

Level 2 and 3 Diploma in Accident Repair Body Competence (4271-12/13)

May 2011

Version 3.3 (September 2013)



Qualification at a glance

Subject area	Accident Repair Body Competence
City & Guilds number	4271
Age group approved	16-18, 19+
Assessment	Portfolio of Evidence and Online Multiple Choice
Fast track	Not available. Automatic approval applies in some cases
Support materials	Centre handbook Practical Assessment workbook
Registration and certification	Consult the Walled Garden/online catalogue for last dates

Title and level	City & Guilds number	Accreditation number
Level 2 Diploma in Accident Repair Body Competence	4271-12	501/0022/1
Level 3 Diploma in Accident Repair Body Competence	4271-13	500/9991/7

Version and date	Change detail	Section
2.0 Nov 2012	Corrected typographical errors	All
3.0 Feb 2013	Replaced incorrect unit content – Units 113 + 163	Units
3.1 June 2013	Corrected typographical error in Unit 167	Unit 167
3.2 July 2013	Amended Unit 172 learning outcome 2	Unit 172
3.3 September	Unit supporting information updated with introductory text	Units



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Unit 152	Knowledge of removing and fitting non permanently fixed motor vehicle body panels	114
Unit 155	Knowledge of removing and replacing exterior motor vehicle body panels including permanently fixed components	117
Unit 156	Knowledge of minor motor vehicle exterior body panel repairs	121
Unit 163	Knowledge of Removing and Replacing Structural Motor Vehicle Body Panels	125
Unit 164	Knowledge of motor vehicle body panel major repairs	129
Unit 167	Knowledge of identifying and rectifying motor vehicle body misalignment	133
Unit 169	Knowledge of motor vehicle body metal active gas (MAG) welding techniques	137
Unit 170	Knowledge of motor vehicle body resistance spot welding operations	142
Unit 171	Knowledge of motor vehicle body metal inert gas (MIG) brazing operations	146

Unit 172	Knowledge of motor vehicle body aluminium metal inert gas (MIG) welding operations	149
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1 Introduction

This document tells you what you need to do to deliver the qualifications:

Area	Description
Who are the qualifications for?	<p>These Level 2 and 3 Diplomas in Accident Repair Body Competence are for anyone developing a career in the motor industry. These practical qualifications demonstrate candidates' skills on the job and in their own workplace showing that they meet national standards for automotive workers.</p> <p>Their structure and assessment strategy have been produced by the Institute of the Motor Industry, who are the Sector Skills Council for the Automotive Industry.</p>
What do the qualifications cover?	<p>Candidates cover areas such as routine vehicle maintenance, removal and replacement of vehicle units and components and carrying out repairs to motor vehicles. They are assessed in the workplace by using the following methods:</p> <ul style="list-style-type: none"> • workplace observation • witness testimony • verbal questioning of essential knowledge • City & Guilds' GOLLA multiple choice test
Are the qualifications part of a framework or initiative?	<p>These qualifications are part of the Automotive Maintenance and Repair Intermediate Apprenticeship and Advanced Apprenticeship Frameworks (framework 1) which will replace the current framework 4 from April 2011.</p>
What opportunities for progression are there?	<p>After taking these qualifications candidates will have a qualification that show employers and customers they are competent and have the skills required to carry out body repairs as a result of accidents and will be able to progress into employment.</p> <p>In addition, candidates who enjoy leading teams of people at work could also move onto a qualification as a Team Leader or Supervisor such as qualifications at Levels 2, 3 and 4 through the Institute of Leadership and Management (ILM).</p>

Structure

To achieve the **Level 2 Diploma in Accident Repair Body Competence**, learners must achieve **96** credits from the mandatory units and a minimum of **5** credits from one pair of optional units available.

Unit reference number	City & Guilds unit	Unit title	Credit value
Mandatory			
A/601/6338	001	Competency in health, safety and good housekeeping in the automotive environment	7
K/601/6366	003	Competency in supporting job roles in the automotive work environment	5
Y/601/6279	004	Skills in materials, fabrication, tools and measuring devices used in the automotive environment	7
D/601/6171	051	Knowledge of health, safety and good housekeeping in the automotive environment	3
T/601/6175	053	Knowledge of support for job roles in the automotive work environment	3
K/601/6237	054	Knowledge of materials, fabrication, tools and measuring devices used in the automotive environment	4
R/601/5373	102	Competency in removing and fitting non-permanently fixed motor vehicle body panels	3
K601/5377	105	Competency in removing and replacing exterior motor vehicle body panels including permanently fixed components	10
K/601/5380	106	Competency in carrying out minor repairs to motor vehicle exterior body panels	10
D/601/5392	119	Competency in motor vehicle body metal active gas (MAG) welding techniques	9
T/601/5396	120	Competency in motor vehicle body resistance spot welding operations	9
D/601/5425	152	Knowledge of removing and fitting non-permanently fixed motor vehicle body panels	2
H/601/5426	155	Knowledge of removing and replacing exterior motor vehicle body panels including permanently fixed components	6
K/601/5427	156	Knowledge of minor motor vehicle exterior body panels repairs	6

Unit reference number	City & Guilds unit	Unit title	Credit value
T/601/5432	169	Knowledge of motor vehicle body metal active gas (MAG) welding techniques	5
F/601/5434	170	Knowledge of motor vehicle body resistance spot welding operations	5
A/601/5450	176	Knowledge of motor vehicle construction and materials	2
Optional Group 1			
F/601/5370	101	Competency in removing and fitting motor mechanical and TRIM (MET) components to vehicles	3
Y/601/5424	151	Knowledge of removing and fitting motor mechanical, electrical and TRIM (MET) components to vehicles	2
Optional Group 2			
F/601/5398	121	Competency in motor vehicle body metal inert gas (MIG) brazing operations	9
J/601/5435	171	Knowledge of motor vehicle body metal inert gas (MIG) brazing operations	5
Optional Group 3			
R/601/5406	124	Competency in motor vehicle body mechanical fastening operations	4
T/601/5446	174	Knowledge of motor vehicle body mechanical fastening operations	2
Optional Group 4			
Y/601/5407	125	Competency in motor vehicle body adhesive bonding operations	4
J/601/5449	175	Knowledge of motor vehicle body adhesive bonding operations	2

To achieve the **Level 3 Diploma in Accident Repair Body Competence** learners must achieve **98** credits from the mandatory units and a minimum of **6** credits from the optional units available

Unit reference number	City & Guilds unit	Unit title	Credit value
Mandatory			
A/601/6338	001	Competency in health, safety and good housekeeping in the automotive environment	7
K/601/6366	003	Competency in supporting job roles in the automotive work environment	5
D/601/6171	051	Knowledge of health, safety and good housekeeping in the automotive environment	3
T/601/6175	053	Knowledge of support for job roles in the automotive work environment	3
T/601/5382	113	Competency in removing and replacing structural motor vehicle body panels	10
F/601/5384	114	Competency in motor vehicle body panel major repairs	11
L/601/5386	117	Competency in identifying and rectifying motor vehicle misalignment	11
D/601/5392	119	Competency in motor vehicle body metal active gas (MAG) welding techniques	9
T/601/5396	120	Competency in motor vehicle body resistance spot welding operations	9
M/601/5428	163	Knowledge of removing and replacing structural motor vehicle body panels	6
T/601/5429	164	Knowledge of motor vehicle body panel major repairs	6
K/601/5430	167	Knowledge of identifying and rectifying motor vehicle body misalignment	6
T/601/5432	169	Knowledge of motor vehicle body metal active gas (MAG) welding techniques	5
F/601/5434	170	Knowledge of motor vehicle body resistance spot welding operations	5
A/601/5450	176	Knowledge of motor vehicle construction and materials	2
Optional Group 1			
Y/601/6380	006	Competency in making learning possible through demonstrations and instruction	5
T/601/6242	056	Knowledge of how to make learning possible through demonstrations and instruction	5
Optional Group 2			
K/601/6383	008	Competency in identifying and agreeing motor vehicle customer service needs	5

Unit reference number	City & Guilds unit	Unit title	Credit value
R/601/6247	058	Knowledge of how to identify and agree motor vehicle customer service needs	5
Optional Group 3			
F/601/5398	121	Competency in motor vehicle body metal inert gas (MIG) brazing operations	9
J/601/5435	171	Knowledge of motor vehicle body metal inert gas (MIG) brazing operations	5
Optional Group 4			
M/601/5400	122	Competency in motor vehicle body aluminium metal inert gas (MIG) welding operations	9
L/601/5436	172	Knowledge of motor vehicle body aluminium metal inert gas (MIG) welding operations	5
Optional Group 5			
J/601/5404	123	Competency in motor vehicle body tungsten inert gas (TIG) welding operations	9
Y/601/5438	173	Knowledge of motor vehicle body tungsten inert gas (TIG) welding operations	5
Optional Group 6			
R/601/5406	124	Competency in motor vehicle body mechanical fastening operations	4
T/601/5446	174	Knowledge of motor vehicle body mechanical fastening operations	2
Optional Group 7			
Y/601/5407	125	Competency in motor vehicle body adhesive bonding operations	4
J/601/5449	175	Knowledge of motor vehicle body adhesive bonding operations	2



2 Centre requirements

Approval

If your Centre is approved to offer the **Level 2 NVQ in Automotive Body and Paint Body Repair** (4101-11) you will be granted automatic approval for the Level 2 Diploma in Accident Repair Body Competence (4271-12) and will be able to make registrations straight away.

If your Centre is approved to offer the **Level 3 NVQ in Automotive Body and Paint Body Repair** (4101-14) you will be granted automatic approval for the Level 3 Diploma in Accident Repair Body Competence (4271-13).

For any other cases, centres will need to gain both centre and qualification approval. Please refer to the *Centre Manual - Supporting Customer Excellence* for further information.

Centre staff should familiarise themselves with the structure, content and assessment requirements of the qualifications before designing a course programme.

Resource requirements

Physical resources and site agreements

Centres must have access to sufficient equipment in the college, training centre or workplace to ensure candidates have the opportunity to cover all of the practical activities.

Centre staffing

Staff delivering these qualifications must be able to demonstrate that they meet the following occupational expertise requirements. They should:

- be occupationally competent or technically knowledgeable in the areas for which they are delivering training and/or have experience of providing training. This knowledge must be to the same level as the training being delivered
- have recent relevant experience in the specific area they will be assessing
- have credible experience of providing training.

Centre staff may undertake more than one role, eg tutor and assessor or internal verifier, but cannot internally verify their own assessments.

Assessors and internal verifiers

All assessors must:

- have sufficient and relevant technical/occupational competence in the Unit, at or above the level of the Unit being assessed

- have in depth knowledge of the Qualification or credit based unit evidence requirements.
- hold or be working towards a relevant assessors' award as specified by the Sector Skills Council. This will include, but not be limited to the Assessor qualifications, Level 3 Award in Understanding the Principles and Practices of Assessment, Level 3 Award in Assessing Competence in the Work Environment, Level 3 Award in Assessing Vocationally Related Achievement, Level 3 Certificate in Assessing Vocational Achievement. (and by implication legacy Assessor units A1, A2 and D32/33 unit) but may be an appropriate equivalent as defined by the SSC).
 - a) assessors working towards a relevant assessor qualification must achieve their qualification within 12 months.
- demonstrate knowledge and understanding of the competencies that a learner is required to demonstrate for the qualification that they are undertaking
- provide evidence of completing 5 days working/job shadowing in industry within their professional area in a 24 month period.
- provide evidence of 30 hours of technical/qualification related CPD within a 12 month period. (This is in addition to working / job shadowing).

All internal verifiers must:

- have in-depth knowledge of the occupational standards and credit based unit evidence requirements.
- be occupationally aware of the relevant industry sector being internally verified
- hold or be working towards a relevant verifier award as specified by the Sector Skills Council. This will include, but not be limited to the Quality Assurance qualifications Level 4 Award in Understanding the Internal Quality Assurance of Assessment Processes and Practice, Level 4 Award in the Internal Quality Assurance of Assessment Processes and Practice, Level 4 Certificate in Leading the Internal Quality Assurance of Assessment Processes and Practice, (and by implication legacy Internal Verifier unit V1 D34 unit) but may be an appropriate equivalent as defined by the Sector Skills Council.
 - b) verifiers working towards a relevant qualification must achieve their qualification within 12 months.
- provide evidence of CPD totalling not less than 30 hours from within their professional area within a 12 month period.

Continuing professional development (CPD)

Centres must support their staff to ensure that they have current knowledge of the occupational area, that delivery, mentoring, training, assessment and verification is in line with best practice, and that it takes account of any national or legislative developments.

Candidate entry requirements

City & Guilds does not set entry requirements for these qualifications. However, centres must ensure that candidates have the potential and opportunity to gain the qualifications successfully.

Age restrictions

There is no age restriction for these qualifications unless this is a legal requirement of the process or the environment.



3 Delivering the qualification

Initial assessment and induction

An initial assessment of each candidate should be made before the start of their programme to identify:

- if the candidate has any specific training needs,
- support and guidance they may need when working towards their qualifications.
- any units they have already completed, or credit they have accumulated which is relevant to the qualifications.
- the appropriate type and level of qualification.

We recommend that centres provide an induction programme so the candidate fully understands the requirements of the qualifications, their responsibilities as a candidate, and the responsibilities of the centre. This information can be recorded on a learning contract.

Support materials

City & Guilds will provide the following learning and support resources which will be posted on our website.

www.cityandguilds.com/automotive

- Practical Assessment workbook

Recording Documents

Candidates and centres may decide to use a paper-based or electronic method of recording evidence.

To support the delivery of vocational qualifications we offer our own ePortfolio, Learning Assistant, an easy to use and secure online tool to support and evidence candidates' progress towards achieving qualifications. Further details are available at:

www.cityandguilds.com/eportfolios.

City & Guilds has developed training and assessment documentation specifically for these qualifications which are available from City & Guilds website.

Although new centres are expected to use these forms, centres may devise or customise alternative forms, which must be approved for use by the external verifier, before they are used by candidates and assessors at the centre.

Health and safety

The requirement to follow safe working practices is an integral part of all City & Guilds qualifications and assessments, and it is the responsibility of centres to ensure that all relevant health and safety requirements are in place before candidates start practical assessments.

Should a candidate fail to follow health and safety practice and procedures during an assessment, the assessment must be stopped. The candidate should be informed that they have not reached the standard required to successfully pass the assessment and told the reason why. Candidates may retake the assessment at a later date, at the discretion of the centre. In case of any doubt, guidance should be sought from the external verifier.

Data protection and confidentiality

Centres offering this qualification may need to provide City & Guilds with personal data for staff and candidates. Guidance on data protection and the obligations of City & Guilds and centres are explained in *Centre Manual - Supporting Customer Excellence*.

Initial assessment and induction

Centres will need to make an initial assessment of each candidate prior to the start of their programme to ensure they are entered for an appropriate type and level of qualification.

The initial assessment should identify any specific training needs the candidate may have, and the support and guidance they may require when working towards their qualification.

City & Guilds recommends that centres provide an induction programme to ensure the candidate fully understands the requirements of the qualification they will work towards, their responsibilities as a candidate, and the responsibilities of the centre. It may be helpful to record the information on a learning contract.

Further guidance about initial assessment and induction, as well as a learning contract that centres may use, are available in the Centre toolkit.

Equal opportunities

It is a requirement of centre approval that centres have an equal opportunities policy (see *Centre Manual - Supporting Customer Excellence*). The regulatory authorities require City & Guilds to monitor centres to ensure that equal opportunity policies are being followed.

The City & Guilds equal opportunities policy is set out on the City & Guilds website, in *Centre Manual - Supporting Customer Excellence*, and is also available from the City & Guilds Customer Relations department.

Access to qualifications on the Qualifications Credit Framework is open to all, irrespective of gender, race, creed, age or special needs. The centre co-ordinator should ensure that no candidate is subject to unfair discrimination on any ground in relation to access to assessment and the fairness of the assessment.

Access to assessment

City & Guilds' guidance and regulations on access to assessment are designed to facilitate access to assessments and qualifications for candidates who are eligible for adjustments to assessment arrangements. Access arrangements are designed to allow attainment to be demonstrated. For further information, please see *Access to assessment and qualifications*, available on the City & Guilds website.

Appeals

Centres must have their own, auditable, appeals procedure that must be explained to candidates during their induction. Appeals must be fully documented by the quality assurance co-ordinator and made available to the external verifier or City & Guilds.

Further information on appeals is given in *Centre Manual - Supporting Customer Excellence*. There is also information on appeals for centres and learners on the City & Guilds website or available from the Customer Relations department.



4 Assessment

Assessment of the qualification

Candidates must complete

- Online multiple choice tests graded as Pass, Merit, Distinction for the knowledge units.
- A portfolio of evidence for each competence unit

Time constraints

There are no time constraints applied to the assessment of this qualification. If centres have queries regarding the length of time required to complete a particular task, they should contact their external verifier in the first instance who will advise accordingly and feed this information back to City & Guilds where appropriate.

Recognition of prior learning (RPL)

Recognition of prior learning means using a learner's previous experience, or qualifications which have already been achieved to contribute to a new qualification. RPL is allowed and is also sector specific.

Level 2 Diploma in Accident Repair Body Competence (QCF)

Unit	Title	Assessment method
001	Competency in health, safety and good housekeeping in the automotive environment	Assignment
003	Competency in supporting job roles in the automotive work environment	Assignment
004	Skills in materials, fabrication, tools and measuring devices used in the automotive environment	Assignment
051	Knowledge of health, safety and good housekeeping in the automotive environment	Assignment
053	Knowledge of support for job roles in the automotive work environment	Assignment
054	Knowledge of materials, fabrication, tools and measuring devices used in the automotive environment	Assignment
101	Competency in removing and fitting motor mechanical and TRIM (MET) components to vehicles	Portfolio
102	Competency in removing and fitting non-permanently fixed motor vehicle body panels	Portfolio
105	Competency in removing and replacing exterior motor vehicle body panels including permanently fixed components	Portfolio

Unit	Title	Assessment method
106	Competency in carrying out minor repairs to motor vehicle exterior body panels	Portfolio
119	Competency in motor vehicle body metal active gas (MAG) welding techniques	Portfolio
120	Competency in motor vehicle body resistance spot welding operations	Portfolio
121	Competency in motor vehicle body metal inert gas (MIG) brazing operations	Portfolio
124	Competency in motor vehicle body mechanical fastening operations	Portfolio
125	Competency in motor vehicle body adhesive bonding operations	Portfolio
151	Knowledge of removing and fitting motor mechanical, electrical and TRIM (MET) components to vehicles	Multiple choice
152	Knowledge of removing and fitting non-permanently fixed motor vehicle body panels	Multiple choice
155	Knowledge of removing and replacing exterior motor vehicle body panels including permanently fixed components	Multiple choice
156	Knowledge of minor motor vehicle exterior body panels repairs	Multiple choice
169	Knowledge of motor vehicle body metal active gas (MAT) welding techniques	Multiple choice
170	Knowledge of motor vehicle body resistance spot welding operations	Multiple choice
171	Knowledge of motor vehicle body metal inert gas (MIG) brazing operations	Multiple choice
174	Knowledge of motor vehicle body mechanical fastening operations	Multiple choice
175	Knowledge of motor vehicle body adhesive bonding operations	Multiple choice
176	Knowledge of motor vehicle construction and materials	Multiple choice

Level 3 Diploma in Accident Repair Body Competence (QCF)

Unit	Title	Assessment method
001	Competency in health, safety and good housekeeping in the automotive environment	Assignment
003	Competency in supporting job roles in the automotive work environment	Assignment
006	Competency in making learning possible through demonstrations and instruction	Assignment
008	Competency in identifying and agreeing motor vehicle customer service needs	Assignment
051	Knowledge of health, safety and good housekeeping in the automotive environment	Assignment

Unit	Title	Assessment method
053	Knowledge of support for job roles in the automotive work environment	Assignment
056	Knowledge of how to make learning possible through demonstrations and instruction	Assignment
058	Knowledge of how to identify and agree motor vehicle customer service needs	Assignment
113	Competency in removing and replacing structural motor vehicle body panels	Portfolio
114	Competency in motor vehicle body panel major repairs	Portfolio
117	Competency in identifying and rectifying motor vehicle misalignment	Portfolio
119	Competency in motor vehicle body metal active gas (MAG) welding techniques	Portfolio
120	Competency in motor vehicle body resistance spot welding operations	Portfolio
121	Competency in motor vehicle body metal inert gas (MIG) brazing operations	Portfolio
122	Competency in motor vehicle body aluminium metal inert gas (MIG) welding operations	Portfolio
123	Competency in motor vehicle body tungsten inert gas (TIG) welding operations	Portfolio
124	Competency in motor vehicle body mechanical fastening operations	Portfolio
125	Competency in motor vehicle body adhesive bonding operations	Portfolio
163	Knowledge of removing and replacing structural motor vehicle body panels	Multiple choice
164	Knowledge of motor vehicle body panel major repairs	Multiple choice
167	Knowledge of identifying and rectifying motor vehicle body misalignment	Multiple choice
169	Knowledge of motor vehicle body metal active gas (MAG) welding techniques	Multiple choice
170	Knowledge of motor vehicle body resistance spot welding operations	Multiple choice
171	Knowledge of motor vehicle body metal inert gas (MIG) brazing operations	Multiple choice
172	Knowledge of motor vehicle body aluminium metal inert gas (MIG) welding operations	Multiple choice
173	Knowledge of motor vehicle body tungsten inert gas (TIG) welding operations	Multiple choice
174	Knowledge of motor vehicle body mechanical fastening operations	Multiple choice
175	Knowledge of motor vehicle body adhesive bonding operations	Multiple choice
176	Knowledge of motor vehicle construction and materials	Multiple choice



5 Units

Availability of units

The following units can be obtained from The Register of Regulated Qualifications: <http://register.ofqual.gov.uk/Unit>

Structure of units

These units each have the following:

- City & Guilds reference number
- unit accreditation number (UAN)
- title
- level
- credit value
- unit aim
- relationship to NOS, other qualifications and frameworks
- endorsement by a sector or other appropriate body
- information on assessment
- learning outcomes which are comprised of a number of assessment criteria
- notes for guidance.

Unit 001

Competency in health, safety and good housekeeping in the automotive environment

UAN:	A/601/6338
Level:	2
Credit value:	7
GLH:	60
Relationship to NOS:	This unit is linked to the NOS G1 Contribute to the housekeeping in motor vehicle environments and NOS G2 Reduce risks to health and safety in the motor vehicle environment.
Endorsement by a sector or regulatory body:	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.
Aim:	<p>This unit will enable the learner to develop competency in order to:</p> <ul style="list-style-type: none">• carry out day to day work area cleaning, clearing away, dealing with spillages and disposal of waste, used materials and debris• identify hazards and risks in the automotive environment and complying with relevant legislation and good practice• work safely at all times within the automotive environment, both as an individual and with others.

Learning outcome
The learner will: 1. be able to use correct personal and vehicle protection within the automotive environment.
Assessment criteria
The learner can: 1.1 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 1.2 select and use vehicle protective equipment throughout all activities.

Learning outcome
The learner will: 2. be able to carry out effective housekeeping practices in the automotive environment.
Assessment criteria
The learner can: 2.1 select and use cleaning equipment which is of the right type and suitable for the task 2.2 use utilities and appropriate consumables, avoiding waste 2.3 use materials and equipment to carry out cleaning and maintenance duties in allocated work areas, following automotive work environment policies, schedules and manufacturers instructions 2.4 perform housekeeping activities safely and in a way which minimises inconvenience to customers and staff 2.5 keep the work area clean and free from debris and waste materials 2.6 keep tools and equipment fit for purpose by regular cleaning and keeping tidy 2.7 dispose of used cleaning agents, waste materials and debris to comply with legal and workplace requirements.

Learning outcome
The learner will: 3. be able to recognise and deal with dangers in order to work safely within the automotive workplace.
Assessment criteria
The learner can: 3.1 name and locate the responsible persons for health and safety in their relevant workplace 3.2 identify and report working practices and hazards which could be harmful to themselves or others 3.3 carry out safe working practices whilst working with equipment, materials and products in the automotive environment 3.4 rectify health and safety risks encountered at work, within the scope and capability of their job role.

Learning outcome
The learner will: 4. be able to conduct themselves responsibly.
Assessment criteria
The learner can: 4.1 show personal conduct in the workplace which does not endanger the health and safety of themselves or others 4.2 display suitable personal presentation at work which ensures the health and safety of themselves and others at work.

Unit 001 Competency in health, safety and good housekeeping in the automotive environment

Supporting information

Evidence Requirements

The Evidence Requirements are shown in full in the Assessment Documentation.

Unit 003

Competency in supporting job roles in the automotive work environment

UAN:	K/601/6366
Level:	3
Credit value:	5
GLH:	40
Relationship to NOS:	This unit is linked to the NOS G3 Maintain working relationships in the motor vehicle environment
Endorsement by a sector or regulatory body:	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.
Aim:	This unit will help the learner develop competency in order to keep good working relationships with all colleagues and customers in the automotive work environment by using effective communication and support.

Learning outcome
The learner will: 1. be able to work effectively within the organisational structure of the automotive work environment.
Assessment criteria
The learner can: 1.1 respond promptly and willingly to requests for assistance from customers and colleagues 1.2 refer customers and colleagues to the correct person should requests fall outside their responsibility and capability.

Learning outcome
The learner will: 2. be able to obtain and use information in order to support their job role within the automotive work environment.
Assessment criteria
The learner can: 2.1 select and use legal and manufacturers information, in an automotive work environment

Learning outcome

The learner will:

3. be able to communicate with and support colleagues and customers effectively within the automotive work environment.

Assessment criteria

The learner can:

- 3.1 use methods of communication with customers and colleagues which meet their needs
- 3.2 give customers and colleagues accurate information
- 3.3 make requests for assistance from or to customers and colleagues clearly and courteously
- 3.4 report any anticipated delays in completion to the relevant persons promptly.

Learning outcome

The learner will:

4. be able to develop and keep good working relationships in the automotive work environment

Assessment criteria

The learner can:

- 4.1 contribute to team work by initiating ideas and co-operating with customers and colleagues
- 4.2 treat customers and colleagues in a way which shows respect for their views and opinions
- 4.3 make and keep achievable commitments to customers and colleagues
- 4.4 inform colleagues promptly of anything likely to affect their own work.

Unit 003 Competency in supporting job roles in the automotive work environment

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation

Unit 004

Skills in materials, fabrication, tools and measuring devices used in the automotive environment

UAN:	Y/601/6279
Level:	2
Credit value:	7
GLH:	60
Relationship to NOS:	This unit is linked to the NOS G4 Use of hand tools and equipment in motor vehicle engineering.
Endorsement by a sector or regulatory body:	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.
Aim:	<p>This unit helps the learner to develop the skills required for:</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. be able to select, maintain and use hand tools and measuring devices in the automotive environment.
Assessment criteria
The learner can: 1.1 select, maintain and use suitable hand tools safely when 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) marking out tools. 1.2 select, maintain and use suitable measuring devices safely when fabricating and fitting in the automotive environment. To include: a) rule/tape b) callipers c) feeler gauge d) volume measures e) micrometer f) dial gauges g) torque wrenches h) depth gauges 1.3 select, maintain and use suitable PPE for fabrication, repair and fitting in the automotive environment 1.4 select, maintain and use suitable electrical measuring tools safely when repairing vehicles and components. To include: a) ammeter b) voltmeter c) ohmmeter d) multi-meter.

Learning outcome
The learner will: 2. be able to prepare and use common workshop equipment.
Assessment criteria
The learner can: 2.1 use suitably maintained workshop equipment safely. To include: a) hydraulic jacks b) axle stands c) pillar drills d) air tools

<ul style="list-style-type: none"> e) vehicle lifts f) cranes g) hoists h) electrical power tools
2.2 use correct interpretation of 'safe working load' on lifting and supporting equipment
2.3 report any faulty or damaged tools and equipment to the relevant persons clearly and promptly
2.4 store work tools and equipment in a safe manner which permits ease of access and identification for use.

Learning outcome
The learner will:
3. be able to select materials when fabricating, modifying and repairing vehicles and fitting components.
Assessment criteria
The learner can:
3.1 select and use appropriate materials whilst constructing, fitting, modifying or repairing vehicles and components.

Learning outcome
The learner will:
4. be able to apply automotive engineering, fabrication and fitting principles when modifying and repairing vehicles and components.
Assessment criteria
The learner can:
4.1 use correct procedures when:
<ul style="list-style-type: none"> a) filing b) tapping threads c) cutting plastics and metals d) drilling plastics and metals e) fitting
4.2 use appropriate techniques when fabricating, repairing and modifying vehicles and components
4.3 select and use:
<ul style="list-style-type: none"> a) gaskets b) seals c) sealants d) fittings and fasteners
4.4 apply modification and repair techniques to automotive electrical circuits
4.5 select and use locking, fixing and fastening devices.

Unit 004 **Skills in materials, fabrication,
tools and measuring devices
in the automotive
environment**

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation

Unit 006

Competency in making learning possible through demonstrations and instruction

UAN:	Y/601/6380
Level:	Level 3
Credit value:	5
GLH:	40
Relationship to NOS:	This unit is linked to G6 Enable Learning through Demonstration and Instruction.
Endorsement by a sector or regulatory body:	This unit was developed by IMI, the Sector Skills Council for the automotive retail industry.
Aim	This unit will help the learner to develop competency in order to carry out demonstrations and instruction. It includes demonstrating equipment, showing skills, giving instruction, deciding when to use demonstration or instruction, potential of technology based learning, checking on learners' progress and giving feedback.

Learning outcome	The learner will:
1.	be able to demonstrate skills and methods to learners
Assessment criteria	
The learner can:	
1.1	perform demonstrations based on an analysis of the skills needed and the order in which they must be learned
1.2	perform demonstrations that are accurate and realistic
1.3	perform structured demonstrations so that the learner can get the most out of it
1.4	perform demonstrations whilst encouraging learners to ask questions and get explanation at appropriate stages in the demonstration
1.5	provide positive feedback to learners whilst they are being given the opportunity to practise the skills that have been demonstrated
1.6	perform additional demonstrations of skills being taught to reinforce learning
1.7	perform demonstrations in a safe environment which also allows learners to see clearly
1.8	respond to the needs of the learners during demonstrations
1.9	reduce distractions and disruptions as much as possible.

Learning outcome	The learner will:
2.	be able to instruct learners
Assessment criteria	
The learner can:	
2.1	implement instruction which is matched to the needs of learners
2.2	use identified learning outcomes which can be achieved through instruction
2.3	perform instruction, ensuring that the manner, level and speed of the instruction encourages learners to take part
2.4	perform instruction whilst regularly checking that the learners understand and adapt instruction as appropriate
2.5	give learners positive feedback on the learning experience and the outcomes achieved
2.6	carry out a review with the learners to identify anything that prevented learning and adapt instruction as appropriate.

Unit 006 **Competence in making
learning possible through
demonstrations and
instruction**

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation.

Unit 008

Competency in identifying and agreeing motor vehicle customer service needs

UAN:	K/601/6383
Level:	Level 3
Credit value:	5
GLH:	40
Relationship to NOS:	This unit is linked to G8 Identify and Agree the Motor Vehicle Customer Needs.
Endorsement by a sector or regulatory body:	This unit was developed by IMI, the Sector Skills Council for the automotive retail industry.
Aim	This unit helps the learner to develop the skills required to: gain information from customers on their perceived needs; give advice and information and agree a course of action; contract for the agreed work and complete all necessary records and instructions.

Learning outcome	The learner will:
1.	be able to obtain relevant information from the customer
Assessment criteria	
The learner can:	
1.1	obtain and interpret sufficient, relevant information, from the customer to make an assessment of their needs
1.2	clarify customer and vehicle needs by referring to vehicle data and operating procedures.

Learning outcome	The learner will:
2.	be able to provide relevant information to the customer
Assessment criteria	
The learner can:	
2.1	provide customers with accurate, current and relevant advice and information, in a form that the customer will understand.
2.2	demonstrate techniques which encourage customers to ask questions and seek clarification during conversation.

Learning outcome	The learner will:
	3. be able to agree work undertaken with the customer
Assessment criteria	
The learner can:	
3.1 summarise and record work agreed with the customer, before accepting the vehicle	
3.2 implement confirmation of the agreement by ensuring customer understanding.	

Learning outcome	The learner will:
	4. be able to ensure recording systems are implemented correctly
Assessment criteria	
The learner can:	
4.1 use recording systems which are accurate and complete, in the required format and signed by the customer where necessary	
4.2 perform the next stage in the process by passing on completed records to the correct person promptly	
4.3 demonstrate correct procedures for customer approval where the contracted agreement is likely to be exceeded.	

Unit 008

Competency in identifying and agreeing motor vehicle customer service needs

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation.

Unit 051

Knowledge of health, safety and good housekeeping in the automotive environment

UAN:	D/601/6171
Level:	2
Credit value:	3
GLH:	30
Relationship to NOS:	This unit is linked to the NOS G1 Contribute to the housekeeping in motor vehicle environments and NOS G2 Reduce risks to health and safety in the motor vehicle environment
Endorsement by a sector or regulatory body:	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.
Aim:	<p>This unit will give the learner the knowledge they need to carry out routine maintenance and cleaning of the automotive environment and using resources economically.</p> <p>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.</p>

Learning outcome
The learner will: 1. understand the correct personal and vehicle protective equipment to be used within the automotive environment.
Assessment criteria
The learner can: 1.1 explain the importance of wearing the types of PPE 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.

Learning outcome
The learner will: 2. understand effective housekeeping practices in the automotive environment.
Assessment criteria
The learner can: 2.1 describe why the automotive environment should be properly cleaned and maintained 2.2 describe requirements and systems which may be put in place to ensure a clean automotive environment 2.3 describe how to minimise waste when using utilities and consumables 2.4 state the procedures and precautions necessary when cleaning and maintaining an automotive environment 2.5 describe the selection and use of cleaning equipment when dealing with general cleaning, spillages and leaks in the automotive environment 2.6 describe procedures for correct disposal of waste materials from an automotive environment 2.7 describe procedures for starting and ending the working day which ensure effective housekeeping practices are followed.

Learning outcome
The learner will: 3. understand key health and safety requirements relevant to the automotive environment.
Assessment criteria
The learner can: 3.1 list the main legislation relating to automotive environment health and safety 3.2 describe the general legal duties of employers and employees required by current health and safety legislation 3.3 describe key, current health and safety requirements relating to the automotive environment 3.4 describe why workplace policies and procedures relating to health and safety are important.

Learning outcome
The learner will: 4. understand about hazards and potential risks relevant to the automotive environment
Assessment criteria
The learner can: 4.1 identify key hazards and risks in an automotive environment 4.2 describe policies and procedures for reporting hazards, risks, health and safety matters in the automotive environment 4.3 state precautions and procedures which need to be taken when working with vehicles, associated materials, tools and equipment. 4.4 identify fire extinguishers in common use and which types of fire they should be used on 4.5 identify key warning signs and their characteristics that are found in the vehicle repair environment. 4.6 state the meaning of common product warning labels used in an automotive environment.

Learning outcome
The learner will: 5. understand personal responsibilities.
Assessment criteria
The learner can: 5.1 explain the importance of personal conduct in maintaining the health and safety of the individual and others 5.2 explain the importance of personal presentation in maintaining health safety and welfare.

Unit 051 Knowledge of health, safety and good housekeeping in the automotive environment

Supporting information

Evidence Requirements

The Evidence Requirements are shown in full in the Assessment Documentation.

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

Economic use of resources

- a Consumable materials eg grease, oils, split pins, locking and fastening devices.

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.

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.
- 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 manufacturers' 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
- 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:

- d 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:
 - 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.
- 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 personnel, customers, contractors etc entering the 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 own limits of authority
- e the 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 policies 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.

Unit 053

Knowledge of support for job roles in the automotive work environment

UAN:	T/601/6175
Level:	3
Credit value:	3
GLH:	20
Relationship to NOS:	This unit is linked to the NOS G3 Maintain working relationships in the motor vehicle environment
Endorsement by a sector or regulatory body:	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.
Aim:	This unit enables the learner to develop an understanding of how to keep good working relationships with all colleagues in the automotive work environment by using effective communication and support skills.

Learning outcome
The learner will: 1. understand key organisational structures, functions and roles within the automotive work environment.
Assessment criteria
The learner can: 1.1 identify the purpose of different sections of a typical automotive work environment, to include: a) reception b) body shop c) service repair workshop d) valeting e) parts f) sales g) administration 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.

Learning outcome
The learner will: 2. understand the importance of obtaining, interpreting and using information in order to support their job role within the automotive work environment.
Assessment criteria
The learner can: 2.1 explain the importance of different sources of information in an automotive work environment. 2.2 explain how to find, interpret and use relevant sources of information 2.3 describe the main legal requirements relating to the vehicle, including road safety requirements 2.4 explain the importance of working to recognised procedures and processes 2.5 explain when replacement units and components must meet the manufacturers' original equipment specification. 2.6 explain the purpose of how to use identification codes.

Learning outcome
The learner will: 3. understand the importance of different types of communication within the automotive work environment.
Assessment criteria
The learner can: 3.1 explain where different methods of communication would be used within the automotive environment 3.2 explain the factors which can determine your choice of communication. 3.3 explain how the communication of information can change with the target audience to include uninformed and informed people.

Learning outcome
The learner will: 4. understand communication requirements when carrying out vehicle repairs in the automotive work environment.
Assessment criteria
The learner can: 4.1 explain how to report using written and verbal communication 4.2 explain the importance of documenting information relating to work carried out in the automotive environment 4.3 explain the importance of working to agreed timescales.

Learning outcome

The learner will:

5. understand how to develop good working relationships with colleagues and customers in the automotive workplace.

Assessment criteria

The learner can:

- 5.1 describe how to develop positive working relationships with colleagues and customers
- 5.2 explain the importance of developing positive working relationships
- 5.3 explain the importance of accepting other peoples' views and opinions
- 5.4 explain the importance of making and honoring realistic commitments to colleagues and customers.

Unit 053 Knowledge of support for job roles in the automotive work environment

Supporting information

Evidence Requirements

The Evidence Requirements are shown in full in the Assessment Documentation.

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

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.

Sources of information:

- a other staff
- b manuals
- c parts lists
- d computer software and the internet
- e manufacturer
- f 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.

- c Methods of communication:
 - i verbal
 - ii signs and notices
 - iii memos
 - iv telephone
 - v electronic mail
 - vi vehicle job card
 - vii notice boards
 - viii SMS text messaging
 - ix letters.
- d Organisational and customer requirements:
 - i importance of time scales to customer and organisation relationship between time and costs
 - ii meaning of profit.
- e Choice of communication:
 - i distance
 - ii location
 - iii job responsibility.
- f Importance of maintaining positive working relationships:
 - i morale
 - ii productivity
 - iii company image
 - iv customer relationships
 - v colleagues.

Unit 054

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

UAN:	K/601/6237
Level:	2
Credit value:	4
GLH:	40
Relationship to NOS:	This unit is linked to the NOS G4 Use of hand tools and equipment in motor vehicle engineering
Endorsement by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry.
Aim:	<p>This unit enables the learner to develop and 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 correct operating specifications for limits, fits and tolerances in the automotive environment.

Unit 054 Knowledge of materials, fabrication, tools and measuring devices used in the automotive environment

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation.

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

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 marking 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.

Unit 056

Knowledge of how to make learning possible through demonstrations and instruction

UAN:	T/601/6242
Level:	Level 3
Credit value:	5
GLH:	45
Relationship to NOS:	This unit is linked to G6 Enable Learning Through Demonstration and Instruction.
Endorsement by a sector or regulatory body:	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.
Aim	This unit enables the learner to develop an understanding of how to carry out demonstrations and instruction which will help the learner to learn. It includes demonstrating equipment, showing skills, giving instruction, deciding when to use demonstration or instruction, potential of technology based learning, checking on learners' progress and giving feedback.

Learning outcome	The learner will:
1.	understand the nature and role of demonstrations and instruction
Assessment criteria	
The learner can:	
1.1	classify the separate areas of demonstrations which encourage learning
1.2	identify which types of learning are best achieved and supported through demonstrations
1.3	explain how to identify and use different learning opportunities
1.4	explain how to structure demonstrations and instruction sessions
1.5	explain how to choose from a range of demonstration techniques.

Learning outcome	The learner will:
2.	understand the principles and concepts of demonstration and instruction
Assessment criteria	
The learner can:	
2.1	describe how to put learners at ease and encourage them to take part
2.2	justify the choice between demonstration and instruction as a learning method
2.3	explain how to identify individual learning needs
2.4	clarify which factors are likely to prevent learning and how to overcome them
2.5	explain how to check learners' understanding and progress
2.6	explain how to choose and prepare appropriate materials
2.7	explain the separate areas of instructional techniques which encourage learning
2.8	describe which types of learning are best achieved and supported through instruction.

Learning outcome	The learner will:
3.	understand the external factors influencing human resource development
Assessment criteria	
The learner can:	
3.1	explain how to make sure everybody acts in line with health, safety and environmental protection, legislation and best practice.
3.2	analyse developments in technology based learning and new ways of delivery.

Unit 056 Knowledge of how to make learning possible through demonstrations and instruction

Supporting information

Evidence Requirements

The Evidence Requirements are shown in full in the Assessment Documentation.

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

Separate areas of demonstration which encourage learning. To include:

- a. demonstration is particularly applicable to learning manual skills.
- b. learning to do something usually involves:
 - i purpose - the aim or objective
 - ii procedure - the most effective way of completing the task
 - iii practice - all skills require practice to improve
- c. practical tasks are more quickly learnt through demonstration.
- d. emphasis is required to body movements when demonstrating.
- e. the demonstrator should encourage learners to ask questions.
- f. emphasis should be placed upon key points whilst demonstrating.
- g. any demonstration should ensure that all safety aspects are covered.

Types of learning which are best achieved and supported through demonstrations. To include:

- a. types of learning:
 - i psychomotor – measurement of manual skill performance
 - ii cognitive – learning involving thought processes
 - iii affective – demonstration of feelings, emotions or attitudes
- b. demonstration - involves learning to do something (Psychomotor Domain).
- c. combination of instruction and practical demonstrations are very effective means of learning practical skills.

How to structure demonstration and instruction sessions. To include:

- a. Before the demonstration and/or instruction ensure that the following good practice is recognised:
 - i identify key points
 - ii relate theoretical underpinning knowledge to key points
 - iii rehearse to ensure that all equipment is working
 - iv ensure all students can see even small equipment and processes

- v time the demonstration
 - vi consider how to make students participate
 - vii consider how to emphasise safe working practices
- b. During the demonstration and/or instruction good practice is to:
- i give a clear introduction
 - ii identify any tools/equipment
 - iii determine the current audience level of knowledge
 - iv complete the demonstration correctly (do not show how not to do it)
 - v stress key points and show links between them
 - vi monitor safety aspects
 - vii check learner understanding
- c. After the demonstration (if possible)
- i enable the audience to practice the techniques
 - ii provide feedback on their performance

How to identify individual learning needs

- a. Diagnose the learning needs of your audience to include:
- i what competencies they already have
 - ii what experience they have of the subject area
 - iii what competencies they need to achieve
 - iv what demonstration techniques are best suited to their needs
 - v how you will assess their needs have been met

What factors are likely to prevent learning. To include:

- a. language barriers
- b. physical barriers
- c. specialist knowledge
- d. pace of learning
- e. method of delivery
- f. environmental factors
- g. teaching styles
- h. dyslexia

How to check learners understanding and progress

- a. Questionnaires.
- b. Verbal questioning.
- c. Observation.
- d. Assessment.
- e. Role play.
- f. Projects/assignments.
- g. Multi-choice questions.
- h. Simulation.
- i. Tests.

How to organise information and prepare materials

- a. Identify the course aim.
- b. Identify the subject aim.
- c. Identify the lesson aim.

- d. Complete a lesson plan - plan the teaching.
- e. Identify a series of 'cues' to be used during the lesson.
- f. Logically organise the information.
- g. Use suitable resources and equipment to maximise learning opportunities.
- h. Assess the learner's progress and understanding.

Instructional techniques

- a. types of instructional techniques to include:
 - i lectures
 - ii handouts
 - iii team teaching
 - iv peer teaching
 - v discussion – individual, group and peer
 - vi question and answer
 - vii multimedia
 - viii seminars
 - ix case studies
 - x project/assignments

Environmental factors that effect learning

- a. environmental factors that should be considered before demonstration/instruction to include:
 - i loud noises
 - ii bright colours
 - iii bright lights
 - iv strong smells
 - v atmosphere
 - vi temperature
 - vii classroom seating
 - viii classroom layout
 - ix bright lights

Health and safety factors that affect learning

- a. health and safety factors that should be considered before demonstration/instruction to include:
 - i assessment of risk and hazards
 - ii condition of electrical/electronic equipment
 - iii position of cables and wires
 - iv safety of equipment used in demonstration/instruction
 - v condition of classroom equipment/furniture/structure
 - vi suitable protective clothing/equipment

Analysis of demonstration/instruction

- a. Analysis of demonstration/instruction to include:
 - i feedback from students
 - ii feedback from colleagues
 - iii organisational quality assessment
 - iv feedback from external organisations
 - v awarding body requirements

Developments in learning To include:

- a. multimedia based materials
- b. web based materials
- c. interactive materials

How to choose and prepare appropriate materials.

- a. putting information in order
- b. deciding whether the language used is appropriate
- c. type of material i.e. paper and technology based.

Unit 058

Knowledge of how to identify and agree motor vehicle customer service needs

UAN:	R/601/6247
Level:	Level 3
Credit value:	5
GLH:	45
Relationship to NOS:	This unit is linked to G8 Identify and Agree the Motor Vehicle Customer Needs.
Endorsement by a sector or regulatory body:	This unit was developed by IMI, the Sector Skills Council for the automotive retail industry.
Aim	This unit enables the learner to develop an understanding of how to gain: information from customers on their perceived needs; give advice and information and agree a course of action; contract for the agreed work and complete all necessary records and instructions.

Learning outcome	The learner will:
1.	understand legislative and organisational requirements and procedures
Assessment criteria	
The learner can:	
1.1	describe the fundamental legal requirements of current consumer legislation and the consequences of their own actions in respect of this legislation.
1.2	describe the content and limitations of company and product warranties for the vehicles dealt with by their company.
1.3	explain the limits of their own authority for accepting vehicles.
1.4	explain the importance of keeping customers informed of progress.
1.5	describe their workplace requirements for the completion of records.
1.6	explain how to complete and process all the necessary documentation.

Learning outcome	The learner will:
2.	understand how to communicate and care for customers
Assessment criteria	
The learner can:	
2.1	explain how to communicate effectively with customers.
2.2	describe how to adapt your language when explaining technical matters to non-technical customers.
2.3	explain how to use effective questioning techniques.
2.4	describe how to care for customers and achieve customer satisfaction.

Learning outcome	The learner will:
3.	understand company products and services
Assessment criteria	
The learner can:	
3.1	describe the range of options available to resolve vehicle problems.
3.2	describe the range and type of services offered by their company.
3.3	explain the effect of resource availability upon the receipt of customer vehicles and the completion work.
3.4	explain how to access costing and work completion time information.

Unit 058 Knowledge of how to Identify and Agree Motor Vehicle Customer Service Needs

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation.

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

Organisational Requirements

- a. Explain the organisation's terms and conditions applicable to the acceptance of customer vehicles.
- b. Explain the content and limitations of vehicle and component warranties for the vehicles dealt with by your organisation.
- c. Detail what, if any, limits there are to the authority for accepting vehicles.
- d. Detail why it is important to keep customers advised of progress and how this is achieved within the organisation.
- e. Detail the organisation's procedures for the completion and processing of documentation and records, including payment methods and obtaining customer signatures as applicable.

Principles of Customer Communication and Care

- a. First Impressions.
- b. Listening skills – 80:20 ratio.
- c. Eye contact and smiling.
- d. Showing interest and concern.
- e. Questioning techniques and customer qualification.
- f. Giving clear non-technical explanations.
- g. Confirming understanding (statement/question technique, reflective summary).
- h. Written communication – purpose, content, presentation and style.
- i. Providing a high quality service – fulfilling (ideally exceeding) customer expectations within agreed time frames.
- j. Obtaining customer feedback and corrective actions when dissatisfaction expressed.
- k. Dealing with complaints.

Company Products and Services

- a. Service standards
 - i national
 - ii manufacturer
 - iii organisational

- b. The range and type of services offered by the organisation.
 - i diagnostic.
 - ii servicing.
 - iii repair.
 - iv warranty.
 - v MOT testing.
 - vi fitment of accessories/enhancements.
 - vii internal.

- c. The courses of action available to resolve customer problems.
 - i the extent and nature of the work to be undertaken.
 - ii the terms and conditions of acceptance.
 - iii the cost.
 - iv the timescale.

Vehicle Information Systems, Servicing and Repair Requirements

- a. Accessing technical data including diagnostics.
- b. Servicing to manufacturer requirements/standards.
- c. Repair/operating procedures.
- d. MOT standards/requirements.
- e. Quality controls – interim and final.
- f. Requirements for cleanliness of vehicle on return to customer.
- g. Handover procedures.

Unit 101

Competency in removing and fitting motor mechanical, electrical and trim (MET) components to vehicles

UAN:	F/601/5370
Level:	2
Credit value:	3
GLH:	30
Relationship to NOS:	This unit is linked to the NOS BP01 Remove and fit basic motor mechanical and electrical and Trim (MET) components to vehicles.
Endorsement by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry.
Aim:	This unit will enable the learner to demonstrate competency in order to remove and fit a range of mechanical, electrical and trim (MET) components to vehicles.

Learning outcome
The learner will: 1. be able to work safely when carrying out removal and fitting of met components to vehicles.
Assessment criteria
The learner can: 1.1 use suitable personal protective equipment and use suitable vehicle coverings throughout all MET removal and replacement activities 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.

Learning outcome
The learner will: 2. be able to use relevant information to carry out the task.
Assessment criteria
The learner can: 2.1 select suitable sources of technical information to support motor vehicle removal and recognised fitting activities including: a) vehicle technical data b) removal and fitting procedures c) legal requirements 2.2 use technical information to support motor vehicle removal and recognised fitting activities.

Learning outcome
The learner will: 3. be able to use appropriate tools and equipment.
Assessment criteria
The learner can: 3.1 select the appropriate tools and equipment necessary for carrying out removal and fitting of MET components 3.2 ensure that equipment has been calibrated to meet manufacturers' and legal requirements 3.3 use the correct tools and equipment in the way specified by manufacturers when carrying removal and fitting of MET components.

Learning outcome
The learner will: 4. be able to carry out removal and fitting of MET components.
Assessment criteria
The learner can: 4.1 carry out removal and fitting of MET components adhering to the correct specifications and tolerances for the vehicle and following: a) the manufacturer's approved removal and fitting methods b) recognised researched removal and fitting methods c) health and safety requirements d) workplace procedures 4.2 ensure that the removal and fitting of MET components conforms to the vehicle operating specification and any legal requirements 4.3 ensure no damage occurs to other components when removing and fitting MET components 4.4 ensure all components and panels are stored safely and in the correct location 4.5 work to the specified timescale for the activity.

Learning outcome
The learner will: 5. be able to record information and make suitable recommendations.
Assessment criteria
The learner can: 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 5.2 make suitable and justifiable recommendations for cost effective repairs 5.3 identify and report any expected delays in completion to the relevant person(s) promptly in the format required. 5.4 record and report any additional faults noticed during the course of their work promptly in the format required.

Unit 101 Competency in removing and fitting motor mechanical, electrical and trim (MET) components to vehicles

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation

Unit 102

Competency in removing and fitting non-permanently fixed motor vehicle body panels

UAN:	R/601/5373
Level:	2
Credit value:	3
GLH:	30
Relationship to NOS:	This unit is linked to the NOS BP02 Remove and fit non permanently fixed motor vehicle body panels
Endorsement by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry.
Aim:	This unit will enable the learner to demonstrate competency in the removing and fitting of non-permanently fixed vehicle panels such as wings, doors, bonnets, boot lids and tailgates. It also covers the evaluation of the operation of the components when fitted.

Learning outcome
The learner will: 1. be able to work safely when carrying out removal and fitting of non-permanently fixed vehicle panels.
Assessment criteria
The learner can: 1.1 use suitable personal protective equipment and vehicle coverings throughout all removal and replacement activities 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.

Learning outcome
The learner will: 2. be able to use relevant information to carry out the task.
Assessment criteria
The learner can: 2.1 select suitable sources of technical information to support motor vehicle removal and recognised fitting activities including: a) vehicle technical data b) removal and fitting procedures c) legal requirements 2.2 use technical information to support motor vehicle removal and recognised fitting activities.

Learning outcome
The learner will: 3. be able to use appropriate tools and equipment.
Assessment criteria
The learner can: 3.1 select the appropriate tools and equipment necessary for carrying out removal and fitting of non-permanently fixed vehicle panels 3.2 ensure that equipment has been calibrated to meet manufacturers' and legal requirements 3.3 use the correct tools and equipment in the way specified by manufacturers when carrying removal and fitting of non-permanently fixed vehicle panels.

Learning outcome
The learner will: 4. be able to carry out removal and fitting of non-permanently fixed vehicle panels.
Assessment criteria
The learner can: 4.1 carry out removal and fitting of non-permanently fixed vehicle panels 4.2 carry out removal and fitting of non-permanently fixed vehicle panels adhering to the correct specifications and tolerances for the vehicle. 4.3 ensure that the removal and fitting of non-permanently fixed panels conforms to the vehicle operating specification and any legal requirements 4.4 ensure the components are realigned correctly in a way which regains their original manufactured tolerance 4.5 ensure no damage occurs to other components when removal and fitting of non-permanently fixed vehicle panels 4.6 ensure all components and panels are stored safely and in the correct location 4.7 work to the specified timescale for the activity.

Learning outcome
The learner will: 5. be able to record information and make suitable recommendations.
Assessment criteria
The learner can: 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 5.2 make suitable and justifiable recommendations for cost effective repairs 5.3 identify and report any expected delays in completion to the relevant person(s) promptly in the format required. 5.4 record and report any additional faults noticed during the course of their work promptly in the format required.

Unit 102 Competency in removing and fitting non-permanently fixed motor vehicle body panels

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation

Unit 105

Competency in removing and replacing exterior motor vehicle body panels including permanently fixed components

UAN:	K/601/5377
Level:	2
Credit value:	10
GLH:	90
Relationship to NOS:	This unit is linked to the NOS BP05 Remove and replace exterior motor vehicle body panels including permanently fixed components
Endorsement by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry.
Aim:	This unit will enable the learner to demonstrate competency in the removing and fitting of exterior panels using mechanical fastening, adhesive bonding, welding and joining techniques. It also covers the evaluation of the operation of the components when fitted

Learning outcome
The learner will: 1. be able to work safely when carrying out removal and replacement of exterior vehicle panels including permanently fixed panels.
Assessment criteria
The learner can: 1.1 use suitable personal protective equipment and vehicle coverings throughout all removal and replacement activities 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.

Learning outcome
The learner will: 2. be able to use relevant information to carry out the task.
Assessment criteria
The learner can: 2.1 select suitable sources of technical information to support motor vehicle removal and fitting activities including:

<ul style="list-style-type: none"> a) vehicle technical data b) removal and fitting procedures c) legal requirements
2.2 use technical information to support motor vehicle removal and fitting activities.

Learning outcome
The learner will: 3. be able to use appropriate tools and equipment.
Assessment criteria
The learner can: 3.1 select the appropriate tools and equipment necessary for carrying out removal and fitting of exterior body panels including permanently fixed vehicle panels 3.2 ensure that equipment has been calibrated to meet manufacturers' and legal requirements 3.3 use the appropriate tools and equipment in the way specified by manufacturers when carrying out removal and fitting of exterior body panels including permanently fixed vehicle panels.

Learning outcome
The learner will: 4. be able to carry out removal and fitting of exterior vehicle panels including permanently fixed panels.
Assessment criteria
The learner can: 4.1 identify prior to working on the vehicle the component materials involved that will be worked on during the repair 4.2 remove and re-fit adjacent exterior body panels including those that are permanently fixed 4.3 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 researched removal and fitting methods b) health and safety requirements c) workplace procedures 4.4 use and apply sealants and anti corrosion materials conforming to the manufacturers specification 4.5 ensure that the replacement panels conform to the vehicle specifications for dimension, material and functional capability 4.6 ensure the components are realigned correctly in a way which regains their original manufactured tolerance 4.7 ensure any damage is minimised to mating surfaces. Any damage caused should be correctly reinstated. 4.8 ensure permanently fixed panels are replaced without incurring damage to the vehicle systems 4.9 ensure all components and panels are stored safely and in the correct location 4.10 work to the specified timescale for the activity.

Learning outcome

The learner will:

5. be able to record information and make suitable recommendations.

Assessment criteria

The learner can:

- 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required
- 5.2 make suitable and justifiable recommendations for cost effective repairs
- 5.3 identify and report any expected delays in completion to the relevant person(s) promptly in the format required
- 5.4 record and report any additional faults noticed during the course of their work promptly in the format required.

**Unit 105 Competency in removing and
replacing exterior motor
vehicle body panels including
permanently fixed
components**

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation

Unit 106

Competency in carrying out minor repairs to motor vehicle exterior body panels

UAN:	K/601/5380
Level:	2
Credit value:	10
GLH:	90
Relationship to NOS:	This unit is linked to the NOS BP06 Repair motor vehicle exterior body panels and NOS BP14 Repair motor vehicle body panels
Endorsement by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry.
Aim:	This unit will enable the learner to become competent in carrying out minor repairs to motor vehicle exterior body panels using a variety of techniques. It also covers the evaluation of the repair once completed

Learning outcome
The learner will: 1. be able to work safely when carrying out minor repairs to motor vehicle exterior body panels.
Assessment criteria
The learner can: 1.1 use suitable personal protective equipment and vehicle coverings throughout all repair activities 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.

Learning outcome
The learner will: 2. be able to use relevant information to carry out the task.
Assessment criteria
The learner can: 2.1 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) legal requirements 2.2 use technical information to support motor vehicle removal and fitting activities.

Learning outcome
The learner will: 3. Be able to use appropriate tools and equipment
Assessment criteria
The learner can: 3.1 select the appropriate tools and equipment necessary for carrying out repairs to motor vehicle exterior and body panels 3.2 check that equipment has been calibrated to meet manufacturers' and legal requirements 3.3 use the correct tools and equipment in the way specified by manufacturers when carrying out repairs to motor vehicle exterior body panels.

Learning outcome
The learner will: 4. be able to carry out minor repairs to motor vehicle exterior body panels.
Assessment criteria
The learner can: 4.1 identify prior to working on the vehicle the component materials involved that will be worked on during the repair 4.2 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 4.3 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 researched removal and fitting methods c) health and safety requirements d) workplace procedures 4.4 replace any sealer, anti corrosion and sound deadening materials which were removed prior to the repair and conforming to the manufacturers specification 4.5 ensure all plastic repairs regain the strength of the original part 4.6 ensure any damage is minimised to mating surfaces. Any damage caused should be correctly reinstated. 4.7 ensure all completed repairs are finished to and agreed standard ready for the refinishing process 4.8 work to the specified timescale for the activity.

Learning outcome

The learner will:

5. be able to record information and make suitable recommendations.

Assessment criteria

The learner can:

- 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required
- 5.2 make suitable and justifiable recommendations for cost effective repairs
- 5.3 identify and report any expected delays in completion to the relevant person(s) promptly in the format required.
- 5.4 record and report any additional faults noticed during the course of their work promptly in the format required.

Unit 106 Competency in carrying out minor repairs to motor vehicle exterior body panels

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation

Unit 113

Competency in Removing and Replacing Structural Motor Vehicle Body Panels

UAN:	T/601/5382
Level:	3
Credit value:	10
GLH:	90
Relationship to NOS:	This unit is linked to BP13 - Remove and Replace Structural Motor Vehicle Body Panels.
Endorsement by a sector or regulatory body:	This unit was developed by IMI, the Sector Skills Council for the automotive retail industry.
Aim	This unit will enable the learner to demonstrate competency in the removing and replacing or repair of exterior and sub-structure body panels and panel sections where these are damaged. It also covers the evaluation of the components when fitted.

Learning outcome	The learner will:
1.	be able to work safely when carrying out removal and replacement of vehicle body panels
Assessment criteria	
The learner can:	
1.1	use suitable personal protective equipment and vehicle coverings throughout all removal and replacement activities
1.2	work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.

Learning outcome	The learner will:
2.	be able to use relevant information to carry out the task
Assessment criteria	
The learner can:	
2.1	select suitable sources of technical information to support motor vehicle removal and fitting activities including: a) vehicle technical data b) removal and fitting procedures c) legal requirements
2.2	use technical information to support motor vehicle removal and fitting activities.

Learning outcome	The learner will:
3.	be able to use appropriate tools and equipment
Assessment criteria	
The learner can:	
3.1	select the appropriate tools and equipment necessary for carrying out removal and fitting of vehicle body panels
3.2	ensure that equipment has been calibrated to meet manufacturers' and legal requirements
3.3	use the correct tools and equipment in the way specified by manufacturers when carrying out removal and fitting of vehicle body panels.

Learning outcome	The learner will:
4.	be able to carry out removal and fitting of vehicle body panels
Assessment criteria	
The learner can:	
4.1	identify prior to working on the vehicle the component materials that will be worked on during the repair or replacement
4.2	carry out the removal and fitting of non-permanently fixed, welded and bonded vehicle body panels
4.3	carry out removal and fitting of vehicle body panels to specification and tolerance following: <ul style="list-style-type: none"> a) the manufacturer's approved removal and fitting methods b) recognised researched removal and fitting methods c) health and safety requirements d) workplace procedures
4.4	ensure all test weld pieces conform to the current industry standard for appearance and penetration
4.5	use and apply sealants and anti corrosion materials to the manufacturers' specification
4.6	ensure that replacement panels conform to the vehicle specifications for dimension, material, quality of finish and functional capability
4.7	ensure the components are realigned to the manufacturers tolerance
4.8	ensure damage to mating surfaces is minimised and any additional damage caused correctly reinstated
4.9	ensure panels are replaced without causing damage to the vehicle systems
4.10	ensure all components and panels are stores safely and in the correct location
4.11	work to the specified timescale for the activity

Learning outcome	The learner will:
5.	be able to record information and make suitable recommendations
Assessment criteria	
The learner can:	
5.1	produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required
5.2	make suitable and justifiable recommendations for cost effective repairs
5.3	identify and report any expected delays in completion to the relevant person(s) promptly in the format required.
5.4	record and report any additional faults noticed during the course of their work promptly in the format required.

Unit 114

Competency in motor vehicle body panel major repairs

UAN:	F/601/5384
Level:	Level 3
Credit value:	11
GLH:	90
Relationship to NOS:	This unit is linked to Unit BP14C Demonstrating Competency in Motor Vehicle Body Panel Major Repairs
Endorsement by a sector or regulatory body:	This unit was developed by IMI, the Sector Skills Council for the automotive retail industry.
Aim	This unit will help the learner to develop the skills required to carry out repairs to motor vehicle body panels using a variety of techniques. It also covers the evaluation of the repair once completed.

Learning outcome	The learner will:
1.	be able to work safely when carrying out major repairs to motor vehicle body panels
Assessment criteria	
The learner can:	
1.1	use suitable personal protective equipment and vehicle coverings throughout all repair activities
1.2	work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.

Learning outcome	The learner will:
2.	be able to use relevant information to carry out the task
Assessment criteria	
The learner can:	
2.1	select suitable sources of technical information to support motor vehicle removal and fitting activities including: a) vehicle technical data b) removal and fitting procedures c) legal requirements
2.2	use technical information to support motor vehicle removal and fitting activities

Learning outcome	The learner will:
3.	be able to use appropriate tools and equipment
Assessment criteria	
The learner can:	
3.1	select the appropriate tools and equipment necessary for carrying out major repairs to motor vehicle body panels
3.2	ensure that equipment has been calibrated to meet manufacturers' and legal requirements
3.3	use the tools and equipment in the way specified by manufacturers when carrying out major repairs to motor vehicle body panels

Learning outcome	The learner will:
4.	be able to carry out major repairs to motor vehicle body panels
Assessment criteria	
The learner can:	
4.1	identify prior to working on the vehicle the component materials involved that will be worked on during the repair
4.2	ensure the methods of preparation leave sub-structure body panels clean, free from materials likely to hinder repair and free of surface finishes when required.
4.3	prepare and reinstate vehicle body panels using the equipment recommended and following: <ul style="list-style-type: none"> a) the manufacturer's approved removal and fitting methods b) recognised researched removal and fitting methods c) health and safety requirements
4.4	carry out major repairs to motor vehicle body panels so they are restored to their original contour and dimensions using hand/power tools and filling materials effectively
4.5	replace any sealer, anti corrosion and sound deadening materials which were removed prior to the repair and conforming to the manufacturers specification
4.6	ensure all test weld pieces conform to the current Industry Standard for appearance and penetration
4.7	ensure any damage is minimised to mating surfaces. Any damage caused should be reinstated.
4.8	ensure all completed repairs are finished to an agreed standard ready for the refinishing process
4.9	work to the specified timescale for the activity

Learning outcome	The learner will:
5.	be able to record information and make suitable recommendations
Assessment criteria	
The learner can:	
5.1	produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required
5.2	make suitable and justifiable recommendations for cost effective repairs
5.3	identify and report any expected delays in completion to the relevant person(s) promptly in the format required.
5.4	record and report any additional faults noticed during the course of their work promptly in the format required

Unit 117

Competency in identifying and rectifying motor vehicle body misalignment

UAN:	L/601/5386
Level:	Level 3
Credit value:	11
GLH:	90
Relationship to NOS:	This unit is linked to Unit BP17C Demonstrating Competency in Identifying and Rectifying Motor Vehicle Body Misalignment
Endorsement by a sector or regulatory body:	This unit was developed by IMI, the Sector Skills Council for the automotive retail industry.
Aim	This unit enables the learner to develop the skills required to carry out identification and rectification of motor vehicle body misalignment. It also covers the evaluation of the repair once completed.

Learning outcome	The learner will:
1.	be able to work safely when carrying out identification and rectification to motor vehicle body misalignment
Assessment criteria	
The learner can:	
1.1	use suitable personal protective equipment and vehicle coverings throughout all repair activities
1.2	work in a way which minimises the risk of damage or injury to the vehicle, people and the environment

Learning outcome	The learner will:
2.	be able to use relevant information to carry out the task
Assessment criteria	
The learner can:	
2.1	select suitable sources of technical information to support the identification and rectification of motor vehicle body misalignment including: a) vehicle technical data b) removal and fitting procedures c) equipment data specific to the vehicle d) legal requirements
2.2	use technical information to support the identification and rectification of motor vehicle body misalignment

Learning outcome	The learner will:
3.	be able to use appropriate tools and equipment
Assessment criteria	
The learner can:	
3.1	select the appropriate tools and equipment necessary for carrying out identification and rectification to motor vehicle body misalignment
3.2	ensure that equipment has been calibrated to meet manufacturers' and legal requirements
3.3	use the appropriate tools and equipment in the way specified by manufacturers when carrying out identification and rectification to motor vehicle body misalignment

Learning outcome	The learner will:
4.	be able to carry out identification and rectification to motor vehicle body misalignment
Assessment criteria	
The learner can:	
4.1	load and secure the vehicle to the body jig correctly following: <ul style="list-style-type: none"> a) the manufacturer's approved instructions b) recognised researched methods c) health and safety requirements d) workplace procedures
4.2	establish the extent of the vehicle misalignment accurately and completely
4.3	align and anchor areas adjacent to the damage in a way that prevents further damage to the vehicle
4.4	attach the pulling system securely to the damaged components and operate it to achieve the realignment required
4.5	operate the pulling system in a way that minimises the risk of injury to yourself and others
4.6	ensure all completed rectification activities restore the vehicle to the correct specification and tolerances
4.7	work to the specified timescale for the activity

Learning outcome	The learner will:
5.	be able to record information and make suitable recommendations
Assessment criteria	
The learner can:	
5.1	produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required
5.2	make suitable and justifiable recommendations for cost effective repairs
5.3	identify and report any expected delays in completion to the relevant person(s) promptly in the format required.
5.4	record and report any additional faults noticed during the course of their work promptly in the format required

Unit 119

Competency in motor vehicle body metal active gas (MAG) welding techniques

UAN:	D/601/5392
Level:	2
Credit value:	9
GLH:	90
Relationship to NOS:	This unit is linked to the NOS BP19 Motor vehicle MIG/MAG welding operations
Endorsement by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry.
Aim:	This unit will enable the learner to demonstrate competency in joining materials using Metal Active Gas (MAG) welding techniques. It also covers the evaluation of the completed welded component

Learning outcome
The learner will: 1. be able to work safely when carrying out motor vehicle body MAG welding operations.
Assessment criteria
The learner can: 1.1 use suitable personal protective equipment and vehicle coverings throughout all motor vehicle body MAG welding operations 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.

Learning outcome
The learner will: 2. be able to use relevant information to carry out the task.
Assessment criteria
The learner can: 2.1 select suitable sources of technical information to support motor vehicle body MAG welding operation activities including: a) vehicle technical data b) welding procedures c) legal requirements 2.2 use technical information to support motor vehicle body MAG welding operation activities.

Learning outcome
The learner will: 3. be able to use appropriate tools and equipment.
Assessment criteria
The learner can: 3.1 select the appropriate tools and equipment necessary for carrying out motor vehicle body MAG welding operations 3.2 ensure all tools and equipment that are required are in a safe working condition 3.3 set up and use the appropriate tools and equipment in the way specified by manufacturers when carrying out motor vehicle body MAG welding operations 3.4 clean and store PPE and equipment in the appropriate manner.

Learning outcome
The learner will: 4. be able to carry out motor vehicle body MAG welding operations.
Assessment criteria
The learner can: 4.1 prepare surface to ensure a good MAG weld is achieved 4.2 ensure alignment, mating and treatment of flanges to enable a suitable joint to be achieved 4.3 conduct MAG weld operations including: a) lap plug b) lap seam c) butt joint d) fillet joint 4.4 conduct MAG 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 4.5 dress the weld area without reducing material thickness and protect the area to inhibit corrosion where applicable 4.6 recognise when the weld is not forming correctly and what action needs to be taken 4.7 inspect and assess quality of welds in accordance with Industry Standards and manufacturers specification 4.8 avoid damaging other components, units, panels and surfaces on the vehicle and the surrounding work area. Any damage caused should be correctly reinstated 4.9 ensure no damage is incurred to other vehicle systems when MAG welding 4.10 work to the specified timescale for the activity.

Learning outcome

The learner will:

5. be able to record information and make suitable recommendations.

Assessment criteria

The learner can:

- 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required
- 5.2 make suitable and justifiable recommendations for cost effective repairs
- 5.3 identify and report any expected delays in completion to the relevant person(s) promptly in the format required.
- 5.4 record and report any additional faults noticed during the course of their work promptly in the format required.

Unit 119 Competency in motor vehicle body metal active gas (MAG) welding techniques

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation

Unit 120

Competency in motor vehicle body resistance spot welding operations

UAN:	T/601/5396
Level:	2
Credit value:	9
GLH:	90
Relationship to NOS:	This unit is linked to the NOS BP20 Motor vehicle body resistance spot welding operations
Endorsement by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry.
Aim:	This unit will enable the learner to demonstrate competency in joining materials correctly and effectively using resistance spot welding techniques and procedures. It also covers the evaluation of the completed welded component.

Learning outcome
The learner will: 1. be able to work safely when carrying out motor vehicle body resistance spot welding operations.
Assessment criteria
The learner can: 1.1 use suitable personal protective equipment and vehicle coverings throughout all motor vehicle body resistance spot welding operations 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.

Learning outcome
The learner will: 2. be able to use relevant information to carry out the task.
Assessment criteria
The learner can: 2.1 select suitable sources of technical information to support motor vehicle body resistance spot welding operation activities including: a) vehicle technical data b) welding procedures c) legal requirements 2.2 use technical information to support motor vehicle body resistance spot welding operation activities.

Learning outcome
The learner will: 3. be able to use appropriate tools and equipment.
Assessment criteria
The learner can: 3.1 select the appropriate tools and equipment necessary for carrying out motor vehicle body resistance spot welding operations 3.2 ensure tools and equipment that are required are in a safe working condition 3.3 set up and use the correct tools and equipment in the way specified by manufacturers when carrying motor vehicle body resistance spot welding operations 3.4 clean and store PPE and equipment in the appropriate manner.

Learning outcome
The learner will: 4. be able to carry out motor vehicle body resistance spot welding operations.
Assessment criteria
The learner can: 4.1 carry out surface preparation to ensure a good resistance spot weld is achieved 4.2 ensure alignment and mating and treatment of flanges to enable a suitable join to be achieved 4.3 produce resistance spot welding operations following: a) manufacturers processes, methods and procedures b) test procedures and providing test coupons on equivalent material in accordance with Industry Standards c) recognised researched repair methods 4.4 dress and protect the area to inhibit corrosion where applicable 4.5 identify when the weld is not forming correctly and what action needs to be taken 4.6 inspect and assess all resistance spot weld quality in accordance with industry standards and manufacturers specification 4.7 ensure the integrity of the weld and record the type of weld achieved on the appropriate paperwork 4.8 store and record all weld test pieces 4.9 avoid damaging other components, units, panels and surfaces on the vehicle and the surrounding work area. any damage caused should be correctly reinstated 4.10 ensure no damage is incurred to other vehicle systems when resistance spot welding 4.11 work to the specified timescale for the activity.

Learning outcome
The learner will: 5. be able to record information and make suitable recommendations.
Assessment criteria
The learner can: 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 5.2 make suitable and justifiable recommendations for cost effective repairs 5.3 identify and report any expected delays in completion to the relevant person(s) promptly in the format required. 5.4 record and report any additional faults noticed during the course of their work promptly in the format required.

Unit 120 Competency in motor vehicle body resistance spot welding operations

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation

Unit 121

Competency in motor vehicle body metal inert gas (MIG) brazing operations

UAN:	F/601/5398
Level:	3
Credit value:	9
GLH:	90
Relationship to NOS:	This unit is linked to the NOS BP21 Motor vehicle body (MIG) brazing operations
Endorsement by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry.
Aim:	This unit will enable the learner to demonstrate competency in joining materials correctly and effectively using Metal Inert Gas (MIG) brazing techniques and procedures. It also covers the evaluation of the completed brazed component.

Learning outcome
The learner will: 1. be able to work safely when carrying out motor vehicle body MIG brazing operations.
Assessment criteria
The learner can: 1.1 use suitable personal protective equipment and vehicle coverings throughout all motor vehicle body MIG brazing operations 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.

Learning outcome
The learner will: 2. be able to use relevant information to carry out the task.
Assessment criteria
The learner can: 2.1 select suitable sources of technical information to support motor vehicle body MIG brazing operations activities including: a) vehicle technical data b) welding procedures c) legal requirements 2.2 use technical information to support motor vehicle body MIG brazing operations activities.

Learning outcome
The learner will: 3. be able to use appropriate tools and equipment.
Assessment criteria
The learner can: 3.1 select the appropriate tools and equipment necessary for carrying out motor vehicle body MIG brazing operations 3.2 ensure all tools and equipment that are required are in a safe working condition 3.3 set up and use the correct tools and equipment in the way specified by manufacturers when carrying out motor vehicle body MIG brazing operations 3.4 clean and store PPE and equipment in the appropriate manner

Learning outcome
The learner will: 4. be able to carry out motor vehicle body MIG brazing welding operations.
Assessment criteria
The learner can: 4.1 prepare surface to ensure a good MIG brazing operation is achieved 4.2 ensure alignment, and mating treatment of flanges to enable a suitable joint to be achieved 4.3 carry out MIG brazing operations including: a) lap slot b) lap seam c) butt joint 4.4 carry out MIG brazing operations following: a) manufacturers processes, methods and procedures b) test procedures and providing test coupons on equivalent material in accordance with Industry Standards c) recognised researched repair methods 4.5 dress the weld area without reducing material thickness and protect the area to inhibit corrosion where applicable 4.6 recognise when the weld is not forming correctly and what action needs to be taken 4.7 inspect and assess all MIG brazing operations for quality in accordance with Industry Standards and manufacturers specification 4.8 ensure the integrity of the weld and record the type of weld achieved on the appropriate paperwork. 4.9 avoid damaging other components, units, panels and surfaces on the vehicle and the surrounding work area. Any damage caused should be correctly reinstated 4.10 ensure no damage is incurred to other vehicle systems when carrying out MIG brazing operations 4.11 work to the specified timescale for the activity.

Learning outcome

The learner will:

5. be able to record information and make suitable recommendations.

Assessment criteria

The learner can:

- 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required
- 5.2 make suitable and justifiable recommendations for cost effective repairs
- 5.3 identify and report any expected delays in completion to the relevant person(s) promptly in the format required.
- 5.4 record and report any additional faults noticed during the course of their work promptly in the format required.

**Unit 121 Competency in motor vehicle
body metal inert gas (MIG)
brazing operations**

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation

Unit 122

Competency in motor vehicle body aluminium metal inert gas (MIG) welding operation

UAN:	M/601/5400
Level:	3
Credit value:	9
GLH:	90
Relationship to NOS:	This unit is linked to the Unit BP22C Demonstrating Competence in Motor Vehicle Body Metal Inert Gas (MIG) Aluminium Welding Operations
Endorsement by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry.
Aim:	This unit will help the learner to develop the skills required to join materials correctly and effectively using aluminium welding techniques and procedures. It also covers the evaluation of the completed welded components.

Learning outcome
The learner will: 1. be able to work safely when carrying out motor vehicle body aluminium MIG welding operations.
Assessment criteria
The learner can: 1.1 use suitable personal protective equipment and vehicle coverings throughout all motor vehicle body aluminium MIG welding operations 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment

Learning outcome
The learner will: 2. be able to use relevant information to carry out the task
Assessment criteria
The learner can: 2.1 select suitable sources of technical information to support motor vehicle body aluminium MIG welding operation activities including: a) vehicle technical data b) welding procedures c) legal requirements 2.2 use technical information to support motor vehicle body aluminium MIG welding operation activities

Learning outcome
The learner will: 3. be able to use appropriate tools and equipment.
Assessment criteria
The learner can: 3.1 select the appropriate tools and equipment necessary for carrying out motor vehicle body aluminium MIG welding operations 3.2 ensure tools and equipment that are required are in a safe working condition 3.3 set up and use the correct tools and equipment in the way specified by manufacturers when carrying motor vehicle body aluminium MIG welding operations 3.4 clean and store PPE and equipment in the appropriate manner

Learning outcome
The learner will: 4. be able to carry out motor vehicle body aluminium MIG welding operations
Assessment criteria
The learner can: 4.1 prepare surface preparation to ensure a good aluminium MIG weld is achieved 4.2 ensure alignment, and mating and treatment of flanges to enable a suitable join to be achieved 4.3 carry out aluminium MIG welding operations including: a) lap seam b) butt joint c) fillet joint 4.4 carry out aluminium MIG welding operations following: a) manufacturers processes, methods and procedures b) test procedures and providing test coupons on equivalent material in accordance with Industry Standards c) recognised researched repair methods 4.5 dress the weld area without reducing material thickness and protect the area to inhibit corrosion where applicable 4.6 identify when the weld is not forming correctly and what action needs to be taken 4.7 inspect and assess all aluminium MIG weld quality in accordance with Industry Standards and manufacturers specification 4.8 ensure the integrity of the weld and record the type of weld achieved on the appropriate paperwork. 4.9 store and record all weld test pieces 4.10 avoid damaging other components, units, panels and surfaces on the vehicle and the surrounding work area. Any damage caused should be correctly reinstated 4.11 ensure no damage is incurred to other vehicle systems when aluminium MIG welding 4.12 work to the specified timescale for the activity

Learning outcome
The learner will: 5. be able to record information and make suitable recommendations.
Assessment criteria
The learner can: 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 5.2 make suitable and justifiable recommendations for cost effective repairs 5.3 identify and report any expected delays in completion to the relevant person(s) promptly in the format required. 5.4 record and report any additional faults noticed during the course of their work promptly in the format required

Unit 122 Competency in motor vehicle body aluminium metal inert gas (MIG) welding operation

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation

Unit 123

Competency in motor vehicle body tungsten inert gas (TIG) welding operations

UAN:	J/601/5404
Level:	3
Credit value:	9
GLH:	90
Relationship to NOS:	This unit is linked to the Unit BP23C Demonstrating Competence in Motor Vehicle Body Tungsten Inert Gas (TIG) Welding Operations
Endorsement by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry.
Aim:	This unit will help the learner to develop the skills required to join materials using TIG welding techniques and procedures. It also covers the evaluation of the completed welded component.

Learning outcome
The learner will: 1. be able to work safely when carrying out motor vehicle body TIG welding operations.
Assessment criteria
The learner can: 1.1 use suitable personal protective equipment and vehicle coverings throughout all motor vehicle body TIG welding operations 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment

Learning outcome
The learner will: 2. be able to use relevant information to carry out the task
Assessment criteria
The learner can: 2.1 select suitable sources of technical information to support motor vehicle body aluminium MIG welding operation activities including: a) vehicle technical data b) welding procedures c) legal requirements 2.2 use technical information to support motor vehicle body TIG welding operation activities

Learning outcome
The learner will: 3. be able to use appropriate tools and equipment.
Assessment criteria
The learner can: 3.1 select the appropriate tools and equipment necessary for carrying out motor vehicle body TIG welding operations 3.2 ensure tools and equipment that are required are in a safe working condition 3.3 set up and use the correct tools and equipment in the way specified by manufacturers when carrying out motor vehicle body TIG welding operations 3.4 clean and store PPE and equipment in the appropriate manner

Learning outcome
The learner will: 4. be able to carry out motor vehicle body TIG welding operations
Assessment criteria
The learner can: 4.1 prepare surface to ensure a good TIG weld is achieved 4.2 ensure alignment and mating and treatment of flanges to enable a suitable joint to be achieved 4.3 carry out TIG welding operations including: a) lap seam b) butt joint c) fillet joint 4.4 carry out TIG welding operations following: d) manufacturers processes, methods and procedures e) test procedures and providing test coupons on equivalent material in accordance with Industry Standards f) recognised researched repair methods 4.5 dress the weld area without reducing material thickness and protect the area to inhibit corrosion where applicable 4.6 identify when the weld is not forming correctly and what action needs to be taken 4.7 inspect and assess all TIG weld quality in accordance with Industry Standards and manufacturers specification 4.8 ensure the integrity of the weld and record the type of weld achieved on the appropriate paperwork. 4.9 store and record all weld test pieces 4.10 avoid damaging other components, units, panels and surfaces on the vehicle and the surrounding work area. Any damage caused should be correctly reinstated 4.11 ensure no damage is incurred to other vehicle systems when TIG welding 4.12 work to the specified timescale for the activity

Learning outcome
The learner will: 5. be able to record information and make suitable recommendations.
Assessment criteria
The learner can: 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 5.2 make suitable and justifiable recommendations for cost effective repairs 5.3 identify and report any expected delays in completion to the relevant person(s) promptly in the format required. 5.4 record and report any additional faults noticed during the course of their work promptly in the format required

Unit 123 Competency in motor vehicle body tungsten inert gas (TIG) welding operations

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation

Unit 124

Competency in motor vehicle body mechanical fastening operations

UAN:	R/601/5406
Level:	3
Credit value:	4
GLH:	40
Relationship to NOS:	This unit is linked to the NOS BP24 Motor vehicle body mechanical fastening operations
Endorsement by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry.
Aim:	This unit will enable the learner to demonstrate competency in joining materials using mechanical fastening techniques and procedures. It also covers the evaluation of the completed mechanical joint.

Learning outcome
The learner will: 1. be able to work safely when carrying out motor vehicle body mechanical fastening operations.
Assessment criteria
The learner can: 1.1 use suitable personal protective equipment and vehicle coverings throughout all motor vehicle body mechanical fastening operations 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.

Learning outcome
The learner will: 2. be able to use relevant information to carry out the task.
Assessment criteria
The learner can: 2.1 select suitable sources of technical information to support motor vehicle body mechanical fastening operations activities including: a) vehicle technical data b) joining procedures c) legal requirements 2.2 use technical information to support motor vehicle body mechanical fastening operations activities.

Learning outcome
The learner will: 3. be able to use appropriate tools and equipment.
Assessment criteria
The learner can: 3.1 select the appropriate tools and equipment necessary for carrying out motor vehicle body mechanical fastening operations 3.2 ensure all tools and equipment that are required are in a safe working condition 3.3 set up and use the correct tools and equipment in the way specified by manufacturers when carrying out motor vehicle body mechanical fastening operations 3.4 clean and store PPE and equipment in the appropriate manner.

Learning outcome
The learner will: 4. be able to carry out motor vehicle body mechanical fastening operations
Assessment criteria
The learner can: 4.1 prepare surface to ensure a good mechanical fastening is achieved 4.2 ensure alignment and mating and treatment of flanges to enable a suitable joint to be achieved 4.3 carry out a range of mechanical fastening 4.4 carry out mechanical fastening operations following: a) manufacturers processes, methods and procedures b) recognised researched repair methods 4.5 dress and protect the joint area to inhibit corrosion where applicable 4.6 recognise when the joint is not forming correctly and what action needs to be taken 4.7 ensure integrity of the joint and record the type of joint achieved on the appropriate paperwork. 4.8 avoid damaging other components, units, panels and surfaces on the vehicle and the surrounding work area. Any damage caused should be correctly reinstated 4.9 work to the specified timescale for the activity.

Learning outcome
The learner will: 5. be able to record information and make suitable recommendations.
Assessment criteria
The learner can: 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 5.2 make suitable and justifiable recommendations for cost effective repairs 5.3 identify and report any expected delays in completion to the relevant person(s) promptly in the format required. 5.4 record and report any additional faults noticed during the course of their work promptly in the format required.

Unit 124 Competency in motor vehicle body mechanical fastening operations

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation

Unit 125

Competency in motor vehicle body adhesive bonding operations

UAN:	Y/601/5407
Level:	3
Credit value:	4
GLH:	40
Relationship to NOS:	This unit is linked to the NOS BP25 Motor vehicle body adhesive bonding operations
Endorsement by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry.
Aim:	This unit will enable the learner to demonstrate competency in joining materials using adhesive bonding techniques and procedures. It also covers the evaluation of the completed joint.

Learning outcome
The learner will: 1. be able to work safely when carrying out motor vehicle body adhesive bonding operations.
Assessment criteria
The learner can: 1.1 use suitable personal protective equipment and vehicle coverings throughout all motor vehicle body adhesive bonding operations 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.

Learning outcome
The learner will: 2. be able to use relevant information to carry out the task.
Assessment criteria
The learner can: 2.1 select suitable sources of technical information to support motor vehicle body adhesive bonding operation activities including: a) vehicle technical data b) joining procedures c) legal requirements 2.2 use technical information to support motor vehicle body adhesive bonding operation activities.

Learning outcome
The learner will: 3. be able to use appropriate tools and equipment.
Assessment criteria
The learner can: 3.1 select the appropriate tools and equipment necessary for carrying out motor vehicle body adhesive bonding operations 3.2 ensure tools and equipment that are required are in a safe working condition 3.3 set up and use the correct tools and equipment in the way specified by manufacturers when carrying motor vehicle body adhesive bonding operations 3.4 clean and store PPE and equipment in the appropriate manner.

Learning outcome
The learner will: 4. be able to carry out motor vehicle body adhesive bonding operations.
Assessment criteria
The learner can: 4.1 prepare surface to ensure a good adhesive bond is achieved 4.2 ensure alignment and mating and treatment of flanges to enable a suitable join to be achieved 4.3 carry out adhesive bonding operations following: a) manufacturers processes, methods and procedures b) test procedures and providing test coupons on equivalent material c) recognised researched repair methods 4.4 dress and protect the area to inhibit corrosion where applicable 4.5 identify when the joint is not forming correctly and what action needs to be taken 4.6 avoid damaging other components, units, panels and surfaces on the vehicle and the surrounding work area. any damage caused should be correctly reinstated 4.7 work to the specified timescale for the activity.

Learning outcome
The learner will: 5. be able to record information and make suitable recommendations.
Assessment criteria
The learner can: 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 5.2 make suitable and justifiable recommendations for cost effective repairs 5.3 identify and report any expected delays in completion to the relevant person(s) promptly in the format required. 5.4 record and report any additional faults noticed during the course of their work promptly in the format required.

Unit 125 Competency in motor vehicle body adhesive bonding operations

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation

Unit 151

Knowledge of removing and fitting motor mechanical, electrical and trim (MET) components to vehicles

UAN:	Y/601/5424
Level:	2
Credit value:	2
GLH:	20
Relationship to NOS:	This unit is linked to the NOS BP01 Remove and fit basic motor mechanical and electrical and Trim (MET) components to vehicles.
Endorsement by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry.
Aim:	This unit enables the learner to develop an understanding of carrying out a range of removal and fitting of mechanical, electrical and trim (MET) components to vehicles. It also covers the evaluation of the operation of the components when fitted

Learning outcome
The learner will: 1. understand how to carry out removal and fitting of motor vehicle mechanical electrical and trim (MET) components.
Assessment criteria
The learner can: 1.1 identify the procedures involved in carry out the systematic removal and fitting of vehicle MET components to the standard required 1.2 identify the procedures involved in working with supplementary safety systems when fitting vehicle MET components 1.3 identify the procedures involved in working with gas discharge headlamp systems when fitting vehicle MET components 1.4 describe the methods and procedures for storing removed vehicle MET components 1.5 identify the different types of fastenings and fixings used when removing and fitting vehicle MET components 1.6 explain the reasons for the use of different types of fastenings and fixings used in vehicle MET components 1.7 describe the procedures, methods and reasons for ensuring correct alignment of vehicle MET components 1.8 identify the quality checks that can be used to ensure correct alignment and operation of vehicle MET components 1.9 identify correct conformity of vehicle systems against vehicle specification and legal requirements on completion 1.10 explain the procedure for reporting cosmetic damage to vehicle MET components and units.

Unit 151 Knowledge of removing and fitting motor mechanical, electrical and trim (MET) components to vehicles

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation.

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

Procedures to prevent damage to the vehicle, components and contents when removing, storing and refitting MET components

- a The methods that can be used to protect undamaged items to ensure they are removed and refitted without causing unnecessary damage:
 - i bumpers
 - ii headlamp units
 - iii road wheels
 - iv batteries
 - v bonnet fittings
 - vi interior trim components
 - vii exterior trim components.
- b The procedures for the correct storage of vehicle contents.
- c The process for the reporting of extra damage and items that may have broken when removed or refitted.

The processes involved when handling batteries

- a The procedure for the removal, storage and refitting of lead acid batteries.
- b The procedure for the disposal of lead acid batteries.
- c Battery checks:
 - i electrolyte
 - ii discharge
 - iii specific gravity.
- d The charging process and procedures:
 - i trickle charge
 - ii normal charge
 - iii boost / start.
- e The health and safety issues involved when charging (explosive gasses).

Types of clips and fixings

- a The following types of clips and identify reasons and limitations for their use:
- i speed
 - ii 'c'
 - iii 'd'
 - iv 'j' type captive nut
 - v 'r'
 - vi 'u' type captive nut
 - vii cable clip
 - viii trim clips.
- b The following types of fixings and identify reasons and limitations for their use:
- i rivets
 - ii plastic capture nut
 - iii nut and bolt
 - iv shoulder bolt
 - v 'Nyloc' type nuts
 - vi washers
 - vii 'Spring' type washers
 - viii self tapping screws and bolts
 - ix quick release plastic trim fastenings
 - x trim tapes
 - xi adhesives and sealers.

The processes involved when carrying out quality checks

- a Items that may have been 'workshop' soiled and describe processes for rectifying:
- i door cards
 - ii seats
 - iii carpets
 - iv boot and bonnet trims.
- b Methods for checking gaps.
- c The process for checking and aligning headlamps:
- i address handling procedures for halogen bulbs
 - ii address handling and health and safety issues relating to xenon bulbs and systems.
- d Operational checks and rectification methods to include:
- i lights
 - ii washers and wipers
 - iii SRS systems (checking not rectification)
 - iv charging system (checking not rectification)
 - v horn
 - vi fluid levels
 - vii interior switches
 - viii operation of door lock mechanisms.

Unit 152

Knowledge of removing and fitting non permanently fixed motor vehicle body panels

UAN:	D/601/5425
Level:	2
Credit value:	2
GLH:	20
Relationship to NOS:	This unit is linked to the NOS BP02 Remove and fit non permanently fixed motor vehicle body panels.
Endorsement by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry.
Aim:	This unit enables the learner to develop knowledge in order to carry out removal and fitting of non-permanently fixed vehicle panels such as wings, doors, bonnets, boot lids and tailgates. It also covers the evaluation of the operation of the components when fitted.

Learning outcome
The learner will: 1. understand how to carry out removal and fitting of non-permanently fixed motor vehicle body panels.
Assessment criteria
The learner can: 1.1 identify the procedures involved in carry out the systematic removal and fitting of non-permanently fixed vehicle body panels: a) wings b) doors c) bonnets d) boot lids e) tailgates 1.2 identify the procedures involved in working with supplementary safety systems when fitting basic non-permanently fixed vehicle body panels 1.3 describe the methods and procedures for storing removed non-permanently fixed vehicle body panels 1.4 identify the different types of fastenings and fixings used when removing and fitting non-permanently fixed vehicle body panels 1.5 explain the reasons for the use of different types of fastenings and fixings used in non-permanently fixed vehicle body panels. 1.6 describe the procedures, methods and reasons for ensuring alignment of non-permanently fixed vehicle body panels

- 1.7 identify the quality checks that can be used to ensure alignment and operation of non-permanently fixed vehicle body panels
- 1.8 identify conformity of vehicle systems against vehicle specification and legal requirements on completion
- 1.9 explain the procedure for reporting damage to vehicle non-permanently fixed vehicle body panels.

Unit 152 Knowledge of removing and fitting non permanently fixed motor vehicle body panels

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation.

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

Removing and fitting non permanently fixed body panels

- a Find, interpret and use sources of information applicable to the removal and fitting of basic non-welded body panels.
- b Select check and use all the tools and equipment required to remove and fit basic non welded body panels. The different types of mechanical fixings for non welded panels and when and why they should be used.
- c The correct procedures and processes for removing and fitting of non welded body panels.
- d The need for correct alignment of panels and methods to achieve this.
- e Aperture gaps.
- f Alignment of panel features.
- g Best fit of components to panels
- h Operation of openings such as doors, tailgates, bonnets.
- i 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.
- j The method of storing removed panels and the importance of storing them correctly.

Unit 155

Knowledge of removing and replacing exterior motor vehicle body panels including permanently fixed components

UAN:	H/601/5426
Level:	2
Credit value:	6
GLH:	45
Relationship to NOS:	This unit is linked to the NOS BP05 Remove and replace exterior motor vehicle body panels including permanently fixed components
Endorsement by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry.
Aim:	This unit enables the learner to develop an understanding of carrying out removal and refitting of exterior panels using mechanical fastening, adhesive bonding, welding and joining techniques.

Learning outcome
The learner will: 1. understand material types and properties used in removing and replacing exterior vehicle panels.
Assessment criteria
The learner can: 1.1 identify the properties and different types 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 properties and safe use of body component sealants, adhesives, and anti corrosion materials 1.4 describe the correct type of sealant to use in a given application in removing and replacing vehicle panels 1.5 describe how to apply sealants and anti corrosion materials following manufacturers recommended methods.

Learning outcome
<p>The learner will:</p> <ol style="list-style-type: none"> 2. understand how to carry out removal and replacing of fixed and non-permanently fixed exterior vehicle body panels including fixed panels.
Assessment criteria
<p>The learner can:</p> <ol style="list-style-type: none"> 2.1 identify the procedures involved in carry out the systematic removal of the manufacturers original joining technique 2.2 identify the procedures involved in carry out the systematic replacement of fixed and non-permanently fixed vehicle 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 vehicle body panels including fixed panels 2.4 describe the need for correct alignment of panels and the methods used to achieve this 2.5 identify the quality checks that can be used to ensure correct alignment and contour of panels and operation of components to manufacturers specification 2.6 describe the methods and procedures for storing components and the importance of storing them correctly and in accordance with legal requirements 2.7 identify the different types of fastenings, fixings and adhesives 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 conformity of vehicle systems against vehicle specification and legal requirements on completion 2.13 explain the procedure for reporting damage caused to the vehicle during the panel replacement activities.

Unit 155 Knowledge of removing and replacing exterior motor vehicle body panels including permanently fixed components

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation.

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

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.

Removing and fitting 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, the different types of mechanical fixings for non welded body panels and when and why they should be used.
- c The correct procedures and processes for removing and fitting of non welded body panels.
- d The need for correct alignment of panels and methods to achieve this
- e Aperture gaps.
- f Alignment of panel features.
- g Best fit of components to panels.
- h Operation of openings such as doors, tailgates, bonnets.
- i 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.
- j The method of storing removed panels and the importance of storing them correctly.

Removal and replacement of welded body panels

- a 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 importance 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 manufacturer's approved methods of working for the removal and replacement of body panels including:
 - i resistance spot
 - ii MIG MAG
 - iii MIG braze
 - iv adhesive bonding
 - v laser
 - vi laser stitch
 - vii mechanical fastening.

Unit 156

Knowledge of minor motor vehicle exterior body panel repairs

UAN:	K/601/5427
Level:	2
Credit value:	6
GLH:	45
Relationship to NOS:	This unit is linked to the NOS BP06 Repair motor vehicle exterior body panels and NOS BP14 Repair motor vehicle body panels.
Endorsement by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry.
Aim:	This unit enables the learner to develop an understanding of carrying out repairs to exterior body panels using a variety of techniques.

Learning outcome
The learner will: 1. understand the principles of selection and use of appropriate tools and equipment in minor repairs on motor vehicle exterior body panels.
Assessment criteria
The learner can: 1.1 identify tools used in the repair of metal finishing and plastic repairs 1.2 identify tools to carry out reshaping work including specialist dent removal tools 1.3 describe how to prepare, test, use and maintain the hand and power tools required to prepare damage and reshape damaged areas.

Learning outcome
The learner will: 2. understand material types and properties used in minor repairs on motor vehicle exterior body panels.
Assessment criteria
The learner can: 2.1 identify the properties and different types of materials used in the construction of vehicle bodies 2.2 describe the properties and use of metals used to manufacture body panels 2.3 identify the properties and safe use of types of filling materials used to repair panels 2.4 explain how to mix and apply plastic fillers 2.5 describe the techniques for identifying the type of plastic used for manufactured components 2.6 identify and describe the different types and grades of abrasive paper and their use.

Learning outcome
The learner will: 3. understand how to carry out minor repairs to motor vehicle exterior body panels.
Assessment criteria
The learner can: 3.1 describe how to prepare the vehicle to avoid contamination 3.2 describe how to prepare damaged areas to facilitate repairs 3.3 describe how to rough out and metal finish body panels 3.4 identify the procedures involved to reshape filling materials to match the original contour 3.5 describe how to finish repairs to a suitable agreed condition to enable the next stage of repairs to proceed 3.6 identify the procedures for repairing damage to plastic components including thermal and adhesive techniques 3.7 describe the techniques used to regain the contours of repaired plastic components 3.8 identify and describe the techniques for reshaping damaged body panels using hand and specialist tools 3.9 describe the methods used to check for panel contours for accuracy after reshaping 3.10 explain the procedures for reinstating anti corrosion, sealant and sound deadening materials 3.11 describe the aspects of pedestrian safety in relation to the reparability of vehicles.

Unit 156 Knowledge of minor motor vehicle exterior body panel repairs

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation.

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

Selection and use of tools

- a The principles governing the selection and use of hand tools for metal finishing and plastic filler repairs to include:
 - i panel beating hammers
 - ii dolly blocks
 - iii beating files
 - iv body spoons
 - v dual action sanders.
- b How to select the correct tools to carry out reshaping work, including specialist dent removal tools including panel pullers.
- c How to prepare, test and use and maintain the hand and power tools required to prepare damage and reshape damaged areas.

Selection and use of materials

- a. How to mix and apply plastic fillers.
- b. The properties and use of metals used to manufacture body panels.
- c. The properties and safe use of types of filling materials used to repair panels including plastic fillers.
- d. The different types and grades of abrasive and their use.
- e. The techniques to identify the type of plastics used for manufactured components.

Repairing body panels

- a. How to interpret and use sources of information relevant to the removal of body components.
- b. How to prepare damaged areas to facilitate repairs.
- c. How to repair plastic components using thermal and adhesive techniques.
- d. How to rough out and metal finish body panels.
- e. How to reshape filling materials to match the original panel contour.
- f. How to finish repairs to a suitable condition for handing on to the painting stage.
- g. How to work safely avoiding damage to the vehicle and its systems.

- h. The techniques for reshaping damaged body panels using hand and specialist tools.
- i. The procedures for reinstating anti-corrosion, sealant and sound deadening materials.
- j. The procedures for repairing damage to plastic components.
- k. The techniques and processes for:
 - i plastic repairs
 - ii hot shrinking
 - iii panel pulling
 - iv metal finishing
 - v plastic filing
 - vi indirect hammering
 - vii direct hammering.
- l. The techniques used to regain the contours of repaired plastic components.
- m. Methods of checking reshaped panel contours for accuracy.
- n. Standards of finish required to enable the next stage of repairs to proceed.
- o. The manufacturer's approved methods of working for the preparation and repair of body panels.

Unit 163

Knowledge of Removing and Replacing Structural Motor Vehicle Body Panels

UAN:	M/601/5428
Level:	3
Credit value:	6
GLH:	45
Relationship to NOS:	This unit is linked to BP13 –Remove and Replace Structural Motor Vehicle Body Panels.
Endorsement by a sector or regulatory body:	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.
Aim	This unit enables the learner to develop an understanding of how to remove a range of exterior and sub-structure body panels and panel sections where these are damaged and how to refit with new or repaired replacements.

Learning outcome	The learner will:
1.	understand material types and properties used in removing and replacing structural motor vehicle body panels
Assessment criteria	
The learner can:	
1.1	identify the properties and different types of materials used in the construction of vehicle bodies
1.2	explain the properties of the materials used in vehicle body construction
1.3	identify the properties and safe use of body component sealants, adhesives, and anti corrosion materials
1.4	explain how to apply sealants and anti corrosion materials following manufacturers recommended methods
1.5	compare the advantages and limitations of vehicles built using chassis frame and monocoque construction
1.6	identify the implications of working with; a) galvanised coatings b) mild steels c) HSS d) UHSS e) aluminium alloys

Learning outcome	The learner will:
2.	understand how to carry out removal and replacing of structural motor vehicle body panels
Assessment criteria	
The learner can:	
2.1	explain how to identify the manufacturers' joining techniques and how they may differ from the repair method
2.2	explain where the different types of mechanical fasteners should be used in the replacement of vehicle body panels
2.3	explain the procedures involved in the removal and replacement of vehicle body panels and assemblies
2.4	explain the procedures involved in the removal and replacement of vehicle door skins
2.5	explain the procedures involved in establishing cut lines for partial panel replacement
2.6	explain how to select the correct joints and joining processes for the repaired area
2.7	explain the importance of clamping and aligning panels to match existing contours and gaps
2.8	explain the effect on the overall body structure of removing and replacing panels
2.9	describe the procedures involved in loading a vehicle onto a jig system to ensure correct alignment and positioning of new panels
2.10	explain the importance of checking the accuracy of repair work
2.11	outline the quality checks that can be used to ensure correct alignment and contour of panels, and operation of components to manufacturers specification
2.12	explain the methods and procedures for storing components and the importance of storing them correctly and in accordance with legal requirements.

Unit 163 Knowledge of Removing and Replacing Structural Motor Vehicle Body Panels

Supporting information

Evidence Requirements

The Evidence Requirements are shown in full in the Assessment Documentation.

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

Selection and use of tools and equipment

- a. How to prepare, test and use the tools and equipment required for the removal and replacement of vehicle body panels and ancillary fittings.
- b. How to operate spot welding and gas shielded arc-welding equipment to achieve welds to the current

Selection and use of materials

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

Removing and replacing vehicle body panels

- a. The principles governing how unitary and separate chassis vehicle bodies are constructed.
- b. How to identify and remove spot and gas shielded arc welds to meet manufacturers and current Industry Standards.
- c. How to identify the difference between manufacturer's processes and repair processes.
- d. The principles of resistance spot welding, gas shielded arc plug welding, gas shielded arc welding and gas shielded brazing.
- e. Correct procedures for the removal and replacement of vehicle body panels.
- f. The manufacturers approved methods of working for the removal and replacement of vehicle body panels.
- g. The different types of mechanical fixings for vehicle body panels and when and why they should be used.
- h. The repair and welding implications of working with:
 - i high strength steels (HSS)

- ii low carbon steels (LCS)
 - iii aluminium alloys
 - iv galvanized coatings
 - v Boron steels.
 - vi TRIP
 - vii TWIP
 - i Laminated
- i. How panel removal and refitting affects the overall body structure of the vehicle.
 - j. The cause and rectification of distortion resulting from welding.
 - k. How to find, interpret and use sources of information relevant to the removal and replacement of vehicle body panels and assemblies.
 - l. How to remove and replace vehicle body panels and assemblies.
 - m. How to remove and replace door skins.
 - n. How to establish cut lines for partial panel replacement.
 - o. How to prepare all edges to be joined
 - p. How to select the correct joints and joining process to match the repair area.
 - q. The importance and implications of panel clamping and alignment to match existing contours and gaps.
 - r. How to test spot weld strength.
 - s. How to load a vehicle onto a jig system to ensure correct alignment and positioning of new panels.
 - t. How to remove and replace supplementary restraint systems (SRS) using the manufacturers approved method.
 - u. How to work safely avoiding damage to the vehicle and its systems.
 - v. The importance and implications of checking accuracy of repair work.
 - w. The types of quality control checks that can be used to ensure correct alignment and contour of panels and the operation of components to manufacturer's specification.
 - x. The method of storing removed panels and the importance of storing them correctly

Unit 164

Knowledge of motor vehicle body panel major repairs

UAN:	T/601/5429
Level:	Level 3
Credit value:	6
GLH:	45
Relationship to NOS:	This unit is linked to Unit BP14K Knowledge of Motor Vehicle Body Panel Major Repairs
Endorsement by a sector or regulatory body:	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.
Aim	This unit enables the learner to develop an understanding of carrying out repairs to motor vehicle body panels using a variety of techniques.

Learning outcome	The learner will:
1.	understand the principles of selection and use of appropriate tools and equipment in major repairs to motor vehicle body panels
Assessment criteria	
The learner can:	
1.1	identify tools used in the repair of metal finishing and plastic repairs
1.2	identify tools used in hydraulic reforming equipment including specialist pulling systems
1.3	explain how to prepare, test, use and maintain the hand and power tools required to repair vehicle body panels
1.4	explain how to adapt hydraulic push equipment to perform pulling operations

Learning outcome	The learner will:
2.	understand material types and properties used in major repairs to motor vehicle body panels
Assessment criteria	
The learner can:	
2.1	identify and describe the properties and different types of materials involved in the construction of the vehicle in the areas that will be worked on during repair
2.2	explain the types and selection of filling materials, their preparation and application
2.3	identify the properties and safe use of types of filling materials used to repair panels
2.4	explain how to mix and apply plastic fillers
2.5	identify and explain the different types and grades of abrasive

	paper and their use
2.6	explain the principles of chassis frame and monocoque vehicle construction
2.7	describe the techniques for identifying the type of plastic used for manufactured components

Learning outcome	The learner will:
3.	understand how to carry out major repairs to motor vehicle body panels
Assessment criteria	
The learner can:	
3.1	explain how to assess the extent of damage, including corrosion damage
3.2	explain how body panel and component damage can affect other panels and the operation of vehicle systems
3.3	identify the factors determining the use of specific preparation and repair methods
3.4	explain the implications of working and joining mild, high, ultra high strength steels, aluminium alloys and galvanised coatings
3.5	explain the principles associated with hot and cold shrinking
3.6	explain how heat can assist in reforming panels but also affect the properties of the steel
3.7	explain the consequences of using inappropriate repair methods
3.8	identify the causes and rectification of distortion resulting from welding
3.9	explain how to prepare the vehicle to avoid contamination
3.10	describe how to prepare damaged areas to facilitate repairs
3.11	describe how to prepare the panel surface prior to filling
3.12	explain how to repair corrosion damage
3.13	3.13.explain how to repair and reinstate vehicle body panel contours and components
3.14	describe the methods used to check for panel contours for accuracy after reshaping
3.15	explain the procedures for reinstating anti corrosion, sealant and sound deadening materials
3.16	describe how to finish repairs to a suitable agreed condition to enable the next stage of repairs to proceed
3.17	identify the specification for panel shapes, dimensions and tolerances for the vehicles worked upon
3.18	identify the types of quality control checks that can be used to ensure the correct contour and standard of finish
3.19	describe the aspects of pedestrian safety in relation to the reparability of vehicles

Unit 164 Knowledge of motor vehicle body panel major repairs

Supporting information

Evidence Requirements

The Evidence Requirements are shown in full in the Assessment Documentation.

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

Selection and use of tools and equipment

- a. The principle governing the selection and use of hand tools for metal finishing and plastic repairs.
- b. The factors governing the selection and use of panel beating and hydraulic reforming equipment, including specialist pulling systems.
- c. How to prepare, test, use and maintain the tools and equipment required to repair vehicle body panels.
- d. How to adapt hydraulic push equipment to perform pulling operations.

Selection and use of materials

- a. The types and selection of filling materials, their preparation and application:
- b. The properties, types, grades and use of abrasives used in vehicle body panel repair process
- c. The properties and safe use of types of filling materials used to repair panels including:
 - i. plastic fillers
 - ii. body solder
- d. How to mix and apply plastic fillers.

Repairing vehicle bodies

- a. How to prepare the vehicle to avoid contamination.
- b. How to assess the extent of damage, including corrosion damage.
- c. How unitary vehicle bodies and cabs are constructed.
- d. The principles of resistance spot welding, gas shielded arc plug welding and gas shielded arc brazing.
- e. How body panels and component damage can affect other panels and the operation of vehicle systems.
- f. The factors determining the use of specific preparation and repair methods.
- g. The repair and welding implications of working with:
 - i. high strength steels (HSS)
 - ii. low carbon steels (LCS)
 - iii. aluminium alloys
 - iv. galvanized coatings
 - v. Boron steels.
 - vi. TRIP
 - vii. TWIP
 - viii. Laminated

- h. The consequences of using inappropriate repair methods.
- i. How heat can be used to assist reforming.
- j. How heating can affect the properties of steels.
- k. The techniques for identifying the type of plastics used for manufactured components.
- l. The procedures for reinstating anti-corrosion, sealant and sound deadening materials.
- m. The causes and rectification and distortion resulting from welding.
- n. The manufacturers approved methods of working for the preparation and repair of vehicle body panels.
- o. The specification of panel shapes, dimensions and tolerances for the vehicle worked on.
- p. The type of quality control checks that can be used to ensure the correct contour and standard of finish.
- q. How to interpret and use sources of information relevant to the repair of vehicle body panels and components.
- r. How to prepare damaged areas to facilitate repairs.
- s. How to repair corrosion damaged panels.
- t. How to remove protective materials.
- u. How to repair and reinstate vehicle body panel contours and components using:
 - i. body filling operations
 - ii. metal finishing
 - iii. plastic filling
 - iv. panel beating
 - v. panel shrinking
 - vi. hydraulic reforming
 - vii. specialist dent removal tools
 - viii. spot welding
 - ix. gas shielded arc welding
 - x. gas shielded arc brazing.
- v. The techniques of reshaping damaged vehicle body panels using hand and specialist tools.
- w. How to check the accuracy of reinstated vehicle body panel shapes.
- x. How to finish repairs to a suitable condition for handing on to the painting stage.
- y. How to work safely avoiding damage to the vehicle and its systems.

Additional Content

Repairs are: -

- a. correction of severely distorted panels
- b. assessing panel damage
- c. splits on metal panels, using relevant joining techniques
- d. fractures on plastic panels

Vehicle panels are: -

- a. non-permanently fixed exterior panels
- b. permanently fixed exterior panels
- c. sub-structure components
 - i. bonded panel
 - ii. TRIP
 - iii. TWI
 - iv. Laminated

Unit 167

Knowledge of identifying and rectifying motor vehicle body misalignment

UAN:	K/601/5430
Level:	Level 3
Credit value:	6
GLH:	45
Relationship to NOS:	This unit is linked to Unit BP17K Knowledge of Identifying and Rectifying Motor Vehicle Body Misalignment.
Endorsement by a sector or regulatory body:	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.
Aim	This unit enables the learner to develop an understanding of how to identify and rectify motor vehicle body misalignment.

Learning outcome	The learner will:
1.	understand the principles of selection and use of appropriate tools and equipment in identifying and rectifying motor vehicle body misalignment
Assessment criteria	
The learner can:	
1.1	identify the constraints the type of vehicle construction places on the choice of repair equipment
1.2	identify the tools and equipment used in the repair of vehicle body misalignment
1.3	explain how to prepare, test and adjust the equipment required for misalignment rectification
1.4	explain how to install vehicles on misalignment rectification equipment, including the use of lifting equipment
1.5	explain how to use rectification equipment including hand and power tools, safety chains, hydraulic push and pull and body alignment jigs (bracket system and or measuring system)
1.6	explain how to use clamps, restraints and supports to minimise additional damage during the repair

Learning outcome	The learner will:
2.	understand how to identify and rectify motor vehicle body misalignment
Assessment criteria	
The learner can:	
2.1	describe the properties of vehicle body construction materials,

- 2.2 compare the materials used in the construction of vehicle bodies.
- 2.3 compare chassis frame and monocoque vehicle construction
- 2.4 explain the principles of damage assessment and identification of direct and indirect damage
- 2.5 describe the function of pulling systems and the criteria used for their selection
- 2.6 identify the geometric principles of alignment in the absence of a data sheet
- 2.7 use sources of information relevant to the rectification of vehicle bodies
- 2.8 identify the extent of the damage or misalignment using measuring equipment and or a measuring system
- 2.9 explain how to realign vehicles to the manufacturers original specification
- 2.10 explain the importance of following manufacturers/research repair methods, instructions and data sheets
- 2.11 state the possible consequences of failing to follow the manufacturers repair methods, instructions
- 2.12 and data sheets

Unit 167

Knowledge of identifying and rectifying motor vehicle body misalignment

Supporting information

Evidence Requirements

The Evidence Requirements are shown in full in the Assessment Documentation.

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

Selection and use of tools and equipment

- a. The constraints that the type of vehicle places on the choice of repair equipment.
- b. How to prepare, test and adjust all equipment required for misalignment rectification.
- c. How to install vehicles on misalignment rectification equipment, including the use of lifting equipment.
- d. How to use rectification equipment including:
 - i. hand and power tools
 - ii. safety chains
 - iii. hydraulic push and pull
 - iv. body jigs (bracket system and/or measuring system)
- e. The correct use of clamps, restraints and supports to minimise additional damage during repair.

Realignment of vehicles

- a. The principle of chassis frame and monocoque vehicle construction.
- b. The principle of damage assessment and identification of direct and indirect damage.
- c. The function of the pulling system and the criteria for selection:
 - i. vector
 - ii. pull arm
 - iii. tower system
 - iv. floor mounted
 - v. bench mounted.
- d. How to use geometric principles of alignment in the absence of data sheets.
- e. The properties of vehicle body construction materials.
- f. How to find, interpret and use sources of information relevant to the rectification of vehicle misalignment.
- g. How to establish the extent of misalignment using measuring equipment and/or measuring system.
- h. How to realign vehicles to the manufacturers' original specification.
- i. How to work safely avoiding damage to vehicles, personal injury and injury to colleagues.
- j. The importance of following manufacturers' instructions and using there approved methods of working (including use of materials and equipment).

k. The consequences of failing to follow manufacturers' instructions and data sheets.

Rectification activities are: -

- a. Visual examination
- b. Setting up
- c. Measurement in conjunction with alignment measuring equipment
- d. Realignment using pulling equipment

Unit 169

Knowledge of motor vehicle body metal active gas (MAG) welding techniques

UAN:	T/601/5432
Level:	2
Credit value:	5
GLH:	45
Relationship to NOS:	This unit is linked to the NOS BP19 Motor vehicle MIG/MAG welding operations.
Endorsement by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry.
Aim:	This unit enables the learner to develop an understanding of joining carbon steels using Metal Active Gas (MAG) welding techniques.

Learning outcome
The learner will: 1. understand how to work safely when carrying out motor vehicle body MAG welding operation.
Assessment criteria
The learner can: 1.1 describe the health, safety and legal 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.

Learning outcome
The learner will: 2. understand how to select, check, use and maintain appropriate tools and equipment used in motor vehicle body MAG welding operations.
Assessment criteria
The learner can: 2.1 explain the use of all tools and equipment required to join carbon steels using MAG welding techniques 2.2 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.

Learning outcome
The learner will: 3. understand how to carry out motor vehicle body MAG welding operations.
Assessment criteria
The learner can: 3.1 explain the importance of correct surface preparation methods to ensure a good MAG weld is achieved 3.2 identify the need for correct alignment and mating of carbon steels and the methods used to achieve this in MAG welding 3.3 describe the welding techniques used in MAG welding to include: a) plug b) lap c) butt d) fillet 3.4 identify the faults and defects that can occur when MAG welding 3.5 identify common causes which result in faults and defects 3.6 describe the quality control measures that can be used to help ensure correct joining of carbon steels before, during and after the welding process 3.7 describe how to inspect and assess MAG welding in accordance to Industry Standards 3.8 compare the advantages and disadvantages of MAG welding over other welding methods 3.9 explain the importance and implications of checking and carrying out weld test pieces prior to carrying out the welding process.

Unit 169 Knowledge of motor vehicle body metal active gas (MAG) welding techniques

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation.

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

- a The safe working practices and procedures to be observed when working with MAGS or cored wire arc welding equipment (general workshop and site safety; appropriate personal protective equipment; fire prevention; protecting other workers from the effects of the welding arc; safety in enclosed/confined spaces; fume control; accident procedure; statutory requirements, risk assessment procedures and relevant requirements of HASAWA, COSHH and Work Equipment Regulations; safe disposal of waste materials).
- b The correct handling and storage of gas cylinders (manual handling and use of cylinder trolley, leak detection procedures, relevant BCGA codes of practice, cylinder identification, gas pressures, cylinder and equipment safety features, emergency shutdown procedures).
- c The hazards associated with arc welding (live electrical components; current return (earth return); the electric arc; fumes and gases; gas supply leaks; spatter, hot slag and metal elevated working; enclosed spaces; slips, trips and falls), and how they can be minimised.
- d The manual, MAGS or cored wire arc welding process (principles of fusion welding, AC and DC power sources, ancillary equipment, power ranges, care of equipment).
- e The consumables associated with MAGS or cored wire arc welding (types of wire and their application (solid and cored), types of shielding gas and their application, gas supply and control).
- f The types of welded joints to be produced (fillet and butt welds, single and multi-run welds, sheet and sections; welding positions).
- g Setting up and restraining the joint (the use of jigs and fixtures, manipulators and positioners, restraining devices, 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 (electrical connections, power return and current return (earth return); wire feed mechanisms, gas supply, setting welding parameters, correct joint

set-up, cleanliness of materials used; calibration before use; 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 (fine tuning parameters, correct manipulation of the welding gun, 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 (causes of distortion and methods of control, effects of welding on materials and sources of weld defects; 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.

Unit 170

Knowledge of motor vehicle body resistance spot welding operations

UAN:	F/601/5434
Level:	2
Credit value:	5
GLH:	45
Relationship to NOS:	This unit is linked to the NOS BP20 Motor vehicle body resistance spot welding operations.
Endorsement by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry.
Aim:	This unit enables the learner to develop the knowledge in order to join materials using resistance spot welding techniques and procedures.

Learning outcome
The learner will: 1. understand how to work safely when carrying out motor vehicle body resistance spot welding operations.
Assessment criteria
The learner can: 1.1 describe the health, safety and legal requirements relating to the joining of materials using resistance spot welding techniques 1.2 describe the importance of selecting, using and maintaining the appropriate personal protective equipment when joining materials using resistance spot welding techniques 1.3 describe the requirements for protecting the vehicle and contents from damage before, during and after the joining of materials by resistance spot welding techniques.

Learning outcome
The learner will: 2. understand how to select, check, use and maintain appropriate tools and equipment used in motor vehicle body resistance spot welding operations.
Assessment criteria
The learner can: 2.1 identify and explain the use of all tools and equipment required to join materials using resistance spot welding techniques 2.2 describe, within the scope of their responsibilities, how to select,

prepare and maintain tools and equipment required to join materials using resistance spot welding techniques.

Learning outcome

The learner will:

3. understand how to carry out motor vehicle body resistance spot welding operations.

Assessment criteria

The learner can:

- 3.1 describe the importance of correct surface preparation methods to ensure a good resistance spot weld is achieved
- 3.2 identify the need for alignment and mating of materials and the best methods used to achieve this in resistance spot welding
- 3.3 describe the welding processes, techniques and joints used for the joining of materials using resistance spot welding
- 3.4 identify the faults and defects that can occur when carrying out resistance spot welding
- 3.5 identify common causes which produce the faults and defects in resistance spot welding
- 3.6 describe the types of quality control checks that can be used to ensure correct joining of materials
- 3.7 describe how to inspect and assess resistance spot welding in accordance to industry standards including:
 - a) weld pitch
 - b) indentation
 - c) heat zone
 - d) nugget size
 - e) peel and shear test
- 3.8 compare the advantages and disadvantages of resistance spot welding over other welding methods
- 3.9 explain the importance and implications of checking and carrying out weld test pieces prior to carrying out the welding process.

Unit 170 Knowledge of motor vehicle body resistance spot welding operations

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation.

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

- a The specific safety precautions to be taken when operating resistance welding installations (working with machinery; the use of appropriate personal protective equipment machine guards; operation of machine safety devices; stopping the machine in an emergency; closing down the machine on completion of the welding activities; statutory requirements, risk assessment procedures and relevant requirements of HASAWA, COSHH and Work Equipment Regulations; safe disposal of waste materials), any regulations relating to EMF (Electric Magnetic Field).
- b The hazards associated with resistance welding machines (dangers from live internal electrical components, fumes, hot metal, expulsion of hot particles, moving parts of machines), and how they can be minimised.
- c The principles of resistance welding; terminology used in welding
- d Mechanised and automated weldings (types of installation; machine functions; control systems; safety features).
- e The key components and features of the equipment used (power source; electrical parameters such as arc voltage, current, electrode pressure and welding time; systems for parameter control; how variation in the parameters influence weld features, quality and output).
- f Extracting the information required from drawings and welding procedure specifications
- g Operation of the machine controls and their function; clamping of components and equipment care procedures.
- h Setting up and aligning the work piece.
- i Monitoring the welding process; recognition of problems, and action to be taken.
- j Problems that can occur with the welding activities, materials and weld defects.
- k Self inspection of completed work.
- l Organisational quality systems (standards to be achieved; production records to be kept).
- 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.
- p The requirements of the power supply to the unit and the use of extension cables.

Unit 171

Knowledge of motor vehicle body metal inert gas (MIG) brazing operations

UAN:	J/601/5435
Level:	3
Credit value:	4
GLH:	45
Relationship to NOS:	This unit is linked to the NOS BP21 Motor vehicle body (MIG) brazing operations
Endorsement by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry.
Aim:	This unit enables the learner to develop an understanding of joining materials using Metal Inert Gas brazing operations techniques and procedures.

Learning outcome
The learner will: 1. understand how to work safely when carrying out motor vehicle body MIG brazing operations.
Assessment criteria
The learner can: 1.1 explain the health, safety and legal requirements relating to the joining of materials using MIG brazing operations 1.2 explain the importance of selecting, using and maintaining the appropriate personal protective equipment when joining materials using MIG brazing operations 1.3 explain the requirements for protecting the vehicle and contents from damage before, during and after the joining of materials by MIG brazing operations.

Learning outcome
The learner will: 2. understand how to select, check, use and maintain appropriate tools and equipment used in motor vehicle body MIG brazing operation.
Assessment criteria
The learner can: 2.1 explain the use of all tools and equipment required to join materials using MIG brazing operations 2.2 explain, within the scope of their responsibilities, how to select,

prepare and maintain tools and equipment required to join materials using MIG brazing operations.

Learning outcome

The learner will:

3. understand how to carry out motor vehicle body MIG brazing operations.

Assessment criteria

The learner can:

- 3.1 explain the importance of correct surface preparation methods to ensure a good MIG brazing operation is achieved
- 3.2 identify the correct need for alignment/mating of materials and the best methods used to achieve this in MIG brazing operations
- 3.3 explain the welding processes, techniques and joints used for the joining of materials using MIG brazing operation, joints include:
 - a) lap slot
 - b) lap seam
 - c) butt joint
- 3.4 identify the faults and defects that can occur when carrying out MIG brazing operation
- 3.5 identify common causes which produce the faults and defects in MIG brazing operation
- 3.6 describe the types of quality control checks that can be used to ensure correct joining of materials
- 3.7 describe how to inspect and assess MIG brazing operation in accordance to Industry Standards
- 3.8 explain the advantages and disadvantages of MIG brazing operation over other welding methods
- 3.9 explain the importance and implications of checking and carrying out brazing test pieces prior to carrying out the brazing process.

Unit 171 Knowledge of motor vehicle body metal inert gas (MIG) brazing operations

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation.

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

- a The safe working practices and procedures to be observed when operating brazing installations (working with machinery; the use of appropriate personal protective equipment; machine guards; operation of machine safety devices; stopping the machine in an emergency; closing the machine down on completion of activities; statutory requirements, risk assessment procedures and relevant requirements of HASAWA, COSHH and Work Equipment Regulations; safe disposal of waste materials).
- b The hazards associated with MIG brazing machines (dangers from relevant equipment sources; fumes and gases; hot metal; moving parts of machinery) and how they can be minimised.
- c Principles of the relevant brazing process; terminology used in brazing.
- d The key components and features of the equipment.
- e How to extract the information required from drawings and brazing procedure specifications.
- f Operation of the machine controls and their function; care of equipment; control and storage of consumables.
- g Setting up and aligning the work pieces.
- h Monitoring the installation during the brazing process; recognition of problems, and action to be taken.
- i Problems that can occur with the brazing activities, materials, filler metals and joint defects.
- j Self inspection of completed work.
- k Organisational quality systems (standards to be achieved; production records to be kept).
- l Personal approval tests and their applicability to your work
- m The extent of your own authority and whom you should report to if you have problems that you cannot resolve.
- n Reporting lines and procedures, line supervision and technical experts.

Unit 172

Knowledge of motor vehicle body aluminium metal inert gas (MIG) welding operations

UAN:	L/601/5436
Level:	3
Credit value:	5
GLH:	45
Relationship to NOS:	This unit is linked to the Unit BP22K Knowledge of Motor Vehicle Body Aluminium MIG Operations
Endorsement by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry.
Aim:	This unit enables the learner to develop an understanding of joining materials using aluminium welding techniques and procedures.

Learning outcome
The learner will: 1. understand how to work safely when carrying out motor vehicle body aluminium MIG welding operations.
Assessment criteria
The learner can: 1.1 explain the health, safety and legal requirements relating to the joining of materials using aluminium MIG welding techniques 1.2 explain the importance of selecting, using and maintaining the appropriate personal protective equipment when joining materials using MIG aluminium welding techniques 1.3 explain the requirements for protecting the vehicle and contents from damage before, during and after the joining of materials by aluminium MIG welding techniques

Learning outcome
The learner will: 2. understand how to carry out motor vehicle body aluminium mig welding operations
Assessment criteria
The learner can: 2.1 explain the importance of correct surface preparation methods to ensure a good aluminium MIG weld is achieved 2.2 identify the correct need for alignment/mating of materials and the best methods used to achieve this in aluminium MIG welding

2.3	explain the welding processes, techniques and joints used for the joining of materials using aluminium MIG welding, joints include: <ol style="list-style-type: none"> a. lap seam b. butt joint c. fillet joint
2.4	identify the faults and defects that can occur when carrying out aluminium MIG welding
2.5	identify common causes which produce the faults and defects in aluminium MIG welding
2.6	explain the types of quality control checks that can be used to ensure correct joining of materials including: <ol style="list-style-type: none"> a. dye penetrate b. crack tests
2.7	explain how to inspect and assess aluminium MIG welding in accordance to Industry Standards
2.8	explain the advantages and disadvantages of aluminium MIG welding over other welding methods
2.9	explain how to ensure cross contamination does not occur and the effect of cross contamination on aluminium
2.10	explain the importance and implications of checking and carrying out weld test pieces prior to carrying out the welding process.

Learning outcome
The learner will: <ol style="list-style-type: none"> 3. understand how to select, check, use and maintain appropriate tools and equipment used in motor vehicle body aluminium MIG welding operations.
Assessment criteria
The learner can: <ol style="list-style-type: none"> 3.1 explain the use of all tools and equipment required to join materials using aluminium MIG welding techniques 3.2 explain, within the scope of their responsibilities, how to select, prepare and maintain tools and equipment required to join materials using aluminium MIG welding techniques

Unit 172 Knowledge of motor vehicle body aluminium metal inert gas (MIG) welding operations

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation.

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

- a The safe working practices and procedures to be observed when working with aluminium welding equipment (general workshop and site safety; appropriate personal protective equipment; fire prevention; protecting other workers from the effects of the electric arc; safety in enclosed/confined spaces; fume control; accident procedure; statutory requirements, risk assessment procedures and relevant requirements of HASAWA, COSHH and Work Equipment Regulations; safe disposal of waste materials)
- b The hazards associated with aluminium welding (live electrical components; current return (earth return) arrangements; the electric arc; fumes and gases; gas supply leaks; spatter; hot slag and metal; grinding and mechanical metal/slag removal; elevated working; enclosed spaces; slips, trips and falls), and how they can be minimised
- c The correct handling and storage of gas cylinders (manual handling and use of cylinder trolley, leak detection procedures, relevant BCGA codes of practice, cylinder identification, gas pressures, cylinder and equipment safety features, emergency shutdown procedures)
- d The manual MIG welding process (principles of fusion welding; power sources; ancillary equipment; power ranges; arc initiation system; care and maintenance of equipment)
- e The consumables associated with MIG welding (types of filler wire, types of shielding gas, welding electrodes, gas supply and control, control and storage of consumables)
- f The types of welded joints to be produced (fillet and butt welds, single and multi-run welds, sheet and sections; welding positions)
- g Setting up and restraining the joint (confirming correct set-up of joint; cleanliness of materials used; the use of jigs and fixtures, manipulators and positioners, restraining devices; tack welding size and spacing in relationship to material thickness)
- h Preparing the equipment, and checks that need to be made to ensure that it is safe to use (condition of electrical connections,

- power return and current return (earth return) arrangements, operating parameters)
- i The techniques of operating the welding equipment to produce a range of joints in the various joint positions (fine tuning parameters, correct manipulation of torch, 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 (causes of distortion and methods of control, effects of welding on materials and sources of weld defects; methods of prevention)
 - l The 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

Unit 173

Knowledge of motor vehicle body tungsten inert gas (TIG) brazing operations

UAN:	Y/601/5438
Level:	3
Credit value:	5
GLH:	45
Relationship to NOS:	This unit is linked to the Unit BP23K Knowledge of Motor Vehicle Body Tungsten Inert Gas (TIG) Welding Operations
Endorsement by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry.
Aim:	This unit enables the learner to develop an understanding of joining materials using Tungsten Inert Gas (TIG) welding techniques and procedures.

Learning outcome
The learner will: 1. understand how to work safely when carrying out motor vehicle body TIG welding operations.
Assessment criteria
The learner can: 1.1 explain the health, safety and legal requirements relating to the joining of materials using TIG welding techniques 1.2 explain the importance of selecting, using and maintaining the appropriate personal protective equipment when joining materials using TIG welding techniques 1.3 explain the requirements for protecting the vehicle and contents from damage before, during and after the joining of materials by TIG welding techniques.

Learning outcome
The learner will: 2. understand how to select, check, use and maintain appropriate tools and equipment used in motor vehicle body TIG welding operations.
Assessment criteria
The learner can: 2.1 explain the use of all tools and equipment required to join materials using TIG welding operations 2.2 explain, within the scope of their responsibilities, how to select, prepare and maintain tools and equipment required to join materials using TIG welding operations.

Learning outcome

The learner will:

3. understand how to carry out motor vehicle body TIG welding operations.

Assessment criteria

The learner can:

- 3.1 explain the importance of correct surface preparation methods to ensure a good TIG weld is achieved
- 3.2 identify the need for alignment and mating of materials and the best methods used to achieve this in TIG welding
- 3.3 identify and describe the welding processes, techniques and joints used for the joining of materials using TIG welding, joints include:
 - a) lap seam
 - b) butt joint
 - c) fillet joint
- 3.4 identify the faults and defects that can occur when carrying out TIG welding
- 3.5 identify common causes which produce the faults and defects in TIG welding
- 3.6 explain the types of quality control checks that can be used to ensure correct joining of materials
- 3.7 explain how to inspect and assess TIG welding in accordance to Industry Standards
- 3.8 explain the advantages and disadvantages of TIG welding over other welding methods
- 3.9 explain the importance and implications of checking and carrying out weld test pieces prior to carrying out the welding process

Unit 173 Knowledge of motor vehicle body tungsten inert gas (TIG) brazing operations

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation.

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

- a. The safe working practices and procedures to be observed when working with TIG or Plasma-arc welding equipment (general workshop and site safety; appropriate personal protective equipment; fire prevention; protecting other workers from the effects of the electric arc; safety in enclosed/confined spaces; fume control; accident procedure; statutory requirements, risk assessment procedures and relevant requirements of HASAWA, COSHH and Work Equipment Regulations; safe disposal of waste materials)
- b. The hazards associated with arc welding (live electrical components; current return (earth return); the electric arc; fumes and gases; gas supply leaks; spatter; hot slag and metal; grinding and mechanical metal/slag removal; elevated working; enclosed spaces; slips, trips and falls), and how they can be minimised
- c. The correct handling and storage of gas cylinders (manual handling and use of cylinder trolley, leak detection procedures, relevant BCGA codes of practice, cylinder identification, gas pressures, cylinder and equipment safety features, emergency shutdown procedures)
- d. The manual TIG or Plasma-arc welding process (principles of fusion welding; power sources; ancillary equipment; power ranges; arc initiation system; care and maintenance of equipment)
- e. The consumables associated with TIG or Plasma-arc welding (types of filler wire, types of shielding gas, welding electrodes, gas supply and control, control and storage of consumables)
- f. The types of welded joints to be produced (fillet and butt welds, single and multi-run welds, sheet and sections; welding positions)
- g. Setting up and restraining the joint (confirming correct set-up of joint; cleanliness of materials used; the use of jigs and fixtures, manipulators and positioners, restraining devices; tack welding size and spacing in relationship to material thickness)
- h. Preparing the equipment, and checks that need to be made to ensure that it is safe to use (condition of electrical connections, power return and earthing arrangements, operating parameters)
- i. The techniques of operating the welding equipment to produce a range of joints in the various joint positions (fine tuning parameters, correct manipulation of torch, 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 (causes of distortion and methods of control, effects of welding on materials and sources of weld defects; methods of prevention)
- l. The 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

Unit 174 Knowledge of motor vehicle body mechanical fastening operations

UAN:	T/601/5446
Level:	3
Credit value:	2
GLH:	20
Relationship to NOS:	This unit is linked to the NOS BP24 Motor vehicle body mechanical fastening operations
Endorsement by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry.
Aim:	This unit enables the learner to develop an understanding of joining materials using mechanical fastening techniques and procedures.

Learning outcome
The learner will: 1. understand how to select, check, use and maintain appropriate tools and equipment used in motor vehicle body mechanical fastening operations.
Assessment criteria
The learner can: 1.1 explain the use of all tools and equipment required to join materials using mechanical fastening operations 1.2 explain, within the scope of their responsibilities, how to select, prepare and maintain tools and equipment required to join materials using mechanical fastening operations.

Learning outcome
The learner will: 2. understand how to carry out motor vehicle body mechanical fastening operations.
Assessment criteria
The learner can: 2.1 describe the importance of correct surface preparation methods to ensure a good mechanical fastening is achieved 2.2 identify the correct need for alignment and mating of materials and the best methods used to achieve this in mechanical fastening operations 2.3 explain the mechanical fastening processes, techniques and joints used for the joining of materials, joints include: a) riveting (single sided, double sided and self piercing)

- b) clinching
 - c) bolts and fasteners
 - d) screwing (self threading and self piercing)
 - e) hybrid joining (combinations of techniques listed that may also include adhesives)
- 2.4 explain how different materials used in the construction of motor vehicles react with each other
- 2.5 identify the faults and defects that can occur when carrying out mechanical fastening operations
- 2.6 identify common causes which produce the faults and defects in mechanical fastening operations
- 2.7 explain the types of quality control checks that can be used to ensure correct joining of materials
- 2.8 explain how to use adhesives with riveting techniques
- 2.9 explain the advantages and disadvantages of mechanical fastening operations over other joining methods.

Unit 174 Knowledge of motor vehicle body mechanical fastening operations

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation.

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

- a The hazards associated with the joining operations (such as handling sheet/fabricated components, using hot metal riveting techniques, handling and using sealants and cleaning agents, dangerous or badly maintained tools and equipment), and how they can be minimised.
- b How to obtain the necessary drawings and joining procedure specifications.
- c How to extract information from engineering drawings and related specifications (to include symbols and conventions to appropriate BS or ISO standards in relation to work undertaken).
- d The use of manufacturers' specifications for the types of fasteners used.
- e The various joining processes that are used, and the tools and equipment required
- f The preparations to be carried out on the materials/components prior to joining them (such as materials to be degreased, dry and clean, with holes and flanges de-burred).
- g How to set up and align the joints prior to fixing, and the tools and methods that can be used (such as clamps, rivet gripping tools, temporary fixings, jacking and supporting devices).
- h How to produce a secure joint using blind rivets, and the type of riveting tools that are available.
- i The range of bolts and screwed fasteners that are to be used; why it is important to use the correct type of washer; sequence of tightening bolts on flanged joints; and the tools and equipment used to ensure they are tightened to the required torque.
- j Checks to be carried out on the tools and equipment prior to use to ensure that they are in a safe and usable condition (such as condition of plugs and leads on power tools, condition of striking faces on hammers, condition of riveting tools).
- k Equipment setting, operating and care procedures; why equipment and tools need to be correctly set up and in good condition.
- l The importance of using the tools only for the purpose intended; the care that is required when using the equipment and tools; the proper way of preserving and storing tools and equipment between operations.
- m The things that can go wrong with the joining operations, and how these can be avoided.

- 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.

Unit 175

Knowledge of motor vehicle body adhesive bonding operations

UAN:	J/601/5449
Level:	3
Credit value:	2
GLH:	20
Relationship to NOS:	This unit is linked to the NOS BP25 Motor vehicle body adhesive bonding operations.
Endorsement by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry.
Aim:	This unit enables the learner to develop an understanding of joining materials using adhesive bonding techniques and procedures.

Learning outcome
The learner will: 1. understand how to work safely when carrying out motor vehicle body adhesive bonding operations.
Assessment criteria
The learner can: 1.1 explain the health, safety and legal requirements relating to the joining of materials using adhesive bonding techniques 1.2 explain the importance of selecting, using and maintaining the appropriate personal protective equipment when joining materials using adhesive bonding techniques 1.3 explain the requirements for protecting the vehicle and contents from damage before, during and after the joining of materials by adhesive bonding techniques.

Learning outcome
The learner will: 2. understand how to select, check, use and maintain appropriate tools and equipment used in motor vehicle body adhesive bonding operations.
Assessment criteria
The learner can: 2.1 explain the use of all tools and equipment required to join materials using adhesive bonding techniques 2.2 explain, within the scope of their responsibilities, how to select, prepare and maintain tools and equipment required to join materials using adhesive bonding techniques.

Learning outcome

The learner will:

3. understand how to carry out motor vehicle body adhesive bonding operations.

Assessment criteria

The learner can:

- 3.1 explain the importance of correct surface preparation methods to ensure a good adhesive bonding joint is achieved
- 3.2 identify the need for alignment/mating of materials and the best methods used to achieve this in adhesive bonding
- 3.3 explain the joining processes, techniques and joints used for the joining of materials using adhesive bonding
- 3.4 identify the faults and defects that can occur when carrying out adhesive bonding
- 3.5 identify common causes which produce the faults and defects in adhesive bonding
- 3.6 explain the types of quality control checks that can be used to ensure correct joining of materials
- 3.7 explain the advantages and disadvantages of adhesive bonding over other joining methods
- 3.8 explain the importance and implications of checking and carrying out test pieces prior to carrying out the joining process.

Unit 175 Knowledge of motor vehicle body adhesive bonding operations

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation.

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

- a The specific safety precautions to be taken when bonding engineering materials using adhesives in a fabrication environment (general workshop and site safety, appropriate personal protective equipment, accident procedure; statutory regulations, risk assessment procedures and COSHH regulations).
- b The personal protective clothing and equipment to be worn when carrying out bonding as part of the fabrication activities (gloves, eye protection, respiratory protection).
- c The importance of good workshop practice and housekeeping, ventilation and fume control equipment, first aid procedures and actions, hazardous substances and relevant sections of COSHH.
- d The hazards associated with bonding fabricated components, and how they can be minimised.
- e How to obtain the necessary drawings and joining specifications
- f How to extract information from research repair methodology in relation to the work undertaken.
- g Types of adhesives:
 - i compact
 - ii two parts
 - iii cyanoacrylate
 - iv anaerobic
 - v sealants
 - vi toughened.
- h Knowledge of curing mechanisms including:
 - i moisture/solvent evaporation
 - ii chemical/thermal reaction
 - iii exposure/exclusion to oxygen
 - iv the importance of recording shelf life, pot life, setting and curing times.
- i Knowledge of adhesion and cohesion.
- j Understanding the material preparations that are required, and the equipment and consumables that are used.

- k Understanding the importance of working to organisational and bonding agent manufacturers' instructions whilst carrying out the bonding activities.

- l Understanding the methods and techniques used for bonding the materials (such as gluing, impact, chemical and thermal reaction techniques).
- m Understanding the characteristics of the adhesives that are to be used.
- n Understanding the application of, and precautions to be taken when using, adhesives and solvents.
- o Understanding maintenance and care of tools and equipment.
- p Understanding methods of degreasing components and producing a keying surface.
- q Understanding type and suitability of adhesives, setting or curing requirements and time, strength and appearance.
- r Understanding common causes of defects associated with the bonding processes, and how to avoid them.
- s Understanding the effects of the environment on the bonding process (such as temperature humidity, cleanliness).
- t Understanding how to identify, select, use, and clean, the appropriate bonding agent holding vessels, brushes, stirrers and spatulas, scrapers, knives, clamps and weights.
- u Understanding the importance of cleaning up after use, to ensure everything can be used again and to minimise the need for replacement of equipment.
- v Understanding reasons for checking that components are assembled in the correct sequence, are positioned dimensionally accurately and to the correct orientation, in accordance with the specifications prior to bonding.
- w Understanding how to check that completed joints are firm, sound and fit for purpose.
- x Understanding procedures for cleaning off surplus adhesive and tidying up the appearance of joints.
- y Understanding the extent of your own authority and whom you should report to if you have problems that you cannot resolve.
- z Understanding reporting lines and procedures, line supervision and technical experts.

Unit 176

Knowledge of motor vehicle construction and materials

UAN:	A/601/5450
Level:	2
Credit value:	2
GLH:	20
Relationship to NOS:	This unit is linked to the NOS BP26 Knowledge of motor vehicle construction and materials.
Endorsement by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry.
Aim:	This unit enables the learner to develop an 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 outcome
The learner will: 1. understand material types and properties used in motor vehicle construction.
Assessment criteria
The learner can: 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 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.

Learning outcome

The learner will:

2. understand how the different types of materials and formation methods affect the construction of motor vehicle bodies.

Assessment criteria

The learner can:

- 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 vehicle bodies and chassis components, now and in the future.

Learning outcome

The learner will:

3. understand how damage to the construction of a motor vehicle will affect its safety.

Assessment criteria

The learner can:

- 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.

Unit 176 Knowledge of motor vehicle construction and materials

Supporting information

Evidence requirements

The Evidence Requirements are shown in full in the Assessment Documentation.

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

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.

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 affecting the use of:
 - i pure metals
 - ii alloys
 - iii plastics.
- c Understand the Importance of melting points of the following:
 - i LC steel
 - ii aluminium alloy
 - iii stainless steel
 - iv solder
 - v 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 UHSS.
- 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.
- f Give examples of common plastics used in repair and construction including:
 - i ABS
 - ii polyethylene
 - iii polypropylene
 - iv polyester
 - v acrylic
 - vi glass reinforced plastic.

State the constituents and general properties of the following alloys:

- a solder
- b stainless steel
- c low carbon steel
- d brass
- e aluminium alloys including duralumin.

Ways in which the properties of metals can be changed temporarily or 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
 - 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.



Appendix 1 Sources of general information

The following documents contain essential information for centres delivering City & Guilds qualifications. They should be referred to in conjunction with this handbook. To download the documents and to find other useful documents, go to the **Centres and Training Providers homepage** on **www.cityandguilds.com**.

Centre Manual - Supporting Customer Excellence contains detailed information about the processes which must be followed and requirements which must be met for a centre to achieve 'approved centre' status, or to offer a particular qualification, as well as updates and good practice exemplars for City & Guilds assessment and policy issues. Specifically, the document includes sections on:

- The centre and qualification approval process
- Assessment, internal quality assurance and examination roles at the centre
- Registration and certification of candidates
- Non-compliance
- Complaints and appeals
- Equal opportunities
- Data protection
- Management systems
- Maintaining records
- Assessment
- Internal quality assurance
- External quality assurance.

Our Quality Assurance Requirements encompasses all of the relevant requirements of key regulatory documents such as:

- Regulatory Arrangements for the Qualifications and Credit Framework (2008)
- SQA Awarding Body Criteria (2007)
- NVQ Code of Practice (2006)

and sets out the criteria that centres should adhere to pre and post centre and qualification approval.

Access to Assessment & Qualifications provides full details of the arrangements that may be made to facilitate access to assessments and qualifications for candidates who are eligible for adjustments in assessment.

The **centre homepage** section of the City & Guilds website also contains useful information such on such things as:

- **Walled Garden:** how to register and certificate candidates on line
- **Qualifications and Credit Framework (QCF):** general guidance about the QCF and how qualifications will change, as well as information on the IT systems needed and FAQs
- **Events:** dates and information on the latest Centre events
- **Online assessment:** information on how to register for GOLLA/e-volve assessments.

Useful contacts

UK learners General qualification information	T: +44 (0)844 543 0033 E: learnersupport@cityandguilds.com
International learners General qualification information	T: +44 (0)844 543 0033 F: +44 (0)20 7294 2413 E: intcg@cityandguilds.com
Centres Exam entries, Certificates, Registrations/enrolment, Invoices, Missing or late exam materials, Nominal roll reports, Results	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413 E: centresupport@cityandguilds.com
Single subject qualifications Exam entries, Results, Certification, Missing or late exam materials, Incorrect exam papers, Forms request (BB, results entry), Exam date and time change	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413 F: +44 (0)20 7294 2404 (BB forms) E: singlesubjects@cityandguilds.com
International awards Results, Entries, Enrolments, Invoices, Missing or late exam materials, Nominal roll reports	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413 E: intops@cityandguilds.com
Walled Garden Re-issue of password or username, Technical problems, Entries, Results, e-assessment, Navigation, User/menu option, Problems	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413 E: walledgarden@cityandguilds.com
Employer Employer solutions, Mapping, Accreditation, Development Skills, Consultancy	T: +44 (0)121 503 8993 E: business@cityandguilds.com
Publications Logbooks, Centre documents, Forms, Free literature	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413

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