

Unit 054

Knowledge of materials, fabrication, tools and measuring devices in the automotive environment

UAN:	K/601/6237
Level:	2
Credit value:	4
GLH:	40
Relationship to NOS:	This unit is linked to G4 Use of hand tools and equipment in Motor Vehicle Engineering.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	<p>This unit enables the learner to develop an understanding of:</p> <ul style="list-style-type: none">• the correct selection, care and use of key hand tools and measuring devices for modification, fabrication and repair in the automotive environment• the correct preparation and use of common work environment equipment• the correct selection and fabrication of materials used when modifying and repairing• the correct application of automotive engineering fabrication and fitting principles.

Learning outcome	The learner will:
1	understand how to select, use and care for hand tools and measuring devices in the automotive environment
Assessment criteria	
The learner can:	
1.1	identify and explain the use of common types of hand tools used for fabricating and fitting in the automotive environment
1.2	identify and explain the use of common measuring devices used for fabrication and fitting in the automotive environment
1.3	describe, within the scope of their responsibilities, how to select, prepare and maintain hand tools, measuring devices and PPE used for fabrication, repair and fitting in the automotive environment
1.4	state the limitations of common hand tools and measuring devices

used for fabricating, repair and fitting in the automotive workplace
1.5 explain how common hand tools and measuring devices used for fabricating, repair and fitting in the automotive environment should be stored and maintained
1.6 identify common electrical measuring tools used in the repair of vehicles and components
1.7 explain the preparation and safe and correct use of common electrical tools when measuring voltage, current and resistance.

Learning outcome	The learner will:
2	understand how to prepare and use common workshop equipment
Assessment criteria	
The learner can:	
2.1	describe the preparation and safe use of workshop equipment
2.2	explain the term: safe working load.

Learning outcome	The learner will:
3	understand how to select materials when fabricating, modifying and repairing vehicles and fitting components
Assessment criteria	
The learner can:	
3.1	describe the properties, application and limitations of ferrous and non-ferrous metals, including their safe use
3.2	describe the properties, application and limitations of common non-metallic materials, including their safe use
3.3	define common terms relating to the properties of materials

Learning outcome	The learner will:
4	understand how to apply automotive engineering, fabrication and fitting principles when modifying and repairing vehicles and components
Assessment criteria	
The learner can:	
4.1	describe how to tap threads, file, cut and drill plastics and metals when modifying or repairing vehicles
4.2	describe how to measure, mark out, shape and join materials when fabricating
4.3	describe the selection and fitting procedures of the following: <ul style="list-style-type: none"> a. gaskets and seals b. sealants and adhesives c. fittings and fasteners d. electrical circuit components
4.4	identify locking, fastening and fixing devices
4.5	state the importance of current operating specifications for limits, fits and tolerances in the automotive environment.

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Supporting information

Unit range

Common types of hand tools used for fabricating and fitting in the automotive workplace to include:

- a. files
- b. hacksaws and snips
- c. hammers
- d. screwdrivers
- e. pliers
- f. spanners
- g. sockets
- h. punches
- i. types of drill and drill bits
- j. taps and dies
- k. stud removers
- l. lmarking out tools.

Common measuring devices used for fabrication and fitting in the automotive environment. To include:

- a. rule or tape
- b. callipers
- c. feeler gauge
- d. volume measures
- e. micrometer
- f. dial gauges
- g. torque wrenches
- h. depth gauges

Common electrical measuring tools used in the repair of vehicles and components. To include:

- a. ammeter
- b. voltmeter
- c. ohmmeter
- d. multi-meter.

Common electrical terms when measuring:

- a. voltage
- b. current
- c. resistance.

Workshop equipment (including appropriate PPE) to include:

- a. hydraulic jacks
- b. axle stands
- c. pillar drills
- d. air tools
- e. vehicle lifts
- f. cranes
- g. hoists
- h. electrical power tools.

The properties, application and limitations to include safe use of ferrous and non-ferrous metals used when constructing, modifying and repairing vehicles and components.

Materials to include:

- a. carbon steels
- b. alloy steels
- c. cast iron
- d. aluminium alloys
- e. brass
- f. copper
- g. lead.

Properties, application and limitations (to include safe use) of non-metallic materials used when constructing, modifying and repairing vehicles and components. Materials to include:

- a. glass
- b. plastics (inc. GRP)
- c. Kevlar
- d. rubber.

Terms relating to the properties of materials to include:

- a. hardness
- b. toughness
- c. ductility
- d. elasticity
- e. tenacity
- f. malleability
- g. plasticity.