



Materials, Fabrication, Tools and Measuring Devices
in the Automotive Environment
Units 004 (G4)

Candidate's Name:

All outcomes for this assignment must be completed to gain a pass. There is no grading, however candidates must demonstrate that they have a good understanding and the ability to use the tools and equipment in a safe and proper manner.

It can be taken as a standalone unit; however it can also be integrated when completing the skills and competence units.

Outcome	Outcome Title	Assessor's feedback
Outcome 1	Tools used for fabricating and fitting	
Outcome 2	Measuring devices used for fabrication, fitting, and electrical testing Use of workshop equipment	
Outcome 3	Properties, application and limitations of ferrous and non-ferrous metals	
Outcome 4	Properties, application and limitations of non-metallic materials	
Outcome 5	Terms relating to the properties of materials	

Candidate's Name: _____ . Signature: _____ . Date. ___/___/___

Assessor Name: _____ . Signature: _____ . Date. ___/___/___

Overall decision

Outcome 1

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

Questions

Name three types of hand files used in the workshop.

- 1.
- 2.
- 3.

Which way should the teeth face on a hacksaw?

State a safety precaution when using a ball peen hammer.

Name the screwdriver types shown:



- | | | |
|---|----|---|
| 1 | 2 | 3 |
| 4 | 5. | 6 |

State a use for pliers.

Name three spanner types commonly used in the workshop.

When would a centre punch be used?

What is the name of the drill bit used before drilling the main hole?

What is a thread tap used for?

What is a thread die used for?

What is an 'easi-out' and what would it be used for?

State three tools used for marking out metal prior to cutting, filing or drilling.

- 1.
- 2.
- 3.

How should tools be cared for and stored after use.

Outcome 2

Types of measuring devices used for fabrication, fitting, and electrical testing in the automotive workplace.

Use of workshop equipment

Name the tool shown and state an example of its use.



Name the tool shown and state an example of its use.



Name the tool shown and state an example of its use.



Name the tool shown and state an example of its use.



Name the tool shown and state an example of its use.



Name the tool shown.

State the three units of measurement needed when using Ohm's Law for calculations

- 1.
- 2.
- 3.

Draw the diagram used for remembering Ohm's Law



What would the equipment shown be used for?



What do the letters SWL stand for?

The image shows a two post ramp. State a safety check to carry out before use.



State two safety checks to carry out before using the equipment shown.



Outcome 3

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

Where on a motor vehicle would low carbon steel be used?

What are the properties of low carbon steel?

Where on a motor vehicle would high carbon steel be used?

What are the properties of high carbon steel?

Where on a motor vehicle would cast iron be used?

What are the properties of cast iron?

Where on a motor vehicle would aluminium alloys be used?

What are the properties of aluminium alloys?

Where on a motor vehicle would brass be used?

What are the properties of brass?

Where on a motor vehicle would copper be used?

What are the properties of copper?

Outcome 4

Properties, application and limitations of non-metallic materials used when constructing, modifying and repairing vehicles and components.

State the two types of glass normally used on modern vehicles.

1.

2.

What are their main properties of each type with regards to breakage and repair?

1.

2.

One use of rubber, on a vehicle, is for tyres; where else can it be used?

What happens to rubber with age?

What is a typical shelf life of a vehicles tyre?

Where on a vehicle could Glass Reinforced Plastic (GRP) be used?

What is GRP made up of?

Where on a motor vehicle could Kevlar be used?

What are the properties of Kevlar?

Where on a motor vehicle could carbon fibre be used?

What are the properties of carbon fibre?

State the main safety precautions when using GRP, glues and adhesives.

Outcome 5

Terms in connection with the properties of materials.

Name a type of metal, used in the construction of motor vehicles, which is very **hard**.

State two uses of this metal on a motor vehicle.

1.

2.

State a simple test to check for metal **hardness**.

What does the term **malleability** mean in relation to materials?

Give an example of the use of a material that has good malleability properties.

What does the term **ductility** mean in relation to materials?

Give an example of the use of a material that has good ductility properties.

What does the term **elasticity** mean in relation to materials?

Give an example of the use of a material that has good elasticity properties.

What does the term **toughness** mean in relation to materials?

Give an example of the use of a material that has good toughness properties.

Knowledge of Materials, Fabrication, Tools and Measuring Devices used in the Automotive Environment
Overview

This unit is about developing the practical skills and knowledge required to safely use tools, equipment and materials in the automotive working environment.

Evidence requirements

It is expected that this evidence will be generated when carrying out practical work and assessments in a workshop.

1. Candidates should list the tools and equipment normally used in the working environment on the job card.
2. Candidates should state the health and safety and risk identified when using tools and equipment on the job card.
3. Candidates should have the opportunity to generate practical evidence while working on projects using different materials and workshop equipment.

Observations are required to cover outcomes 1 and 2

Essential knowledge will be primarily assessed using practical observations, questions and written assignments to cover the assessment outcome criteria; further knowledge can be assessed by using oral questioning.

At the end, the assessor must sign this form to confirm that all evidence identified above has been carried out to the required standard by the candidate.

Assignments for knowledge and practical work are available for this unit

PRN Numbers use boxes as appropriate				
SVQ and VRQ (in Scotland) Tick when observed competence				
Outcomes	Practical observation PRN number		Knowledge PRN number	
1. Common hand tools				
2. Measuring devices				
3. Properties of ferrous/non ferrous metals	Covered in knowledge			
4. Properties of non-metallic materials	Covered in knowledge			
5. Terms relating to properties of materials	Covered in knowledge			
Tools/measuring devices for outcomes 1 and 2: include others as appropriate. Highlight when used correctly				
spanners	sockets	multi-meter	vehicle lift	tap and die
files	hack saw	rule	jack and stands	easy-out
hammer	air tool	electrical hand tool	torque wrench	screwdrivers
Signing this document below by the assessor indicates that the assessor and candidate have agreed that all components of the unit have been fully completed Assessor name _____ Signature _____ Date __/__/__ Internal verifier _____ Signature _____ Date __/__/__ External verifier _____ Signature _____ Date __/__/__				

Light Vehicle Skills

Use of Hand Tools and Equipment in Motor Vehicle Engineering

Demonstrate the ability to file, cut, thread and drill materials

Unit/s covered on this evidence record

Candidate's name: _____	Date: ___/___/___	(G1/2) 001	(G3) 003	(G4) 004	
-------------------------	-------------------	-----------------------------	---------------------------	---------------------------	--

State the activities you demonstrated to complete this unit: This can be products made, photographic or integrated within other units.

Details of work activity
 To complete this exercise you must show that you can use engineering equipment correctly and safely.
 You will need to make an engineering tool which will demonstrate the skills of cutting, filing, drilling, threading, measuring and understanding drawings.
 You can make a tool and or demonstrate these skills when repairing vehicle components.

Hack saw	Drills/bits	Taps/die	Files	Stock/wrench	Material types
----------	-------------	----------	-------	--------------	----------------

Evidence of Health and Safety, good housekeeping and working with others. (Assessor to sign this area if the learner meets the requirements)

- | | |
|--|--|
| 1. Work with others when reporting finding | 5. Clear up spillages |
| 2. Dispose all waste correctly and safely | 6. Identify workshop policies |
| 3. Tools tidy, cleaned, checked and put away | 7. Wear and use correct PPE |
| 4. Sweep up | 8. Evidence of recycling and correct disposal of waste (ESDGC) |

Assessor's signature: _____

State how you checked your work against specification, disposed of waste, recycled materials

Assessor's knowledge questions								
--------------------------------	--	--	--	--	--	--	--	--

Assessor's feedback on evidence provided.

I confirm that the work carried out on this evidence record meets City & Guilds' requirements for validity, authenticity, currency and sufficiency.

Assessor's name: _____ Signature: _____ Date: ___/___/___

Candidate's signature: _____ Date: ___/___/___

Light Vehicle Skills

Use of Hand Tools and Equipment in Motor Vehicle Engineering

Demonstrate the ability to File, cut, thread and drill materials

Unit/s covered on this evidence record

Candidate's name:	Date: ___/___/___	(G1/2) 001	(G3) 003	(G4) 004	
-------------------	-------------------	-----------------------------	---------------------------	---------------------------	--

Details of work activity
 To complete this exercise you must show that you can use engineering equipment correctly and safely.
 You will need to make an engineering tool which will demonstrate the skills of cutting, filing, drilling, threading, measuring and understanding drawings.
 You can make a tool and or demonstrate these skills when repairing vehicle components.
 You must demonstrate that you have used all the tools listed below.

Hacksaw	Drills/bits	Taps/die	Files/hammer/punch	Stock/wrench	Steel
---------	-------------	----------	--------------------	--------------	-------

Evidence of Health and Safety, good housekeeping and working with others. (Assessor to sign this area if the learner meets the requirements)

- | | |
|--|--|
| 1. Work with others when reporting finding | 5. Clear up spillages |
| 2. Dispose all waste correctly and safely | 6. Identify workshop policies |
| 3. Tools tidy, cleaned, checked and put away | 7. Wear and use correct PPE |
| 4. Sweep up | 8. Evidence of recycling and correct disposal of waste (ESDGC) |



Examples shown include:

- 1 pad saw
- 2 brake pie clamp
3. block and stud
 - block and stud with easy-out hole to simulate snapped stud

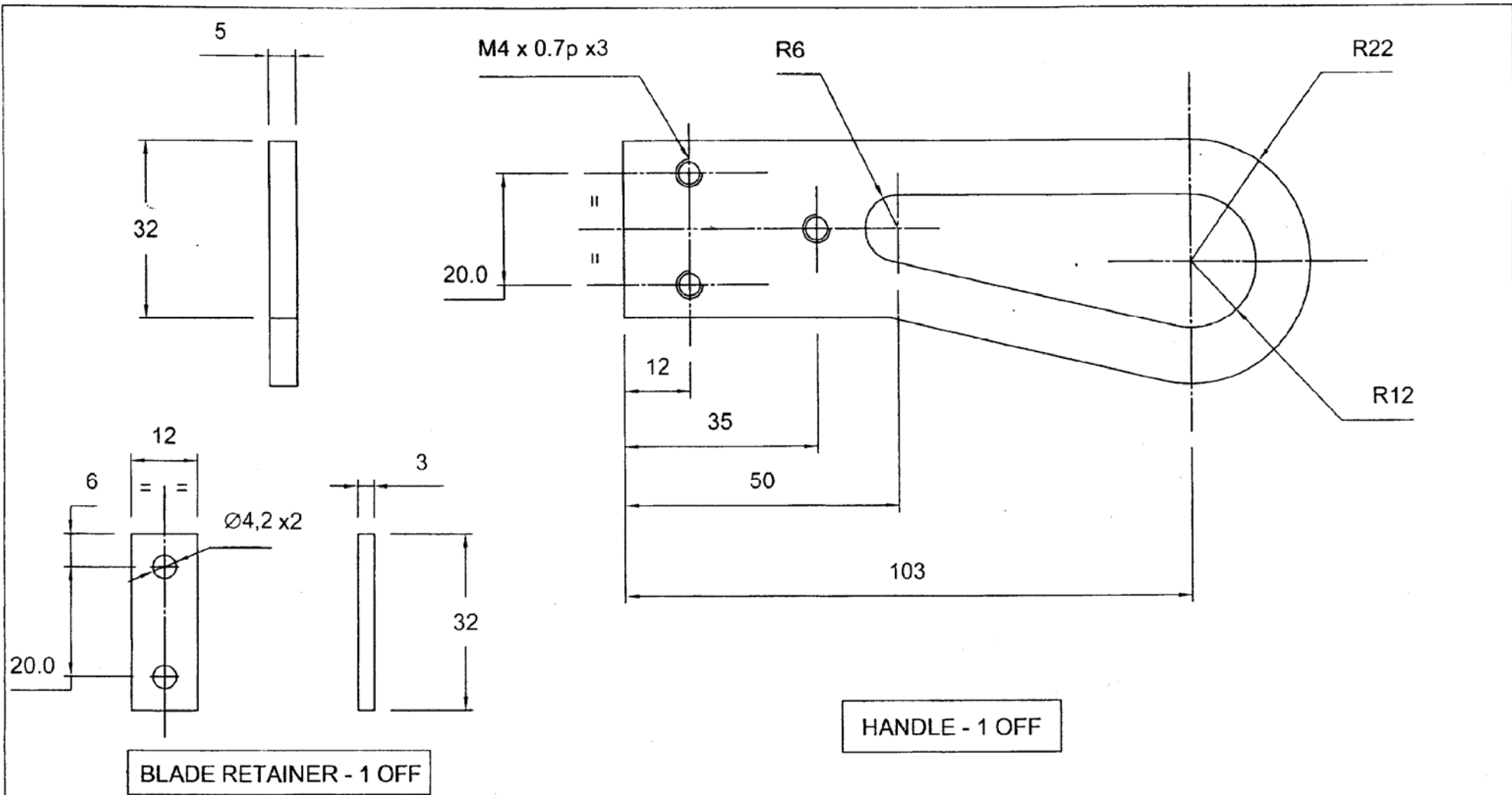
Assessor's signature: _____

Work found that requires further attention and any action taken:


Assessor's knowledge questions								
--------------------------------	--	--	--	--	--	--	--	--

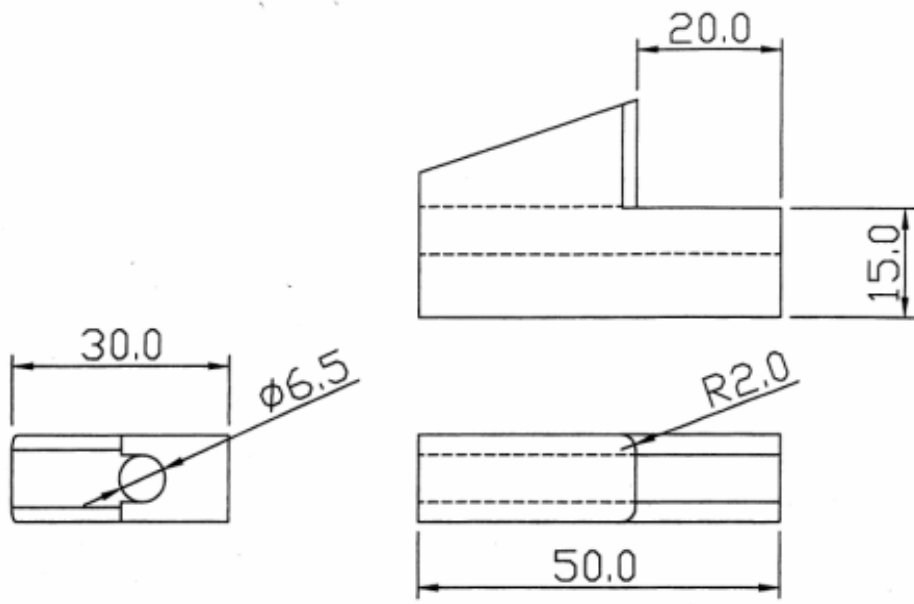
Assessor's feedback on evidence provided.

I confirm that the work carried out on this evidence record meets City & Guilds' requirements for validity, authenticity, currency and sufficiency.
 Assessor's name: _____ Signature: _____ Date: ___/___/___
 Candidate's signature: _____ Date: ___/___/___

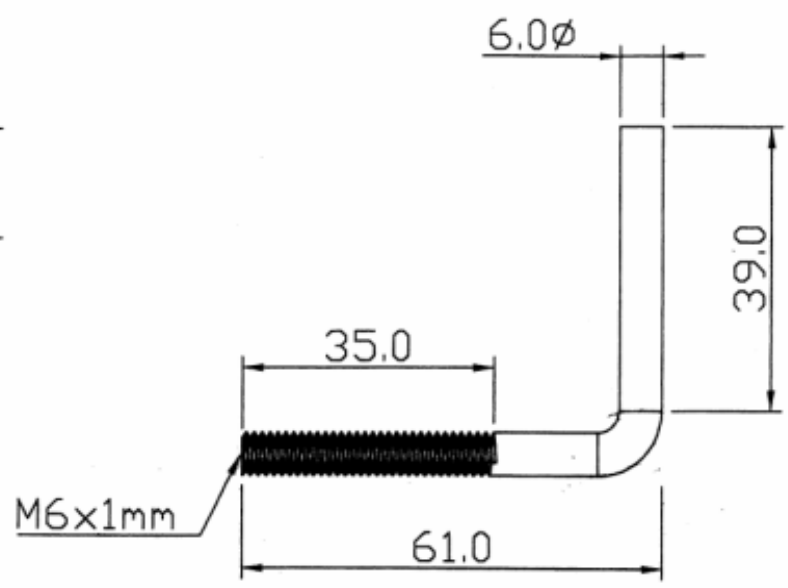


ISSUE	DETAIL	SIGN.	GEN. TOLERANCES +/- 0.5 DECIMAL DIMS 0.0 +/- 0.1 DECIMAL DIMS 0.00 +/- 0.025 UNLESS OTHERWISE STATED	SCALE 1:1	DATE 22/10/2007
2	REDRAWN 22/10/2007	A.C.C.		DIMENSIONS IN M/METRES	MATL. & FINISH B.D.M.S. POLISHED
			TITLE PAD SAW	DRAWN	DRAWING NUMBER
				SHEET	OF

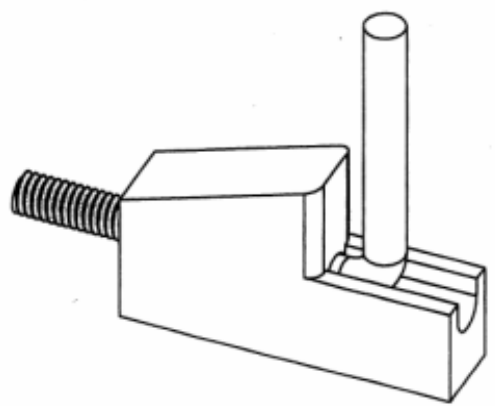
Do not Scale 



Detail 1 : Body



Detail 2 : Bar



			DIMENSIONS IN MM UNLESS OTHERWISE STATED		DWG. SIZE NTS		TITLE Brake Clamp		
			TOLERANCES UNLESS OTHERWISE STATED		DRAWN BY		DRAWING NUMBER		
A			Fabrication ± 0.5 mm		DATE		REV		
REV			Machining ± 0.5 mm		CHECKED BY		A		
DATE			Angular ± 1.0 degree		SCALE				
BY									
DESCRIPTION									