INSTITUTE OF THE MOTOR INDUSTRY

IMI QUALIFICATION

QUALIFICATION SPECIFICATION Part B:

Assessment Criteria

for

IMI Level 2 Certificate in Vehicle Accident Repair - Body

QUALIFICATION NO: 601/7049/9

To be used in conjunction with Candidate Assessment Summary, Practical and Written Support Materials (Optional)

For assessor use only: Refer to Qualification Specification Part A and Assessor and Quality Assurer Guidance document

CENTRE INFORMATION

Please be aware that any **legislation** referred to in this qualification may be subject to amendment/s during the life of this qualification. Therefore IMI Approved Centres must ensure they are aware of and comply with any amendments, e.g. to health and safety legislation and employment practices.

Please be aware that **vehicle technologies** referred to in this qualification reflect current practice, but may be subject to amendment/s, updates and replacements during the life of this qualification. Therefore IMI Approved Centres must ensure they are aware of the latest developments and emerging technologies to ensure the currency of this qualification.

Please note: the relevance of the information contained in the **unit content** will vary depending upon the vehicle types being worked upon. The unit content is for guidance only and is not meant to be prescriptive.

CONTACT SHEET

Learner Name:	
Learner Registration No:	
Learner Address:	
Learner Tel No:	
Learner Email:	
Employer Contact:	
Employer Name & Address:	
Employer Tel No:	

Please complete as appropriate:	
Witness Name:	Witness Name:
Witness Job Title:	Witness Job Title:
Witness Signature:	Witness Signature:
Witness Name:	Witness Name:
Witness Job Title:	Witness Job Title:
Witness Signature:	Witness Signature:
Assessor Name:	Assessor Name:
Assessor Signature:	Assessor Signature:
Assessor Name:	
Assessor Signature:	
Internal Verifier Name:	Internal Verifier Name:
Internal Verifier Signature:	Internal Verifier Signature:

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Level 2 Certificate in Vehicle Accident Repair - Body

Group A: Mandatory Units.

Group B: Core Unit (Synoptic Assessment)

Group C: Mandatory Specialist Units

To achieve the Level 2 Certificate in Vehicle Accident Repair-Body the learner will need to complete all the units in groups A, B and C. Group B 'Core Unit' must not be completed until achievement of all the units in groups A and C.

Total GLH: 361
TQT = 619

***Key:** W = Written Task/s (support material)*
P = Practical Task/s (support materials)

Please see Qualification Specification Part A for further information on support materials.

Group A: Mandatory Units						
Unit Ref:	Unit Title & I.D. Number	Unit Level	GLH	Task		OLT
				W	P	
GA0102	Health, Safety and Good Housekeeping in the Automotive Environment (A/507/6089)	2	37	W	P	Group A Test
GA3	Support for Job Roles in the Automotive Environment (M/507/6090)	3	26	W	P	
GA10	Tools, Equipment and Measuring Devices used in the Accident Repair Industry (K/507/6248)	2	26	W	P	

Group B: Core Unit (Synoptic Assessment)						
Unit Ref:	Unit Title & I.D. Number	Unit Level	GLH	Task		OLT
				W	P	
L2BRS	Plan, Prepare, Carry Out and Report on Repairs to External Body Panels (M/507/6249)	2	50	N/A	P	Group B Test

Group C: Mandatory Specialist Units						
Unit Ref:	Unit Title & I.D. Number	Unit Level	GLH	Task		OLT
				W	P	
BR02	Remove and Fit Non-Permanently Fixed Automotive Body Panels (H/507/6250)	2	53	W	P	Group C Test
BR05	Remove and Replace Exterior Automotive Body Panels Including Permanently Fixed Components (K/507/6251)	2	65	W	P	
BR19	Automotive Metal Active Gas (MAG) Welding Techniques (M/507/6252)	2	73	W	P	
BR26	Knowledge of Automotive Construction and Materials (T/507/6253)	2	31	W	N/A	

UNIT REF: GA0102	UNIT TITLE: HEALTH, SAFETY AND GOOD HOUSEKEEPING IN THE AUTOMOTIVE ENVIRONMENT

Mapping: This unit is mapped to the IMI NOS G1 and G2	Level: 2	GLH: 37
Rationale: This unit enables the learner to develop an understanding, knowledge and skills in routine maintenance and cleaning of the automotive environment and using resources economically and health and safety legislation and duties of everyone in the motor vehicle environment. It will provide an appreciation of significant risks in the automotive environment and how to identify and deal with them. Once completed the learner will be able to identify hazards and evaluate and reduce risk.		

LEARNING OUTCOMES The Learner will:	ASSESSMENT CRITERIA The Learner can:
1. Understand the correct personal and vehicle protective equipment to be used within the automotive environment	1.1. Explain the importance of wearing the types of personal protective equipment required for a range of automotive repair activities 1.2. Identify vehicle protective equipment for a range of repair activities 1.3. Describe vehicle and personal safety considerations when working at the roadside
2. Be able to use correct personal and vehicle protection within the automotive environment	2.1. Select and use personal protective equipment throughout activities. To include appropriate protection of: a. eyes b. ears c. head d. skin e. feet f. hands g. lungs 2.2. Select and use vehicle protective equipment throughout all activities
3. Understand effective housekeeping practices in the automotive environment	3.1. Describe why the automotive environment should be properly cleaned and maintained 3.2. Describe requirements and systems, which may be put in place to ensure a clean automotive environment 3.3. Describe how to minimise waste when using utilities and consumables 3.4. State the procedures and precautions necessary when cleaning and maintaining an automotive environment 3.5. Describe the selection and use of cleaning equipment when dealing with general cleaning, spillages and leaks in the automotive environment 3.6. Describe procedures for correct disposal of waste materials from an automotive environment 3.7. Describe procedures for starting and ending the working day which ensure effective housekeeping practices are followed

4. Be able to carry out effective housekeeping practices in the automotive environment	4.1. Select and use cleaning equipment which is of the right type and suitable for the task 4.2. Use utilities and appropriate consumables, avoiding waste 4.3. Use materials and equipment to carry out cleaning and maintenance duties in allocated work areas, following automotive work environment policies, schedules and manufacturer's instructions 4.4. Perform housekeeping activities safely and in a way which minimises inconvenience to customers and staff 4.5. Keep the work area clean and free from debris and waste materials 4.6. Keep tools and equipment fit for purpose by regular cleaning and keeping tidy 4.7. Dispose of used cleaning agents, waste materials and debris to comply with legal and workplace requirements
5. Understand key health and safety requirements relevant to the automotive environment	5.1. List the main legislation relating to automotive environment health and safety 5.2. Describe the general legal duties of employers and employees required by current health and safety legislation 5.3. Describe key and current health and safety requirements relating to the automotive environment 5.4. Describe why workplace policies and procedures relating to health and safety are important
6. Be able to recognise and deal with dangers in order to work safely within the automotive workplace	6.1. Name and locate the responsible persons for health and safety in their relevant workplace 6.2. Identify and report working practices and hazards which could be harmful to themselves or others 6.3. Carry out safe working practices whilst working with equipment, materials and products in the automotive environment 6.4. Rectify health and safety risks encountered at work, within the scope and capability of their job role
7. Understand about hazards and potential risks relevant to the automotive environment	7.1. Identify key hazards and risks in an automotive environment 7.2. Describe policies and procedures for reporting hazards, risks, and health and safety matters in the automotive environment 7.3. State precautions and procedures which need to be taken when working with vehicles, associated materials, tools and equipment

	7.4. Identify fire extinguishers in common use and which types of fire they should be used on 7.5. Identify key warning signs and their characteristics that are found in the vehicle repair environment. 7.6. State the meaning of common product warning labels used in an automotive environment
8. Be able to conduct themselves responsibly	8.1. Show personal conduct in the workplace which does not endanger the health and safety of themselves or others 8.2. Display suitable personal presentation at work which ensures the health and safety of themselves and others at work
9. Understand personal responsibilities	9.1. Explain the importance of personal conduct in maintaining the health and safety of the individual and others 9.2. Explain the importance of personal presentation in maintaining health safety and welfare

Content:

Economic use of resources

a. Consumable materials e.g. grease, oils, split pins, locking and fastening devices etc.

Requirement to maintain work area effectively

a. Cleaning tools and equipment to maximise workplace efficiency.
b. Requirement to carry out the housekeeping activities safely and in a way that minimises inconvenience to customers and staff.
c. Risks involved when using solvents and detergents.
d. Advantages of good housekeeping.

Spillages, leaks and waste materials

a. Relevance of safe systems of work to the storage and disposal of waste materials.
b. Requirement to store and dispose of waste, used materials and debris correctly.
c. Safe disposal of special / hazardous waste materials.
d. Advantages of recycling waste materials.
e. Dealing with spillages and leaks

Basic legislative requirements

a. Provision and Use of Work Equipment Regulations 1992.
b. Power Presses Regulations 1992.
c. Pressure Systems and Transportable Gas Containers Regulations 1989.
d. Electricity at Work Regulations 1989.
e. Noise at Work Regulations 1989.
f. Manual Handling Operations Regulations 1992.
g. Health and Safety (Display Screen Equipment) Regulations 1992.
h. Abrasive Wheel Regulations.
i. Safe Working Loads.
j. Working at Height Regulations (2005)

Routine maintenance of the workplace

a. Trainee's personal responsibilities and limits of their authority with regard to work equipment.
b. Risk assessment of the workplace activities and work equipment.
c. Workplace person responsible for training and maintenance of workplace equipment.
d. When and why safety equipment must be used.
e. Location of safety equipment

Content Contd.

f. Particular hazards associated with their work area and equipment.
g. Prohibited areas.
h. Plant and machinery that trainees must not use or operate.
i. Why and how faults on unsafe equipment should be reported.
j. Storing tools, equipment and products safely and appropriately.
k. Using the correct PPE.
l. Following manufacturer's recommendations.
m. Location of routine maintenance information e.g. electrical safety check log.

Legislation relevant to Health and Safety

a. HASAWA
b. COSHH
c. EPA
d. Manual Handling Operations Regulations 1992
e. PPE Regulations 1992

General regulations to include an awareness of:

a Health and Safety (Display Screen Equipment) Regulations 1992
b Health and Safety (First Aid) Regulations 1981
c Health and Safety (Safety Signs and Signals) Regulations 1996
d Health and Safety (Consultation with Employees) Regulations 1996
e Employers Liability (Compulsory Insurance) Act 1969 and Regulations 1998
f Confined Spaces Regulations 1997
g Noise at Work Regulations 1989
h Electricity at Work Regulations 1989
i Electricity (Safety) Regulations 1994
j Fire Precautions Act 1971
k Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1985
l Pressure Systems Safety Regulations 2000
m Waste Management 1991
n Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) 2002
o Control of Asbestos at Work Regulations 2002

Legislative duties:

a. The purpose of a Health and Safety Policy.
b. The relevance of the Health and Safety Executive.
c. The relevance of an initial induction to Health and Safety requirements at your workplace.
d. General employee responsibilities under the HASAWA and the consequences of non-compliance.
e. General employer responsibilities under the HASAWA and the consequences of non-compliance.
f. The limits of authority with regard to Health and Safety within a personal job role.
g. Workplace procedure to be followed to report Health and Safety matters.

Precautions to be taken when working with vehicles, workshop materials, tools and equipment including electrical safety, pneumatics and hydraulics

a. Accessing and interpreting safety information
b. Seeking advice when needed
c. Seeking assistance when required
d. Reporting of unsafe equipment
e. Storing tools, equipment and products safely and appropriately
f. Using the correct PPE
g. Following manufacturers recommendations
h. Following application procedures e.g. hazardous substances
i. The correct selection and use of extraction equipment

PPE to include:

a. Typical maintenance procedures for PPE equipment to include:
    i. typical maintenance log
    ii. cleaning procedures
    iii. filter maintenance
    iv. variation in glove types
    v. air quality checks

Content Contd:

b. Choice and fitting procedures for masks and air breathing equipment.
c. Typical workplace processes which would require the use of PPE to include:
    i. welding
    ii. sanding and grinding
    iii. filling
    iv. panel removal and replacement
    v. drilling
    vi. cutting
    vii. chiselling
    viii. removal of broken glass
    ix. removal of rubber seals from fire damaged vehicles
    x. removal of hypodermic needles
    xi. servicing activities
    xii. roadside recovery
d. Unserviceable PPE.
e. PPE required for a range automotive repair activities. To include appropriate protection of:
    i. eyes
    ii. ears
    iii. head
    iv. skin
    v. feet
    vi. hands
    vii. lungs

Fire and extinguishers

a. Classification of fire types
b. Using a fire extinguisher effectively.
c. Types of Extinguishers
    i. foam
    ii. dry powder
    iii. CO2
    iv. water
    v. fire blanket

Action to be taken in the event of a fire to include:

a. The procedure as:
    i. raise the alarm
    ii. fight fire only if appropriate
    iii. evacuate building
    iv. call for assistance

Product warning labels to include:

a. Reasons for placing warning labels on containers.
b. Warning labels in common use, to include:
    i. toxic
    ii. corrosive
    iii. poisonous
    iv. harmful
    v. irritant
    vi. flammable
    vii. explosive

Warning signs and notices

a. Colours used for warning signs:
    i. red
    ii. blue
    iii. green
b. Shapes and meaning of warning signs:
    i. round
    ii. triangular
    iii. square
c. The meaning of prohibitive warning signs in common use.
d. The meaning of mandatory warning signs in common use.

Content Contd.

e. The meaning of warning notices in common use.
f. General design of safe place warning signs

Hazards and risks to include:

a. The difference between a risk and a hazard.
b. Potential risks resulting from:
   i. the use and maintenance of machinery or equipment
   ii. the use of materials or substances
   iii. accidental breakages and spillages
   iv. unsafe behaviour
   v. working practices that do not conform to laid down policies
   vi. environmental factors
   vii. personal presentation
   viii. unauthorised personal, customers, contractors etc entering your work premises
   ix. working by the roadside
   x. vehicle recovery
c. The employee's responsibilities in identifying and reporting risks within their working environment.
d. The method of reporting risks that are outside your limits of authority.
e. Potential causes of:
   i. fire
   ii. explosion
   iii. noise
   iv. harmful fumes
   v. slips
   vi. trips
   vii. falling objects
   viii. accidents whilst dealing with broken down vehicles

Personal responsibilities

a. The purpose of workplace polices and procedures on:
   i. the use of safe working methods and equipment
   ii. the safe use of hazardous substances
   iii. smoking, eating , drinking and drugs
   iv. emergency procedures
   v. personal appearance
b. The importance of personal appearance in the control of health and safety.

Action to be taken in the event of colleagues suffering accidents

a. The typical sequence of events following the discovery of an accident such as:
   i. make the area safe
   ii. remove hazards if appropriate i.e. switch off power
   iii. administer minor first aid
   iv. take appropriate action to re-assure the injured party
   v. raise the alarm
   vi. get help
   vii. report on the accident
b. Typical examples of first aid which can be administered by persons at the scene of an accident:
   i. check for consciousness
   ii. stem bleeding
   iii. keep the injured person's airways free
   iv. place in the recovery position if injured person is unconscious
   v. issue plasters for minor cuts
   vi. action to prevent shock i.e. keep the injured party warm
   vii. administer water for minor burns or chemical injuries
   viii. wash eyes with water to remove dust or ingress of chemicals (battery acid)
   ix. need to seek professional help for serious injuries
c. Examples of bad practice which may result in further injury such as:
   i. moving the injured party
   ii. removing foreign objects from wounds or eyes
   iii. inducing vomiting
   iv. straightening deformed limbs

Evidence Requirements	
1.	**You must be observed by your assessor** using personal and vehicle protection, cleaning the work environment and disposal of waste on **2** separate **occasions.**
2.	**You must be observed by your assessor** identifying risks which may result from at least **2** of the items listed below:
	• the use and maintenance of machinery or equipment
	• the use of materials or substances
	• working practices which do not conform to laid down policies
	• unsafe behaviour
	• accidental breakages and spillages
	• environmental factors
3.	**You must be observed by your assessor** identifying risks.
4.	**You must be observed by your assessor** following at least **2** of the workplace policies listed below:
	• the use of safe working methods and equipment
	• the safe use of hazardous substances
	• smoking, eating, drinking and drugs
	• what to do in the event of an emergency
	• personal presentation

UNIT REF: GA3	UNIT TITLE: SUPPORT FOR JOB ROLES IN THE AUTOMOTIVE ENVIRONMENT

Mapping: This unit is mapped to the IMI NOS G3	Level: 3	GLH: 26
Rationale: This unit enables the learner to develop an understanding, knowledge and skills of how to keep good working relationships with all colleagues in the automotive work environment by using effective communication and support skills.		

LEARNING OUTCOMES The Learner will:	ASSESSMENT CRITERIA The Learner can:
1. Understand key organisational structures, functions and roles within the automotive work environment	1.1. Identify the purpose of different sections of a typical automotive work environment 1.2. Explain organisational structures and lines of communication within the automotive work environment 1.3. Explain levels of responsibility within specific job roles in automotive workplace. To include: a. trainee b. skilled technician c. supervisor d. manager
2. Be able to work effectively within the organisational structure of the automotive work environment	2.1. Respond promptly and willingly to requests for assistance from customers and colleagues 2.2. Refer customers and colleagues to the correct person should requests fall outside their responsibility and capability
3. Understand the importance of obtaining, interpreting and using information in order to support their job role within the automotive work environment	3.1. Explain the importance of different sources of information in an automotive work environment. 3.2. Explain how to find, interpret and use relevant sources of information 3.3. Describe the main legal requirements relating to the vehicle, including road safety requirements 3.4. Explain the importance of working to recognised procedures and processes 3.5. Explain when replacement units and components must meet the manufacturers' original equipment specification. 3.6. Explain the purpose of how to use identification codes
4. Be able to obtain and use information in order to support their job role within the automotive work environment	4.1. Select and use legal and technical information, in an automotive work environment
5. Understand the importance of different types of communication within the automotive work environment	5.1. Explain where different methods of communication would be used within the automotive environment 5.2. Explain the factors, which can determine your choice of communication. 5.3. Explain how the communication of information can change with the target audience to include uninformed and informed people

6. Be able to communicate with and support colleagues and customers effectively within the automotive work environment	6.1. Use methods of communication with customers and colleagues which meet their needs 6.2. Give customers and colleagues accurate information 6.3. Make requests for assistance from or to customers and colleagues clearly and courteously
7. Understand communication requirements when carrying out vehicle repairs in the automotive work environment	7.1. Explain how to report using written and verbal communication 7.2. Explain the importance of documenting information relating to work carried out in the automotive environment 7.3. Explain the importance of working to agreed timescales
8. Be able to develop and keep good working relationships in the automotive work environment	8.1. Contribute to team work by initiating ideas and co-operating with customers and colleagues 8.2. Treat customers and colleagues in a way which shows respect for their views and opinions 8.3. Make and keep achievable commitments to customers and colleagues 8.4. Inform colleagues promptly of anything likely to affect their own work
9. Understand how to develop good working relationships with colleagues and customers in the automotive workplace	9.1. Describe how to develop positive working relationships with colleagues and customers 9.2. Explain the importance of developing positive working relationships 9.3. Explain the importance of accepting other peoples' views and opinions 9.4 Explain the importance of making and honouring realistic commitments to colleagues and customers
10. Know the purpose of the Automotive Charity, BEN and how the automotive industry supports it	10.1. Describe the purpose of the Automotive Charity, BEN 10.2. Outline how BEN can help employees in the automotive and transportation sector 10.3. State how the automotive industry supports the charity 10.4. Give examples of ways to contact the charity 10.5. State how to make a donation to BEN

Content:

The structure of a typical vehicle repair business

a. How these areas relate to each other within the business
   i. body shop
   ii. vehicle repair workshop
   iii. paint shop
   iv. valeting
   v. vehicle parts store
   vi. main office
   vii. vehicle sales
   viii. reception

b. Sources of information
   i. other staff
   ii. manuals
   iii. parts lists
   iv. computer software and the internet
   v. manufacturer
   vi. diagnostic equipment

Communication requirements when carrying out vehicle repairs

a. Locating and using correct documentation and information for:
   i. recording vehicle maintenance and repairs
   ii. vehicle specifications
   iii. component specifications
   iv. oil and fluid specifications
   v. equipment and tools
   vi. identification codes

b. Procedures for:
   i. referral of problems
   ii. reporting delays
   iii. additional work identified during repair or maintenance
   iv. keeping others informed of progress

Methods of communication

a. Verbal
b. Signs and notices
c. Memos
d. Telephone
e. Electronic mail
f. Vehicle job card
g. Notice boards
h. SMS text messaging
i. Letters

Organisational & customer requirements:

a Importance of time scales to customer and organisation
b Relationship between time and costs
c Meaning of profit

Choice of communication

a. Distance
b. Location
c. Job responsibility

Importance of maintaining positive working relationships:

a Morale
b Productivity
c Company image
d Customer relationships#]
e Colleagues

Know the purpose of the Automotive Charity BEN and how it is supported:

a They provide support and advice to people in the automotive / transportation industries
b Who the charity supports:
   i. those in the automotive industry in times of hardship or distress
c What they support:
   i. welfare
   ii. illness

Content Contd.

- iii. money
- iv. relationship worries
- v. stress
- vi. relationship problems
- vii. care and retirement living

d How to contact the charity:

- i. using the website
- ii. helpline numbers
- iii. text
- iv. leave a message
- v. email
- vi. phone
- vii. online form
- viii. social media
- ix. referral process

e How to support the charity:

- i. volunteering
- ii. hosting events
- iii. company involvement
- iv. backing BEN
- v. performance related giving
- vi. adopt BEN as a charity

f How to make a donation:

- i. online
- ii. purchases from the online shop
- iii. donation form
- iv. gift aid
- v. through your salary
- vi. phone
- vii. post
- viii. direct debit

g Raise awareness of BEN by locating the charity website and their social media links

Evidence Requirements
1. **You must be observed by your assessor** working well with others **on at least 1 occasion** whilst performing your normal duties.

UNIT REF: GA10	UNIT TITLE: TOOLS, EQUIPMENT AND MEASURING DEVICES USED IN THE ACCIDENT REPAIR INDUSTRY

Mapping: This unit is mapped to IMI NOS PO01 and G4	Level: 2	GLH: 26
Rationale: This unit enables the learner to develop the knowledge and skills to select, care and use tools, measuring devices and workshop equipment used in the Accident Repair environment		

LEARNING OUTCOMES The Learner will:	ASSESSMENT CRITERIA The Learner can:
1. Understand how to select, use and care for accident repair tools, equipment and measuring devices	1.1. Explain the purpose and how to use accident repair tools, equipment and measuring devices 1.2. Explain how to prepare and maintain tools, equipment and measuring devices used in the accident repair environment. 1.3. Describe variations of hand tools, equipment and measuring devices to suit specific applications and tasks 1.4. Explain appropriate methods of storing accident repair tools, equipment and measuring devices 1.5. Explain the benefits of undertaking training before using accident repair tools, equipment and measuring devices 1.6. Describe how to prepare and set-up accident repair tools, equipment and measuring devices 1.7 Explain the consequences of using accident repair tools, equipment and measuring devices, which are inaccurate or **NOT** calibrated 1.8. Describe how to dismantle and shut-down accident repair equipment and measuring devices 1.9. Explain the importance and benefits of having an equipment service contract in the accident repair environment 1.10. Describe equipment which has visual and audible alarms and define their meanings 1.11. Report any faulty or damaged tools and equipment to the relevant persons
2. Be able to select, use and care for accident repair tools, equipment and measuring devices	2.1. Work safely whilst using accident repair tools, equipment and measuring devices 2.2. Locate and use manufactures' information to aid the use of accident repair equipment and measuring devices 2.3. Select and use accident repair hand tools, equipment and measuring devices 2.4. Demonstrate how to prepare and maintain tools, equipment and measuring devices which are used in the automotive environment.

	2.5. Select and use different variations of hand tools, equipment and measuring devices to suit specific applications and tasks 2.6. Demonstrate how to store tools, equipment and measuring devices in an appropriate environment 2.7. Participate in training before using tools, equipment and measuring devices which are unfamiliar 2.8. Demonstrate how to prepare and set-up accident repair tools, equipment and measuring devices 2.9. Calibrate accident repair tools, equipment and measuring devices prior to use 2.10. Demonstrate how to dismantle and 'shut-down' accident repair equipment and measuring devices 2.11. Demonstrate the appropriate actions, when visual and audible warnings are observed when using accident repair tools, equipment and measuring devices 2.12. Demonstrate how to report any faulty or damaged tools and equipment to the relevant persons

Content:

Health and Safety:
The appropriate personal health and safety requirements and legislation must be included in this unit and any specific workplace polices highlighted.

See the evidence Requirements for a list of tools, equipment and measuring devices.

Explain the purpose and how to use accident repair tools, equipment and measuring devices
a Techniques when using tools
b How to access safe working practices and instructions
c Manufactures training
d How to use tools in the accident repair environment

Explain how to prepare and maintain tools, equipment and measuring devices used in the accident repair environment.
a. Maintenance procedures
b. Safe working loads
c. Checking for faults and signs of wear
d. Signs of poor performance - low batteries, lack of lubrication, clogged with dust etc.
e. Maintenance contracts and schedules
f. Preparation and set-up procedures - pressures, speeds, voltage, and gas flow etc.
g. Training, manufacturers helplines and instructions / online videos

Describe variations of hand tools, equipment and measuring devices to suit specific applications and tasks
Using the list of tools, equipment and measuring devices within the evidence requirements, include variations on:
a. Designs
b. Types
c. Examples: different types of hammers, dollies, lifting equipment, a spot repair spray gun compared to conventional gravity spray gun, bracket jigs, tower systems and electronic measuring systems.

Explain appropriate methods of storing accident repair tools, equipment and measuring devices
a. Safe storage
b. Dust free
c. Accessible

Content Contd.

d. Organised and easy to see when tools are missing or being used - shadow boards
e. Racking
f. Reducing risks of damage - protection and packaging
g. Security and access

Explain the benefits of undertaking training before using accident repair tools, equipment and measuring devices

a. Reduced risk of accidents
b. Prevents breakages
c. Calibration and settings
d. Familiarisation and confidence
e. Generates a record of professional development
f. Accurate and efficient repairs
g. Reduces labour time
h. Information can be passed onto other colleagues
i. Recognise the limitations of the equipment, tools or measuring device

Describe how to prepare and set-up accident repair tools, equipment and measuring devices

a. How to use manufacturers information
b. Health and safety considerations
c. Changing fittings to adapt tools and equipment to a specific task
d. Adjustments of settings
e. Calibration
f. Check batteries or power supply
g. Processes and procedures
h. Testing and test pieces

Explain the consequences of using accident repair tools, equipment and measuring devices, which are inaccurate or NOT calibrated

a. Inaccurate readings, pressures and settings
b. Poor quality and unsafe repairs / results
c. Faults and defects
d. Misalignments
e. Dangerous / poor vehicle handling
f. Legal issues
g. Damage to vehicles, equipment, tools and measuring devices
h. Health and safety issues and accidents

Describe how to dismantle and shut-down accident repair equipment and measuring devices

a. Manufacturers guidelines
b. Processes and procedures - releasing pressures, order of dismantling or shutting down equipment
c. Reasons for specific shut-down methods
d. Precautions and health and safety
e. Consequences of performing incorrect dismantling and shut-down procedures

Explain the importance and benefits of having an equipment service contract in the accident repair environment

a. Equipment remains operative
b. Safety checks
c. Satisfies insurance polices
d. Satisfies legislation
e. Provides an audit trail
f. Maintains the equipment in a serviceable condition
g. Call out facility to repair breakdowns and faults
h. Parts are replaced before breakdowns occur
i. Assessment of equipment life
j. Link to maintenance such as: Air quality checks, spray booth clearance times and portable / fixed extraction effectiveness

Describe equipment which has visual and audible alarms and define their meanings

a. Examples include: spray booth light connected to the fire alarm
b. Alarm indicating positive spray booth pressure
c. Lights on equipment - low fuel on a pressure washer
d. Welding equipment
e. Electronic paint thickness gauges

Content Contd.

f. Importance of visual and audible alarms - noisy environments, prevent damage of vehicles and equipment, indicate specifics tests, such as readings on a multimeter

Report any faulty or damaged tools and equipment to the relevant persons

a. The importance of reporting faulty tools and equipment
b. The consequences of failing to report faulty tools and equipment
c. Identify the person(s) to report any faults
d. Methods of recording the faults
e. How to file and log records of faulty equipment
f. Processes and procedures for taking equipment out of service

Evidence Requirements	
1. **You must be observed** preparing, using and carryout basic routine checks on: **2** accident repair tools **1** piece of equipment **1** measuring device which covers the learning outcomes. **Note: Evidence for this unit may be mapped to practical tasks and other units within the qualification**	
Tools	
Spray guns	Chisels
Sanders	Hammer and panel hammers
Polishers	Dollies
Masking dispensers	Contour / profile gauges
Screwdrivers	Sealant / adhesive guns
Types of spanner	Punches
Sockets	Saws / cutters
Torque wrenches	Pliers
Pressure washer	Trim tool
Clamps / Grips	Impact guns
Files	Ratchet
Equipment	
Spray booth	MIG brazing equipment
Paint mixing equipment / scheme	Resistance spot welding equipment
Spray gun cleaner	MAG welding equipment
Air regulator / filter	Riveting equipment
Smart scales	Paintless dent removal equipment
Lifting equipment	Vehicle moving equipment / trollies
Panel stands	Dent pulling equipment
Induction / heating equipment	Parts cleaner
Battery chargers	Axel stands
Measuring Devices	
Smart / paint scales	Tram gauge
Paint thickness gauge	Vernier calliper
Wet paint gauges / combs	Micrometer
Mixing stick	Dial gauges
Viscosity cup	Vehicle alignment systems / jigs
Wheel alignment systems	Headlight alignment equipment
Multimeter	Panel gap gauges, tape or rule

UNIT REF: L2BRS	UNIT TITLE: PREPARE, CARRY OUT AND REPORT ON REPAIRS TO EXTERNAL BODY PANELS

Mapping: This unit is mapped to the IMI NOS GO102, G3, BP02, BP06, BP05	Level: 2	GLH: 50
Rationale: This unit enables the learner to develop an understanding, knowledge and skills of carrying out repairs to exterior body panels using a variety of techniques. The learner **must** demonstrate how meaningful employer involvement has benefitted them during the delivery and/or the assessment of this synoptic unit.		

LEARNING OUTCOMES The Learner will:	ASSESSMENT CRITERIA The Learner can:
1. Be able to produce a plan and prepare the work area	1.1. Produce a detailed plan, prior to carrying out the work activity, of the work to be completed including: a. Tools and equipment required b. Methods required c. Cleaning/conditioning materials required d. Consumables required e. Technical data required f. Personal Protective Equipment 1.2. Prepare the work area prior to commencement of the work activity
2. Understand the principles of selection and use of appropriate tools and equipment in minor repairs on motor vehicle exterior body panels	2.1. Identify tools used in the repair of metal finishing and plastic repairs 2.2. Identify tools to carry out reshaping work including specialist dent removal tools 2.3. Describe how to prepare, test, use and maintain the hand and power tools required to prepare damage and reshape damaged areas
3. Be able to work safely when carrying out minor repairs to motor vehicle exterior body panels	3.1. Use suitable personal protective equipment and vehicle coverings throughout all repair activities 3.2. Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
4. Understand material types and properties used in minor repairs on motor vehicle exterior body panels	4.1. Identify the properties and different types of materials used in the construction of vehicle bodies 4.2. Describe the properties and use of metals used to manufacturer body panels 4.3. Identify the properties and safe use of types of filling materials used to repair panels 4.4. Explain how to mix and apply plastic fillers 4.5. Describe the techniques for identifying the type of plastic used for manufactured components 4.6. Identify and describe the different types and grades of abrasive paper and their use

5. Be able to use relevant information to carry out the task	5.1. Select suitable sources of technical information to support motor vehicle removal and fitting activities including: a. manufacturers' instructions b. vehicle technical data c. removal and fitting procedures d. any legal requirements 5.2. Use technical information to support motor vehicle removal and fitting activities
6. Understand how to carry out minor repairs to motor vehicle exterior body panels	6.1. Describe how to prepare the vehicle to avoid further damage and panel contamination 6.2. Describe how to prepare damaged areas to facilitate repairs 6.3. Describe how to rough out and metal finish body panels 6.4. Identify the procedures involved to reshape filling materials to match the original contour 6.5. Describe how to finish repairs to a suitable agreed condition to enable the next stage of repairs to proceed 6.6. Identify the procedures for repairing damage to plastic components including thermal and adhesive techniques 6.7. Describe the techniques used to regain the contours of repaired plastic components 6.8. Identify and describe the techniques for reshaping damaged body panels using hand and specialist tools 6.9. Describe the methods used to check for panel contours for accuracy after reshaping 6.10. Explain the procedures for reinstating anti corrosion, sealant and sound deadening materials 6.11. Describe the aspects of pedestrian safety in relation to the reparability of vehicles
7. Be able to use appropriate tools and equipment	7.1. Check that equipment has been calibrated to meet manufacturers' requirements 7.2. Use the correct tools and equipment in the way specified by manufacturers when carrying out repairs to motor vehicle exterior body panels
8. Be able to carry out minor repairs to motor vehicle exterior body panels	8.1. Identify prior to working on the vehicle the component materials involved that will be worked on during the repair 8.2. Carry out minor repairs to motor vehicle exterior body panels so they are restored to their original contour using hand tools and filling materials effectively

	8.3. Carry out minor repairs to motor vehicle exterior body panels adhering to specifications and tolerances for the vehicle and following: a. the manufacturer's approved removal and fitting methods b. recognised removal and fitting methods c. health and safety requirements d. workplace procedures 8.4. Replace any sealer, anti corrosion and sound deadening materials which were prior to the repair and conforming to the manufacturers specification 8.5. Ensure all plastic repairs regain the strength of the original part 8.6. Ensure any damage is minimised to mating surfaces. Any damage caused should be correctly reinstated. 8.7. Ensure all completed repairs are finished to and agreed standard ready for the refinishing process
9. Be able to record information and make suitable recommendations	9.1. Produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 9.2. Make suitable and justifiable recommendations for cost effective repairs 9.3. Record and report any additional faults noticed during the course of their work promptly in the format required
10. Be able to demonstrate the benefits of the meaningful employer involvement obtained	10.1 State the type and duration of the meaningful employer involvement 10.2 Explain how the meaningful employer involvement has benefitted them during the completion of this work activity

This unit has been designed to be a 'synoptic' assessment for the Level 2 Vehicle Accident Repair - Body qualification. As such this must be the final unit to be assessed, following successful achievement of all the other mandatory units within groups A, C, D

The content for this unit is a combination of the content within the mandatory units within the Level 2 Vehicle Accident Repair - Body qualification. Please refer to the 'content' of each of the following units when preparing to undertake this unit:

GA0102 – Health, Safety and Good Housekeeping in the Automotive Environment
GA3 – Support for Job Roles in the Automotive Environment
BR02 – Remove and Fit Non-Permanently Fixed Automotive Body Panels
BR05 – Remove and Replace Exterior Automotive Body Panels Including Permanently Fixed Components
BR19 – Automotive Metal Active Gas (MAG) Welding
BR26 – Knowledge of Automotive Construction and Materials

Examples of recognised meaningful employer involvement are limited to:

a. structured work experience which develops skills and knowledge relevant to the qualification
b. structured work placement which develops skills and knowledge relevant to the qualification

Content Contd.

c. undertaking project(s), exercises and/or assessments/examination(s) set with input from industry practitioners
d. taking one or more units delivered or co-delivered by an industry practitioner(s) (master class or guest lectures)
e. industry practitioners operating as 'expert witnesses' which contributes to the assessment of the learner's work or practice, operating within a specified assessment framework. This could be a specific project(s), exercise(s) or assessment for the qualification

Examples of unrecognised employer involvement include:

a. employer hosted visits
b. employers providing premises, facilities or equipment
c. employers or industry practitioners providing talks or contributing to delivery on employability, careers advice, CV writing or interview training
d. learner attendance at careers fairs, events or other networking opportunities
e. simulated or provider-based working environments
f. employers providing learners with job references

Evidence Requirements
1. **You must be observed by your assessor** carrying out each of the following repairs listed below, which covers the learning outcomes
• body filling and finishing of flat areas of panel
• repairs to dents that are over 70mm in diameter in exterior body panels, including curvature panels and swage lines
• repairs to scuffs on plastic components
2. **You must be observed by your assessor** in each of the techniques and processes listed below in carrying out the repairs listed above
• hot shrinking
• panel pulling
• metal finishing
• indirect hammering
• direct hammering
• body filing
• application of body filler/stopper

UNIT REF: BR02	UNIT TITLE: REMOVE AND FIT NON-PERMANENTLY FIXED AUTOMOTIVE BODY PANELS

Mapping: This unit is mapped to the IMI NOS BP02	Level: 2	GLH: 53
Rationale: This unit enables the learner to develop the knowledge and skills in carrying out the removal and fitting of non-permanently fixed vehicle panels such as wings, doors, bonnets, boot lids and tailgates.		

LEARNING OUTCOMES The Learner will:	ASSESSMENT CRITERIA The Learner can:
1. Understand how to remove and fit non-permanently fixed motor vehicle body panels	1.1. Describe different types of information which is used to aid the removal and refitting of vehicle panels 1.2. Explain the procedures involved in working with supplementary safety systems 1.3. Describe the methods and procedures for storing removed vehicle body panels 1.4. Identify the different types of fastenings and fixings and their reasons for use 1.5. Compare the differences in removing different body panels which are not permanently fixed to include: a. wings b. doors c. bonnets d. boot lids e. tailgates 1.6. Describe the procedures and methods used to align body panels and the consequences of misalignment 1.7 Describe the quality checks which are carried out after removing and refitting body panels 1.8. Explain the procedures used to ensure the vehicle and its systems conform to the original specification 1.9. Explain the procedure for reporting vehicle damage which previously existed or has been caused during panel removal and refitting
2. Be able to carry out removal and fitting of non-permanently fixed vehicle panels	2.1. Perform tasks safely and without a risk of injuring other people or causing damage to the vehicle or the environment 2.2. Use coverings to protect the vehicle whilst removing and refitting body panels 2.3. Select suitable sources of technical information to support the removal and refitting of body panels to include: researched repair methods 2.4. Select and use the appropriate tools and equipment for carrying out removal and fitting of non-permanently fixed vehicle panels

	2.5. Demonstrate methods and techniques in removing and refitting vehicle body panels to the manufacturers specifications and tolerances 2.6. Demonstrate how and where to store any removed vehicle panels, components or trim 2.7. Demonstrate how to align panels to the manufactures / researched repair methods specifications 2.8. Assess and check the quality of the work and confirm it meets the required standard to progress to the next stage 2.9. Report any vehicle damage which previously existed or has been caused during panel removal and refitting 2.10. Perform cleaning tasks whilst removing and refitting body panels and leave the work area in a safe condition on completion
3. Be able to record information and make recommendations	3.1. Produce work records which are relevant to removing and refitting non-permanently fixed body panels 3.2. Produce information to justify the repair methods 3.3. Record and report any additional faults found during removing and refitting body panels

Content.

Health and Safety:
The appropriate personal health and safety requirements and legislation must be included in this unit and any specific workplace polices highlighted.

Describe different types of information which is used to aid the removal and refitting of vehicle panels
a. Vehicle information
b. Manufactures information
c. Research repair methods

Explain the procedures involved in working with supplementary safety systems
a. Isolating the vehicle
b. Manufactures information on removal, refitting and storage
c. Legal requirements - airbags etc.
d. Warning lights and faults
e. Fault codes and diagnosis
f. Implications of incorrect removal and refitting

Describe the methods and procedures for storing removed vehicle body panels
a. Examples of good and bad practice
b. Safe, secure and clean environments
c. Storage organisation and management
d.

Identify the different types of fastenings and fixings and their reasons for use:
a. Locking devices
b. Rivets
c. Self-tapping screws
d. Bolts
e. Nuts

Content Contd.

f. Rivnuts
g. Metal and plastic clips
h. Screws

Compare the differences in removing different body panels which are not permanently fixed to include:

a. wings
b. doors
c. bonnets
d. boot lids
e. tailgates
   i. Methods and techniques for safe removal
   ii. Tightening torque settings
   iii. Panel stands and trestles
   iv. MET - wiring, cables, components location and methods of refitting
   v. Methods to assist reassembly - marking, photographs, notes and repair methods information

Describe the procedures and methods used to align body panels and the consequences of misalignment

a. Use of technical data
b. Body lines and swages
c. Working with others
d. Avoiding damage
e. Preparation for fitting
f. Adjustment methods
g. Methods to measure panel gaps

Describe the quality checks which are carried out after removing and refitting body panels

a. Additional damage
b. Corrosion protection replacement / damage
c. Alignment
d. MET checks - operation and specification

Explain the procedures used to ensure the vehicle and its systems conform to the original specification

a. How to record information
b. Comparing information to the original specification
c. Legal requirements and measurements

Explain the procedure for reporting vehicle damage which previously existed or has been caused during panel removal and refitting

a. Methods of recording
b. Witnesses
c. Signatures
d. Involvement with customers
e. Inspection methods

Perform tasks safely and without a risk of injuring other people or causing damage to the vehicle or the environment

a. Safe methods of working
b. Hazards and risks involved with the task
c. Reducing risks
d. Recognising risks

Use coverings to protect the vehicle whilst removing and refitting body panels

a. Cleanliness of covers
b. What is fit for the purpose
c. Dispensers and tools for vehicle coverings
d. When and where to use coverings
e. Types and storage of vehicle covers

Select suitable sources of technical information to support the removal and refitting of body panels to include:

a. Researched repair methods
b. Vehicle data

Content Contd.

c. Manufacturer specific researched repair methods
d. Body alignment data

Select and use the appropriate tools and equipment for carrying out removal and fitting of non-permanently fixed vehicle panels

a. Trim tools
b. Lifting equipment
c. Hand tools
d. Measuring tools
e. Test equipment

Demonstrate methods and techniques in removing and refitting vehicle body panels to the manufacturers specifications and tolerances

a. Following repair research methods
b. Interpreting information
c. Logical sequences of removing and refitting panels
d. Alignment before final tightening
e. Storage of fastenings and fixings
f. Positioning of fixings
g. Assessing fixings and fastenings and their condition

Evidence Requirements
1. **You must produce evidence** of removing and replacing **3 out of the 5** panels listed below, which covers the learning outcomes.
• wings
• doors
• bonnets
• boot lids
• tailgates

UNIT REF: BR05	UNIT TITLE: REMOVE AND REPLACE EXTERIOR AUTOMOTIVE BODY PANELS INCLUDING PERMANENTLY FIXED COMPONENTS

Mapping: This unit is mapped to the IMI NOS BP05	Level: 2	GLH: 65
Rationale: This unit enables the learner to develop an understanding, knowledge and skills of carrying out removal and refitting of exterior panels using mechanical fastening, adhesive bonding, welding and joining techniques.		

LEARNING OUTCOMES The Learner will:	ASSESSMENT CRITERIA The Learner can:
1. Understand the material types and properties used in removing and replacing exterior vehicle panels	1.1. Identify the types and properties of materials used in the construction of vehicle bodies 1.2. Describe the properties of materials used in vehicle body construction 1.3. Identify the safe use of body sealants, adhesives, and anti corrosion materials 1.4. Describe the correct type of sealant used in a given application in removing and replacing body panels 1.5. Describe how to apply sealants and anti corrosion materials following manufacturers recommended methods
2. Understand how to carry out removal and replacing of fixed and non-permanently fixed exterior vehicle body panels including fixed panels	2.1. Identify the procedures involved in carry out the removal of manufacturers original joining methods 2.2. Identify the procedures involved in carry out the replacement of fixed and non-permanently fixed panels using recognised joining techniques 2.3. Identify the procedures involved in working with supplementary safety systems when replacing fixed and non-permanently fixed exterior body panels 2.4. Explain the need for correct alignment of body panels and the methods used to achieve. 2.5. Identify the types of quality checks that can be used to ensure correct alignment, contouring and operation of panels to meet manufacturers specifications 2.6. Describe the methods and procedures for correctly storing components in accordance with any local legal requirements 2.7. Identify the different types of fasteners, fixings and adhesive bonding used in the removal and replacement of vehicle body panels 2.8. Explain the reasons for the use of different types of fastenings, fixings and adhesives used in vehicle body panel replacement

	2.9. Identify the procedures involved in carry out the systematic replacement of vehicle panels using fastenings, fixings and adhesives bonding techniques 2.10. Describe how panel removal and replacement affects the overall body structure 2.11. Identify the manufacturers approved methods of working for the removal and replacement of exterior body panels 2.12. Identify correct vehicle systems against vehicle specification on completion 2.13. Explain the procedure for reporting damage caused to the vehicle during the panel replacement activities
3. Be able to work safely when carrying out removal and replacement of exterior automotive including permanently fixed panels	3.1. Use suitable personal and vehicle protection equipment throughout all removal and replacement activities 3.2. Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
4. Be able to use relevant information to carry out the task	4.1. Select suitable sources of technical information for correctly removing and fitting activities including: a. vehicle technical data b. removal and fitting procedures c. any legal requirements 4.2. Use technical information to support automotive removal and fitting activities
5. Be able to use appropriate tools and equipment	5.1. Select the appropriate tools and equipment necessary for carrying out removal and fitting of exterior body panels including permanently fixed vehicle panels 5.2. Establish whether the equipment has been calibrated to meet manufacturers' requirements 5.3. Use the appropriate tools and equipment in the way specified by manufacturers when carrying out removal and fitting exterior body panels including permanently fixed panels
6. Be able to carry out removal and fitting of exterior vehicle panels including permanently fixed panels	6.1. Identify prior to working on the vehicle the component materials involved that will be worked on during the repair 6.2. Remove and re-fit adjacent exterior body panels including those that are permanently fixed 6.3. Carry out removal and fitting of exterior body panels including permanently fixed vehicle panels adhering to specifications and tolerances for the vehicle and following: a. recognised removal and fitting methods b. health and safety requirements c. workplace procedures

	6.4. Use and apply sealants and anti corrosion materials as detailed in the manufacturers specification 6.5. Ensure that the replacement panels conform to the vehicle specifications for dimension, material and functional capability 6.6. Ensure the components are realigned correctly in a way which regains their original manufactured tolerance 6.7. Ensure any damage is minimised to surrounding surfaces. Any damage caused should be correctly rectified. 6.8. Ensure permanently fixed panels are replaced without damaging vehicle systems 6.9. Ensure all components and panels are stored safely and in the correct location
7. Be able to record information and make suitable recommendations	7.1. Produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 7.2. Make suitable and justifiable recommendations for cost effective repairs 7.3 Identify and report any expected delays in completion to the relevant person(s) promptly in the format required. 7.4 Record and report any additional faults noticed during the course of their work promptly in the format required

Content:

Selection and use of materials

a. The properties and different types of materials used in the construction of vehicle bodies
b. The properties and safe use of body component sealers, adhesives and anti-corrosion materials.
c. The type of sealants and anti-corrosion materials to use and the manufacturer's recommended methods for their application and thickness.
d. How to apply sealants and anti-corrosion materials.

Remove and fit of non welded body panels

a How to find, interpret and use sources of information applicable to the removal and fitting of non welded body panels.
b How to select, check and use all the tools and equipment required to remove and fit non welded structural body panels
c The different types of mechanical fixings for non welded body panels and when and why they should be used
d The correct procedures and processes for removing and fitting of non welded body panels.
e The need for correct alignment of panels and methods to achieve this:
  i. Aperture gaps
  ii. Alignment of panel features
  iii. Best fit of components to panels
  iv. Operation of openings such as doors, tailgates, bonnets etc.
f. The types of quality control checks that can be used to ensure correct alignment and contour of panel and operation of components to manufacturer's specification.
g. The method of storing removed panels and the importance of storing them correctly.

Content Contd.

Remove and replace of welded body panels

a. Explain principles of welding.
b. How to spot and MIG weld vehicle panels.
c. How to remove spot and MIG welded vehicle panels.
d. How to interpret and use sources of information relevant to the removal and refitting of non-stressed body panels.
e. The need for correct alignment of panels and the methods used to achieve this.
f. The types of quality control checks that can be used to ensure correct alignment and contour of panels and operation of components to manufacturer's specification.
g. How to work safely avoiding damage to the vehicle and its systems.
h. The methods of storing removed panels and the impotence of storing them correctly.
i. The removal and replacement procedures for body panels using mechanical fastening, adhesive bonding and welding techniques.
j. How panel removal and refitting affects the overall body structure of the vehicle. The manufacturers approved methods of working for the removal and replacement of body panels including:
    i. MIG MAG
    ii. MIG braze
    iii. Resistance spot
    iv. Adhesive bonding
    v. Laser
    vi. Laser stitch
    vii. Mechanical fastening

Evidence Requirements
1. **You must be observed by your assessor** carrying out the removal and replacement of vehicle body panels in combinations of **3 or more** adjacent panels, **one** of which should be permanently fixed e.g. welded or bonded. All learning outcomes must be covered.
Examples of combinations: a. combinations of **3 or more** adjacent panels, one of which should be permanently fixed (Examples include: two doors and a wing, two wings and a bonnet; bonnet, wing and door on the same side; bumper, wing, and bonnet)
b. welded panels could include; front panels; including headlamp panel, bonnet landing panel, lower cross member.

UNIT REF: BR19	UNIT TITLE: AUTOMOTIVE METAL ACTIVE GAS (MAG) WELDING

Mapping: This unit is mapped to the IMI NOS BP19	Level: 2	GLH: 73
Rationale: This unit enables the learner to develop an understanding, knowledge and skills of joining carbon steels using Metal Active Gas Shielding (MAGS) welding techniques		

LEARNING OUTCOMES The Learner will:	ASSESSMENT CRITERIA The Learner can:
1. Understand how to work safely when carrying out motor vehicle body MAGS welding operations	1.1. Describe health and safety requirements relating to the joining of carbon steels using MAG welding techniques 1.2. Describe the importance of selecting, using and maintaining the appropriate personal protective equipment when joining carbon steels using MAG welding techniques 1.3. Describe the requirements for protecting the vehicle and contents from damage before, during and after the joining of carbon steels by MAG welding techniques
2. Be able to use relevant information to carry out the task	2.1. Use suitable personal and vehicle protection equipment throughout all automotive MAG welding operations 2.2. Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
3. Understand how to select, check, use and maintain appropriate tools and equipment used in motor vehicle body MAGS welding operations	3.1. Explain the use of all tools and equipment required to join carbon steels using MAG welding techniques 3.2. Describe, within the scope of their responsibilities, how to select, prepare and maintain the tools and equipment required to join carbon steels using MAG welding techniques
4. Be able to use relevant information to carry out the task	4.1. Select suitable sources of technical information to support automotive MAG welding operation activities including: a. vehicle technical data b. welding procedures c. any legal requirements 4.2. Use technical information to support automotive MAG welding operation activities
5. Understand how to carry out motor vehicle body MAGS welding operations	5.1. Explain the importance of correct surface preparation methods to ensure a good MAG weld is achieved 5.2. Identify the need for correct alignment and mating of carbon steels and the methods used to achieve this in MAGS welding

	5.3. Describe the welding techniques used in MAG welding to include: a. plug b. lap c. butt d. fillet 5.4. Identify the faults and defects that can occur when MAG welding 5.5. Identify common causes which result in faults and defects 5.6. Describe the quality control measures that can be used to help ensure correct joining of carbon steels before, during and after the welding process 5.7. Describe how to inspect and assess MAG welding in accordance to Industry Standards 5.8. Compare the advantages and disadvantages of MAG welding over other welding methods 5.9. Explain the importance and implications of checking and carrying out weld test pieces prior to carrying out the welding process
6. Be able to use appropriate tools and equipment	6.1. Select the appropriate tools and equipment necessary for carrying out automotive MAG welding operations 6.2. Ensure all tools and equipment that are required are in a safe working condition 6.3. Set up and use the appropriate tools and equipment in the way specified by manufacturers when carrying automotive MAG welding operations 6.4. Clean and store PPE and equipment in the appropriate manner
7. Be able to carry out motor vehicle body MAGS welding operations	7.1. Prepare surface to ensure a good MAG weld is achieved 7.2. Ensure alignment, mating and treatment of flanges to enable a suitable join to be achieved 7.3. Conduct MAG weld operations including: a. lap plug b. lap seam c. butt joint d. fillet joint 7.4. Conduct MAGS weld operations following: a. manufacturers processes, methods and procedures b. test procedures to provide test coupons on equivalent material in accordance with Industry Standards c. recognised researched repair methods

	7.5. Dress the weld area without reducing material thickness and protect the area to inhibit corrosion where applicable 7.6. Recognise when the weld is not forming correctly and what action needs to be taken 7.7. Inspect and assess quality of welds in accordance with Industry Standards and manufacturers specification 7.8. Avoid damaging other components, units, panels and surfaces on the vehicle and the surrounding work area. Any damage caused should be correctly reinstated 7.9. Ensure no damage is incurred to other vehicle systems when MAG welding 7.10 Store and record all weld test pieces
8. Be able to record information and make suitable recommendations	8.1. Produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 8.2. Make suitable and justifiable recommendations for cost effective repairs 8.3. Identify and report any expected delays in completion to the relevant person(s) promptly in the format required. 8.4. Record and report any additional faults noticed during the course of their work promptly in the format required

Content:

a The safe working practices and procedures to be observed when working with MAG or cored wire arc welding equipment
   i. general workshop and site safety
   ii. appropriate personal protective equipment
   iii. fire prevention
   iv. protecting other workers from the effects of the welding arc
   v. safety in enclosed/confined Spaces
   vi. fume control
   vii. accident procedure
   viii. statutory requirements, risk assessment procedures
   ix. safe disposal of waste materials

b The correct handling and storage of gas cylinders
   i. manual handling and use of cylinder trolleys
   ii. leak detection procedures
   iii. relevant codes of practice
   iv. cylinder identification
   v. gas/cylinder pressures
   vi. cylinder and equipment safety features
   vii. emergency shutdown procedures

c The hazards associated with MIG/MAG welding
   i. live electrical components

Content Contd.

- ii. current return lead (earth return)
- iii. the electric arc
- iv. fumes and gases
- v. gas supply leaks
- vi. spatter
- vii. hot slag and metal
- viii. elevated working
- ix. enclosed spaces
- x. slips, trips and falls, and how they can be minimised

d The MAG or cored wire arc welding process
- i. principles of fusion welding
- ii. AC and DC power sources
- iii. ancillary equipment
- iv. power ranges (parameters)
- v. care of equipment

e The consumables associated with MAG or cored wire arc welding
- i. types of wire and their application (solid and cored)
- ii. types of shielding gas and their application
- iii. gas supply and control

f The types of welded joints to be produced
- i. fillet and butt welds
- ii. single and multi-run welds
- iii. sheet and sections
- iv. welding positions

g Setting up and restraining the joint
- i. the use of jigs and fixtures
- ii. manipulators and positions
- iii. restraining devices
- iv. tack welding size and spacing in relationship to material thickness

h Preparing the welding equipment and checks that need to be made to ensure that it is safe and ready to use
- i. electrical connections
- ii. power return and current return (earth return)
- iii. wire feed mechanisms
- iv. gas supply
- v. setting welding parameters
- vi. correct joint set-up
- vii. cleanliness of materials used
- viii. calibration before use
- ix. routine care and maintenance of equipment

i The techniques of operating the welding equipment to produce a range of joints in the various joint positions
- i. fine tuning parameters
- ii. correct manipulation of the welding gun
- iii. safe closing down of the welding equipment

j The importance of complying with job instructions and the welding procedure specification

k Problems that can occur with the welding activities and how these can be overcome
- i. causes of distortion and methods of control
- ii. effects of welding on materials
- iii. sources of weld defects and methods of prevention

l The importance and usage of organisational quality systems used and weld standards to be achieved; weld inspection and test procedures used (including visual and non-destructive tests)

m Personal approval tests, and their applicability to your work

n The extent of your own authority and whom you should report to if you have problems that you cannot resolve

o. Reporting lines and procedures, line supervision and technical experts

Evidence Requirements
1. **You must be observed by your assessor** carrying out **all** of the different types of joints listed below to join materials using MAGS welding. All learning outcomes must be covered
• lap plug
• lap seam
• butt joint
• fillet joint

UNIT REF: BR26	UNIT TITLE: KNOWLEDGE OF AUTOMOTIVE CONSTRUCTION AND MATERIALS

Mapping: This unit is mapped to the IMI NOS BP26	Level: 2	GLH: 31
Rationale: This unit enables the learner to develop the knowledge and understanding of types of metals and composites used in the construction of motor vehicles, the areas where these materials are used and what their properties are. It is also about the design and construction techniques used in the vehicle body and chassis.		

LEARNING OUTCOMES The Learner will:	ASSESSMENT CRITERIA The Learner can:
1. Understand material types and properties used in motor vehicle construction	1.1. Describe the properties and different types of materials used in the construction of vehicle bodies including: a. mild steel b. ultra high strength steel c. aluminium alloys d. stainless steel e. plastics f. composites g. trim materials h. glass 1.2. Identify the types of materials used in the construction of vehicle bodies and chassis components 1.3. Explain the properties of materials used in vehicle body construction 1.4. Describe how different materials used in the construction of motor vehicles react with each other 1.5. Describe the importance of cleanliness and avoiding cross contamination when working with different materials 1.6. Describe the importance of selecting and using the appropriate joining techniques for the type of material
2. Understand how the different types of materials and formation methods affect the construction	2.1. Explain the principles of chassis frame and monocoque vehicle construction 2.2. Identify the different types of chassis designs used for modern vehicles, including commercials 2.3. Explain the effects on strength once the overall body structure is complete 2.4. Identify the different body and chassis components that are made using different materials, including the advantages and disadvantages 2.5. Describe how crumple zones affect the safety, design, cost and construction of motor vehicle bodies and chassis

	2.6. Describe how the type of material used affects the safety, design, cost and construction of motor vehicle bodies and chassis 2.7. Identify the implications of recycling of vehicle bodies and chassis components, now and in the future
3. Understand how damage to the construction of a motor vehicle will affect its safety	3.1. Describe how to carry out a vehicle inspection to assess for damage 3.2. Describe how to check a vehicle for correct alignment 3.3. Describe how manipulation of the vehicle body and chassis will affect its residual strength

Content:

Common forms in which body repair materials are supplied

a. Identify the common forms of supply of metals to include:
   i. sheet
   ii. roll
   iii. bar
   iv. section
b. Identify common forms of supply for non metals:
   i. solid
   ii. liquid
   iii. composites
   iv. laminated

Mechanical properties and use examples of materials to illustrate these properties

a. Define the three states of matter.
b. State the definitions of the following mechanical properties:
   i. ductility
   ii. malleability
   iii. hardness
   iv. toughness
   v. elasticity
   vi. plasticity
   vii. weld ability
   viii. conductivity
   ix. insulation
c. Give examples of materials and components exhibiting the above properties.
d. Describe ways in which the above properties can be changed temporarily or permanently to include:
   i. heating
   ii. alloying
   iii. cold working
   iv. heat treatments

Define and distinguish between classes of materials

a. Define classes of materials as:
   i. metals
   ii. non metals
   iii. synthetic
   iv. natural
b. Classify metals into:
   i. ferrous
   ii. non ferrous
   iii. pure metals
   iv. alloys

Content Contd.

Factors which affect the selection of listed materials

a. Identify the range of selection factors which determine the use of materials to include:
   i. material costs
   ii. suitability for use
   iii. form of supply
   iv. joining characteristics
   v. strength
   vi. material properties
   vii. corrosion resistance
   viii. melting point
b. Compare the factors effecting the use of:
   i. pure metals
   ii. alloys
   iii. plastics

Understand the Importance of melting points of the following:

a. Low Carbon steel
b. aluminium alloy
c. stainless steel
d. solder
e. common plastics

Listed materials used in repair or construction

a. Identify the types and properties of steels used in construction and repair to include:
   i. low carbon steels
   ii. medium carbon steels
   iii. high carbon steels
   iv. cast irons
   v. alloy steels
   vi. Ultra High Strength Steel
b. Describe the properties of common non ferrous metals used in construction and repair to include:
   i. aluminium
   ii. zinc
   iii. lead
   iv. tin
   v. copper
c. Compare and identify listed non-metals used in repair or construction to include:
   i. plastics
   ii. glass
   iii. fabrics
   iv. leather
   v. rubber
d. Define the terms:
   i. thermo plastic
   ii. thermo setting plastics
e. Identify the uses and properties of materials used for interior furnishings such as:
   i. rubber
   ii. fabric
   iii. leather
   iv. glass

Give examples of common plastics used in repair and construction including:

a. ABS (Acrylonitrile Butadiene Styrene) plastic
b. polyethylene
c. polypropylene
d. polyester
e. acrylic
f. glass reinforced plastic

State the constituents and general properties of the following alloys:

a. solder
b. stainless steel

Content Contd.

c. low carbon steel
d. brass
e. aluminium alloys including duralumin

Ways in which the properties of metals can be changed temporarily of permanently

a. Explain the advantages of changing the material properties temporarily
b. Explain the effects of changing the material properties permanently
c. State the advantages of changing materials properties
d. State that material properties can be changed by:
    i. heat treatment
    ii. cold working
    iii. alloying
e. Describe how the properties of metals are changed under the above three headings

Causes of corrosion in steel car bodies

a. Explain the principle of oxidation to include:
    i. simple corrosion cell
    ii. combination with oxygen
    iii. effects of an electrolyte
    iv. effects of dissimilar metals
b. Identify reasons for corrosion in vehicles to include:
    i. bad joint design
    ii. poor protection
    iii. stone chips
    iv. water leaks
    v. industrial pollution
c. Explain that methods of corrosion protection can include:
    i. protective metal coatings
    ii. protective non-metal coatings
    iii. cavity waxes
    iv. anti chip coatings
    v. sealers
d. Describe the effects of corrosion in a vehicle body to include:
    i. loss of strength
    ii. manufacturers warranty consideration
    iii. loss of appearance

Characteristics of body assemblies

a. Describe methods of producing body panels to include:
    i. forming
    ii. pressing
    iii. moulding
b. Describe the methods of imparting strength to sheet metal to include:
    i. swages
    ii. edging
    iii. forming into sections
    iv. combining sections into box sections
    v. the principles of crowned panels
c. Describe the characteristics of monocoque structures.
d. Describe the characteristics of separate construction.
e. Identify by name and description of use, the following:
    i. sill panel
    ii. bulkhead
    iii. chassis leg
    iv. inner flitch
    v. cross member
    vi. a, b, c and d posts

Content Contd.

vii. roof
viii. cant rail
ix. windscreen header rails
x. floor assembly
xi. inner wheel arches
xii. dog leg
xiii. scuttle panels
xiv. front panel
xv. headlamp mounting panels
xvi. back panel

No Evidence Requirements