heavy commercial vehicle components are greased according to manufacturer’s specification</p> <p>5.5 Heavy machinery are greased according to manufacturer’s specification</p> <p>5.6 Lubricants are “read” according to manufacturer’s specification</p>

## RANGE

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

<b>Variable</b>	<b>Range</b>
1. Re-installation checks may include but is not limited to:	1.1 bleeding 1.2 engine ignition timing 1.3 initialization
2.Engine components may include but is not limited to:	2.1 Oil seals and oil filters 2.2 Piston and piston rings 2.3 Top covers 2.4 Valves, push rods and valve lifters 2.5 Camshaft 2.6 Crankshaft 2.7 Drive pulleys 2.8 Oil sump and oil pump 2.9 Timing gears 2.10 Cylinder head 2.11 Cylinder block
3.Engine pulleys may include but is not limited to:	3.1 water pump 3.2 camshaft
4. Engine V-belts may include but is not limited to:	4.1 fan 4.2 power steering

## **REQUIRED KNOWLEDGE AND SKILLS**

### *The individual needs to demonstrate knowledge of:*

- Legislative and organizational requirements and procedures
- Kenyan legislation and workplace procedures relevant to:
  - Health and safety
  - Environment
  - Personal and vehicle protective equipment
  - Waste disposal
- Legal requirements relating to the vehicles warranty and insurance policies
- Workplace procedures for:
  - Recording the fault, the location and fault correction activities
  - Reporting the results of tests
  - The referral of problems
  - Reporting anticipated delays
- Assessment and rectification procedures
- Obtaining the correct information for rectification
- Documenting assessment and rectification information
- Working to agreed time frame and keeping others informed of progress
- The relationship between time, costs and profitability
- Reporting anticipated delays
- How to find, interpret and use technical information for engine service activities
- Importance of using the correct technical information
- The purpose of and how to use identification codes.



## Required Skills

*The individual needs to demonstrate the following skills:*

- Communications (verbal and written)
- Proficient in ICT
- Time management
- Problem solving
- Decision making
- Planning
- Multitasking
- First aid
- Report writing
- Driving

## EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

1. Critical Aspects of competency.	<b><i>Assessment requires evidence that the candidate:</i></b> <ul style="list-style-type: none"><li>1.1 Used Personal protective equipment (PPE)</li><li>1.2 Observed Health and safety regulations</li><li>1.3 Removed engine</li><li>1.4 Dismantled engine parts and inspected them</li><li>1.5 Replaced defective engine parts</li><li>1.6 Serviced engine parts</li><li>1.7 Reassembled vehicle engine parts</li><li>1.8 Fit back engine into the vehicle</li><li>1.9 Performed vehicle engine overhaul</li><li>1.10 Serviced vehicle engine cooling system</li><li>1.11 Serviced vehicle engine exhaust system</li><li>1.12 Lubricated vehicle engine system</li></ul>
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<p>2. Resource implications.</p>	<p><b><i>The following resources must be provided:</i></b></p> <p>2.1 A workshop that is fully equipped for the service and repair of vehicle engines</p> <p>2.2 Instruments and equipment for measuring and assessing the condition of engine components</p> <p>2.4 Access to manufacturers' technical information</p> <p>2.5 Facilities for the disposal of waste oil and scrap parts</p> <p>2.6 Customer database and systems for recording service records</p> <p>2.7 Personal protection equipment</p> <p>2.8 Access to computers</p>
<p>3. Methods of assessment.</p>	<p><b><i>Competency may be assessed through:</i></b></p> <p>3.1 Observation with the use of checklists</p> <p>3.2 Verbal questioning during service and repair activities to test underpinning knowledge</p> <p>3.3 Short-answer tests to assess understanding of engine operations, measuring, assessing component condition and fault rectification.</p>
<p>4. Context of Assessment.</p>	<p>Competency may be assessed individually in an actual workplace or in work-simulated conditions within accredited institutions.</p>
<p>5. Guidance information for assessment.</p>	<p>This unit may be assessed on an integrated basis with others within this occupational sector.</p>