Skills & Education Group Awards

SEG Awards Level 2 Award, Certificate and Diploma in Motor Vehicle Studies

Qualification Guidance

England
Level 2 Award – 600/2996/1
Level 2 Certificate – 600/2966/3
Level 2 Diploma – 600/2957/2

Wales
Level 2 Award – C00/0397/2
Level 2 Certificate – C00/0397/3
Level 2 Diploma – C00/0397/4

About Us

At the Skills and Education SEG Awards we continually invest in high quality qualifications, assessments and services for our chosen sectors. As a UK leading sector specialist we continue to support employers and skills providers to enable individuals to achieve the skills and knowledge needed to raise professional standards across our sectors.

Skills and Education Group Awards has an on-line registration system to help customers register learners on its qualifications, units and exams. In addition it provides features to view exam results, invoices, mark sheets and other information about learners already registered.

The system is accessed via a web browser by connecting to our secure website using a username and password: https://ors.skillsandeducationgroup.co.uk/

Sources of Additional Information

The Skills and Education Group Awards website http://www.skillsandeducationgroupawards.co.uk provides access to a wide variety of information.

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This is a live document and as such will be updated when required. It is the responsibility of the approved centre to ensure the most up-to-date version of the Qualification Guide is in use. Any amendments will be published on our website and centres are encouraged to check this site regularly

Introduction

The SEG Level 2 Award, Certificate and Diploma in Motor Vehicle Studies have been developed to provide a range of progression opportunities. The flexible structure and nature of these qualifications provides the ideal route for learners to progress from the SEG Level 1 Award, Certificate and Diploma in Motor Vehicle Studies on to higher level of study and skills acquisition, such as automotive apprenticeships. Learners will develop knowledge and skills aligned to specific areas of the automotive industry through practical experience. The rules of combination for the Level 2 Award, Certificate and Diploma in Motor Vehicle Studies are made up of six pathways which are:

- Auto Electrical
- Body Repair
- Motorcycle
- SMART Repair
- Specialist Tyre Fitting

Aims

The SEG Level 2 Award, Certificate and Diploma in Motor Vehicle Studies aims to offer learners and centres a flexible bank of units that can be tailored into specialised learning packages in specific areas of interest. These can be built upon from award through to diploma aligned to careers in the motor vehicle industry that provides knowledge and skills required for potential occupations and job roles within. The overall aim is to provide learners a qualification that can be used as a pre-apprenticeship entry route, as well as enabling career progression and employment prospects.

Target Group

These qualifications are designed for:
The mature learner who is seeking re-entry into the employment market, but who has insufficient qualifications and/or experience to compete for work

16–19 year olds in post-school education or training who wish to pursue a vocational course as a foundation to employment

Those in employment in the motor vehicle service and repair industry who need to acquire appropriate job-related qualifications

Learners Who wish to gain industry relevant knowledge and skills in areas aligned to specific job roles within the automotive industry

SEG expects approved centres to recruit with integrity on the basis of a learner's ability to contribute to and successfully complete all the requirements of a unit(s) or the full qualification.

Progression Opportunities

Successful completion of the Level 2 Award in Motor Vehicle Studies provides learners with the opportunity to progress on to the SEG Level 2 Certificate or Diploma in Motor Vehicle Studies or Apprenticeships at Level 2 in:

- Vehicle Fitting
- Vehicle Maintenance and Repair
- Vehicle Body and Paint Operations
- Roadside Assistance and Recovery
- Vehicle Parts Operations
- Vehicle Sales

Successful completion of the Level 2 Certificate in Motor Vehicle Studies provides a sound preparation for further vocational training, such as continuing onto the SEG Level 2 Diploma in Motor Vehicle Studies or Apprenticeships at Level 2 or 3 in:

- Vehicle Fitting
- Vehicle Maintenance and Repair
- Vehicle Body and Paint Operations
- Roadside Assistance and Recovery
- Vehicle Parts Operations
- Vehicle Sales

Successful completion of the Level 2 Diploma in Motor Vehicle Studies provides a sound preparation for further vocational training, such as continuing onto other related qualifications at Level 3 or Apprenticeships at Level 2 or 3 in,

- Vehicle Fitting
- Vehicle Maintenance and Repair
- Vehicle Body and Paint Operations
- Roadside Assistance and Recovery
- Vehicle Parts Operations
- Vehicle Sales

Centres should be aware that Reasonable Adjustments which may be permitted for assessment may in some instances limit a learner's progression into the sector. Centres must, therefore, inform learners of any limits their learning difficulty may impose on future progression

Language

These specifications and associated assessment materials are in English only.

Qualification Summary

Qualifications and Pathways	
Level 2 Award in Motor Vehicle Studies (Auto Electrical pathway) Level 2 Award in Motor Vehicle Studies (Body Repair pathway) Level 2 Award in Motor Vehicle Studies (Light Vehicle pathway) Level 2 Award in Motor Vehicle Studies (Motor Cycle pathway) Level 2 Award in Motor Vehicle Studies (SMART Repair pathway) Level 2 Award in Motor Vehicle Studies (Specialist Tyre Fitting pathway) Level 2 Certificate in Motor Vehicle Studies (Auto Electrical pathway) Level 2 Certificate in Motor Vehicle Studies (Body Repair pathway) Level 2 Certificate in Motor Vehicle Studies (Light Vehicle pathway) Level 2 Certificate in Motor Vehicle Studies (Motor Cycle pathway) Level 2 Certificate in Motor Vehicle Studies (SMART Repair pathway) Level 2 Certificate in Motor Vehicle Studies (Specialist Tyre Fitting pathway) Level 2 Diploma in Motor Vehicle Studies (Auto Electrical pathway) Level 2 Diploma in Motor Vehicle Studies (Body Repair pathway) Level 2 Diploma in Motor Vehicle Studies (Light Vehicle pathway) Level 2 Diploma in Motor Vehicle Studies (Motor Cycle pathway) Level 2 Diploma in Motor Vehicle Studies (SMART Repair pathway) Level 2 Diploma in Motor Vehicle Studies (Specialist Tyre Fitting pathway)	
Regulated	The qualifications identified above are all regulated by Ofqual and also Qualifications Wales
Assessment	Internal assessment, internal and external moderation
Grading	Pass
Operational Start Date	01/09/2011
Review Date	Award 31/07/2018 Certificate and Diploma 31/07/2018
SEG Sector	Engineering and Manufacturing Technologies
SSA Sector	04.3 Transportation Operations and Maintenance
Support from sector	IMI SSC

bodies	
SEG Administering Office	See SEG web site

Level 2 Award in Motor Vehicle Studies

Rules of Combination: Learners must achieve a minimum of 10 credits from one pathway.

Unit	Unit Number	Level	Credit Value	GLH
Auto Electrical Pathway (Mandatory unit plus one Option Group)				
Mandatory Unit: Health, Safety and Good Housekeeping in the Automotive Environment				
Health and safety for motor vehicle studies	[H/501/7005]	1	4	40
Option Group A: Fitting Auxiliary Locks and Security Devices (Electrical and Mechanical) (Both units must be achieved)				
Knowledge of fitting auxiliary locks and security devices (electrical and mechanical)	[K/601/6027]	2	3	25
Skills in fitting auxiliary locks and security devices (electrical and mechanical)	[H/601/6043]	2	3	25
Option Group B: Removing and Fitting Electrical Components (Both units must be achieved)				
Knowledge of removing and fitting electrical components	[K/601/6030]	2	5	45
Skills in removing and fitting electrical components	[Y/601/6055]	2	2	20
Body Repair Pathway (5 Mandatory units)				
Mandatory Units				
Health and safety for motor vehicle studies	[H/501/7005]	1	4	40
Knowledge of removing and fitting motor mechanical, electrical and trim (MET) components to vehicles	[Y/601/5424]	2	2	20
Skills in removing and fitting motor mechanical, electrical and trim (MET) components to vehicles	[F/601/5451]	2	2	20
Knowledge of removing and fitting non permanently fixed	[D/601/5425]	2	2	20

motor vehicle body panels				
Skills in removing and fitting non permanently fixed motor vehicle body panels	[R/601/5454]	2	2	20
Light Vehicle Pathway (Mandatory unit plus a minimum of one Option Group to achieve the minimum credit value)				
Mandatory Unit: Health, Safety and Good Housekeeping in the Automotive Environment				
Health and safety for motor vehicle studies	[H/501/7005]	1	4	40
Option Group A: Inspecting Light Vehicles using Prescribed Methods (Both units must be achieved)				
Knowledge of inspecting light vehicles using prescribed methods	[H/601/3742]	2	4	40
Skills in inspecting light vehicles using prescribed methods	[A/601/3889]	2	4	40
Option Group B: Inspection and Repair of Light Vehicle Clutches (Both units must be achieved)				
Knowledge of inspection and repair of light vehicle clutches	[H/601/6060]	2	2	12
Skills in inspection and repair of light vehicle clutches	[D/601/6753]	2	4	32
Option Group C: Inspection and Replacement of Light Vehicle Exhaust Components (Both units must be achieved)				
Knowledge of inspection and replacement of light vehicle exhaust components	[Y/601/6072]	2	2	14
Skills in inspection and replacement of light vehicle exhaust components	[A/601/6842]	2	3	24
Option Group D: Inspection, Testing and Replacement of Vehicle Batteries and Related Components (Both units must be achieved)				
Knowledge of inspection, testing and replacement of vehicle batteries and related components	[F/601/6082]	2	2	18

Skills in inspection, testing and replacement of vehicle batteries and related components	[K/601/8179]	2	3	25
Option Group E: Inspection and Replacement of Light Vehicle Suspension Dampers and Springs (Both units must be achieved)				
Knowledge of inspection and replacement of light vehicle suspension dampers and springs	[J/601/6083]	2	2	14
Skills in inspection and replacement of light vehicle suspension dampers and springs	[F/601/6857]	2	3	24
Option Group F: Inspection, Adjustment and Replacement of Light Vehicle Braking Systems and Components (Both units must be achieved)				
Knowledge of inspection, adjustment and replacement of light vehicle braking systems and components	[L/601/6084]	2	2	18
Skills in inspection and replacement of light vehicle braking systems and components	[L/601/6862]	2	4	32
Motor Cycle Pathway (5 Mandatory units)				
Mandatory Units				
Health and safety for motor vehicle studies	[H/501/7005]	1	4	40
Knowledge of routine motorcycle maintenance	[F/601/5515]	2	2	20
Skills in routine motorcycle maintenance	[F/601/5594]	2	2	20
Knowledge of motorcycle preparation and inspection	[F/601/5563]	2	2	20
Skills in motorcycle preparation and inspection	[Y/601/5617]	2	2	20
SMART Repair Pathway (Mandatory unit plus a minimum of one Option Group to achieve the minimum credit value)				
Mandatory Unit: Health, Safety and Good Housekeeping in the Automotive Environment				

Health and safety for motor vehicle studies	[H/501/7005]	1	4	40
Option Group A: Removing Dents and Creases from Motor Vehicle Flat Panels(Both units must be achieved)				
Knowledge of removing dents and creases from motor vehicle flat panels	[M/502/6354]	2	2	20
Skills in removing dents and creases from motor vehicle flat panels	[T/502/6355]	2	2	20
Option Group B: Removing Dents and Creases from Motor Vehicles through Swage Lines (Both units must be achieved)				
Knowledge of removing dents and creases from motor vehicles through swage lines	[F/502/6357]	2	2	20
Skills in removing dents and creases from motor vehicles through swage lines	[M/502/6337]	2	2	20
Option Group C: Removing Dents and Creases from Motor Vehicles where Access is Difficult or Restricted (Both units must be achieved)				
Knowledge of removing dents and creases from motor vehicles where access is difficult or restricted	[Y/502/6347]	3	2	20
Skills in removing dents and creases from motor vehicles where access is difficult or restricted	[D/502/6348]	2	2	20
Option Group D: Vehicle Cosmetic Interior Trim Repair (Both units must be achieved)				
Knowledge of vehicle cosmetic interior trim repair	[H/503/4645]	2	2	15
Skills in vehicle cosmetic interior trim repair	[K/503/4646]	2	3	25
Option Group E: Vehicle Cosmetic Interior Upholstery Repair (Fabric) (Both units must be achieved)				
Knowledge of vehicle cosmetic interior upholstery repair (fabric)	[M/503/4647]	2	2	15

Skills in vehicle cosmetic interior upholstery repair (fabric)	[M/503/4650]	2	2	20
Option Group F: Vehicle Cosmetic Interior Upholstery Repair (Leather) (Both units must be achieved)				
Knowledge of vehicle cosmetic interior upholstery repair (leather)	[A/503/4652]	2	2	15
Skills in vehicle cosmetic interior upholstery repair (leather)	[F/503/4653]	2	2	20
Option Group G: Windscreen Repair (Both units must be achieved)				
Understanding windscreen repair and system maintenance	[L/600/7448]	2	3	23
Repair damaged windscreen glass in vehicles	[K/600/7442]	2	5	31
Specialist Tyre Fitting Pathway (Mandatory unit plus one Option Group)				
Mandatory Unit: Health, Safety and Good Housekeeping in the Automotive Environment				
Health and safety for motor vehicle studies	[H/501/7005]	1	4	40
Option Group A: Inspection, Repair and Replacement of High Performance Light Vehicle Tyres (Both units must be achieved)				
Knowledge of inspection, repair and replacement of high performance light vehicle tyres	[T/601/6032]	2	3	24
Skills in inspection, repair and replacement of high performance light vehicle tyre	[K/601/6092]	2	4	36
Option Group B: Inspection, Repair and Replacement of Motorcycle Tyres (Both units must be achieved)				
Knowledge of inspection, repair and replacement of motorcycle tyres	[R/601/6040]	2	3	24
Skills in inspection, repair and replacement of motorcycle tyres	[T/601/6094]	2	4	36

If learners achieve credits from units of the same title (or linked titles) at more than one level, they cannot count credits achieved from both units towards the credit target of a qualification.

Entry Requirements						
Section 96/97	**Pre 16**		**16 – 18**	✓	**19 +**	✓
LAD Aim Reference	60029961					
Recommended GLH[2]	90					
Recommended TQT[3]	100					
Credit Value	10					
Contribution to Threshold	See SEG Qualifications Directory					
ASL Option	Yes					
Foundation Learning	N/A					
Type of Funding Available	See LAD (Learning Aims Database)					
Minimum Qualification Fee	See SEG web site for current fees and charges					
Unit Fee	Unit fees are based upon a unit's individual credit value. Please see the SEG web site for the current fee charged per credit					
Additional Information	Please see SEG web site for qualifications that are eligible for Credit Transfer/RPL/Exemption This could also include information about Technical Certificates/Apprenticeships					

[2] See Glossary of Terms
[3] See Glossary of Terms

Level 2 Certificate in Motor Vehicle Studies

Rules of Combination: Learners must achieve a minimum of 32 credits from one pathway. This must include 10 credits from the Mandatory Group and a minimum of 22 credits from the pathway specific Option Groups.

Unit	Unit Number	Level	Credit Value	GLH
Auto Electrical Pathway (Mandatory group plus a minimum of 22 credits from the option groups)				
Mandatory Group: Health, Safety and Good Housekeeping in the Automotive Environment				
Knowledge of health, safety and good housekeeping in the automotive environment	[D/601/6171]	2	3	30
Skills in health, safety and good housekeeping in the automotive environment	[Y/601/7254]	2	7	60
Option Group A: Locating and Correcting Simple Electrical Faults in the Automotive Workplace (Both units must be achieved)				
Knowledge of locating and correcting simple electrical faults in the automotive workplace	[K/601/6013]	2	6	45
Skills in locating and correcting simple electrical faults in the automotive workplace	[F/601/6034]	2	5	45
Option Group B: Fitting Auxiliary Locks and Security Devices (Electrical and Mechanical) (Both units must be achieved)				
Knowledge of fitting auxiliary locks and security devices (electrical and mechanical)	[K/601/6027]	2	3	25
Skills in fitting auxiliary locks and security devices (electrical and mechanical)	[H/601/6043]	2	3	25
Option Group C: Inspecting Vehicles using Prescribed Methods (Both units must be achieved)				
Knowledge of inspecting vehicles using prescribed	[M/601/6028]	2	1	4

methods				
Skills in inspecting vehicles using prescribed methods	[T/601/6046]	2	2	4
Option Group D: Removing and Fitting Electrical Components (Both units must be achieved)				
Knowledge of removing and fitting electrical components	[K/601/6030]	2	5	45
Skills in removing and fitting electrical components	[Y/601/6055]	2	2	20
Option Group F: Inspection, Testing and Replacement of Vehicle Batteries and Related Components (Both units must be achieved)				
Knowledge of inspection, testing and replacement of vehicle batteries and related components	[F/601/6082]	2	2	18
Skills in inspection, testing and replacement of vehicle batteries and related components	[K/601/8179]	2	3	25
Body Repair Pathway				
Mandatory Group: Health, Safety and Good Housekeeping in the Automotive Environment				
Knowledge of health, safety and good housekeeping in the automotive environment	[D/601/6171]	2	3	30
Skills in health, safety and good housekeeping in the automotive environment	[Y/601/7254]	2	7	60
Option Group A: Removing and Fitting Motor Mechanical, Electrical and Trim (MET) Components to Vehicles (Both units must be achieved)				
Knowledge of removing and fitting motor mechanical, electrical and trim (MET) components to vehicles	[Y/601/5424]	2	2	20
Skills in removing and fitting motor mechanical, electrical and trim (MET) components to vehicles	[F/601/5451]	2	2	20

Option Group B: Removing and Fitting Non Permanently Fixed Motor Vehicle Body Panels (Both units must be achieved)				
Knowledge of removing and fitting non permanently fixed motor vehicle body panels	[D/601/5425]	2	2	20
Skills in removing and fitting non permanently fixed motor vehicle body panels	[R/601/5454]	2	2	20
Option Group C: Removing and Replacing Exterior Motor Vehicle Body Panels including Permanently Fixed Components (Both units must be achieved)				
Knowledge of removing and replacing exterior motor vehicle body panels including permanently fixed components	[H/601/5426]	2	6	45
Skills in removing and replacing exterior motor vehicle body panels including permanently fixed components	[D/601/5456]	2	5	45
Option Group D: Minor Motor Vehicle Exterior Body Panel Repairs (Both units must be achieved)				
Knowledge of minor motor vehicle exterior body panel repairs	[K/601/5427]	2	6	45
Skills in carrying out minor repairs to motor vehicle exterior body panels	[K/601/5458]	2	5	45
Option Group E: Motor Vehicle Body Metal Active Gas (MAG) Welding Techniques (Both units must be achieved)				
Knowledge of motor vehicle body metal active gas (MAG) welding techniques	[T/601/5432]	2	5	45
Skills in motor vehicle body metal active gas (MAG) welding techniques	[R/601/5468]	2	5	45
Option Group F: Motor Vehicle Body Resistance Spot Welding Operations (Both units must be achieved)				
Knowledge of motor vehicle	[F/601/5434]	2	5	45

body resistance spot welding operations				
Skills in motor vehicle body resistance spot welding Operations	[Y/601/5469]	2	5	45
Option Group G: Tools and Equipment Used In Vehicle Refinishing (Both units must be achieved)				
Knowledge of tools and equipment used in vehicle refinishing	[J/601/6116]	2	5	45
Skills in tools and equipment used in vehicle refinishing	[Y/601/6153]	2	5	45
Option Group H: Working with Plastic Materials and Components (Both units must be achieved)				
Knowledge of working with plastic materials and components	[Y/601/6119]	3	6	45
Skills in working with plastic materials and components	[J/601/6231]	3	5	45
Option Group I: Vehicle Colour Matching (Both units must be achieved)				
Knowledge of vehicle colour matching	[R/601/6135]	3	6	45
Skills in vehicle colour matching	[T/601/6256]	3	5	45
Option Group J: Introduction to Vehicle Refinishing				
Introduction to vehicle refinishing	[Y/501/7020]	1	4	40
Light Vehicle				
Mandatory Group: Health, Safety and Good Housekeeping in the Automotive Environment				
Knowledge of health, safety and good housekeeping in the automotive environment	[D/601/6171]	2	3	30
Skills in health, safety and good housekeeping in the automotive environment	[Y/601/7254]	2	7	60
Option Group A: Locating and Correcting Simple Electrical Faults in the Automotive Workplace (Both units must be achieved)				

Knowledge of locating and correcting simple electrical faults in the automotive workplace	[K/601/6013]	2	6	45
Skills in locating and correcting simple electrical faults in the automotive workplace	[F/601/6034]	2	5	45
Option Group B: Removing and Fitting Basic Light Vehicle Mechanical, Electrical and Trim (MET) Components and Non Permanently Fixed Vehicle Body Panels(Both units must be achieved)				
Knowledge of removing and fitting basic light vehicle mechanical, electrical and trim (MET) components and non permanently fixed vehicle body panels	[F/601/3747]	2	2	20
Skills in removing and fitting basic light vehicle mechanical, electrical and trim (MET) components and non permanently fixed vehicle body panels	[K/601/3869]	2	3	20
Option Group C: Materials, Fabrication, Tools and Measuring Devices used in the Automotive Environment (Both units must be achieved)				
Knowledge of materials, fabrication, tools and measuring devices used in the automotive environment	[K/601/6237]	2	4	40
Skills in materials, fabrication, tools and measuring devices used in the automotive environment	[Y/601/6279]	2	7	60
Option Group D: Routine Light Vehicle Maintenance (Both units must be achieved)				
Knowledge of routine light vehicle maintenance	[F/601/3716]	2	3	20
Skills in routine light vehicle maintenance	[H/601/3871]	2	2	20

Option Group E: Removing and Replacing Light Vehicle Engine Units and Components (All three units must be achieved)				
Knowledge of light vehicle engine mechanical, lubrication and cooling system units and components	[R/601/3719]	2	3	20
Knowledge of light vehicle fuel, ignition, air and exhaust system units and components	[H/601/3725]	2	3	20
Skills in removing and replacing light vehicle engine units and components	[K/601/3872]	2	5	45
Option Group F: Inspecting Light Vehicles using Prescribed Methods (Both units must be achieved)				
Knowledge of inspecting light vehicles using prescribed methods	[H/601/3742]	2	4	40
Skills in inspecting light vehicles using prescribed methods	[A/601/3889]	2	4	40
Option Group G: Removing and Replacing Light Vehicle Electrical Units and Components				
Knowledge of removing and replacing light vehicle electrical units and components	[T/601/3731]	2	6	45
Skills in removing and replacing light vehicle electrical units and components	[T/601/3874]	2	5	45
Option Group H: Removing and Replacing Light Vehicle Chassis Units and Components (Both units must be achieved)				
Knowledge of removing and replacing light vehicle chassis units and components	[A/601/3732]	2	6	45
Skills in removing and replacing light vehicle chassis	[F/601/3876]	2	5	45

units and components				
Option Group I: Light Vehicle Transmission and Driveline Units and Components (Both units must be achieved)				
Knowledge of light vehicle transmission and driveline units and components	[Y/601/3740]	2	6	45
Skills in removing and replacing light vehicle driveline units and components	[K/601/3886]	2	5	45
Option Group J: Removing and Fitting Electrical Components (Both units must be achieved)				
Knowledge of removing and fitting electrical components	[K/601/6030]	2	5	45
Skills in removing and fitting electrical components	[Y/601/6055]	2	2	20
Motor Cycle Pathway				
Mandatory Unit: Health, Safety and Good Housekeeping in the Automotive Environment (Both units must be achieved)				
Knowledge of health, safety and good housekeeping in the automotive environment	[D/601/6171]	2	3	30
Skills in health, safety and good housekeeping in the automotive environment	[Y/601/7254]	2	7	60
Option Group A: Routine Motorcycle Maintenance (Both units must be achieved)				
Knowledge of routine motorcycle maintenance	[F/601/5515]	2	2	20
Skills in routine motorcycle maintenance	[F/601/5594]	2	2	20
Option Group B: Motorcycle Internal Engine Systems (Both units must be achieved)				
Knowledge of motorcycle internal engine systems	[Y/601/5519]	2	3	20
Knowledge of motorcycle fuel, ignition, air and exhaust system units and components	[T/601/5527]	2	3	20
Skills in motorcycle internal	[R/601/5597]	2	5	45

engine systems				
Option Group C: Removing and Replacing Motorcycle Electrical Units and Components (Both units must be achieved)				
Knowledge of removing and replacing motorcycle electrical units and components	[H/601/5555]	2	6	45
Skills in removing and replacing motorcycle electrical units and components	[D/601/5604]	2	5	45
Option Group D: Removing and Replacing Motorcycle Chassis Units and Components (Both units must be achieved)				
Knowledge of removing and replacing motorcycle chassis units and components	[T/601/5558]	2	6	45
Skills in removing and replacing motorcycle chassis units and components	[M/601/5610]	2	5	45
Option Group E: Motorcycle Preparation and Inspection (Both units must be achieved)				
Knowledge of motorcycle preparation and inspection	[F/601/5563]	2	2	20
Skills in motorcycle preparation and inspection	[Y/601/5617]	2	2	20
Option Group F: Inspection, Repair and Replacement of Motorcycle Tyres (Both units must be achieved)				
Knowledge of inspection, repair and replacement of motorcycle tyres	[R/601/6040]	2	3	24
Skills in inspection, repair and replacement of motorcycle tyres	[T/601/6094]	2	4	36
Option Group G: Working with Plastic Materials and Components (Both units must be achieved)				
Knowledge of working with plastic materials and components	[Y/601/6119]	3	6	45

Skills in working with plastic materials and components	[J/601/6231]	3	5	45
SMART Repair				
Mandatory Group: Health, Safety and Good Housekeeping in the Automotive Environment				
Knowledge of health, safety and good housekeeping in the automotive environment	[D/601/6171]	2	3	30
Skills in health, safety and good housekeeping in the automotive environment	[Y/601/7254]	2	7	60
Option Group A: Removing Dents and Creases from Motor Vehicle Flat Panels (Both units must be achieved)				
Knowledge of removing dents and creases from motor vehicle flat panels	[M/502/6354]	2	2	20
Skills in removing dents and creases from motor vehicle flat panels	[T/502/6355]	2	2	20
Option Group B: Removing Dents and Creases from Motor Vehicles through Swage Lines (Both units must be achieved)				
Knowledge of removing dents and creases from motor vehicles through swage lines	[F/502/6357]	2	2	20
Skills in removing dents and creases from motor vehicles through swage lines	[M/502/6337]	2	2	20
Option Group C: Removing Dents and Creases from Motor icles where Access is Difficult or Restricted (Both units must be achieved)				
Knowledge of removing dents and creases from motor vehicles where access is difficult or restricted	[Y/502/6347]	3	2	20
Skills in removing dents and creases from motor vehicles where access is difficult or restricted	[D/502/6348]	2	2	20
Option Group D: Vehicle Cosmetic Interior Trim Repair (Both units must be achieved)				

Knowledge of vehicle cosmetic interior trim repair	[H/503/4645]	2	2	15
Skills in vehicle cosmetic interior trim repair	[K/503/4646]	2	3	25
Option Group E: Vehicle Cosmetic Interior Upholstery Repair (Fabric) (Both units must be achieved)				
Knowledge of vehicle cosmetic interior upholstery repair (fabric)	[M/503/4647]	2	2	15
Skills in vehicle cosmetic interior upholstery repair (fabric)	[M/503/4650]	2	2	20
Option Group F: Vehicle Cosmetic Interior Upholstery Repair (Leather) (Both units must be achieved)				
Knowledge of vehicle cosmetic interior upholstery repair (leather)	[A/503/4652]	2	2	15
Skills in vehicle cosmetic interior upholstery repair (leather)	[F/503/4653]	2	2	20
Option Group G: Working with Plastic Materials and Components (Both units must be achieved)				
Knowledge of working with plastic materials and components	[Y/601/6119]	3	6	45
Skills in working with plastic materials and components	[J/601/6231]	3	5	45
Option Group H: Repairing Minor Paint Defects (Both units must be achieved)				
Knowledge of repairing minor paint defects	[Y/601/6122]	2	6	45
Skills in repairing minor paint defects	[F/601/6244]	2	5	45
Option Group I: Vehicle Colour Matching (Both units must be achieved)				
Knowledge of vehicle colour matching	[R/601/6135]	3	6	45
Skills in vehicle colour matching	[T/601/6256]	3	5	45

Option Group J: Windscreen Repair (Both units must be achieved)				
Understanding windscreen repair and system maintenance	[L/600/7448]	2	3	23
Repair damaged windscreen glass in vehicles	[K/600/7442]	2	5	31
Option Group K: Introduction to vehicle valeting				
Introduction to vehicle valeting	[J/501/7028]	1	4	40
Specialist Tyre Fitting				
Mandatory Group: Health, Safety and Good Housekeeping in the Automotive Environment				
Knowledge of health, safety and good housekeeping in the automotive environment	[D/601/6171]	2	3	30
Skills in health, safety and good housekeeping in the automotive environment	[Y/601/7254]	2	7	60
Option Group A: Inspection, Repair and Replacement of Standard Light Vehicle Tyres (Both units must be achieved)				
Knowledge in inspection, repair and replacement of standard light vehicle tyres	[D/601/6025]	1	3	24
Skills in inspection, repair and replacement of standard light vehicle tyres	[H/601/6091]	1	5	46
Option Group B: Inspection, Repair and Replacement of High erformance Light Vehicle Tyres (Both units must be achieved)				
Knowledge of inspection, repair and replacement of high performance light vehicle tyres	[T/601/6032]	2	3	24
Skills in inspection, repair and replacement of high performance light vehicle tyre	[K/601/6092]	2	4	36
Option Group C: Inspection, Repair and Replacement of Motorcycle Tyres (Both units must be achieved)				
Knowledge of inspection, repair and replacement of	[R/601/6040]	2	3	24

motorcycle tyres				
Skills in inspection, repair and replacement of motorcycle tyres	[T/601/6094]	2	4	36
Option Group D: Light Vehicle Four Wheel Alignment (Both units must be achieved)				
Knowledge of light vehicle four wheel alignment	[F/601/6051]	2	3	24
Skills in light vehicle four wheel alignment	[F/601/6745]	2	4	36
Option Group E: Inspection and Replacement of Light Vehicle Suspension Dampers and Springs (Both units must be achieved)				
Knowledge of inspection and replacement of light vehicle suspension dampers and springs	[J/601/6083]	2	2	14
Skills in inspection and replacement of light vehicle suspension dampers and springs	[F/601/6857]	2	3	24

If learners achieve credits from units of the same title (or linked titles) at more than one level, they cannot count credits achieved from both units towards the credit target of a qualification.

Entry Requirements						
Section 96/97	**Pre 16**		**16 – 18**	✓	**19 +**	✓
LAD Aim Reference	60029663					
Recommended GLH[4]	270					
Recommended TQT[5]	320					
Credit Value	32					
Contribution to Threshold	See SEG Qualifications Directory					
ASL Option	Yes					

[4] See Glossary of Terms
[5] See Glossary of Terms

Foundation Learning	N/A
Type of Funding Available	See LAD (Learning Aims Database)
Minimum Qualification Fee	See SEG web site for current fees and charges
Unit Fee	Unit fees are based upon a unit's individual credit value. Please see the SEG web site for the current fee charged per credit
Additional Information	Please see SEG web site for qualifications that are eligible for Credit Transfer/APL/Exemption This could also include information about Technical Certificates/Apprenticeships

Level 2 Diploma in Motor Vehicle Studies

Rules of Combination: Learners must achieve a minimum of 45 credits from one pathway. This must include 10 credits from the Mandatory Group and a minimum of 35 credits from the pathway specific Option Groups.

Unit	Unit Number	Level	Credit Value	GLH
Auto Electrical Pathway				
Mandatory Group: Health, Safety and Good Housekeeping in the Automotive Environment				
Knowledge of health, safety and good housekeeping in the automotive environment	[D/601/6171]	2	3	30
Skills in health, safety and good housekeeping in the automotive environment	[Y/601/7254]	2	7	60
Option Group A: Locating and Correcting Simple Electrical Faults in the Automotive Workplace (Both units must be achieved)				
Knowledge of locating and correcting simple electrical faults in the automotive workplace	[K/601/6013]	2	6	45
Skills in locating and correcting simple electrical faults in the automotive workplace	[F/601/6034]	2	5	45
Option Group B: Enhancing Vehicle Electrical Systems (Both units must be achieved)				
Knowledge in enhancing vehicle electrical systems	[F/601/6017]	2	6	45
Skills in enhancing vehicle electrical systems	[J/601/6035]	2	5	45
Option Group C: Fitting Auxiliary Locks and Security Devices (Electrical and Mechanical) (Both units must be achieved)				
Knowledge of fitting auxiliary locks and security devices (electrical and mechanical)	[K/601/6027]	2	3	25
Skills in fitting auxiliary locks and security devices (electrical and mechanical)	[H/601/6043]	2	3	25

Option Group D: Inspecting Vehicles using Prescribed Methods (Both units must be achieved)				
Knowledge of inspecting vehicles using prescribed methods	[M/601/6028]	2	1	4
Skills in inspecting vehicles using prescribed methods	[T/601/6046]	2	2	4
Option Group E: Materials, Fabrication, Tools and Measuring Devices used in the Automotive Environment (Both units must be achieved)				
Knowledge of materials, fabrication, tools and measuring devices used in the automotive environment	[K/601/6237]	2	4	40
Skills in materials, fabrication, tools and measuring devices used in the automotive environment	[Y/601/6279]	2	7	60
Option Group F: Identify and Agree Motor Vehicle Customer Service Needs (Both units must be achieved)				
Knowledge of how to identify and agree motor vehicle customer service needs	[R/601/6247]	3	5	45
Skills to identify and agree motor vehicle customer service needs	[M/601/6286]	3	5	40
Option Group G: Removing and Fitting Electrical Components (Both units must be achieved)				
Knowledge of removing and fitting electrical components	[K/601/6030]	2	5	45
Skills in removing and fitting electrical components	[Y/601/6055]	2	2	20
Option Group H: Inspection, Testing and Replacement of Vehicle Batteries and Related Components (Both units must be achieved)				
Knowledge of inspection, testing and replacement of vehicle batteries and related components	[F/601/6082]	2	2	18
Skills in inspection, testing and replacement of vehicle batteries and related components	[K/601/8179]	2	3	25
Body Repair Pathway				
Mandatory Group: Health, Safety and Good Housekeeping in the Automotive Environment				

Knowledge of health, safety and good housekeeping in the automotive environment	[D/601/6171]	2	3	30
Skills in health, safety and good housekeeping in the automotive environment	[Y/601/7254]	2	7	60
Option Group A: Removing and Fitting Motor Mechanical, Electrical and Trim (MET) Components to Vehicles (Both units must be achieved)				
Knowledge of removing and fitting motor mechanical, electrical and trim (MET) components to vehicles	[Y/601/5424]	2	2	20
Skills in removing and fitting motor mechanical, electrical and trim (MET) components to vehicles	[F/601/5451]	2	2	20
Option Group B: Removing and Fitting Non Permanently Fixed Motor Vehicle Body Panels (Both units must be achieved)				
Knowledge of removing and fitting non permanently fixed motor vehicle body panels	[D/601/5425]	2	2	20
Skills in removing and fitting non permanently fixed motor vehicle body panels	[R/601/5454]	2	2	20
Option Group C: Removing and Replacing Exterior Motor Vehicle Body Panels including Permanently Fixed Components (Both units must be achieved)				
Knowledge of removing and replacing exterior motor vehicle body panels including permanently fixed components	[H/601/5426]	2	6	45
Skills in removing and replacing exterior motor vehicle body panels including permanently fixed components	[D/601/5456]	2	5	45
Option Group D: Minor Motor Vehicle Exterior Body Panel Repairs (Both units must be achieved)				
Knowledge of minor motor vehicle	[K/601/5427]	2	6	45

exterior body panel repairs				
Skills in minor motor vehicle exterior body panel repairs	[K/601/5458]	2	5	45
Option Group E: Motor Vehicle Body Metal Active Gas (MAG) Welding Techniques (Both units must be achieved)				
Knowledge of motor vehicle body metal active gas (MAG) welding techniques	[T/601/5432]	2	5	45
Skills in motor vehicle body metal active gas (MAG) welding techniques	[R/601/5468]	2	5	45
Option Group F: Motor Vehicle Body Resistance Spot Welding Operations (Both units must be achieved)				
Knowledge of motor vehicle body resistance spot welding operations	[F/601/5434]	2	5	45
Skills in motor vehicle body resistance spot welding Operations	[Y/601/5469]	2	5	45
Option Group G: Motor Vehicle Body Adhesive Bonding Operations (Both units must be achieved)				
Knowledge of motor vehicle body adhesive bonding operations	[J/601/5449]	3	2	20
Skills in motor vehicle body adhesive bonding operations	[T/601/5480]	3	2	20
Option Group H: Materials, Fabrication, Tools and Measuring Devices used in the Automotive Environment (Both units must be achieved)				
Knowledge of materials, fabrication, tools and measuring devices used in the automotive environment	[K/601/6237]	2	4	40
Skills in materials, fabrication, tools and measuring devices used in the automotive environment	[Y/601/6279]	2	7	60
Option Group I: Identify and Agree Motor Vehicle Customer Service Needs (Both units must be achieved)				
Knowledge of how to identify and	[R/601/6247]	3	5	45

agree motor vehicle customer service needs				
Skills to identify and agree motor vehicle customer service needs	[M/601/6286]	3	5	40
Option Group J: Tools and Equipment used in Vehicle Refinishing (Both units must be achieved)				
Knowledge of tools and equipment used in vehicle refinishing	[J/601/6116]	2	5	45
Skills in tools and equipment used in vehicle refinishing [Y/601/6153]	[Y/601/6153]	2	5	45
Option Group K: Working with Plastic Materials and Components (Both units must be achieved)				
Knowledge of working with plastic materials and components	[Y/601/6119]	3	6	45
Skills in working with plastic materials and components	[J/601/6231]	3	5	45
Option Group L: Vehicle Colour Matching (Both units must be achieved)				
Knowledge of vehicle colour matching	[R/601/6135]	3	6	45
Skills in vehicle colour matching	[T/601/6256]	3	5	45
Option Group M: Introduction to Vehicle Refinishing				
Introduction to vehicle refinishing	[Y/501/7020]	1	4	40
Light Vehicle Pathway				
Mandatory Group: Health, Safety and Good Housekeeping in the Automotive Environment				
Knowledge of health, safety and good housekeeping in the automotive environment	[D/601/6171]	2	3	30
Skills in health, safety and good housekeeping in the automotive environment	[Y/601/7254]	2	7	60
Option Group A: Locating and Correcting Simple Electrical Faults in the Automotive Workplace (Both units must be achieved)				
Knowledge of locating and correcting simple electrical faults in the automotive workplace	[K/601/6013]	2	6	45
Skills in locating and correcting	[F/601/6034]	2	5	45

simple electrical faults in the automotive workplace				
Option Group B: Removing and Fitting Basic Light Vehicle Mechanical, Electrical and Trim (MET) Components and Non Permanently Fixed Vehicle Body Panels (Both units must be achieved)				
Knowledge of removing and fitting basic light vehicle mechanical, electrical and trim (MET) components and non permanently fixed vehicle body panels	[F/601/3747]	2	2	20
Skills in removing and fitting basic light vehicle mechanical, electrical and trim (MET) components and non permanently fixed vehicle body panels	[K/601/3869]	2	3	20
Option Group C: Materials, Fabrication, Tools and Measuring Devices used in the Automotive Environment (Both units must be achieved)				
Knowledge of materials, fabrication, tools and measuring devices used in the automotive environment	[K/601/6237]	2	4	40
Skills in materials, fabrication, tools and measuring devices used in the automotive environment	[Y/601/6279]	2	7	60
Option Group D: Identify and Agree Motor Vehicle Customer Service Needs (Both units must be achieved)				
Knowledge of how to identify and agree motor vehicle customer service needs	[R/601/6247]	3	5	45
Skills to identify and agree motor vehicle customer service needs	[M/601/6286]	3	5	40
Option Group E: Routine Light Vehicle Maintenance (Both units must be achieved)				
Knowledge of routine light vehicle maintenance	[F/601/3716]	2	3	20
Skills in routine light vehicle maintenance	[H/601/3871]	2	2	20
Option Group F: Removing and Replacing Light Vehicle Engine				

Units and Components (All 3 units must be achieved)				
Knowledge of light vehicle engine mechanical, lubrication and cooling system units and components	[R/601/3719]	2	3	20
Knowledge of light vehicle fuel, ignition, air and exhaust system units and components	[H/601/3725]	2	3	20
Skills in removing and replacing light vehicle engine units and components	[K/601/3872]	2	5	45
Option Group G: Removing and Replacing Light Vehicle Electrical Units and Components (Both units must be achieved)				
Knowledge of removing and replacing light vehicle electrical units and components	[T/601/3731]	2	6	45
Skills in removing and replacing light vehicle electrical units and components	[T/601/3874]	2	5	45
Option Group H: Removing and Replacing Light Vehicle Chassis Units and Components (Both units must be achieved)				
Knowledge of removing and replacing light vehicle chassis units and components	[A/601/3732]	2	6	45
Skills in removing and replacing light vehicle chassis units and components	[F/601/3876]	2	5	45
Option Group I: Inspecting Light Vehicles using Prescribed Methods (Both units must be achieved)				
Knowledge of inspecting light vehicles using prescribed methods	[H/601/3742]	2	4	40
Skills in inspecting light vehicles using prescribed methods	[A/601/3889]	2	4	40
Option Group J: Light Vehicle Transmission and Driveline Units and Components (Both units must be achieved)				
Knowledge of light vehicle transmission and driveline units and components	[Y/601/3740]	2	6	45

Skills in removing and replacing light vehicle driveline units and components	[K/601/3886]	2	5	45
Option Group K: Removing and Fitting Electrical Components (Both units must be achieved)				
Knowledge of removing and fitting electrical components	[K/601/6030]	2	5	45
Skills in removing and fitting electrical components	[Y/601/6055]	2	2	20
Motor Cycle Pathway				
Mandatory Unit: Health, Safety and Good Housekeeping in the Automotive Environment (Both units must be achieved)				
Knowledge of health, safety and good housekeeping in the automotive environment	[D/601/6171]	2	3	30
Skills in health, safety and good housekeeping in the automotive environment	[Y/601/7254]	2	7	60
Option Group A: Locating and Correcting Simple Electrical Faults in the Automotive Workplace (Both units must be achieved)				
Knowledge of locating and correcting simple electrical faults in the automotive workplace	[K/601/6013]	2	6	45
Skills in locating and correcting simple electrical faults in the automotive workplace	[F/601/6034]	2	5	45
Option Group B: Materials, Fabrication, Tools and Measuring Devices used in the Automotive Environment (Both units must be achieved)				
Knowledge of materials, fabrication, tools and measuring devices used in the automotive environment	[K/601/6237]	2	4	40
Skills in materials, fabrication, tools and measuring devices used in the automotive environment	[Y/601/6279]	2	7	60
Option Group C: Identify and Agree Motor Vehicle Customer Service Needs (Both units must be achieved)				
Knowledge of how to identify and agree motor vehicle customer	[R/601/6247]	3	5	45

service needs				
Skills to identify and agree motor vehicle customer service needs	[M/601/6286]	3	5	40
Option Group D: Routine Motorcycle Maintenance (Both units must be achieved)				
Knowledge of routine motorcycle maintenance	[F/601/5515]	2	2	20
Skills in routine motorcycle maintenance	[F/601/5594]	2	2	20
Option Group E: Motorcycle Internal Engine Systems (Both units must be achieved)				
Knowledge of motorcycle internal engine systems	[Y/601/5519]	2	3	20
Knowledge of motorcycle fuel, ignition, air and exhaust system units and components	[T/601/5527]	2	3	20
Skills in motorcycle internal engine systems	[R/601/5597]	2	5	45
Option Group F: Removing and Replacing Motorcycle Electrical Units and Components (Both units must be achieved)				
Knowledge of removing and replacing motorcycle electrical units and components	[H/601/5555]	2	6	45
Skills in removing and replacing motorcycle electrical units and components	[D/601/5604]	2	5	45
Option Group G: Removing and Replacing Motorcycle Chassis Units and Components (Both units must be achieved)				
Knowledge of removing and replacing motorcycle chassis units and components	[T/601/5558]	2	6	45
Skills in removing and replacing motorcycle chassis units and components	[M/601/5610]	2	5	45
Option Group H: Motorcycle Preparation and Inspection (Both units must be achieved)				
Knowledge of motorcycle preparation and inspection	[F/601/5563]	2	2	20
Skills in motorcycle preparation and inspection	[Y/601/5617]	2	2	20

Option Group I: Working with Plastic Materials and Components (Both units must be achieved)				
Knowledge of working with plastic materials and components	[Y/601/6119]	3	6	45
Skills in working with plastic materials and components	[J/601/6231]	3	5	45
Option Group J: Repairing Minor Paint Defects (Both units must be achieved)				
Knowledge of repairing minor paint defects	[Y/601/6122]	2	6	45
Skills in repairing minor paint defects	[F/601/6244]	2	5	45
Option Group K: Vehicle Colour Matching (Both units must be achieved)				
Knowledge of vehicle colour matching	[R/601/6135]	3	6	45
Skills in vehicle colour matching	[T/601/6256]	3	5	45
Option Group L: Inspection, Repair and Replacement of Motorcycle Tyres (Both units must be achieved)				
Knowledge of inspection, repair and replacement of motorcycle tyres	[R/601/6040]	2	3	24
Skills in inspection, repair and replacement of motorcycle tyres	[T/601/6094]	2	4	36
SMART Repair Pathway				
Mandatory Group: Health, Safety and Good Housekeeping in the Automotive Environment				
Knowledge of health, safety and good housekeeping in the automotive environment	[D/601/6171]	2	3	30
Skills in health, safety and good housekeeping in the automotive environment	[Y/601/7254]	2	7	60
Option Group A: Removing Dents and Creases from Motor Vehicle Flat Panels (Both units must be achieved)				
Knowledge of removing dents and creases from motor vehicle flat panels	[M/502/6354]	2	2	20

Skills in removing dents and creases from motor vehicle flat panels	[T/502/6355]	2	2	20
Option Group B: Removing Dents and Creases from Motor Vehicles through Swage Lines (Both units must be achieved)				
Knowledge of removing dents and creases from motor vehicles through swage lines	[F/502/6357]	2	2	20
Skills in removing dents and creases from motor vehicles through swage lines	[M/502/6337]	2	2	20
Option Group C: Removing Dents and Creases from Motor Vehicles where Access is Difficult or Restricted (Both units must be achieved)				
Knowledge of removing dents and creases from motor vehicles where access is difficult or restricted	[Y/502/6347]	3	2	20
Skills in removing dents and creases from motor vehicles where access is difficult or restricted	[D/502/6348]	2	2	20
Option Group D: Vehicle Cosmetic Interior Trim Repair (Both units must be achieved)				
Knowledge of vehicle cosmetic interior trim repair	[H/503/4645]	2	2	15
Skills in vehicle cosmetic interior trim repair	[K/503/4646]	2	3	25
Option Group E: Vehicle Cosmetic Interior Upholstery Repair (Fabric) (Both units must be achieved)				
Knowledge of vehicle cosmetic interior upholstery repair (Fabric)	[M/503/4647]	2	2	15
Skills in vehicle cosmetic interior upholstery repair (Fabric)	[M/503/4650]	2	2	20
Option Group F: Vehicle Cosmetic Interior Upholstery Repair (Leather) (Both units must be achieved)				
Knowledge of vehicle cosmetic interior upholstery repair (Leather)	[A/503/4652]	2	2	15
Skills in vehicle cosmetic interior upholstery repair (Leather)	[F/503/4653]	2	2	20

Option Group G: Materials, Fabrication, Tools and Measuring Devices used in the Automotive Environment (Both units must be achieved)				
Knowledge of materials, fabrication, tools and measuring devices used in the automotive environment	[K/601/6237]	2	4	40
Skills in materials, fabrication, tools and measuring devices used in the automotive environment [Y/601/6279]		2	7	60
Option Group H: Identify and Agree Motor Vehicle Customer Service Needs (Both units must be achieved)				
Knowledge of how to identify and agree motor vehicle customer service needs	[R/601/6247]	3	5	45
Skills to identify and agree motor vehicle customer service needs	[M/601/6286]	3	5	40
Option Group I: Working with Plastic Materials and Components (Both units must be achieved)				
Knowledge of working with plastic materials and components	[Y/601/6119]	3	6	45
Skills in working with plastic materials and components	[J/601/6231]	3	5	45
Option Group J: Repairing Minor Paint Defects (Both units must be achieved)				
Knowledge of repairing minor paint defects	[Y/601/6122]	2	6	45
Skills in repairing minor paint defects	[F/601/6244]	2	5	45
Option Group K: Vehicle Colour Matching (Both units must be achieved)				
Knowledge of vehicle colour matching	[R/601/6135]	3	6	45
Skills in Vehicle Colour Matching	[T/601/6256]	3	5	45
Option Group L: Windscreen Repair (Both units must be achieved)				
Understanding windscreen repair and system maintenance	[L/600/7448]	2	3	23
Repair damaged windscreen glass in vehicles	[K/600/7442]	2	5	31
Option Group M: Introduction to Vehicle Valeting				

Introduction to vehicle valeting	[J/501/7028]	1	4	40
Specialist Tyre Fitting Pathway				
Mandatory Group: Health, Safety and Good Housekeeping in the Automotive Environment				
Knowledge of health, safety and good housekeeping in the automotive environment	[D/601/6171]	2	3	30
Skills in health, safety and good housekeeping in the automotive environment	[Y/601/7254]	2	7	60
Option Group A: Inspecting Vehicles using Prescribed Methods (Both units must be achieved)				
Knowledge of inspecting vehicles using prescribed methods	[M/601/6028]	2	1	4
Skills in inspecting vehicles using prescribed methods	[T/601/6046]	2	2	4
Option Group B: Identify and Agree Motor Vehicle Customer Service Needs (Both units must be achieved)				
Knowledge of how to identify and agree motor vehicle customer service needs	[R/601/6247]	3	5	45
Skills to identify and agree motor vehicle customer service needs	[M/601/6286]	3	5	40
Option Group C: Inspection, Repair and Replacement of Standard Light Vehicle Tyres (Both units must be achieved)				
Knowledge in inspection, repair and replacement of standard light vehicle tyres	[D/601/6025]	1	3	24
Skills in inspection, repair and replacement of standard light vehicle tyres	[H/601/6091]	1	5	46
Option Group D: Inspection, Repair and Replacement of High Performance Light Vehicle Tyres (Both units must be achieved)				
Knowledge of inspection, repair and replacement of high performance light vehicle tyres	[T/601/6032]	2	3	24
Skills in inspection, repair and replacement of high performance light vehicle tyre	[K/601/6092]	2	4	36

Option Group E: Inspection, Repair and Replacement of Commercial Vehicle Tyres (Both units must be achieved)				
Knowledge of inspection, repair and replacement of commercial vehicle tyres	[L/601/6036]	1	3	26
Skills in inspection repair and replacement of commercial vehicle tyres	[M/601/6093]	1	5	44
Option Group F: Inspection, Repair and Replacement of Motorcycle Tyres (Both units must be achieved)				
Knowledge of inspection, repair and replacement of motorcycle tyres	[R/601/6040]	2	3	24
Skills in inspection, repair and replacement of motorcycle tyres	[T/601/6094]	2	4	36
Option Group G: Light Vehicle Four Wheel Alignment (Both units must be achieved)				
Knowledge of light vehicle four wheel alignment	[F/601/6051]	2	3	24
Skills in light vehicle four wheel alignment	[F/601/6745]	2	4	36
Option Group H: Inspection and Replacement of Light Vehicle Suspension Dampers and Springs (Both units must be achieved)				
Knowledge of inspection and replacement of light vehicle suspension dampers and springs	[J/601/6083]	2	2	14
Skills in inspection and replacement of light vehicle suspension dampers and springs	[F/601/6857]	2	3	24

If learners achieve credits from units of the same title (or linked titles) at more than one level, they cannot count credits achieved from both units towards the credit target of a qualification.

Entry Requirements						
Section 96/97	**Pre 16**		**16 – 18**	✓	**19 +**	✓
LAD Aim Reference	60029572					
Recommended GLH[6]	390					

[6] See Glossary of Terms

Recommended TQT[7]	450
Credit Score	45
Contribution to Threshold	See SEG Qualifications Directory
ASL Option	Yes
Foundation Learning	N/A
Type of Funding Available	See LAD (Learning Aims Database)
Minimum Qualification Fee	See SEG web site for current fees and charges
Unit Fee	Unit fees are based upon a unit's individual credit value. Please see the SEG web site for the current fee charged per credit.
Additional Information	Please see SEG web site for qualifications that are eligible for Credit Transfer/RPL/Exemption This could also include information about Technical Certificates/Apprenticeships

[7] See Glossary of Terms

Unit Details

Health and Safety for Motor Vehicle Studies

Unit Reference:	**H/501/7005**
Level:	**1**
Credit Value:	**4**
Guided Learning Hours:	**40**
Unit Summary	In this unit learners will explore the responsibility of the employer and employee and the requirements of basic Health and Safety legislation. They will identify workshop hazards and basic safety procedures
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.2)** ***The learner can***
1. Know Health and Safety procedures and the responsibilities of employers and employees	1.1 Identify personal responsibilities and the responsibilities of others in the working environment 1.2 Identify and use correctly equipment and procedures provided for Health and Safety in the workplace 1.3 Demonstrate good housekeeping routines in the working environment
2. Know about PPE	2.1 Select and use correct Personal Protective Equipment

3. Know about COSHH	3.1 Identify four substances hazardous to health according to current regulations 3.2 Demonstrate appropriate ways to dispose of waste products in accordance with environmental guidance
4. Know about safe manual handling	4.1 Know the principles of safe manual handling 4.2 Demonstrate safe manual handling using appropriate equipment
5. Know about fire prevention and emergency procedures	5.1 Identify the principles of fire prevention 5.2 Identify the type and location of fire extinguisher(s) in the working area 5.3 State the procedure to follow in the event of an emergency evacuation
Mapping to National Occupational Standards	

Supporting Unit Information

Health and Safety for Motor Vehicle Studies - H/501/7005 – Level 1

Indicative Content

The learner should understand:

Health and Safety procedures

- The basic principles of employer and employee responsibilities
- The basic provision of (Health and Safety) statutory requirements and the penalties that can be enforced by legislation
- The provision of equipment and facilities provided for Health and Safety
- Where and how medical help can be obtained and reporting procedures

PPE

The reasons for and the importance of Personal Protective Equipment

COSHH

The safe use and Control of Substances Hazardous to Health used in vehicle workshops

Manual Handling

Manual Handling Techniques used in a vehicle workshop
Safe use of Lifting Equipment

Fire prevention and emergency procedures

Types of fire extinguishers and their application
The procedures to be followed in the event of an emergency evacuation

Teaching Strategies And Learning Activities

The practical aspects of the unit are usually delivered as an integral part of other units within the qualification.
The learning activities could include assignments, projects, workshop investigations, or a combination of these.

Methods Of Assessment

This unit is internally assessed and externally moderated.

Providers are encouraged to use innovative and stimulating assessment methods and to ensure there is an appropriate and manageable range, balance and volume of assessment across units. A number of units can be assessed via integrative assessment methods but it is essential that the evidence of achievement is clearly signposted and referenced.

Sample assessment tasks are provided that may be used or adapted as appropriate. These are available on the SEG website https://skillsandeducationgroupawards.co.uk/. Centres may wish to develop their own assessments for individual units or a number of units.

Evidence Of Achievement

All evidence must be clearly signposted to individual unit learning outcomes.

Learners must provide evidence of achievement of **all learning outcomes** within the unit to the standard specified within the criteria for assessment in order to be awarded credit. Sample evidence checklists are available on the SEG website.

Additional Information

This unit is an integral part of all the units in the qualification. Evidence for the learning outcomes will come from a variety of sources depending on the other units selected.

Knowledge of Health, Safety and Good Housekeeping in the Automotive Environment

Unit Reference	**D/601/6171**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**30**
Unit Summary	This unit enables the learner to develop an understanding of: • Routine maintenance and cleaning of the automotive environment and using resources economically • Health and safety legislation and duties of everyone in the motor vehicle environment. It will provide an appreciation of significant risks in the automotive environment and how to identify and deal with them. Once completed the learner will be able to identify hazards and evaluate and reduce risk
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.2)** ***The learner can***
1. Know the correct personal and vehicle protective equipment to be used within the automotive environment	1.1 Explain the importance of wearing the types of PPE required for a range automotive repair activities 1.2 Identify vehicle protective equipment for a range of repair activities 1.3 Describe vehicle and personal safety

	considerations when working at the roadside
2. Know effective housekeeping practices in the automotive environment	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
3. Know key health and safety requirements relevant to the automotive environment	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
4. Know about hazards and potential risks relevant to the automotive environment	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
5. Recognise personal responsibilities	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
Mapping to National Occupational Standards Directly mapped to IMI SSC Generic NOS 2010, Units G1 & G2	

Supporting Unit Information

Knowledge of Health, Safety and Good Housekeeping in the Automotive Environment - D/601/6171 – Level 2

Indicative Content

Economic use of resources

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

Requirement to maintain work area effectively

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

Spillages, leaks and waste materials

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

Basic legislative requirements

- Provision and Use of Work Equipment Regulations 1992
- Power Presses Regulations 1992
- Pressure Systems and Transportable Gas Containers Regulations 1989
- Electricity at Work Regulations 1989
- Noise at Work Regulations 1989
- Manual Handling Operations Regulations 1992
- Health and Safety (Display Screen Equipment) Regulations 1992
- Abrasive Wheel Regulations
- Safe Working Loads
- Working at Height Regulations (date)

Routine maintenance of the workplace

- Trainees personal responsibilities and limits of their authority with regard to work equipment
- Risk assessment of the workplace activities and work equipment
- Workplace person responsible for training and maintenance of workplace equipment
- When and why safety equipment must be used
- Location of safety equipment
- Particular hazards associated with their work area and equipment
- Prohibited areas
- Plant and machinery that trainees must **not** use or operate
- Why and how faults on unsafe equipment should be reported
- Storing tools, equipment and products safely and appropriately
- Using the correct PPE
- Following manufacturers recommendations
- Location of routine maintenance information e.g. electrical safety check log

Legislation relevant to Health and Safety

- HASAWA
- COSHH
- EPA
- Manual Handling Operations Regulations 1992
- PPE Regulations 1992

General regulations to include an awareness of

- Health and Safety (Display Screen Equipment) Regulations 1992
- Health and Safety (First Aid) Regulations 1981
- Health and Safety (Safety Signs and Signals) Regulations 1996
- Health and Safety (Consultation with Employees) Regulations 1996
- Employers Liability (Compulsory Insurance) Act 1969 and Regulations 1998
- Confined Spaces Regulations 1997
- Noise at Work Regulations 1989
- Electricity at Work Regulations 1989
- Electricity (Safety) Regulations 1994
- Fire Precautions Act 1971
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1985
- Pressure Systems Safety Regulations 2000
- Waste Management 1991

- Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) 2002
- Control of Asbestos at Work Regulations 2002

Legislative duties

- The purpose of a Health and Safety Policy
- The relevance of the Health and Safety Executive
- The relevance of an initial induction to Health and Safety requirements at your workplace
- General employee responsibilities under the HASAWA and the consequences of non-compliance
- General employer responsibilities under the HASAWA and the consequences of non-compliance
- The limits of authority with regard to Heath and Safety within a personal job role
- 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 and hydraulics

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

PPE to include

- Typical maintenance procedures for PPE equipment to include:
  - typical maintenance log
  - cleaning procedures
  - filter maintenance
  - variation in glove types
  - air quality checks
- Choice and fitting procedures for masks and air breathing equipment
- Typical workplace processes which would require the use of PPE to include:

- welding
- sanding and grinding
- filling
- panel removal and replacement
- drilling
- cutting
- chiselling
- removal of broken glass
- removal of rubber seals from fire damaged vehicles
- removal of hypodermic needles
- servicing activities
- roadside recovery

- Unserviceable PPE
- PPE required for a range of automotive repair activities. To include appropriate protection of:
  - eyes
  - ears
  - head
  - skin
  - feet
  - hands
  - lungs

Fire and extinguishers

- Classification of fire types
- Using a fire extinguisher effectively
  Types of extinguishers
  - foam
  - dry powder
  - CO2
  - water
  - fire blanket

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

- The procedure as:
  - raise the alarm
  - fight fire only if appropriate
  - evacuate building
  - call for assistance

Product warning labels to include

- Reasons for placing warning labels on containers
- Warning labels in common use, to include:

- toxic
- corrosive
- poisonous
- harmful
- irritant
- flammable
- explosive

Warning signs and notices

- Colours used for warning signs
  - red
  - blue
  - green
- Shapes and meaning of warning signs
  - round
  - triangular
  - square
- The meaning of prohibitive warning signs in common use
- The meaning of mandatory warning signs in common use
- The meaning of warning notices in common use
- General design of safe place warning signs

Hazards and risks to include

- The difference between a risk and a hazard
- Potential risks resulting from:
  - the use and maintenance of machinery or equipment
  - the use of materials or substances
  - accidental breakages and spillages
  - unsafe behaviour
  - working practices that do not conform to laid down policies
  - environmental factors
  - personal presentation
  - unauthorised personal, customers, contractors etc entering your work premises
  - working by the roadside
  - vehicle recovery
- The employee's responsibilities in identifying and reporting risks within their working environment
- The method of reporting risks that are outside your limits of authority
- Potential causes of:
  - fire

- explosion
- noise
- harmful fumes
- slips
- trips
- falling objects
- accidents whilst dealing with broken down vehicles

Personal responsibilities

- The purpose of workplace polices and procedures on:
  - the use of safe working methods and equipment
  - the safe use of hazardous substances
  - smoking, eating , drinking and drugs
  - emergency procedures
  - personal appearance
- The importance of personal appearance in the control of health and safety

Action to be taken in the event of colleagues suffering accidents

- The typical sequence of events following the discovery of an accident such as:
  - make the area safe
  - remove hazards if appropriate i.e. switch off power
  - administer minor first aid
  - take appropriate action to re-assure the injured party
  - raise the alarm
  - get help
  - report on the accident

- Typical examples of first aid which can be administered by persons at the scene of an accident:
  - check for consciousness
  - stem bleeding
  - keep the injured person's airways free
  - place in the recovery position if injured person is unconscious
  - issue plasters for minor cuts
  - action to prevent shock i.e. keep the injured party warm
  - administer water for minor burns or chemical injuries
  - wash eyes with water to remove dust or ingress of chemicals (battery acid)
  - need to seek professional help for serious injuries

- Examples of bad practice which may result in further injury such as:
  - moving the injured party
  - removing foreign objects from wounds or eyes
  - inducing vomiting
  - straightening deformed limbs

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place

Methods Of Assessment

This unit is internally assessed and internally and externally moderated.

Providers are encouraged to use innovative and stimulating assessment methods and to ensure there is an appropriate and manageable range, balance and volume of assessment across units. A number of units can be assessed via integrative assessment methods but it is essential that the evidence of achievement is clearly signposted and referenced. **Methods of assessment must include practical tasks.**

Sample assessment tasks are provided that may be used or adapted as appropriate. These are available on the SEG website https://skillsandeducationgroupawards.co.uk/. Centres may wish to develop their own assessments for individual units or a number of units.

Minimum requirements when assessing this unit
SEG expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching

Evidence Of Achievement

All evidence must be clearly signposted and made available for the external moderator upon request

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the SEG web site)

Sample evidence checklists are available on the SEG website

Skills in Health, Safety and Good Housekeeping in the Automotive Environment

Unit Reference	**Y/601/7254**
Level	**2**
Credit Value	**7**
Guided Learning Hours	**60**
Unit Summary	This unit will enable the learner to develop the skills required to: • 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 Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.2)** ***The learner can***
1. Be able to use correct personal and vehicle protection within the automotive environment	1.1 Select and use personal protective equipment throughout activities. To include appropriate protection of: • Eyes • Ears • Head • Skin • Feet

	• Hands • Lungs 1.2 Select and use vehicle protective equipment throughout all activities
2. Be able to carry out effective housekeeping practices in the automotive environment	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 minimizes 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
3. Be able to recognise and deal with dangers in order	3.1 Name and locate the responsible persons for health and safety in their relevant workplace

to work safely within the automotive 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
4. Be able to conduct themselves responsibly	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
Mapping to National Occupational Standards Directly mapped to IMI SSC Generic NOS 2010, Units G1 & G2	

Supporting Unit Information

Skills in Health, Safety and Good Housekeeping in the Automotive Environment - Y/601/7254 - Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre.
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Produce evidence of use of personal and vehicle protection, cleaning the work environment and disposal of waste on two separate occasions
- Produce evidence of identifying risks which may result from at least 2 of the items listed below:
  - the use and maintenance of machinery or equipment
  - the use of materials or substances
  - working practices which do not conform to laid down policies
  - unsafe behaviour
  - accidental breakages and spillages
  - environmental factors
- Produce evidence of identifying risks
- Produce evidence of following at least two of the workplace policies listed below:
  - the use of safe working methods and equipment
  - the safe use of hazardous substances
  - smoking, eating, drinking and drugs
  - what to do in the event of an emergency
  - personal presentation
- Produce evidence of following workplace policies

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners,

including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place

Methods Of Assessment

This unit is internally assessed and internally and externally moderated.

Providers are encouraged to use innovative and stimulating assessment methods and to ensure there is an appropriate and manageable range, balance and volume of assessment across units. A number of units can be assessed via integrative assessment methods but it is essential that the evidence of achievement is clearly signposted and referenced. **Methods of assessment must include practical tasks.**

Sample assessment tasks are provided that may be used or adapted as appropriate. These are available on the SEG website https://skillsandeducationgroupawards.co.uk/. Centres may wish to develop their own assessments for individual units or a number of units.

Minimum requirements when assessing this unit
SEG expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching

Evidence Of Achievement

All evidence must be clearly signposted and made available for the external moderator upon request

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the SEG web site)

Sample evidence checklists are available on the SEG website

Knowledge of Locating and Correcting Simple Electrical Faults in the Automotive Workplace

Unit Reference	**K/601/6013**
Level	**2**
Credit Value	**6**
Guided Learning Hours	**45**
Unit Summary	This unit enables the learner to develop an understanding in conducting a range of routine electrical tests, identifying simple faults on a variety of basic electrical components and undertaking suitable correction activities
Learning Outcomes (1 to 2) ***The learner will***	**Assessment Criteria (1.1 to 2.8)** ***The learner can***
1. Understand the use of electrical testing equipment and measurements taken	1.1 Identify commonly used electrical test equipment 1.2 Describe how to use and operate electrical test equipment 1.3 Describe the safety and operational checks that should be carried out on tools and equipment required to remove and replace electrical components 1.4 Describe how to measure voltage, resistance, current, and specific gravity in determining simple circuit faults

	1.5 Describe when and where to use voltage, ohm, amp and specific gravity measurements in determining simple circuit faults 1.6 Describe the fundamental operation of motors, capacitors, resistors, semi-conductors, transistors, actuators and sensors (including active or self-generating and passive or modulating)
2. Understand how to carry out electrical testing techniques	2.1 Describe common types of testing methods used to check the operation of vehicle electrical/electronic circuits and components 2.2 Describe how to determine component condition and suitability based upon calculations using ohms law 2.3 Describe how to conduct tests following electrical safety and workplace procedures 2.4 Explain how to evaluate and interpret test results found in diagnosing simple electrical circuit faults against vehicle manufacturer specifications and settings 2.5 Describe how and the importance of making recommendations for rectification based upon the analysis of the test information gained 2.6 Explain how to identify common faults and their causes found in fundamental electrical systems and components 2.7 Explain how to evaluate the performance of any replaced electrical components against vehicle specification and the importance of doing so 2.8 Describe the procedures for disposing of any

	removed electrical components

Mapping to National Occupational Standards
Directly mapped to IMI SSC Auto Electrical & Mobile Electrical Installation NOS 2010, unit AE01

Supporting Unit Information

Knowledge of Locating and Correcting Simple Electrical Faults in the Automotive Workplace - K/601/6013 - Level 2

Indicative Content

Basic electrical principles

- Explain the direction of current flow and electron flow
- These principles must include:
  - volts
  - amps
  - ohms
  - power
  - AC/DC
  - magnetism
  - electromagnetism
  - electromotive force
  - electromagnetic induction
  - electrical heating effect

  The terms used within these principles:
  - volt (electrical pressure)
  - ampere (electrical current)
  - ohm (electrical resistance)
  - watt (power)

  Calculations for the basic principles:
  - amps
  - Ohms
  - volts
  - watts

  Circuit principles to include:
  - series circuits
  - parallel circuits
  - current flow
  - voltage of components
  - volt drop
  - resistance
  - the effect on circuit operation of open circuit component(s)
  - Earth and insulated return systems
  - Cable sizes and colour codes

- Different types of connectors, terminals and circuit protection devices

Meaning of and checks for:

- short circuit
- open circuit
- bad earth
- high resistance
- security
- functionality
- performance to specific Vehicle and electrical unit wiring diagrams

- Describe and identify vehicle and unit electrical symbols
- Interpret information from vehicle wiring diagrams
  - vehicle systems
  - electrical units
  - wire colour and size
  - earth locations
  - wiring junction locations
  - fuse size and location
  - connection pin numbers

Safety procedures and precautions when working on electrical and electronic systems

- Safety precautions when working on electrical and electronic systems to include:
  - avoidance of short circuits
  - power surges
  - prevention of electric shock
  - protection of electrical and electronic components
  - protection of circuits from overload or damage

Electrical test equipment, it's function and correct use

- Equipment to include:
  - voltmeters
  - ammeters
  - ohmmeters
  - lock torque testers
  - regulator testers
  - insulation testers
  - oscilloscopes
  - specialist test equipment

Different types of batteries

- Identify various types
  - lead acid – conventional
  - maintenance free
  - gel
  - alkaline
  - sodium

Battery structure and chemical composition

- Lead-acid and alkaline batteries:
  - construction
  - capacity
  - rating
  - reserve capacity
  - cranking rating
  - polarity
  - electrochemical action
  - electrolyte type

Battery maintenance and charging

- Maintenance including:
  - cleaning terminals and battery tops
  - protecting terminals
  - cell top-up for non-sealed units
  - securing to the vehicle
  - removal and refitting procedures

- Charging to include:
  - trickle charging
  - boost charging
  - charging rates
  - safe charging techniques
  - charging equipment

Lead-acid battery testing techniques and identify basic battery faults

- Testing techniques for:
  - testing of electrolyte
  - high rate discharge testing
  - testing equipment
- Faults including:

- low charge
- battery not holding charge
- sulphating
- battery voltage drop during different component operation
- damaged plates and insulators

Different types of generators

- Dynamos and regulators
- Alternators with internal and external regulators

Charging principles and function of generators

- Charging principles:
  - supply current demands
  - battery charging
  - constant voltage at different engine speeds

Components of generators

- Dynamo and alternator components:
  - field coils
  - armature
  - brush assemblies
  - alternator stator
  - rotor
  - slip rings
  - rectifier
  - end frame packs
  - bearings
  - regulator
  - drive system

Basic testing procedures and identify charging system faults

- Basic test procedures:
  - testing of generator outputs (under and off load)
  - testing for rectification and regulation
  - removal and fitting procedure
  - bench testing
  - vehicle testing
- Faults to include:
  - slipping drive belt
  - corroded or loose connections
  - secure mounting

- not charging
- noisy operation

Types, structure and operating principles of starter motors

- Starter motor types:
  - pre-engaged
  - permanent magnet for heavy and diesel vehicles
  - add gear reduction to starter motor types
- Components to include:
  - solenoid
  - armature
  - commutator
  - brush assemblies
  - drive systems
  - ignition switches

Basic common faults and testing procedures for starter motors

- Basic test to include:
  - pre-engaged
  - permanent magnet for heavy and diesel vehicles and light vehicle
  - gear reduction starters
  - wiring related to the circuits
  - ignition switches
  - removal and refitting procedures
- Faults to include:
  - starter not engaging
  - slow engine cranking speed
  - insecure mounting

Types of ignition systems and ignition fundamentals

- Ignition system types:
  - conventional
  - electronic
  - programmed
  - distributorless
- Ignition system functional requirements

The function of ignition components

- Components to include:
  - ignition switch
  - coil

- distributor
- spark plugs
- leads
- ballast resistor
- contact breakers
- condenser
- electronic systems

Testing procedures and basic common faults relating to the ignition system

- Testing procedures relating to the ignition system and components including:
  - wiring
  - connections
  - switching of the primary circuit
  - removal and refitting procedures
- Failing to start and running erratic

The operating principles of the fuel system

Different fuel types and the relevant combustion process.

- Fuel and air mix
- Compression ratios
- Exhaust emissions

The different types of fuel system and components

- Petrol fuel systems and components:
  - carburettor
  - choke
  - fuel cut off
  - stepper motors
  - sensors
  - injectors
  - fuel pumps
  - relays
  - cold start
  - anti run on solenoid
  - lambda sensors
  - idle control actuators
  - single and multipoint injection systems
- Compression ignition systems:
  - engine stop solenoid

- injectors
- fuel pumps
- relays
- heater plugs
- injection pumps
- filters

Test procedures and basic common faults associated electronic elements of fuel systems and components

- Basic testing procedures:
  - diesel engine failing to start
  - failing to stop when switched off
  - petrol engine not starting
  - difficult to start when cold

The function of the engine management system and its components

- Describe the engine management working processes
- System component including:
  - pulse, hall, optimum inductive generators
  - ECU
  - control modules
- Sensors including:
  - crankshaft
  - manifold
  - temperature
  - knock

Different types of components

- Components to include:
  - constant energy systems
  - pulse generators
  - hall effect generators
  - optimum inductive pulse generators
  - modules
  - ECU
  - sensors

Basic common faults and testing methods associated with engine management systems

- Basic faults and tests to include:

- engine fails to start
- erratic running
- poor fuel consumption
- poor connections

- Removal and replacement procedures

The different lighting system components

- Components to include:
  - side and tail lights
  - brake lights
  - reverse lights
  - rear and front fog lights
  - headlights
  - driving lights
  - spot lights
  - indicators
  - headlamp trim motors
  - index lights

The function of component parts

- Components to include:
  - lamp holders
  - bulbs
  - relays
  - switches
  - warning systems
  - trim motors

Basic common faults and testing methods associated with external lighting system

- Faults relating to:
  - switches
  - relays
  - lamp holders
  - wiring
  - connections
  - fuses and fuse ratings
  - headlamp alignment

The operating principles of external lighting systems

- Principles including:

- side and tail lights
- brake lights
- reverse lights
- rear and front fog lights
- headlights
- spot lights
- indicators

Teaching Strategies And Learning Activities

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Methods Of Assessment

This unit is internally assessed and internally and externally moderated.

Providers are encouraged to use innovative and stimulating assessment methods and to ensure there is an appropriate and manageable range, balance and volume of assessment across units. A number of units can be assessed via integrative assessment methods but it is essential that the evidence of achievement is clearly signposted and referenced. **Methods of assessment must include practical tasks.**

Sample assessment tasks are provided that may be used or adapted as appropriate. These are available on the SEG website https://skillsandeducationgroupawards.co.uk/. Centres may wish to develop their own assessments for individual units or a number of units.

Minimum requirements when assessing this unit
SEG expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching

Evidence Of Achievement

All evidence must be clearly signposted and made available for the external moderator upon request

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the SEG web site)

Sample evidence checklists are available on the SEG website

Skills in Locating and Correcting Simple Electrical Faults in the Automotive Workplace

Unit Reference	**F/601/6034**
Level	**2**
Credit Value	**5**
Guided Learning Hours	**45**
Unit Summary	This unit will help the learner to demonstrate and conduct a range of routine electrical tests and identifying simple faults on a variety of basic electrical components and undertaking suitable correction activities
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to work safely when carrying out electrical testing techniques and rectification activities	1.1 Use suitable personal protective equipment and vehicle coverings throughout when carrying out vehicle electrical testing and rectification activities 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support the identification of electrical faults, by reviewing • technical data • diagnostic test procedures

	2.2 Use technical information to support the identification of electrical faults
3. Be able to use appropriate tools and equipment	3.1 Select the appropriate tools and equipment necessary for carrying out electrical testing techniques and rectification activities 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 electrical testing techniques and rectification activities
4. Be able to carry out electrical testing techniques and rectification activities	4.1 Carry out a functionality test of the electrical system and or component 4.2 Use electrical testing methods that are suitable for assessing the performance of the electrical system and or components concerned 4.3 Carry out all diagnostic and rectification activities following • manufacturers' instructions • recognised researched repair methods • workplace procedures • health and safety requirements 4.4 Ensure all electrical testing techniques clearly identifies the cause of the identified faults 4.5 Seek assistance of the relevant person promptly where the results of the testing are unclear 4.6 Ensure all repaired and replaced electrical components are secure and function as specified by the manufacturer or any legal

	requirements 4.7 Dispose of any removed electrical components safely to comply with legal requirements and workplace procedures
5. Be able to record information and make suitable recommendations	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 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Auto Electrical and Mobile Electrical Installation NOS 2010, unit AE01	

Supporting Unit Information

Skills in Locating and Correcting Simple Electrical Faults in the Automotive Workplace - F/601/6034 - Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Be observed by an assessor locating and correcting simple faults occurring in 5 out of the 11 engine systems listed, which covers the learning outcomes
  - power storage devices
  - power generating devices
  - vehicle starting devices
  - vehicle lighting devices
  - wiring harness and connection devices
  - vehicle sensors and actuators
  - circuit protection devices
  - information and entertainment systems
  - telematic and tracking systems
  - security systems
  - communication systems

Teaching Strategies And Learning Activities

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difficulties/disabilities, should be considered and appropriate support mechanisms put in place

Methods Of Assessment

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Minimum requirements when assessing this unit
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Evidence Of Achievement

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Sample evidence checklists are available on the SEG website

Knowledge in Enhancing Vehicle Electrical Systems

Unit Reference	**F/601/6017**
Level	**2**
Credit Value	**6**
Guided Learning Hours	**45**
Unit Summary	This unit enables the learner to develop an understanding of the operation and fitting of electrical enhancement components and systems to improve the original vehicle features and specification to meet customer requirements
Learning Outcomes (1 to 3) ***The learner will***	**Assessment Criteria (1.1 to 3.3)** ***The learner can***
1. Understand how electrical enhancement systems and components operate	1.1 Identify commonly fitted electrical enhancement systems and components 1.2 Describe the function and operation of the electrical enhancement systems and components 1.3 Describe how the enhancement may be limited by the existing vehicle systems and fitments 1.4 Compare the advantages and disadvantages of carrying out the vehicle electrical customisation
2. Understand how to	2.1 Describe the procedures involved in fitting

fit electrical enhancement systems and components	vehicle enhancement systems and components 2.2 Describe how to follow manufacturers requirements relating to the components that are fitted 2.3 Compare the differences in fitting a tow bar between a light vehicle and a draw bar on a heavy vehicle
3. Understand how to carry out checks to any electrical enhancement systems and components fitted	3.1 Describe the checks that are made to make sure the components are compatible with the vehicle specification and the customer requirements 3.2 Explain how to test and evaluate the performance of any electrical enhancements fitted against vehicle specification and the importance of doing so 3.3 Explain how to make adjustments to components and to any surrounding systems to ensure effective operation
Mapping to National Occupational Standards Directly mapped to IMI SSC Auto Electrical & Mobile Electrical Installation NOS 2010, unit AE02	

Supporting Unit Information

Knowledge in Enhancing Vehicle Electrical Systems - F/601/6017 - Level 2

Indicative Content

The different types of I.C.E. systems and components

- Systems and components to include:
  - radio/CD players
  - multi-play CD players
  - DVD
  - MP3 players
  - speakers
  - aerial systems
  - amplifiers
  - visual display screens
  - satellite navigation
  - mobile communication units

The function of component parts in the I.C.E. systems

- Components include:
  - radio
  - CD
  - video
  - DVD players
  - aerial systems
  - speakers
  - amplifiers
  - visual display screens
  - mobile communication systems

The operating principles of I.C.E systems

- Operation of entertainment systems speaker systems and aerial systems

The relevant legislation relevant to I.C.E systems

- Find and apply all relevant legislation for the fitment and use of I.C.E systems

Basic common faults and testing methods associated I.C.E. systems

- Test and procedures for the following:
  - radio/CD players
  - speakers
  - aerial systems
  - amplifiers
  - wiring
  - connections
  - relays
  - fuses
  - removal and refitting procedures

Types of security/warning systems and components

- Components to include:
  - control units
  - alarm modules
  - audible warning units
  - immobiliser units
  - sensing units
  - horn
  - audible warning speakers

The function of component parts in security and warning systems

- Components to include:
  - control units
  - alarm modules
  - audible warning units
  - interior sensing systems
  - immobiliser units
  - relays
  - diodes
  - horns

The operating principles of security and warning systems

- Operation of alarm systems and audible warning units

The relevant legislation relevant to security and warning systems

- Find and apply all relevant legislation for the fitment and use of security and warning systems

Basic common faults and testing methods associated security and

warning systems

- Components to include:
  - control units
  - audible warning units
  - immobiliser units
  - horns
  - relays
  - diodes
  - wiring
  - connections and protection devices
  - removal and refitting procedures

The different types of safety fitment systems and components

- Components to include:
  - reversing aids and systems
  - working lamps
  - driving lamps
  - additional fog lights
  - fuel cut off switches
  - engine cut off switches

The function of component parts in safety fitment systems

- Components to include:
  - reversing aids and systems
  - working lamps
  - driving lamps
  - additional fog lights
  - fuel cut off switches
  - engine cut off switches

The operating principles of safety fitment systems

- The following safety fitments:
  - reversing aids and systems
  - working lamps
  - driving lamps
  - additional fog lights
  - fuel cut off switches
  - engine cut off switches

The relevant legislation relevant to safety fitment systems

- Find and apply all relevant legislation for the fitment and use of safety

fitment systems

Basic common faults and testing methods associated with safety fitment systems

- To include the following systems and components:
  - control units
  - components
  - horns
  - relays
  - diodes
  - wiring
  - connections
  - protection devices
  - removal and refitting procedures

The different types of towing systems and components

- Components to include:
  - reversing aids and systems
  - towbar mounting systems
  - single and double plug wiring systems
  - audible warning systems
  - split charging systems
  - trailer lighting board

The function of component parts in towing systems

- Components must include:
  - reversing aids
  - towbar
  - wiring connectors
  - audible warning systems
  - visible warning systems
  - split charge control units
  - relays
  - lighting boards

The operating principles of towing systems

- Principles to include:
  - reversing aids
  - 7 pin plug systems
  - vehicle lighting systems
  - audible warning systems

- visible warning systems
- split charge systems

The relevant legislation relevant to towbar systems

- Find and apply all relevant legislation for the fitment and use of towbar systems

Basic common faults and testing methods associated with towing systems

- Basic faults and tests to include:
  - lighting systems
  - split charge systems
  - warning systems
  - reversing aid systems
  - earth faults
  - voltage test methods
  - resistance testing
  - functional tests

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Sample assessment tasks are provided that may be used or adapted as

appropriate. These https://awards.co.uk/. are available on the SEG website Centres may wish to develop their own assessments for individual units or a number of units.

Minimum requirements when assessing this unit

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Evidence Of Achievement

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Sample evidence checklists are available on the SEG website

Skills in Enhancing Vehicle Electrical Systems

Unit Reference	**J/601/6035**
Level	**2**
Credit Value	**5**
Guided Learning Hours	**45**
Unit Summary	This unit will help the learner to develop the skills required to demonstrate they can carry out a range of vehicle enhancement activities to improve the original vehicle features and specification and to meet customer requirements
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to work safely when carrying out vehicle electrical enhancement activities	1.1 Use suitable personal protective equipment and vehicle coverings throughout when carrying out vehicle electrical enhancement activities 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support the vehicle enhancement activities, by reviewing manufacturer • technical data • fitting procedures • legal requirements

	2.2 Use technical information to support the vehicle enhancement activities
3. Be able to use appropriate tools and equipment	3.1 Select the appropriate tools and equipment necessary for carrying out vehicle enhancement activities: 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 vehicle enhancement activities
4. Be able to carry out vehicle electrical enhancement activities	4.1 Ensure prior to fitment that components are compatible with the vehicle specification and the customers' requirements 4.2 Carry out all vehicle enhancement activities following • manufacturers' instructions • legal requirements • workplace procedures • health and safety requirements 4.3 Ensure when necessary that adjustments to components and systems are carried out to ensure correct and effective operation 4.4 Ensure all enhanced vehicle electrical components are secure and function as specified by the manufacturer or any legal requirements
5. Be able to record information and make suitable recommendations	5.1 Produce work records that are accurate, complete and passed to the relevant persons promptly in the format required

	5.2 Make suitable and justifiable recommendations for cost effective repairs 5.3 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Auto Electrical and Mobile Electrical Installation NOS 2010, unit AE02	

Supporting Unit Information

Skills in Enhancing Vehicle Electrical Systems - J/601/6035 - Level 2

Indicative Content

General Requirements
You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Be observed by an assessor carrying out electrical enhancement from 3 different systems out of the 10 listed below, which covers the learning outcomes
  - audio systems
  - visual systems
  - communication equipment
  - safety fitments
  - lamps
  - tow bars
  - reversing aids
  - navigation systems
  - alarm systems
  - immobilisation system

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Minimum requirements when assessing this unit

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Evidence Of Achievement

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Knowledge of Fitting Auxiliary Locks and Security Devices (Electrical and Mechanical)

Unit Reference	**K/601/6027**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**25**
Unit Summary	This unit enables the learner to develop an understanding of the operation and fitting of auxiliary locks and security devices to improve the original features and specification of the vehicle and to meet customer requirements
Learning Outcomes (1 to 1) ***The learner will***	**Assessment Criteria (1.1 to 3.4)** ***The learner can***
1. Understand how auxiliary locks and security devices operate	1.1 Identify auxiliary locks and security devices including • Electronic and electro mechanical lock mechanisms • Additional auxiliary mechanical door locks using cylinder type locks • Additional auxiliary mechanical door and aperture locks using external locking systems • Mechanical window protection devices (internal and external) • Replacement security windows and window security films • Pneumatic locking systems

	1.2 Describe the function and operation of the auxiliary locks and security devices 1.3 Describe how the fitment may be limited by the existing vehicle systems and fitments 1.4 Compare the advantages and disadvantages of carrying out the fitting of auxiliary locks and security devices 1.5 Describe the interaction between electrical and electronic and mechanical components within auxiliary locks and security devices
2. Understand how to fit auxiliary locks and security devices	2.1 Describe the procedures involved in fitting auxiliary locks and security devices 2.2 Describe how to integrate vehicle electrical systems with auxiliary locks and security devices 2.3 Describe how to apply vehicle body anticorrosion to meet vehicle requirements
3. Understand how to carry out checks to auxiliary locks and security devices fitted	3.1 Describe the checks that are made to make sure the components are compatible with the vehicle specification and the customer requirements 3.2 Explain how to test and evaluate the performance of any auxiliary locks and security devices fitted against vehicle specification and the importance of doing so 3.3 Describe how to prepare, calibrate and use any equipment required to fit auxiliary security devices 3.4 Explain how to make adjustments to

	components and to any surrounding systems to ensure effective operation
Mapping to National Occupational Standards Directly mapped to IMI SSC Auto Electrical and Mobile Electrical Installation NOS 2010, unit AE07	

Supporting Unit Information

Knowledge of Fitting Auxiliary Locks and Security Devices (Electrical and Mechanical) - K/601/6027 - Level 2

Indicative Content

The identification of different types of auxiliary locks and security devices components

- Systems and components to include:
  - electronic/electro mechanical lock mechanisms
  - additional auxiliary mechanical door locks using cylinder type locks
  - additional auxiliary mechanical door/aperture locks using external locking systems
  - mechanical window protection devices (internal and external)
  - replacement security windows/ window security films
  - pneumatic locking systems

The function of components in the auxiliary locks and security devices components

- Components include:
  - electronic/electro mechanical lock mechanisms
  - additional auxiliary mechanical door locks using cylinder type locks
  - additional auxiliary mechanical door/aperture locks using external locking systems
  - mechanical window protection devices (internal and external)
  - replacement security windows/ window security films
  - pneumatic locking systems

The operating principles of auxiliary locks and security systems

- Systems include:
  - electronic/electro mechanical lock mechanisms
  - additional auxiliary mechanical door locks using cylinder type locks
  - additional auxiliary mechanical door/aperture locks using external locking systems
  - mechanical window protection devices (internal and external)
  - replacement security windows/ window security films
  - pneumatic locking systems

The relevant legislation relevant to the auxiliary locks and security systems

- Find and apply all relevant legislation for the fitment and use of auxiliary locks and security systems

Faults and testing methods associated with auxiliary locks and security systems

- Test and procedures for the following:
  - lock mechanisms
  - cylinder locks
  - external locks
  - window protection devices
  - pneumatic locks

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Minimum requirements when assessing this unit

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Evidence Of Achievement

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Skills in Fitting Auxiliary Locks and Security Devices (Electrical and Mechanical)

Unit Reference	**H/601/6043**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**25**
Unit Summary	This unit will help the learner to develop the skills required to demonstrate they can carry out a range of vehicle enhancement activities fitting auxiliary locks and security devices. It also covers the evaluation of performance of the fitted auxiliary locks and security devices
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to work safely when carrying out the fitting of auxiliary locks and security devices	1.1 Use suitable personal protective equipment and vehicle coverings throughout when fitting auxiliary locks and security devices 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support the fitting of auxiliary locks and security devices including • vehicle technical data • manufacturers fitting procedures

	2.2 Use technical information to support the fitting of auxiliary locks and security devices
3. Be able to use appropriate tools and equipment	3.1 Select the appropriate tools and equipment necessary for the fitting of auxiliary locks and security devices 3.2 Check that equipment has been calibrated to meet manufacturers' and legal requirements 3.3 Use the equipment required, correctly and safely throughout all of the fitting activities
4. Be able to carry out the fitting of auxiliary locks and security devices	4.1 Ensure fitment of components are compatible with the vehicle specification and the customers' requirements 4.2 Carry out all vehicle fitting activities following • manufacturers' instructions • legal requirements • workplace procedures • health and safety requirements 4.3 Ensure when necessary that adjustments to components and systems are carried out to ensure correct and effective operation 4.4 Ensure all auxiliary locks and security devices conform to the vehicle operating specification and are secure and function as specified by the manufacturer or any legal requirements
5. Be able to record information and make suitable recommendations	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 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Auto Electrical and Mobile Electrical Installation NOS 2010, unit AE07	

Supporting Unit Information

Skills in Fitting Auxiliary Locks and Security Devices (Electrical and Mechanical) - H/601/6043 - Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Be observed by an assessor fitting auxiliary locks and security devices (electrical and mechanical) from 2 different systems out of the 6 listed below, which covers the learning outcomes
  - Electronic and electro mechanical lock mechanisms
  - Additional auxiliary mechanical door locks using cylinder type locks
  - Additional auxiliary mechanical door and aperture locks using external locking Systems
  - Mechanical window protection devices (internal and external)
  - Replacement security windows and window security films
  - Pneumatic locking systems

Teaching Strategies And Learning Activities

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Methods Of Assessment

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methods and to ensure there is an appropriate and manageable range, balance and volume of assessment across units. A number of units can be assessed via integrative assessment methods but it is essential that the evidence of achievement is clearly signposted and referenced. **Methods of assessment must include practical tasks.**

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Minimum requirements when assessing this unit

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Evidence Of Achievement

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Sample evidence checklists are available on the SEG website

Knowledge of Inspecting Vehicles Using Prescribed Methods

Unit Reference	**M/601/6028**
Level	**2**
Credit Value	**1**
Guided Learning Hours	**4**
Unit Summary	This unit enables the learner to develop an understanding of carrying out a range of inspections on light vehicles using a variety of prescribed testing and inspection methods
Learning Outcomes (1 to 1) ***The learner will***	**Assessment Criteria (1.1 to 1.10)** ***The learner can***
1. Understand how to carry out inspections on light vehicle using prescribed methods	1.1 Explain the difference between the various prescribed light vehicle inspection methods to include • pre-work • installed system functional check • post-work • vehicle handover inspection 1.2 Identify the different systems to be inspected when using the prescribed inspection methods 1.3 Identify the procedures involved in carry out the systematic inspection of the prescribed inspection methods on light vehicles 1.4 Identify correct conformity of vehicle systems

	and condition on light vehicles inspections 1.5 Compare test and inspection results against light vehicle specification and legal requirements 1.6 Explain how to record and complete the inspection results in the format required 1.7 Identify the recommendations that can be made based on results of the light vehicle inspections 1.8 Explain the implications of failing to carry out light vehicle inspections activities correctly 1.9 Explain the implications of signing workplace documentation and vehicle records 1.10 Explain the procedure for reporting cosmetic damage to light vehicle components and units outside normal inspection items

Mapping to National Occupational Standards
Directly mapped to IMI SSC Auto Electrical and Mobile Electrical Installation NOS 2010, unit AE08

Supporting Unit Information

Knowledge of Inspecting Vehicles Using Prescribed Methods - M/601/6028 - Level 2

Indicative Content

Pre and post work vehicle inspections and record findings

- PPE and vehicle protection relating to:
  - vehicle body panels
  - paint surfaces
  - seats
  - carpets and floor mats prior to conduction vehicle inspections
- Pre and post work vehicle inspection procedures:
  - aural
  - visual and functional assessments on engine
  - engine systems
  - chassis systems
  - wheels and tyres
  - transmission system
  - electrical and electronic systems
  - exterior vehicle body
  - vehicle interior
- The methods for carrying out inspections for: damage, corrosion, fluid leaks, wear, security, mounting security and condition to include:
  - engines and engine systems
  - chassis systems
  - brakes
  - steering
  - suspension
  - wheels
  - tyres
  - body panels
  - electrical and electronic systems and components
  - vehicle seating and vehicle interior
  - vehicle instrumentation
  - driver controls
- Check conformity to manufacturer’s specifications and legal requirements
- Completion of documentation to include:

- inspection records
- job cards
- vehicle records

- Make recommendations based on results of vehicle inspections
- The checks necessary to ensure customer satisfaction for:
  - vehicle body panels
  - paint surfaces
  - seats
  - carpets and floor mats following pre or post vehicle inspections
- Prepare and use appropriate inspection equipment and tools
- Inspection procedures following inspection checklists

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Sample assessment tasks are provided that may be used or adapted as appropriate. These are available on the SEG website https://skillsandeducationgroupawards.co.uk/. Centres may wish to develop their own assessments for individual units or a number of units.

Minimum requirements when assessing this unit

SEG expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff

should be qualified and/or vocationally experienced to at least a level above that which they are teaching

Evidence Of Achievement

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the SEG web site).

Sample evidence checklists are available on the SEG website.

Skills in Inspecting Vehicles Using Prescribed Methods

Unit Reference	**T/601/6046**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**4**
Unit Summary	This unit allows the learner to demonstrate they can carry out a range of light vehicle inspections on vehicles using a variety of prescribed testing and inspection methods
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to work safely when carrying out light vehicle inspections using prescribed methods	1.1 Use suitable personal protective equipment and vehicle coverings throughout when carrying out vehicle inspection activities 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support light vehicle inspection activities including • vehicle technical data • inspection procedures • legal requirements

	2.2 Use technical information to support light vehicle inspection activities
3. Be able to use appropriate tools and equipment	3.1 Select the appropriate tools and equipment necessary for carrying out a range of inspections on light vehicle systems 3.2 Use tools and equipment in the way specified by manufacturers when carrying out a range of inspections on light vehicle systems
4. Be able to carry out light vehicle inspections using prescribed methods	4.1 Carry out light vehicle inspections using prescribed methods, adhering to the specifications and tolerances for the vehicle and following the manufacturer's approved inspection methods • recognised researched inspection methods • health and safety requirements • prescribed documentation 4.2 Ensure that inspected light vehicle conforms to the vehicle operating specification and any legal requirements 4.3 Ensure any comparison of the vehicle against specification accurately identifies any • differences from the vehicle specification • vehicle appearance and condition faults 4.4 Use suitable testing methods to evaluate the performance of the inspected systems
5. Be able to record information and make suitable recommendations	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 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Auto Electrical and Mobile Electrical Installation NOS 2010, unit AE08	

Supporting Unit Information

Skills in Inspecting Vehicles Using Prescribed Methods - T/601/6046 - Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Be observed by an assessor carrying out 2 different inspections from the 4 listed below, which covers the learning outcomes
  - pre-work
  - installed system functional check
  - post-work
  - vehicle handover inspection

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place

Methods Of Assessment

This unit is internally assessed and internally and externally moderated.

Providers are encouraged to use innovative and stimulating assessment methods and to ensure there is an appropriate and manageable range, balance and volume of assessment across units. A number of units can be assessed via integrative assessment methods but it is essential that the evidence of achievement is clearly signposted and referenced. **Methods of assessment must include practical tasks.**

Sample assessment tasks are provided that may be used or adapted as appropriate. These are available on the SEG website https://skillsandeducationgroupawards.co.uk/. Centres may wish to develop their own assessments for individual units or a number of units.

Minimum requirements when assessing this unit

SEG expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching

Evidence Of Achievement

All evidence must be clearly signposted and made available for the external moderator upon request

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Sample evidence checklists are available on the SEG website

Knowledge of Removing and Fitting Motor Mechanical, Electrical and Trim (MET) Components to Vehicles

Unit Reference	**Y/601/5424**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**20**
Unit Summary	This unit enables the learner to develop an understanding of carrying out a range of removal and fitting of basic mechanical, electrical and trim (MET) components to vehicles. It also covers the evaluation of the operation of the components when fitted
Learning Outcomes (1 to 1) ***The learner will***	**Assessment Criteria (1.1 to 1.10)** ***The learner can***
1. Understand how to carry out removal and fitting of basic motor vehicle mechanical electrical and trim (MET) components	1.1 Identify the procedures involved in carry out the systematic removal and fitting of basic vehicle MET components to the standard required 1.2 Identify the procedures involved in working with supplementary safety systems when fitting basic vehicle MET components 1.3 Identify the procedures involved in working with gas discharge headlamp systems when fitting basic vehicle MET components

	1.4 Explain 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

Mapping to National Occupational Standards
Directly mapped to IMI SSC Accident Repair - Body NOS 2010, unit BP01

Supporting Unit Information

Knowledge Of Removing And Fitting Motor Mechanical, Electrical And Trim (MET) Components To Vehicles - Y/601/5424 - Level 2

Indicative Content

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

- The methods that can be used to protect undamaged items to ensure they are removed and refitted without causing unnecessary damage:
  - bumpers
  - headlamp units
  - road wheels
  - batteries
  - bonnet and boot trim
  - interior trim components
  - exterior trim components
- The procedures for the correct storage of vehicle contents
- The process for the reporting of extra damage and items that may have broken when removed or refitted

The processes involved when handling batteries

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

Types of clips and fixings

- The following types of clips and identify reasons and limitations for

their use:
- speed
- 'c'
- 'd'
- 'j' type captive nut
- 'r'
- 'u' type captive nut
- cable clip
- trim clips

- The following types of fixings and identify reasons and limitations for their use:
  - pop rivet
  - plastic rivet
  - plastic capture nut
  - nut and bolt
  - shoulder bolt
  - 'Nyloc' type nuts
  - washers
  - 'Spring' type washers
  - self tapping screws and bolts
  - quick release plastic trim fastenings
  - trim tapes
  - adhesives and sealers

The processes involved when carrying out quality checks

- Items that may have been 'workshop' soiled and describe processes for rectifying:
  - door cards
  - seats
  - carpets
  - boot and bonnet trims
- Methods for checking gaps
- The process for checking and aligning headlamps:
  - address handling procedures for halogen bulbs
  - address handling and health and safety issues relating to xenon bulbs and systems
- Operational checks and rectification methods to include:
  - lights
  - washers and wipers
  - SRS systems (checking not rectification)
  - charging system (checking not rectification)

- horn
- fluid levels
- interior switches
- operation of door lock mechanisms

Teaching Strategies And Learning Activities

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Methods Of Assessment

This unit is internally assessed and internally and externally moderated.

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Sample assessment tasks are provided that may be used or adapted as appropriate. These are available on the SEG website https://skillsandeducationgroupawards.co.uk/. Centres may wish to develop their own assessments for individual units or a number of units.

Minimum requirements when assessing this unit
SEG expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching

Evidence Of Achievement

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Sample evidence checklists are available on the SEG website

Skills in Removing and Fitting Motor Mechanical, Electrical and Trim (MET) Components to Vehicles

Unit Reference	**F/601/5451**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**20**
Unit Summary	This unit will help the learner to develop the skills required to carry out a range of removal and fitting of basic mechanical, electrical and trim (MET) components to vehicles. It also covers the evaluation of the operation of the components when fitted
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.4)** ***The learner can***
1. Be able to work safely when carrying out removal and fitting of basic MET components to vehicles	1.1 Use suitable personal protective equipment and use suitable vehicle coverings throughout all MET removal activities 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support motor vehicle removal and recognised fitting activities including • vehicle technical data • removal and fitting procedures

	• legal requirements 2.2 Use technical information to support motor vehicle removal and recognised fitting activities
3. Be able to use appropriate tools and equipment	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
4. Be able to carry out removal and fitting of basic MET components	4.1 Carry out removal and fitting of MET components adhering to the correct specifications and tolerances for the vehicle and following: • the manufacturer's approved removal and fitting methods • recognised researched removal and fitting methods • health and safety requirements • 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 removal and fitting of MET components 4.4 Ensure all components and panels are stored safely and in the correct location
5. Be able to record	5.1 Produce work records that are accurate,

information and make suitable recommendations	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 Record and report any additional auto electrical faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Accident Repair - Body NOS 2010, unit BP01	

Supporting Unit Information

Skills in Removing and Fitting Motor Mechanical, Electrical and Trim (MET) Components To Vehicles - F/601/5451 - Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
  Be observed by an assessor as defined in the IMI Assessment Strategy
  Produce evidence of removing and refitting all of the units or components listed below, which covers the learning outcomes
  - bumpers
  - headlamp units
  - road wheels
  - batteries
  - bonnet fittings
  - interior trim components
  - exterior trim components

Teaching Strategies And Learning Activities

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Methods Of Assessment

This unit is internally assessed and internally and externally moderated.

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balance and volume of assessment across units. A number of units can be assessed via integrative assessment methods but it is essential that the evidence of achievement is clearly signposted and referenced. **Methods of assessment must include practical tasks.**

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Evidence Of Achievement

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Knowledge of Removing and Fitting Non Permanently Fixed Motor Vehicle Body Panels

Unit Reference	**D/601/5425**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**20**
Unit Summary	This unit enables the learner to develop an the understanding needed to carry out the removal and fitting non permanently fixed motor vehicle body panels
Learning Outcomes (1 to 1) ***The learner will***	**Assessment Criteria (1.1 to 1.9)** ***The learner can***
1. Understand how to carry out removal and fitting of non-permanently fixed motor vehicle body panels	1.1 Identify the procedures involved in carry out the systematic removal and fitting of non-permanently fixed vehicle body panels • wings • doors • bonnets • boot lids • 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

Mapping to National Occupational Standards
Directly mapped to IMI SSC Accident Repair - Body NOS 2010, unit BP02

Supporting Unit Information

Knowledge of Removing and Fitting Non-permanently Fixed Motor Vehicle Body Panels - D/601/5425 - Level 2

Indicative Content

Removing and fitting non-structural body panels

- Find, interpret and use sources of information applicable to the removal and fitting of basic non-welded non-structural body panels Select check and use all the tools and equipment required to remove and fit basic non welded non-structural body panels including:
  - hinge pin removers
  - spanners
  - screwdrivers
- The different types of mechanical fixings for non welded non-structural body panels and when and why they should be used including:
  - bolts
  - self tapping bolts
  - speed nuts
  - washers
- The correct procedures and processes for removing and fitting of non-welded non-structural body panels
- The need for correct alignment of panels and methods to achieve this
- Aperture gaps
- Alignment of panel features
- Best fit of components to panels
- Vehicle geometry
- Operation of openings such as doors, tailgates, bonnets etc
- 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
- The method of storing removed panels and the importance of storing them correctly

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners,

including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place

Methods Of Assessment

This unit is internally assessed and internally and externally moderated.

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Sample assessment tasks are provided that may be used or adapted as appropriate. These are available on the SEG website https://skillsandeducationgroupawards.co.uk/. Centres may wish to develop their own assessments for individual units or a number of units.

Minimum requirements when assessing this unit
SEG expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching

Evidence Of Achievement

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Skills in Removing and Fitting Non Permanently Fixed Motor Vehicle Body Panels

Unit Reference	**R/601/5454**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**20**
Unit Summary	This unit will help the learner to develop the skills required to carry out a range of 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 Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.4)** ***The learner can***
1. Be able to work safely when carrying out removal and fitting of non-permanently fixed vehicle panels	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, the environment
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support motor vehicle removal and recognised fitting activities including • vehicle technical data • removal and fitting procedures

	• legal requirements 2.2 Use technical information to support motor vehicle removal and recognised fitting activities
3. Be able to use appropriate tools and equipment	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
4. Be able to carry out removal and fitting of non-permanently fixed vehicle panels	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
5. Be able to record information and make suitable recommendations	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 Record and report any additional auto electrical faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Accident Repair - Body NOS 2010, unit BP02	

Supporting Unit Information

Skills in Removing and Fitting Non-Permanently Fixed Motor Vehicle Body Panels - R/601/5454 - Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined in the IMI Assessment Strategy
- Produce evidence of removing and replacing 3 out of the 5 panels listed below, which covers the learning outcomes
  - wings
  - doors
  - bonnets
  - boot lids
  - tailgates

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place

Methods Of Assessment

This unit is internally assessed and internally and externally moderated.

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of assessment must include practical tasks.

Sample assessment tasks are provided that may be used or adapted as appropriate. These are available on the SEG website https://skillsandeducationgroupawards.co.uk/. Centres may wish to develop their own assessments for individual units or a number of units.

Minimum requirements when assessing this unit

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Evidence Of Achievement

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Knowledge of Removing and Replacing Exterior Motor Vehicle Body Panels Including Permanently Fixed Components

Unit Reference	**H/601/5426**
Level	**2**
Credit Value	**6**
Guided Learning Hours	**45**
Unit Summary	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 Outcomes (1 to 2) ***The learner will***	**Assessment Criteria (1.1 to 2.13)** ***The learner can***
1. Understand material types and properties used in removing and replacing exterior vehicle panels	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
2. Understand how to carry out removal and replacing of fixed and non-permanently fixed exterior vehicle body panels including fixed panels	2.1 Identify the procedures involved in carry out the 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 fitting basic vehicle MET components 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

Mapping to National Occupational Standards
Directly mapped to IMI SSC Accident Repair - Body NOS 2010, unit BP05

Supporting Unit Information

Knowledge of Removing and Replacing Exterior Motor Vehicle Body Panels Including Permanently Fixed Components - H/601/5426 - Level 2

Indicative Content

Selection and use of materials

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

Removing and fitting of non-welded non-structural body panels

- How to find, interpret and use sources of information applicable to the removal and fitting of basic non welded non-structural body panels
- How to select, check and use all the tools and equipment required to remove and fit basic non welded non-structural body panels including:
  - hinge pin removers
  - spanners
  - screwdrivers
- The different types of mechanical fixings for non-welded non-structural body panels and when and why they should be used including:
  - bolts
  - self tapping bolts
  - speed nuts
  - washers
- The correct procedures and processes for removing and fitting of non-welded non-structural body panels
- The need for correct alignment of panels and methods to achieve this
- Aperture gaps
- Alignment of panel features
- Best fit of components to panels
- Vehicle geometry
- Operation of openings such as doors, tailgates, bonnets etc.

- 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
- The method of storing removed panels and the importance of storing them correctly

Removal and replacement of welded non-structural body panels

- Basic principles of welding
- How to spot and MIG weld vehicle panels
- How to remove spot and MIG welded vehicle panels
- How to interpret and use sources of information relevant to the removal and refitting of non-structural (i.e. non-stressed) body panels
- The need for correct alignment of panels and the methods used to achieve this
- 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
- How to work safely avoiding damage to the vehicle and its systems
- The methods of storing removed panels and the impotence of storing them correctly
- The removal and replacement procedures for non-structural body panels using mechanical fastening, adhesive bonding and welding techniques
- How panel removal and refitting affects the overall body structure of the vehicle
- The manufacturers approved methods of working for the removal and replacement of non-structural body panels

Teaching Strategies And Learning Activities

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Methods Of Assessment

This unit is internally assessed and internally and externally moderated.

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Minimum requirements when assessing this unit

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Evidence Of Achievement

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Sample evidence checklists are available on the SEG website

Skills in Removing and Replacing Exterior Motor Vehicle Body Panels Including Permanently Fixed Components

Unit Reference	**D/601/5456**
Level	**2**
Credit Value	**5**
Guided Learning Hours	**45**
Unit Summary	This unit will help the learner to develop the skills required to carry out a range of removal 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 Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.4)** ***The learner can***
1. Be able to work safely when carrying out removal and replacement of exterior vehicle panels including permanently fixed panels	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
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support motor vehicle removal and fitting activities including

	• vehicle technical data • removal and fitting procedures • legal requirements 2.2 Use technical information to support motor vehicle removal and fitting activities
3. Be able to use appropriate tools and equipment	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 removal and fitting of exterior body panels including permanently fixed vehicle panels
4. Be able to carry out removal and fitting of exterior vehicle panels including permanently fixed panels	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 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 • recognised researched removal and fitting methods • health and safety requirements • 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
5. Be able to record information and make suitable recommendations	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 Record and report any additional auto electrical faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Accident Repair - Body NOS 2010, unit BP05	

Supporting Unit Information

Skills in Removing and Replacing Exterior Motor Vehicle Body Panels Including Permanently Fixed Components - D/601/5456 - Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined in the IMI Assessment Strategy
- Produce evidence of carrying out the removal and replacement of vehicle body panels in combinations of 3 or more adjacent panels, one of which should be permanently fixed e.g. welded or bonded. All learning outcomes must be covered.
- Exterior body panels:
  - combinations of 3 or more adjacent panels, one of which should be permanently fixed (Examples include: two doors and a wing, two wings and a bonnet; bonnet, wing and door on the same side; bumper, wing, and bonnet
  - Welded panel. (These are front panels; including headlamp panel, bonnet landing panel, lower cross member) and rear panels

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place

Methods Of Assessment

This unit is internally assessed and internally and externally moderated.

Providers are encouraged to use innovative and stimulating assessment

methods and to ensure there is an appropriate and manageable range, balance and volume of assessment across units. A number of units can be assessed via integrative assessment methods but it is essential that the evidence of achievement is clearly signposted and referenced. **Methods of assessment must include practical tasks.**

Sample assessment tasks are provided that may be used or adapted as appropriate. These are available on the SEG website https://skillsandeducationgroupawards.co.uk/. Centres may wish to develop their own assessments for individual units or a number of units.

Minimum requirements when assessing this unit

SEG expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching

Evidence Of Achievement

All evidence must be clearly signposted and made available for the external moderator upon request

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the SEG web site)

Sample evidence checklists are available on the SEG website

Knowledge of Minor Motor Vehicle Exterior Body Panel Repairs

Unit Reference	**K/601/5427**
Level	**2**
Credit Value	**6**
Guided Learning Hours	**45**
Unit Summary	This unit enables the learner to develop an understanding of carrying out repairs to exterior body panels using a variety of techniques
Learning Outcomes (1 to 3) ***The learner will***	**Assessment Criteria (1.1 to 3.11)** ***The learner can***
1. Understand the principles of selection and use of appropriate tools and equipment in minor repairs on motor vehicle exterior body panels	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
2. Understand material types and properties used in minor repairs on motor vehicle exterior body panels	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 manufacturer 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
3. Understand how to carry out minor repairs to motor vehicle exterior body panels	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 to include 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 repairability of vehicles
Mapping to National Occupational Standards Directly mapped to IMI SSC Accident Repair - Body NOS 2010, unit BP06	

Supporting Unit Information

Knowledge of Minor Motor Vehicle Exterior Body Panel Repairs - K/601/5427 - Level 2

Indicative Content

Selection and use of tools

- The principles governing the selection and use of hand tools for metal finishing and plastic filler repairs:
  - panel beating hammers
  - dolly blocks
  - beating files
  - body spoons
  - power sanders
  - dual action sanders
- How to select the correct tools to carry out reshaping work, including specialist dent removal tools including:
  - panel pullers
- 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

- How to mix and apply plastic fillers
- The properties and use of metals used to manufacture body panels
- The properties and safe use of types of filling materials used to repair panels including:
  - plastic fillers
- The different types and grades of abrasive and their use
- The techniques to identify the type of plastics used for manufactured components:
  - identification marks on components
  - solvent tests
  - combustion tests

Repairing non-structural body panels

How to interpret and use sources of information relevant to the removal of body components

- How to prepare damaged areas to facilitate repairs
- How to repair plastic components using thermal and adhesive

techniques

- How to rough out and metal finish body panels
- How to reshape filling materials to match the original panel contour
- How to finish repairs to a suitable condition for handing on to the painting stage
- How to work safely avoiding damage to the vehicle and its systems
- The techniques for reshaping damaged body panels using hand and specialist tools
- The procedures for reinstating anti-corrosion, sealant and sound deadening materials
- The procedures for repairing damage to plastic components
- The techniques and processes for:
  - plastic repairs
  - hot shrinking
  - panel pulling
  - metal finishing
  - plastic filing
  - indirect hammering
  - direct hammering
  - spring hammering
- The techniques used to regain the contours of repaired plastic components
- Methods of checking reshaped panel contours for accuracy
- Standards of finish require to enable the next stage of repairs to proceed
- The manufacturer's approved methods of working for the preparation and repair of non-structural body panels

Teaching Strategies And Learning Activities

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Methods Of Assessment

This unit is internally assessed and internally and externally moderated.

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Sample assessment tasks are provided that may be used or adapted as appropriate. These are available on the SEG website https://skillsandeducationgroupawards.co.uk/. Centres may wish to develop their own assessments for individual units or a number of units.

Minimum requirements when assessing this unit

SEG expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching

Evidence Of Achievement

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Sample evidence checklists are available on the SEG website

Skills in Carrying Out Minor Repairs to Motor Vehicle Exterior Body Panels

Unit Reference	**K/601/5458**
Level	**2**
Credit Value	**5**
Guided Learning Hours	**45**
Unit Summary	This unit will help the learner to develop the skills required to carry 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 Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.4)** ***The learner can***
1. Be able to work safely when carrying out minor repairs to motor vehicle exterior body panels	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
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support motor vehicle removal and fitting activities including • Manufacturers' Instructions • Vehicle Technical Data • Removal And Fitting Procedures

	• Legal Requirements 2.2 Use technical information to support motor vehicle removal and fitting activities
3. Be able to use appropriate tools and equipment	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
4. Be able to carry out minor repairs to motor vehicle exterior body panels	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 • The manufacturer's approved removal and fitting methods • Recognised researched removal and fitting methods • Health and safety requirements • 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
5. Be able to record information and make suitable recommendations	5.1 Produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format require 5.2 Make suitable and justifiable recommendations for cost effective repairs 5.3 Record and report any additional auto electrical faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Accident Repair - Body NOS 2010, unit BP06	

Supporting Unit Information

Skills in Carrying Out Minor Repairs to Motor Vehicle Exterior Body Panels - K/601/5458 - Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined in the IMI Assessment Strategy
- Be observed by an assessor carrying out each of the following repairs listed below, which covers the learning outcomes.
  - body filling and finishing of flat areas of panel
  - repairs to dents that are over 70mm in diameter in exterior body panels, including curvature panels and swage lines
  - repairs to scuffs on plastic components
- Produce evidence of covering all of the techniques and processes listed below in carrying out the repairs listed above
  - hot shrinking (using carbon rod)
  - panel pulling
  - metal finishing
  - indirect hammering
  - direct hammering
  - body filing
  - application of body filler/stopper

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Minimum requirements when assessing this unit

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Evidence Of Achievement

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Sample evidence checklists are available on the SEG website

Knowledge of Removing and Fitting Basic Light Vehicle Mechanical, Electrical and Trim (MET) Components and Non Permanently Fixed Vehicle Body Panels

Unit Reference	**F/601/3747**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**20**
Unit Summary	This unit enables the learner to develop an understanding of removing and fitting basic light vehicle mechanical, electrical and trim (MET) components and non-permanently fixed vehicle body panels
Learning Outcomes (1 to 2) ***The learner will***	**Assessment Criteria (1.1 to 2.9)** ***The learner can***
1. Understand how to carry out removal and fitting of basic light vehicle mechanical electrical and trim (MET) components	1.1 Identify the procedures involved in carry out the systematic removal and fitting of basic light vehicle MET components to the standard required including • Bumpers • Headlamp units • Road wheels • Batteries • Bonnet and boot trim • Interior trim components • Exterior trim components

	1.2 Identify the procedures involved in working with supplementary safety systems when fitting basic light vehicle MET components 1.3 Identify the procedures involved in working with gas discharge headlamp systems when fitting basic light vehicle MET components 1.4 Explain the methods and procedures for storing removed light vehicle MET components 1.5 Identify the different types of fastenings and fixings used when removing and fitting light vehicle MET components 1.6 Explain the reasons for the use of different types of fastenings and fixings used in light vehicle MET components 1.7 Explain the procedures, methods and reasons for ensuring correct alignment of light vehicle MET components 1.8 Identify the quality checks that can be used to ensure correct alignment and operation of light vehicle MET components 1.9 Identify correct conformity of vehicle systems against light vehicle specification and legal requirements on completion 1.10 Explain the procedure for reporting cosmetic damage to light vehicle MET components and units
2. Understand how to carry out removal and fitting of basic light vehicle non permanently fixed	2.1 Identify the procedures involved in carry out the systematic removal and fitting of basic light vehicle non-welded, non-structural body panels to the standard required including • wings

vehicle body panels	• doors • bonnets • boot lids and tailgates • bumper bars, covers and components 2.2 Identify the procedures involved in working with supplementary safety systems when fitting basic light vehicle non-welded, non-structural body panels 2.3 Explain the methods and procedures for storing removed light vehicle non-welded, non-structural body panels 2.4 Identify the different types of fastenings and fixings used when removing and fitting light vehicle non-welded, non-structural body panels 2.5 Explain the reasons for the use of different types of fastenings and fixings used in light vehicle non-welded, non-structural body panels 2.6 Explain the procedures, methods and reasons for ensuring correct alignment of light vehicle non-welded, non-structural body panels 2.7 Identify the quality checks that can be used to ensure correct alignment and operation of light vehicle non-welded, non-structural body panels 2.8 Identify correct conformity of vehicle systems against light vehicle specification and legal requirements on completion 2.9 Explain the procedure for reporting cosmetic damage to light vehicle non-welded, non-structural body panels
Mapping to National Occupational Standards Directly mapped to IMI SSC Accident Repair - Body NOS 2010, unit BP18	

Supporting Unit Information

Knowledge Of Removing And Fitting Basic Light Vehicle Mechanical, Electrical And Trim (MET) Components And Non Permanently Fixed Vehicle Body Panels - F/601/3747 – Level 2

Indicative Content

Describe procedures to prevent damage to the vehicle, components and contents when removing, storing and refitting basic MET components

- The methods that can be used to protect undamaged items to ensure they are removed and refitted without causing unnecessary damage:
  - bumpers
  - headlamp units
  - road wheels
  - batteries
  - bonnet and boot trim
  - interior trim components
  - exterior trim components
- The procedures for the correct storage of vehicle contents
- The process for the reporting of extra damage and items that may have broken when removed or refitted

The processes involved when handling batteries

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

Types of clips and fixings

- The following types of clips and identify reasons and limitations for their use:
  - speed
  - 'c'
  - 'd'
  - 'j' type captive nut
  - 'r'
  - 'u' type captive nut
  - cable clip
  - trim clips
- The following types of fixings and identify reasons and limitations for their use:
  - pop rivet
  - plastic rivet
  - plastic capture nut
  - nut and bolt
  - soulder bolt
  - 'Nyloc' type nuts
  - washers
  - 'Spring' type washers
  - self tapping screws and bolts
  - quick release plastic trim fastenings
  - trim tapes
  - adhesives and sealers

The processes involved when carrying out quality checks

- Items that may have been 'workshop' soiled and describe processes for rectifying:
  - door cards
  - seats
  - carpets
  - boot and bonnet trims
- Methods for checking gaps
- The process for checking and aligning headlamps:
  - address handling procedures for halogen bulbs
  - address handling and health and safety issues relating to xenon bulbs and systems
- Operational checks and rectification methods to include:
  - lights
  - washers and wipers

- SRS systems (checking not rectification)
- charging system (checking not rectification)
- horn
- fluid levels
- interior switches
- operation of door lock mechanisms

Removing and fitting non-structural body panels

- Find, interpret and use sources of information applicable to the removal and fitting of basic non welded non-structural body panels
- Select, check and use all the tools and equipment required to remove and fit basic non welded non-structural body panels including:
  - hinge pin removers
  - spanners
  - screwdrivers
- The different types of mechanical fixings for non-welded non-structural body panels and when and why they should be used including:
  - bolts
  - self tapping bolts
  - speed nuts
  - washers
- The correct procedures and processes for removing and fitting of non-welded non-structural body panels
- The need for correct alignment of panels and methods to achieve this:
- Aperture gaps
- Alignment of panel features
- Best fit of components to panels
- Vehicle geometry
- Operation of openings such as doors, tailgates, bonnets etc
- 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
- The method of storing removed panels and the importance of storing them correctly.

Teaching Strategies And Learning Activities

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including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place

Methods Of Assessment

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Sample assessment tasks are provided that may be used or adapted as appropriate. These are available on the SEG website https://skillsandeducationgroupawards.co.uk/. Centres may wish to develop their own assessments for individual units or a number of units.

Minimum requirements when assessing this unit
SEG expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching

Evidence Of Achievement

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Sample evidence checklists are available on the SEG website

Skills in Removing and Fitting of Basic Light Vehicle Mechanical, Electrical and Trim (MET) Components and Non Permanently Fixed Vehicle Body Panels

Unit Reference	**K/601/3869**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**20**
Unit Summary	This unit will help the learner to develop the skills required to carry out the removal and fitting of basic light vehicle mechanical, electrical and trim (MET) components and non permanently fixed vehicle body panels
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to work safely when carrying out removal and fitting of basic MET components and non-permanently fixed light vehicle body panels	1.1 Use suitable personal protective equipment and vehicle coverings throughout all light vehicle removal and fitting of basic MET components and non-permanently fixed light vehicle body panels 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to use	2.1 Select suitable sources of technical information

relevant information to carry out the task	to support light vehicle removal and fitting activities including • vehicle technical data • removal and fitting procedures • legal requirements 2.2 Use technical information to support light vehicle removal and fitting activities
3. Be able to use appropriate tools and equipment	3.1 Select the appropriate tools and equipment necessary for carrying out removal and fitting of basic MET components and non-permanently fixed light 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 removal and fitting of basic MET components and non-permanently fixed light vehicle body panels
4. Be able to carry out removal and fitting of basic MET components and non-permanently fixed light vehicle body panels	4.1 Remove and fit basic MET components and non-permanently fixed light vehicle body panels 4.2 Ensure that the removal and fitting of basic MET components and non-permanently fixed light vehicle body panels conforms to the vehicle operating specification and any legal requirements 4.3 Ensure no damage occurs to other components when removal and fitting of basic MET components and non-permanently fixed light vehicle body panels 4.4 Ensure all components and panels are stored

	safely and in the correct location
5. Be able to record information and make suitable recommendations	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 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Accident Repair - Body NOS 2010, unit BP18	

Supporting Unit Information

Skills In Removing And Fitting Of Basic Light Vehicle Mechanical, Electrical And Trim (MET) Components And Non Permanently Fixed Vehicle Body Panels - K/601/3869 - Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined in the IMI VCQ Assessment Strategy
- Produce evidence from your normal workplace of removing and replacing 4 of the 12 units or components from the list below on at least 2 occasions
    - bumpers
    - headlamp units
    - road wheels
    - batteries
    - bonnet fittings
    - interior trim components
    - exterior trim components
    - wings
    - doors
    - bonnets
    - boot lids and tailgates
    - bumper bars, covers and components

Teaching Strategies And Learning Activities

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of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place

Methods Of Assessment

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Evidence Of Achievement

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Knowledge of Motor Vehicle Body Metal Active Gas (MAG) Welding Techniques

Unit Reference	**T/601/5432**
Level	**2**
Credit Value	**5**
Guided Learning Hours	**45**
Unit Summary	This unit enables the learner to develop an understanding of joining materials using Metal Active Gas (MAG) welding techniques
Learning Outcomes (1 to 3) ***The learner will***	**Assessment Criteria (1.1 to 3.9)** ***The learner can***
1. Understand how to work safely when carrying out motor vehicle body MAG welding operations	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
2. Understand how to select, check, use and	2.1 Explain the use of all tools and equipment required to join carbon steels using MAG

maintain appropriate tools and equipment used in motor vehicle body MAG welding operations	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
3. Understand how to carry out motor vehicle body MAG welding operations	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 • plug • lap • butt • 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 British 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
Mapping to National Occupational Standards Directly mapped to IMI SSC Accident Repair - Body NOS 2010, unit BP19	

Supporting Unit Information

Knowledge of Motor Vehicle Body Metal Active Gas (MAG) Welding Techniques - T/601/5432 - Level 2

Indicative Content

- 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)
- 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)
- 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
- 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)
- 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)
- The types of welded joints to be produced (fillet and butt welds, single and multi-run welds, sheet and sections; welding positions)
- 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)
- 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)

- 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)
- The importance of complying with job instructions and the welding procedure specification
- 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)
- 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)
- Personal approval tests, and their applicability to your work
- The extent of your own authority and whom you should report to if you have problems that you cannot resolve
- Reporting lines and procedures, line supervision and technical experts

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Providers are encouraged to use innovative and stimulating assessment methods and to ensure there is an appropriate and manageable range, balance and volume of assessment across units. A number of units can be assessed via integrative assessment methods but it is essential that the evidence of achievement is clearly signposted and referenced. **Methods of assessment must include practical tasks.**

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https://skillsandeducationgroup.co.uk/ Centres may wish to develop their own assessments for individual units or a number of units.

Minimum requirements when assessing this unit

SEG expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching

Evidence Of Achievement

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Sample evidence checklists are available on the SEG website

Skills in Motor Vehicle Body Metal Active Gas (MAG) Welding Techniques

Unit Reference	**R/601/5468**
Level	**2**
Credit Value	**5**
Guided Learning Hours	**45**
Unit Summary	This unit enables the learner to develop the skills required to join materials using Metal Active Gas (MAG) welding techniques. It also covers the evaluation of the completed welded component
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.4)** ***The learner can***
1. Be able to work safely when carrying out motor vehicle body MAG welding operations	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
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support motor vehicle body MAG welding operation activities including • vehicle technical data • welding procedures • legal requirements

	2.2 Use technical information to support motor vehicle body MAG welding operation activities
3. Be able to use appropriate tools and equipment	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 motor vehicle body MAG welding operations 3.4 Clean and store PPE and equipment in the appropriate manner
4. Be able to carry out motor vehicle body MAG welding operations	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 join to be achieved 4.3 Conduct MAG weld operations including • lap plug • lap seam • butt joint • fillet joint 4.4 Conduct MAG weld operations following • manufacturers processes, methods and procedures • test procedures to provide test coupons on equivalent material in accordance with British Standards • 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 British 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
5. Be able to record information and make suitable recommendations	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 Record and report any additional auto electrical faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Accident Repair - Body NOS 2010, unit BP19	

Supporting Unit Information

Skills in Motor Vehicle Body Metal Active Gas (MAG) Welding Techniques - R/601/5468 - Level 2

Indicative Content

General Requirements
You must:

- Produce evidence to show you **meet all** of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined in the IMI Assessment Strategy
- Produce evidence of carrying out all of the different types of joints listed below to join materials using MAGS welding. All learning outcomes must be covered
  - lap plug
  - lap seam
  - butt joint
  - fillet joint

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place

Methods Of Assessment

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Evidence Of Achievement

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Sample evidence checklists are available on the SEG website

Knowledge of Motor Vehicle Body Resistance Spot Welding Operations

Unit Reference	**F/601/5434**
Level	**2**
Credit Value	**5**
Guided Learning Hours	**45**
Unit Summary	This unit enables the learner to develop an understanding of joining materials using resistance spot welding techniques and procedures
Learning Outcomes (1 to 3) ***The learner will***	**Assessment Criteria (1.1 to 3.9)** ***The learner can***
1. Understand how to work safely when carrying out motor vehicle body resistance spot welding operations	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
2. Understand how to	2.1 Identify and explain the use of all tools and

select, check, use and maintain appropriate tools and equipment used in motor vehicle body resistance spot welding operations	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
3. Understand how to carry out motor vehicle body resistance spot welding operations	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 British Standards including • weld pitch • indentation • heat zone • nugget size • 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
Mapping to National Occupational Standards Directly mapped to IMI SSC Accident Repair - Body NOS 2010, unit BP20	

Supporting Unit Information

Knowledge of Motor Vehicle Body Resistance Spot Welding Operations - F/601/5434 - Level 2

Indicative Content

- 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)
- 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
- The basic principles of resistance welding; terminology used in welding
- Mechanised and automated welding basics (types of installation; machine functions; control systems; safety features)
- 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)
- Extracting the information required from drawings and welding procedure specifications
- Operation of the machine controls and their function; clamping and transfer of components; equipment care procedures
- Setting up and aligning the work piece
- Monitoring the installation during the welding process; recognition of problems, and action to be taken
- Problems that can occur with the welding activities, materials and weld defects
- Self inspection of completed work
- Organisational quality systems (standards to be achieved; production records to be kept)
- Personal approval tests and their applicability to your work

- The extent of your own authority and whom you should report to if you have problems that you cannot resolve
- Reporting lines and procedures, line supervision and technical experts

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Skills in Motor Vehicle Body Resistance Spot Welding Operations

Unit Reference	**Y/601/5469**
Level	**2**
Credit Value	**5**
Guided Learning Hours	**45**
Unit Summary	This unit will help the learner to develop the skills required to join materials correctly and effectively using resistance spot welding techniques and procedures. It also covers the evaluation of the completed welded component
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.2)** ***The learner can***
1. Be able to work safely when carrying out motor vehicle body resistance spot welding operations	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
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support motor vehicle body resistance spot welding operation activities including • vehicle technical data • welding procedures

	• legal requirements 2.2 Use technical information to support motor vehicle body resistance spot welding operation activities
3. Be able to use appropriate tools and equipment	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
4. Be able to carry out motor vehicle body resistance spot welding operations	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 • manufacturers processes, methods and procedures • test procedures and providing test coupons on equivalent material in accordance with British Standards • 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 British 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
5. Be able to record information and make suitable recommendations	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 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Accident Repair - Body NOS 2010, unit BP20	

Supporting Unit Information

Skills in Motor Vehicle Body Resistance Spot Welding Operations - Y/601/5469 - Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined in the IMI Assessment Strategy
- Produce evidence of carrying out resistance spot welding when joining a vehicle body panel to a vehicle, which covers the learning outcomes
- Produce evidence of covering all the checks listed below to ensure the quality of the weld area
  - weld pitch
  - indentation
  - heat zone
  - nugget size
  - peel and shear test

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Knowledge of Motor Vehicle Body Adhesive Bonding Operations

Unit Reference	**J/601/5449**
Level	**3**
Credit Value	**2**
Guided Learning Hours	**20**
Unit Summary	This unit enables the learner to develop an understanding of joining materials using adhesive bonding techniques and procedures
Learning Outcomes (1 to 3) ***The learner will***	**Assessment Criteria (1.1 to 3.8)** ***The learner can***
1. Understand how to work safely when carrying out motor vehicle body adhesive bonding operations	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
2. Understand how to select, check, use and	2.1 Explain the use of all tools and equipment required to join materials using adhesive

maintain appropriate tools and equipment used in motor vehicle body adhesive bonding operations	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
3. Understand how to carry out motor vehicle body adhesive bonding operations	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
Mapping to National Occupational Standards Directly mapped to IMI SSC Accident Repair - Body NOS 2010, unit BP25	

Supporting Unit Information

Knowledge of Motor Vehicle Body Adhesive Bonding Operations - J/601/5449 – Level 3

Indicative Content

- 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)
- The personal protective clothing and equipment to be worn when carrying out bonding as part of the fabrication activities (gloves, eye protection, respiratory protection, etc)
- 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
- The hazards associated with bonding fabricated components, and how they can be minimised
- How to obtain the necessary drawings and joining specifications
- How to extract information from research repair methodology in relation to the work undertaken

  Types of adhesives:
  - compact
  - two parts
  - cyanoacrylate
  - anerobic
  - sealants
  - toughened
- Knowledge of curing mechanisms including:
  - moisture/solvent evaporation
  - chemical/thermal reaction
  - exposure/exclusion to oxygen
- Understanding the importance of recording shelf life, pot life, setting and curing times
- Knowledge of adhesion and cohesion

Understanding:

- The material preparations that are required, and the equipment and

consumables that are used
- The importance of working to organisational and bonding agent manufacturers' instructions whilst carrying out the bonding activities
- The methods and techniques used for bonding the materials (such as gluing, impact, chemical and thermal reaction techniques)
- The characteristics of the adhesives that are to be used
- The application of, and precautions to be taken when using, adhesives and solvents
- Maintenance and care of tools and equipment
- Methods of degreasing components and producing a keying surface
- Type and suitability of adhesives, setting or curing requirements and time, strength and appearance
- Common causes of defects associated with the bonding processes, and how to avoid them
- The effects of the environment on the bonding process (such as temperature humidity, cleanliness)
- How to identify, select, use, and clean, the appropriate bonding agent holding vessels, brushes, stirrers and spatulas, scrapers, knives, clamps and weights
- The importance of cleaning up after use, to ensure everything can be used again and to minimise the need for replacement of equipment
- 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
- How to check that completed joints are firm, sound and fit for purpose
- Procedures for cleaning off surplus adhesive and tidying up the appearance of joints
- The extent of your own authority and whom you should report to if you have problems that you cannot resolve
- Reporting lines and procedures, line supervision and technical experts

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Skills in Motor Vehicle Body Adhesive Bonding Operations

Unit Reference	**T/601/5480**
Level	**3**
Credit Value	**2**
Guided Learning Hours	**20**
Unit Summary	This unit will help the learner to develop the skills required to join materials using adhesive bonding techniques and procedures. It also covers the evaluation of the completed joint
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.4)** ***The learner can***
1. Be able to work safely when carrying out motor vehicle body adhesive bonding operations	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
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support motor vehicle body adhesive bonding operation activities including • vehicle technical data • joining procedures • legal requirements

	2.2 Use technical information to support motor vehicle body adhesive bonding operation activities
3. Be able to use appropriate tools and equipment	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
4. Be able to carry out motor vehicle body adhesive bonding operations	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 • manufacturers processes, methods and procedures • test procedures and providing test coupons on equivalent material • 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
5. Be able to record information and make suitable recommendations	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 Record and report any additional auto electrical faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Accident Repair - Body NOS 2010, unit BP25	

Supporting Unit Information

Knowledge of Motor Vehicle Body Adhesive Bonding Operations - J/601/5449 - Level 3

Indicative Content

General Requirements
You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined in the IMI Assessment Strategy
- Produce evidence of carrying out adhesive bonding operations in joining a vehicle body panel to a vehicle, which covers the learning outcomes

Teaching Strategies And Learning Activities

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Knowledge of Removing Dents and Creases from Motor Vehicle Flat Panels

Unit Reference	**M/502/6354**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**20**
Unit Summary	This unit enables the learner to develop an understanding of carrying out the straightforward removal of dents and creases from flat panels. It is also about checking the integrity of the panel prior to repair and the condition of the panel after the repair has been completed
Learning Outcomes (1 to 3) ***The learner will***	**Assessment Criteria (1.1 to 3.3)** ***The learner can***
1. Understand the principles of checking the integrity of the panel prior to the flat panel being repaired	1.1 Describe how to assess the size, depth and plane of damage and any additional damage in Paintless Dent Removal (PDR) refinishing in flat panels 1.2 Identify the best course of action to carry out the PDR repair to the standard required 1.3 Identify the action to be taken if the PDR repair cannot be carried out to the standard required 1.4 Interpret and use sources of information applicable to the safe repair of panels using PDR techniques

2. Understand how to carry out straightforward PDR repairs to motor vehicle flat body panels	2.1 Identify the tools used in PDR finishing 2.2 Describe how to prepare, test, use and maintain the tools and equipment used in PDR techniques 2.3 Describe how to prepare damaged areas to facilitate repairs 2.4 Describe how to repair and reinstate vehicle body panel contours 2.5 Describe the implications of working with mild, high, ultra high strength steels, aluminium alloys and galvanised coatings 2.6 Describe how heat can assist in reforming panels but also affect the properties of the steel 2.7 Describe how to prepare and protect the vehicle being repaired from cross contamination 2.8 Describe the different types of PDR techniques and methods used for repairing panels 2.9 Describe the consequences of using inappropriate repair methods 2.10 Describe the faults that can occur when repairing panels using PDR techniques and the causes of these faults including the dangers to • damaging wiring • protective coatings • SRS systems 2.11 Explain the procedures for reinstating anti corrosion, sealant and sound deadening materials
3. Understand the	3.1 Describe the methods used to check for panel

principles of checking the integrity of the panel after the flat panel has been repaired	contours for accuracy after reshaping 3.2 Identify the need for correct alignment of components and the methods used to achieve this 3.3 Identify the types of quality checks that can be used to ensure the correct repair, alignment and operation of components to manufacturers specification and purpose
Mapping to National Occupational Standards Directly mapped to IMI SSC Accident Repair – SMART Cosmetic NOS 2010, unit CR01	

Supporting Unit Information

Knowledge of Removing Dents and Creases from Motor Vehicle Flat Panels - M/502/6354 - Level 2

Indicative Content

Selection and use of tools and equipment

- The principle governing the selection and use of hand tools for metal finishing and plastic repairs
- The factors governing the selection and use of panel beating and reforming equipment, including specialist PDR tooling and accessories
- The equipment required for polishing to include:
  - air polisher
  - electric polisher
  - foam compound mop
  - foam polishing mop
  - lambs-wool mop
  - types of paste compound
  - types of liquid compound
  - types of polishing cloth
  - lubricants
  - specialist de-nib equipment
- How to prepare, test, use and maintain the tools and equipment required to repair vehicle body panels

Adjust, set up and use listed tools and equipment for PDA repairs

- The process of using a polishing machine to refurbish paint work to include:
  - speed of polishing machine
  - application of the machine to the surface
  - application of compound to the surface
  - operation of polishing machine
  - awareness of polishing near to edges and swage lines
  - avoiding burn marks
  - removal of dried polish

Repairing vehicle bodies

- How to prepare the vehicle to avoid contamination
- How to assess the extent of damage

- How unitary vehicle bodies and cabs are constructed
- How body panels and component damage can affect other panels and the operation of vehicle systems
- The factors determining the use of specific preparation and repair methods
- The repair implications of working with:
  - high strength steels (HSS)
  - low carbon steels (LCS)
  - aluminium alloys
  - galvanized coatings
  - Boron steels
- The consequences of using inappropriate repair methods
- How heat can be used to assist reforming
- How heating can affect the properties of steels
- The techniques for identifying the type of plastics used for manufactured components
- The procedures for reinstating anti-corrosion, sealant and sound deadening materials
- The manufacturers approved methods of working for the preparation and repair of vehicle body panels
- The specification of panel shapes, dimensions and tolerances for the vehicle worked on
- The type of quality control checks that can be used to ensure the correct contour and standard of finish
- How to interpret and use sources of information relevant to the repair of vehicle body panels and components
- How to prepare damaged areas to facilitate repairs
- How to remove protective materials
- How to repair and reinstate vehicle body panel contours and components using:
  - hand tools
  - lever bars
  - power tools
  - specialist PDR tooling and accessories
- How to check the accuracy of reinstated vehicle body panel shapes
- How to work safely avoiding damage to the vehicle and its systems

Selection and use of materials

- The properties and different types of materials used in the construction of vehicle bodies
- The properties and safe use of body component sealers, adhesives and

anti-corrosion materials

- The type of sealants and anti-corrosion materials to use and the manufacturer's recommended methods for their application and thickness
- How to apply sealants and anti-corrosion materials

The types of substrates likely to be found in vehicle refinishing

- Types of substrate to include:
  - all plastics
  - high bake Enamels (O E finishes)
  - 2K Paints
  - 1K Paints
  - clear over bases
  - polyester fillers
  - repaired panels
  - primed panels (E coat)

Methods used in determining vehicle substrates

- Workshop tests to determine substrates to include:
  - visual test for aluminium, plastics
  - magnet test for steel
- For determination of paint type:
  - compound small area
  - solvent wipe test (1k or 2k)
  - colour of flatting sludge (straight colour or C O B)

The properties and correct use of conditioning materials

- That a vehicle must be thoroughly washed and cleaned prior to refinishing to include:
  - outside body panels
  - under arches
  - under bonnet
  - all apertures
  - degreased

The importance of correctly interpreting and following manufacturers' instructions, workplace maintenance procedures, and the consequences of failing to do so

- Main sources of information to include:
  - vehicle identity plate
  - colour directory

- micro-fiche
- electronically held data
- hazard/technical data sheets

- The main purposes of the vehicle identification plate
  - identify the types of information available from this plate
  - identify the method of designating year of registration

Teaching Strategies And Learning Activities

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Methods Of Assessment

This unit is internally assessed and internally and externally moderated.

Providers are encouraged to use innovative and stimulating assessment methods and to ensure there is an appropriate and manageable range, balance and volume of assessment across units. A number of units can be assessed via integrative assessment methods but it is essential that the evidence of achievement is clearly signposted and referenced. **Methods of assessment must include practical tasks.**

Sample assessment tasks are provided that may be used or adapted as appropriate. These are available on the SEG website https://skillsandeducationgroupawards.co.uk/. Centres may wish to develop their own assessments for individual units or a number of units.

Minimum requirements when assessing this unit

SEG expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching

Evidence Of Achievement

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Sample evidence checklists are available on the SEG website

Skills in Removing Dents and Creases from Motor Vehicle Flat Panels

Unit Reference	**T/502/6355**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**20**
Unit Summary	This unit will help the learner to develop the skills required to carry out the straightforward removal of dents and creases from flat panels. It is also about checking the integrity of the panel prior to repair and the condition of the panel after the repair has been completed
Learning Outcomes (1 to 3) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to work safely when carrying out dent removal using Paintless Dent Removal (PDR) techniques on motor vehicle flat panels	1.1 Wear suitable personal protective equipment and use suitable vehicle coverings throughout all PDR operations on vehicle flat panels 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support PDR activities on vehicle flat panels to include • vehicle technical data • removal and fitting procedures

	• health and safety • recognised researched repair methods 2.2 Interpret technical information to support motor vehicle PDR activities
3. Be able to use appropriate tools and equipment	3.1 Select the appropriate tools and equipment necessary for carrying out all PDR operations on vehicle flat 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 all PDR operations on vehicle flat panels
4. Be able to carry out dent removal using PDR techniques on motor vehicle flat panels	4.1 Assess the area for repair to ensure that a PDR repair can be effected to an acceptable standard without compromising the integrity of the vehicle 4.2 Prepare the damaged area to facilitate a PDR repair 4.3 Reinstate vehicle body panel contours using PDR repairs 4.4 Reinstate vehicle body panel contours adhering to the correct specifications and tolerances for the vehicle and following • the manufacturer's approved removal and fitting methods • recognised researched removal and fitting methods • health and safety requirements 4.5 Ensure the components are realigned correctly in a way which regains their original manufactured tolerance

	4.6 Ensure all components operate correctly following the manufacturers specification after the completion of the PDR repair 4.7 Avoid damaging other components and units on the vehicle whilst carrying out the PDR repair. Any damage caused should be correctly reinstated. 4.8 Store all removed components safely in an appropriate location
5. Be able to record information and make suitable recommendations	5.1 Produce work records that are accurate, complete in the format required 5.2 Make suitable and justifiable recommendations for cost effective repairs 5.3 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Accident Repair – SMART Cosmetic NOS 2010, unit CR01	

Supporting Unit Information

Skills in Removing Dents and Creases from Motor Vehicle Flat Panels - T/502/6355 - Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your
  training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined in the IMI Assessment Strategy
- Produce evidence of removing dents and creases from motor vehicle flat panels, which covers the learning outcomes

Examples of flat panels are:
Panels that contain no swage lines, bodylines or defining contours. The panel itself may contain convex curvature as part of the overall structure such as bonnet, doors, roof etc.

Acceptable repairs are:
A repair that is assessed by a qualified PDR assessor that would meet the normal expectations of a customer. In general terms the acceptable standard would be that the panel is returned to the original condition without any visible sign that a repair has been carried out

Types of damage are:
Either a single area of damage or two areas of damage that are contained within a 100mm diameter

Drilling
For the purpose of this unit drilling to gain access to effect a repair is not acceptable

Tools

- Hand tools
- Lever bars
- Power tools
- Specialist PDR tooling and accessories
- Glue type pulling repair kits

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Knowledge of Removing Dents and Creases from Motor Vehicles through Swage Lines

Unit Reference	**F/502/6357**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**20**
Unit Summary	This unit enables the learner to develop an understanding of carrying out the removal of dents and creases from panels where the damage is through a swage line. It is also about checking the integrity of the panel prior to repair and the condition of the panel after the repair has been completed
Learning Outcomes (1 to 3) ***The learner will***	**Assessment Criteria (1.1 to 3.3)** ***The learner can***
1. Understand the principles of checking the integrity of the panel prior to the swage line being reinstated	1.1 Describe how to assess the size, depth and plane of damage and any additional damage in Paintless Dent Removal (PDR) refinishing 1.2 Identify the best course of action to carry out the PDR repair to the standard required 1.3 Identify the action to be taken if the PDR repair cannot be carried out to the standard required 1.4 Select, interpret and use sources of information applicable to the safe repair of panels using PDR techniques

2. Understand how to carry out PDR repairs to reinstate swage lines in motor vehicle panels	2.1 Identify the tools used in PDR finishing 2.2 Describe how to prepare, test, use and maintain the tools and equipment used in PDR techniques 2.3 Describe how to prepare damaged areas to facilitate repairs 2.4 Describe how to repair and reinstate vehicle body panel contours 2.5 Describe the implications of working with mild, high, ultra high strength steels, aluminium alloys and galvanised coatings 2.6 Describe how heat can assist in reforming panels but also affect the properties of the steel 2.7 Describe how to prepare and protect the vehicle being repaired from cross contamination 2.8 Describe the different types of PDR techniques and methods used for repairing panels 2.9 Describe the consequences of using inappropriate repair methods 2.10 Describe the faults that can occur when repairing panels using PDR techniques and the causes of these faults including the dangers to • damaging wiring • protective coatings • SRS systems 2.11 Explain the procedures for reinstating anti corrosion, sealant and sound deadening materials
3. Understand the	3.1 Describe the methods used to check panel

principles of checking the integrity of the panel after the swage line has been reinstated	contours for accuracy after reshaping 3.2 Identify the need for correct alignment of components and the methods used to achieve this 3.3 Identify the types of quality checks that can be used to ensure the correct repair, alignment and operation of components to manufacturers specification and purpose
Mapping to National Occupational Standards Directly mapped to IMI SSC Accident Repair – SMART Cosmetic NOS 2010, unit CR02	

Supporting Unit Information

Knowledge of Removing Dents and Creases from Motor Vehicles through Swage Lines - F/502/6357 - Level 2

Indicative Content

Selection and use of tools and equipment

- The principle governing the selection and use of hand tools for metal finishing and plastic repairs
- The factors governing the selection and use of panel beating and reforming equipment, including specialist PDR tooling and accessories
- The equipment required for polishing to include:
  - air polisher
  - electric polisher
  - foam compound mop
  - foam polishing mop
  - lambs-wool mop
  - types of paste compound
  - types of liquid compound
  - types of polishing cloth
  - lubricants
  - specialist de-nib equipment
- How to prepare, test, use and maintain the tools and equipment required to repair vehicle body panels

Adjust, set up and use listed tools and equipment for PDR repairs

- The process of using a polishing machine to refurbish paint work to include:
  - speed of polishing machine
  - application of the machine to the surface
  - application of compound to the surface
  - operation of polishing machine
  - awareness of polishing near to edges and swage lines
  - avoiding burn marks
  - removal of dried polish

Repairing vehicle bodies

- How to prepare the vehicle to avoid contamination
- How to assess the extent of damage

- How unitary vehicle bodies and cabs are constructed
- How body panels and component damage can affect other panels and the operation of vehicle systems
- The factors determining the use of specific preparation and repair methods
- The repair implications of working with:
  - high strength steels (HSS)
  - low carbon steels (LCS)
  - aluminium alloys
  - galvanized coatings
  - Boron steels
- The consequences of using inappropriate repair methods
- How heat can be used to assist reforming
- How heating can affect the properties of steels
- The techniques for identifying the type of plastics used for manufactured components
- The procedures for reinstating anti-corrosion, sealant and sound deadening materials
- The manufacturers approved methods of working for the preparation and repair of vehicle body panels
- The specification of panel shapes, dimensions and tolerances for the vehicle worked on
- The type of quality control checks that can be used to ensure the correct contour and standard of finish
- How to interpret and use sources of information relevant to the repair of vehicle body panels and components
- How to prepare damaged areas to facilitate repairs
- How to remove protective materials
- How to repair and reinstate vehicle body panel contours and components using:
  - hand tools
  - lever bars
  - power tools
  - specialist PDR tooling and accessories
- How to check the accuracy of reinstated vehicle body panel shapes
- How to work safely avoiding damage to the vehicle and its systems

Selection and use of materials

- The properties and different types of materials used in the construction of vehicle bodies
- The properties and safe use of body component sealers, adhesives and

anti-corrosion materials.

- The type of sealants and anti-corrosion materials to use and the manufacturer's recommended methods for their application and thickness
- How to apply sealants and anti-corrosion materials

The types of substrates likely to be found in vehicle refinishing

- Types of substrate to include:
  - all plastics
  - high bake Enamels (O E finishes)
  - 2 K Paints
  - 1K Paints
  - clear over bases
  - polyester fillers
  - repaired panels
  - primed panels (E coat)

Methods used in determining vehicle substrates

- Workshop tests to determine substrates to include:
  - visual test for aluminium, plastics
  - magnet test for steel
- For determination of paint type:
  - compound small area
  - solvent wipe test (1k or 2k)
  - colour of flatting sludge (straight colour or C O B)

The properties and correct use of conditioning materials

- That a vehicle must be thoroughly washed and cleaned prior to refinishing to include:
  - outside body panels
  - under arches
  - under bonnet
  - all apertures
  - degreased

The importance of correctly interpreting and following manufacturers' instructions, workplace maintenance procedures, and the consequences of failing to do so

- Main sources of information to include:
  - vehicle identity plate
  - colour directory

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Evidence Of Achievement

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Skills in Removing Dents and Creases from Motor Vehicles through Swage Lines

Unit Reference	**M/502/6337**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**20**
Unit Summary	This unit will help the learner to develop the skills required to carry out the removal of dents and creases through swage lines. It is also about checking the integrity of the panel prior to repair and the condition of the panel after the repair has been completed
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to work safely when carrying out dent removal through swage lines using Paintless Dent Removal (PDR) techniques on motor vehicle panels	1.1 Wear suitable personal protective equipment and use suitable vehicle coverings throughout all PDR operations on swage lines on vehicle panels 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support PDR activities on swage lines to include • vehicle technical data

	• removal and fitting procedures • health and safety • recognised researched repair methods 2.2 Interpret technical information to support motor vehicle PDR activities
3. Be able to use appropriate tools and equipment	3.1 Select the appropriate tools and equipment necessary for carrying out all PDR operations on vehicle 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 all PDR operations on vehicle panels
4. Be able to carry out dent removal through swage lines using PDR techniques on motor vehicle panels	4.1 Assess the area for repair to ensure that a PDR repair can be effected to an acceptable standard without compromising the integrity of the vehicle 4.2 Prepare the damaged area to facilitate a PDR repair 4.3 Reinstate vehicle body panel contours and swage lines using PDR repairs 4.4 Reinstate vehicle body panel contours and swage lines adhering to the correct specifications and tolerances for the vehicle and following • the manufacturer's approved removal and fitting methods • recognised researched removal and fitting methods • health and safety requirements 4.5 Ensure the components are realigned correctly

	in a way which regains their original manufactured tolerance 4.6 Ensure all components operate correctly following the manufacturers specification after the completion of the PDR repair 4.7 Avoid damaging other components and units on the vehicle whilst carrying out the PDR repair. Any damage caused should be correctly reinstated 4.8 Store all removed components safely in an appropriate location
5. Be able to record information and make suitable recommendations	5.1 Produce work records that are accurate, complete in the format required 5.2 Make suitable and justifiable recommendations for cost effective repairs 5.3 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Accident Repair – SMART Cosmetic NOS 2010, unit CR02	

Supporting Unit Information

Skills in Removing Dents and Creases from Motor Vehicles through Swage Lines - M/502/6337 - Level 2

Indicative Content

General Requirements
You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined in the IMI Assessment Strategy
- Produce evidence of removing dents and creases from motor vehicles through swage lines, which covers the learning outcomes

Examples of swage lines are:
This is a contour line pressed into a panel at the manufacturers process. Swage lines are also referred to as bodylines, design lines, or style lines.

Acceptable repairs are:
A repair that is assessed by a qualified PDR assessor that would meet the normal expectations of a customer. In general terms the acceptable standard would be that the panel is returned to the original condition without any visible sign that a repair has been carried out

Types of damage are:
Either a single area of damage or two areas of damage that are contained within a 100mm diameter

Drilling
For the purpose of this unit drilling to gain access to effect a repair is not acceptable

Tools

- hand tools
- lever bars
- power tools
- specialist PDR tooling and accessories
- glue type pulling repair kits

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Knowledge of Removing Dents and Creases from Motor Vehicles Where Access Is Difficult or Restricted

Unit Reference	**Y/502/6347**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**20**
Unit Summary	This unit enables the learner to develop an understanding of carrying out the removal of dents and creases from panels where access to enable the repair to be carried out is difficult or restricted. It is also about checking the integrity of the panel prior to repair and the condition of the panel after the repair has been completed
Learning Outcomes (1 to 3) ***The learner will***	**Assessment Criteria (1.1 to 3.3)** ***The learner can***
1. Understand the principles of checking the integrity of the panel prior to the restricted access to the dent being reinstated	1.1 Describe how to assess the size, depth and plane of damage and any additional damage in Paintless Dent Removal (PDR) refinishing 1.2 Identify the best course of action to carry out the PDR repair to the standard required 1.3 Identify the action to be taken if the PDR repair cannot be carried out to the standard required 1.4 Select, interpret and use sources of information applicable to the safe repair of

	panels using PDR techniques
2. Understand how to carry out PDR repairs with restricted access to reinstate the motor vehicle panel	2.1 Identify the tools used in PDR finishing 2.2 Describe how to prepare, test, use and maintain the tools and equipment used in PDR techniques 2.3 Describe how to prepare damaged areas to facilitate repairs 2.4 Describe how to repair and reinstate vehicle body panel contours where access to the panel is restricted 2.5 Describe the implications of working with mild, high, ultra high strength steels, aluminium alloys and galvanised coatings 2.6 Describe how heat can assist in reforming panels but also affect the properties of the steel 2.7 Describe how to prepare and protect the vehicle being repaired from cross contamination 2.8 Describe the different types of PDR techniques and methods used for repairing panels with restricted access 2.9 Describe the consequences of using inappropriate repair methods 2.10 Describe the faults that can occur when repairing panels using PDR techniques and the causes of these faults including the dangers to • damaging wiring • protective coatings • SRS systems 2.11 Explain the procedures for reinstating anti corrosion, sealant and sound deadening materials

3. Understand the principles of checking the integrity of the panel after the restricted access to the dent being reinstated is repaired	3.1 Describe the methods used to check for panel contours for accuracy after reshaping 3.2 Identify the need for correct alignment of components and the methods used to achieve this 3.3 Identify the types of quality checks that can be used to ensure the correct repair, alignment and operation of components to manufacturers specification and purpose
Mapping to National Occupational Standards Directly mapped to IMI SSC Accident Repair – SMART Cosmetic NOS 2010, unit CR03	

Supporting Unit Information

Knowledge of Removing Dents and Creases from Motor Vehicles Where Access Is Difficult or Restricted - Y/502/6347 - Level 2

Indicative Content

Selection and use of tools and equipment

- The principle governing the selection and use of hand tools for metal finishing and plastic repairs
- The factors governing the selection and use of panel beating and reforming equipment, including specialist PDR tooling and accessories
- The equipment required for polishing to include:
  - air polisher
  - electric polisher
  - foam compound mop
  - foam polishing mop
  - lambs-wool mop
  - types of paste compound
  - types of liquid compound
  - types of polishing cloth
  - lubricants
  - specialist de-nib equipment
- How to prepare, test, use and maintain the tools and equipment required to repair vehicle body panels

Adjust, set up and use listed tools and equipment for PDR repairs

- The process of using a polishing machine to refurbish paint work to include:
  - speed of polishing machine
  - application of the machine to the surface
  - application of compound to the surface
  - operation of polishing machine
  - awareness of polishing near to edges and swage lines
  - avoiding burn marks
  - removal of dried polish

Repairing vehicle bodies

- How to prepare the vehicle to avoid contamination
- How to assess the extent of damage

- How unitary vehicle bodies and cabs are constructed
- How body panels and component damage can affect other panels and the operation of vehicle systems
- The factors determining the use of specific preparation and repair methods
- The repair implications of working with:
  - high strength steels (HSS)
  - low carbon steels (LCS)
  - aluminium alloys
  - galvanized coatings
  - Boron steels
- The consequences of using inappropriate repair methods
- How heat can be used to assist reforming
- How heating can affect the properties of steels
- The techniques for identifying the type of plastics used for manufactured components
- The procedures for reinstating anti-corrosion, sealant and sound deadening materials
- The manufacturers approved methods of working for the preparation and repair of vehicle body panels
- The specification of panel shapes, dimensions and tolerances for the vehicle worked on
- The type of quality control checks that can be used to ensure the correct contour and standard of finish
- How to interpret and use sources of information relevant to the repair of vehicle body panels and components
- How to prepare damaged areas to facilitate repairs
- How to remove protective materials
- How to repair and reinstate vehicle body panel contours and components using:
  - hand tools
  - lever bars
  - power tools
  - specialist PDR tooling and accessories
  - glue type pulling repair kits
- How to check the accuracy of reinstated vehicle body panel shapes
- How to work safely avoiding damage to the vehicle and its systems

Selection and use of materials

- The properties and different types of materials used in the construction of vehicle bodies

- The properties and safe use of body component sealers, adhesives and anti-corrosion materials.
- The type of sealants and anti-corrosion materials to use and the manufacturer's recommended methods for their application and thickness
- How to apply sealants and anti-corrosion materials

The types of substrates likely to be found in vehicle refinishing

- Types of substrate to include:
  - all plastics
  - high bake Enamels (O E finishes)
  - 2 K Paints
  - 1K Paints
  - clear over bases
  - polyester fillers
  - repaired panels
  - primed panels (E coat)

Methods used in determining vehicle substrates

- Workshop tests to determine substrates to include:
  - visual test for aluminium, plastics
  - magnet test for steel
- For determination of paint type:
  - compound small area
  - solvent wipe test (1k or 2k)
  - colour of flatting sludge (straight colour or C O B)

The properties and correct use of conditioning materials

- That a vehicle must be thoroughly washed and cleaned prior to refinishing to include:
  - outside body panels
  - under arches
  - under bonnet
  - all apertures
  - degreased

The importance of correctly interpreting and following manufacturers' instructions, workplace maintenance procedures, and the consequences of failing to do so

- Main sources of information to include:
  - vehicle identity plate

- colour directory

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place

Methods Of Assessment

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Sample evidence checklists are available on the SEG website

Skills in Removing Dents and Creases from Motor Vehicles Where Access Is Difficult or Restricted

Unit Reference	**D/502/6348**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**20**
Unit Summary	This unit will help the learner to develop the skills required to carry out the removal of dents and creases where access to enable the repair to be carried out is difficult or restricted. It is also about checking the integrity of the panel prior to repair and the condition of the panel after the repair has been completed
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to work safely when carrying out dent removal where access is restricted using Paintless Dent Removal (PDR) techniques on motor vehicle panels	1.1 Wear suitable personal protective equipment and use suitable vehicle coverings throughout all PDR operations on vehicle panels 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to use relevant information	2.1 Select suitable sources of technical information to support PDR activities where access is

to carry out the task	difficult or restricted to include: • vehicle technical data • removal and fitting procedures • health and safety • recognised researched repair methods 2.2 Interpret technical information to support motor vehicle PDR activities
3. Be able to use appropriate tools and equipment	3.1 Select the appropriate tools and equipment necessary for carrying out all PDR operations on vehicle 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 all PDR operations on vehicle panels
4. Be able to carry out dent removal where access is restricted using PDR techniques on motor vehicle panels	4.1 Assess the restricted area for repair to ensure that a PDR repair can be effected to an acceptable standard without compromising the integrity of the vehicle 4.2 Prepare the damaged area to facilitate a PDR repair 4.3 Reinstate vehicle body panel contours and swage lines using PDR repairs where access is difficult or restricted 4.4 Reinstate vehicle body panel contours and swage lines where access is difficult or restricted adhering to the correct specifications and tolerances for the vehicle and following • the manufacturer's approved removal and fitting methods • recognised researched removal and fitting methods

	• health and safety requirements 4.5 Ensure the components are realigned correctly in a way which regains their original manufactured tolerance 4.6 Ensure all components operate correctly following the manufacturers specification after the completion of the PDR repair 4.7 Avoid damaging other components and units on the vehicle whilst carrying out the PDR repair. Any damage caused should be correctly reinstated 4.8 Store all removed components safely in an appropriate location 4.9 Ensure all anti corrosion, sealant and sound deadening materials are reinstated after the repair
5. Be able to record information and make suitable recommendations	5.1 Produce work records that are accurate, complete in the format required 5.2 Make suitable and justifiable recommendations for cost effective repairs 5.3 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Accident Repair – SMART Cosmetic NOS 2010, unit CR03	

Supporting Unit Information

Skills In Removing Dents And Creases From Motor Vehicles Where Access Is Difficult Or Restricted - D/502/6348 - Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your
  training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined in the IMI Assessment Strategy
- Produce evidence of removing dents and creases from motor vehicles through swage lines, which covers the learning outcomes

Definition of restricted access:
Restricted access is where access to the rear of the damage cannot be gained either directly or indirectly using normal access methods, or where the back of the dent is enclosed or covered by another component.
Examples of types of dent that would normally have restricted access are

- dents covered by crash/strengthening bar
- dents covered by a box section
- dents covered by a cross/strengthening bracing (glued or not glued)
- a dent where the edge of the damage is close to the edge of the panel

Acceptable repairs are:
A repair that is assessed by a qualified PDR assessor that would meet the normal expectations of a customer. In general terms the acceptable standard would be that the panel is returned to the original condition without any visible sign that a repair has been carried out

Types of damage are:
Either a single area of damage or two areas of damage that are contained within a 100mm diameter

Drilling
For he purpose of this unit drilling to gain access to effect a repair is not acceptable, unless a manufacturer has issued specific guidelines for the model of vehicle that you are trying to repair

Tools

- hand tools

- lever bars
- power tools
- specialist PDR tooling and accessories
- glue type pulling repair kits

Teaching Strategies And Learning Activities

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Methods Of Assessment

This unit is internally assessed and internally and externally moderated.

Providers are encouraged to use innovative and stimulating assessment methods and to ensure there is an appropriate and manageable range, balance and volume of assessment across units. A number of units can be assessed via integrative assessment methods but it is essential that the evidence of achievement is clearly signposted and referenced. **Methods of assessment must include practical tasks.**

Sample assessment tasks are provided that may be used or adapted as appropriate. These are available on the SEG website https://skillsandeducationgroupawards.co.uk/. Centres may wish to develop their own assessments for individual units or a number of units.

Minimum requirements when assessing this unit
SEG expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching

Evidence Of Achievement

All evidence must be clearly signposted and made available for the external

moderator upon request

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the SEG web site)

Sample evidence checklists are available on the SEG website

Knowledge of Vehicle Cosmetic Interior Trim Repair

Unit Reference	**H/503/4645**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**15**
Unit Summary	This unit enables the learner to develop an understanding for following guidelines and procedures for the cosmetic repair of vehicle interior trim
Learning Outcomes (1 to 7) ***The learner will***	**Assessment Criteria (1.1 to 7.3)** ***The learner can***
1. Understand the limits of cosmetic interior trim repairs	1.1 Distinguish between viable and non-viable cosmetic interior trim repairs 1.2 Identify the limits of equipment used for cosmetic interior trim repairs
2. Understand how to identify materials used in vehicle interior trim	2.1 Identify types of materials used in vehicle interior trim 2.2 Identify the properties of materials used in vehicle interior trim
3. Understand how to prepare interior trim	3.1 Explain methods for cleaning interior trim prior to repair

to accept cosmetic repair	3.2 Identify processes of preparation for different repairs and materials 3.3 Describe the methods of protecting adjacent and unaffected areas and the circumstances in which they should be used
4. Know how to select the correct products and equipment to complete an effective repair	4.1 Determine the correct products for the type of repair, referring to repair kit manufacturers guidelines 4.2 List the correct equipment required to complete an effective interior trim repair, to include • spraying equipment • compressed air supply • drying equipment • scales
5. Know the processes of application for cosmetic interior trim repairs	5.1 Identify suitable gels and fillers used in cosmetic interior trim repair 5.2 List the processes involved in the application of fillers, adhesives and textures 5.3 Describe how to replicate the grain or texture of interior trim 5.4 Explain how to achieve levels of finish in vehicle interiors including • gloss • satin • matt 5.5 Describe methods used to blend repair colour to existing colour 5.6 Describe how to minimise waste when using

	consumables 5.7 Identify the correct drying methods for a range adhesives, gels and paints 5.8 Describe the importance of applying conditioning products to the trim
6. Understand quality control procedures relating to cosmetic interior trim repair	6.1 List the quality checks required after completing the repair 6.2 Explain how to assess and evaluate colour match, blending and the final finish 6.3 Identify methods for rectifying defects found in the repair
7. Understand the importance good housekeeping in relation to cosmetic interior trim repair	7.1 Describe the importance of visual inspection of the vehicle interior for residues and surface finish 7.2 Explain how to strip and clean spraying equipment 7.3 Identify appropriate ways to dispose of waste products in accordance with environmental guidance
Mapping to National Occupational Standards NOS not currently available	

Supporting Unit Information

Knowledge of Vehicle Cosmetic Interior Trim Repair - H/503/4645 - Level 2

Indicative Content

Correct personal protective equipment must be used, and health and safety issues must be addressed throughout this unit.

The limits of cosmetic interior trim repairs
Maximum size of repair area with regards to

- material to be repaired
- type of damage
- repair kit manufacturers guidelines
- durability of repair

Types of damage to be repaired

- burn
- scuff
- rip/tear
- holes

Materials used in vehicle interior trim
Types of material used in vehicle trim

- plastic
- vinyl
- fibreglass
- wood

Properties of material used in vehicle trim

- hard
- soft
- malleable
- porous
- solvent sensitive
- heat sensitive
- thermoset
- thermoplastic
- brittle

Prepare interior trim to accept cosmetic repair

Cleaning and degreasing agents

- water based
- solvent based

Processes of preparation

- grades of abrasive
- consumables
- tools and equipment
- PPE
- masking

Protecting adjacent areas

- reasons for masking
- masking materials
- masking techniques
- masking faults

Products and equipment

- importance of referring to kit manufacturer guidelines
- use of datasheets and technical information

Identify correct products for the repair from:

- adhesives
- activators
- gels
- fillers
- compounds

Correct equipment

- sanding equipment
  - blocks
  - countersink
  - rotary sander
- spraying equipment
  - air brush
  - spot repair gun
  - spray gun
  - aerosols
  - respirator
- compressed air supply

- air blower
- filtration
- air pressures
- maintenance

- drying equipment
  - heat gun
  - hot air blowers
  - air dryer
  - infrared lamp
- scales
  - portable
  - fixed

Processes of application

Application of adhesives and gels that require activators

Use of appropriate tools such as:

- filling knife
- spreader
- spatula
- applicator gun
- pipette
- syringe

Replicate grain or texture

- graining mat
- copying material
- spray textures (e.g. coarse, medium, fine)

Levels of finish

Gloss, satin, matt finish using different ratios of matting agents/additives

Ready for use (RFU) gloss, satin, matt finishes

Blending techniques

- colour matching
  - colour swatches
  - colour formulation
- arcing of spray gun/air brush
- fading repair colour into existing colour
- localising repair

Minimising waste

- economic use of consumables and products
- accurate mixing of materials
- recognise waste materials result in cost

Drying methods

- importance of referring to kit manufacturer guidelines
- use of datasheets and technical information
- different drying methods
  - chemical reaction
  - air dry
  - force dry
  - single and two pack products

Conditioning products

- reasons and uses
- appearance
- protection

Quality control procedures

- check for overspray
- colour match
- texture
- gloss level
- final finish
- defects
- odour
- final clean up

Good housekeeping

- job cards
- inventory checklist
- damage report
- ensure safe working area
- ensure vehicle is returned to customer with repair waste removed
- clean and maintain equipment
- return tools, equipment and consumables to the appropriate place
- correct disposal of waste to include:
  - labelling of hazardous waste
  - environmental guidelines
  - registered waste disposal company

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Minimum requirements when assessing this unit
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Evidence Of Achievement

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Sample evidence checklists are available on the SEG website

Skills in Vehicle Cosmetic Interior Trim Repair

Unit Title	**K/503/4646**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**25**
Unit Summary	This unit enables the learner to develop the skills required to carry out cosmetic repair of vehicle interior trim
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.4)** ***The learner can***
1. Be able to work safely when carrying out cosmetic interior trim repairs	1.1 Wear suitable personal protective equipment and follow repair kit manufacturers guidelines on safe working practices 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support the process of cosmetic interior trim repair *2.2* Interpret technical information to support cosmetic interior trim repair
3. Be able to use appropriate tools and	3.1 Select the appropriate tools and equipment necessary for carrying out all cosmetic interior

equipment	trim repair operations 3.2 Check that the equipment is safe and has been calibrated to meet manufacturers requirements 3.3 Use the correct tools and equipment in the way specified by manufacturers when carrying out interior trim repairs 3.4 Leave all application equipment in a clean and serviceable condition
4. Be able to carry out vehicle cosmetic interior trim repair	4.1 Identify in the vehicle the type of cosmetic interior trim repair for a range of materials 4.2 Use surface cleaning agents and protect all surfaces adjacent to those being prepared using the specified method 4.3 Prepare the damaged area of interior trim 4.4 Replace any damaged foam in trim 4.5 Fill the area of repair using fillers/gels 4.6 Replicate grain and leather texture using appropriate methods to match area of repair 4.7 Dry the area of repair using the appropriate methods 4.8 Match trim repair in terms of colour and finish using colour swatches 4.9 Formulate colours using manufacturers formulation chart 4.10 Apply colours coats and blend into original area using appropriate spraying equipment and methods

	4.11 Use heat gun to dry colour coats 4.12 Apply conditioning products to protect the interior trim 4.13 Keep the work area clean and tidy throughout all repair activities 4.14 Dispose of waste materials to conform with legal and workplace requirements 4.15 Ensure all interior trim repairs are completed to an agreed standard
5. Be able to record information and make suitable recommendations	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 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards NOS not currently available	

Supporting Unit Information

Skills in Vehicle Cosmetic Interior Trim Repair - K/503/4646 - Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your
  training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Be observed by your assessor successfully carrying out cosmetic repair activities on at
  least 1 vehicle which collectively covers the learning outcomes

Acceptable repairs are:
A repair that is assessed by a qualified SMART repair assessor that would meet the normal expectations of a customer. In general terms the acceptable standard would be that the interior trim is returned to the original condition without any visible sign that a repair has been carried out

Types of damage are:
Either a single area of damage or two areas of damage that are contained within a 10mm diameter

Tools

- hand tools
- power tools
- specialist SMART interior trim repair kit tooling and accessories
- grain mats
- airbrush

Teaching Strategies And Learning Activities

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Knowledge of Vehicle Cosmetic Interior Upholstery Repair (Fabric)

Unit Reference	**M/503/4647**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**15**
Unit Summary	This unit enables the learner to develop an understanding for following guidelines and procedures for the cosmetic repair of vehicle fabric upholstery
Learning Outcomes (1 to 7) ***The learner will***	**Assessment Criteria (1.1 to 7.2)** ***The learner can***
1. Understand the limits of cosmetic interior upholstery repairs	1.1 Distinguish between viable and non-viable cosmetic interior upholstery repairs 1.2 Identify the limits of equipment used for cosmetic interior upholstery repairs
2. Understand how to identify fabrics used in vehicle upholstery	2.1 Identify types of fabrics used in vehicle upholstery 2.2 Identify the properties of fabrics used in vehicle upholstery
3. Understand how to prepare fabric to	3.1 Explain methods for cleaning interior fabric prior to repair

accept cosmetic repair	3.2 Identify processes of preparation for different repairs and fabrics 3.3 Describe the methods of protecting adjacent and unaffected areas and the circumstances in which they should be used
4. Know how to select the correct products to complete an effective repair	4.1 Determine the correct products for the type of repair, referring to repair kit manufacturers guidelines
5. Know the processes of application for cosmetic interior upholstery repairs	5.1 Identify suitable upholstery reinforcement materials used in cosmetic fabric repair 5.2 Explain the methods used to correctly colour match the area of repair 5.3 Describe methods used to blend repair colour to existing colour 5.4 List the processes involved in the application of compounds, adhesives and fibres 5.5 Describe how to minimise waste when using consumables 5.6 Identify the correct drying methods for a range compounds and adhesives
6. Understand quality control procedures relating to cosmetic interior upholstery repair	6.1 List the quality checks required after completing the repair 6.2 Explain how to assess and evaluate colour match, blending and the final finish 6.3 Identify methods for rectifying defects found in

	the repair
7. Understand the importance good housekeeping in relation to cosmetic interior upholstery repair	7.1 Describe the importance of visual inspection of the vehicle interior for residues and surface finish 7.2 Identify appropriate ways to dispose of waste products in accordance with environmental guidance
Mapping to National Occupational Standards NOS not currently available	

Supporting Unit Information

Knowledge of Vehicle Cosmetic Interior Upholstery Repair (Fabric) - M/503/4647 - Level 2

Indicative Content

Correct personal protective equipment must be used, and health and safety issues must be addressed throughout this unit.

The limits of cosmetic interior fabric repairs
Maximum size of repair area with regards to

- material to be repaired
- type of damage
- repair kit manufacturers guidelines
- durability of repair
- fabric repair area (e.g. Carpet, seat, door-card, parcel shelf, etc.)

Types of damage to be repaired

- burn
- scuff
- rip/tear
- holes

Fabrics used in vehicle interior trim
Types of fabrics used in vehicle trim

- pattern
- non-pattern
- weave
- texture

Properties of fabric used in vehicle trim

- soft
- malleable
- porous
- solvent sensitive
- heat sensitive
- delicate

Prepare fabric to accept cosmetic repair
Cleaning agents

- low foam detergents
- fabric cleaner

Processes of preparation
- trimming the repair area
- renew foam
- backing pad
- adhesives
- consumables
- tools and equipment
- PPE
- masking

Protecting adjacent areas
- reasons for masking
- masking materials
- masking techniques
- masking faults

Products and equipment
- importance of referring to kit manufacturer guidelines
- use of datasheets and technical information

Identify correct products for the repair from
- adhesives
- foams
- compounds
- backing materials
- fibres

Correct equipment
- spraying equipment
  - fiber/llockit sprayer
  - aerosol
- drying equipment
  - heat gun
  - hot air blowers
  - heat iron

Processes of application
Application of adhesives, compounds and fibres

Use of appropriate tools such as

- filling knife
- spreader
- spatula
- applicator gun
- pipette
- syringe

Colour matching

- tinting of fibres using a range of other fibres close to original finish
- replicate patterns using:
  - water-based pencils
  - markers

Blending techniques

- colour matching
- fading repair colour into existing colour
- localising repair

Minimising waste

- economic use of consumables and products
- accurate mixing of materials
- recognise waste materials result in cost

Drying methods

- importance of referring to kit manufacturer guidelines
- use of datasheets and technical information
- different drying methods
  - chemical reaction
  - air dry
  - force dry

Quality control procedures

- check for overspray of adhesives
- colour match
- final finish
- defects
- odour
- final clean up

Good housekeeping

- job cards
- inventory checklist
- damage report
- ensure safe working area
- ensure vehicle is returned to customer with repair waste removed
- clean and maintain equipment
- return tools, equipment and consumables to the appropriate place
- correct disposal of waste to include:
  - labelling of hazardous waste
  - environmental guidelines
  - registered waste disposal company

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Skills in Vehicle Cosmetic Interior Upholstery Repair (Fabric)

Unit Reference	**M/503/4650**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**20**
Unit Summary	This unit enables the learner to develop the skills required to carry out cosmetic repair of vehicle interior upholstery
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.4)** ***The learner can***
1. Be able to work safely when carrying out cosmetic interior upholstery repairs	1.1 Wear suitable personal protective equipment and follow repair kit manufacturers guidelines on safe working practices 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support the process of cosmetic interior fabric repair 2.2 Interpret technical information to support cosmetic interior fabric repair

3. Be able to use appropriate tools and equipment	3.1 Select the appropriate tools and equipment necessary for carrying out all cosmetic interior fabric repair operations 3.2 Check that the equipment is safe and has been calibrated to meet manufacturers requirements 3.3 Use the correct tools and equipment in the way specified by manufacturers when carrying out interior fabric repairs 3.4 Leave all application equipment in a clean and serviceable condition
4. Be able to carry out Vehicle Cosmetic Interior Upholstery Repair	4.1 Identify in the vehicle the type of cosmetic interior upholstery repair for a range of fabrics 4.2 Use surface cleaning agents and protect all surfaces adjacent to those being prepared using the specified method 4.3 Prepare the damaged area of interior fabric, removing any burnt material from around the repair if required 4.4 Replace any damaged foam in seat or trim 4.5 Reinforce the area of repair using backing material and appropriate adhesive 4.6 Apply suitable compounds to the area of repair 4.7 Colour match fibres to the area of repair 4.8 Apply fibres to the area of repair 4.9 Reproduce material patterns on the area of repair

	4.10 Keep the work area clean and tidy throughout all repair activities 4.11 Dispose of waste materials to conform with legal and workplace requirements 4.12 Ensure all upholstery repairs are completed to an agreed standard
5. Be able to record information and make suitable recommendations	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 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards NOS not currently available	

Supporting Unit Information

Skills in Vehicle Cosmetic Interior Upholstery Repair (Fabric) - M/503/4650 – Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Be observed by your assessor successfully carrying out cosmetic repair activities on at least 1 vehicle which collectively covers the learning outcomes

Acceptable repairs are:
A repair that is assessed by a qualified SMART repair assessor that would meet the normal expectations of a customer. In general terms the acceptable standard would be that the fabric is returned to the original condition without any visible sign that a repair has been carried out

Types of damage are:
Either a single area of damage or two areas of damage that are contained within a 10mm diameter

Tools

- hand tools
- power tools
- specialist SMART fabric repair kit tooling and accessories
- texture pencils
- airbrush

Teaching Strategies And Learning Activities

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mechanisms put in place

Methods Of Assessment

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Knowledge of Vehicle Cosmetic Interior Upholstery Repair (Leather)

Unit Reference	**A/503/4652**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**15**
Unit Summary	This unit enables the learner to develop an understanding for following guidelines and procedures for the cosmetic repair of vehicle leather upholstery
Learning Outcomes (1 to 7) ***The learner will***	**Assessment Criteria (1.1 to 7.3)** ***The learner can***
1. Understand the limits of cosmetic interior upholstery repairs	1.1 Distinguish between viable and non-viable cosmetic interior upholstery repairs 1.2 Identify the limits of equipment used for cosmetic interior upholstery repairs
2. Understand how to identify leathers used in vehicle upholstery	2.1 Identify types of leathers used in vehicle upholstery 2.2 Identify the properties of leathers used in vehicle upholstery
3. Understand how to prepare leather to	3.1 Explain methods for cleaning interior leather prior to repair

accept cosmetic repair	3.2 Identify processes of preparation for different repairs and leathers 3.3 Describe the methods of protecting adjacent and unaffected areas and the circumstances in which they should be used
4. Know how to select the correct products and equipment to complete an effective repair	4.1 Determine the correct products for the type of repair, referring to repair kit manufacturers guidelines 4.2 List the correct equipment required to complete an effective leather repair, to include • spraying equipment • compressed air supply • drying equipment • scales
5. Know the processes of application for cosmetic interior leather repairs	5.1 Identify suitable upholstery reinforcement materials used in cosmetic leather repair 5.2 List the processes involved in the application of compounds, fillers, adhesives and textures 5.3 Describe how to replicate the grain or texture of interior leather upholstery 5.4 Explain how to achieve levels of finish in vehicle interiors including • gloss • satin • matt 5.5 Describe methods used to blend repair colour to existing colour 5.6 Describe how to minimise waste when using consumables

	5.7 Identify the correct drying methods for a range compounds, adhesives and paints 5.8 Describe the importance of applying conditioning products to the leather
6. Understand quality control procedures relating to cosmetic interior leather repair	6.1 List the quality checks required after completing the repair 6.2 Explain how to assess and evaluate colour match, blending and the final finish 6.3 Identify methods for rectifying defects found in the repair
7. Understand the importance good housekeeping in relation to cosmetic interior upholstery repair	7.1 Describe the importance of visual inspection of the vehicle interior for residues and surface finish 7.2 Explain how to strip and clean spraying equipment 7.3 Identify appropriate ways to dispose of waste products in accordance with environmental guidance
Mapping to National Occupational Standards NOS not currently available	

Supporting Unit Information

Knowledge of Vehicle Cosmetic Interior Upholstery Repair (Leather) - A/503/4652 - Level 2

Indicative Content

Correct personal protective equipment must be used, and health and safety issues must be addressed throughout this unit.

The limits of cosmetic interior leather repairs
Maximum size of repair area with regards to

- material to be repaired
- type of damage
- repair kit manufacturers guidelines
- durability of repair

Types of damage to be repaired

- burn
- scuff
- rip/tear
- holes

Leathers used in vehicle interior trim
Types of leathers used in vehicle trim

- leather
- faux leather

Properties of leather used in vehicle trim

- soft
- malleable
- porous
- solvent sensitive
- heat sensitive
- delicate

Prepare leather to accept cosmetic repair
Cleaning and degreasing agents

- water based
- solvent based

Processes of preparation

- grades/type of abrasive
- consumables
- tools and equipment
- PPE
- masking

Protecting adjacent areas

- reasons for masking
- masking materials
- masking techniques
- masking faults

Products and equipment

- importance of referring to kit manufacturer guidelines
- use of datasheets and technical information

Identify correct products for the repair from

- adhesives
- activators
- gels
- fillers
- compounds

Correct equipment

- spraying equipment
  - air brush
  - spot repair gun
  - spray gun
  - aerosols
  - respirator
- compressed air supply
  - air blower
  - filtration
  - air pressures
  - maintenance
- drying equipment
  - heat gun
  - hot air blowers
  - air dryer
  - infrared lamp

- scales
  - portable
  - fixed

Processes of application

Application of adhesives, gels and fillers that require activators

Use of appropriate tools such as

- filling knife
- spreader
- spatula
- applicator gun
- pipette
- syringe

Replicate grain or texture

- graining mat
- copying material
- spray textures (e.g. coarse, medium, fine)

Levels of finish

Satin and matt finish using different ratios of matting agents/additives

Ready for use (RFU) satin and matt finishes

Blending techniques

- colour matching
  - colour swatches
  - colour formulation
- arcing of spray gun/air brush
- fading repair colour into existing colour
- localising repair

Minimising waste

- economic use of consumables and products
- accurate mixing of materials
- recognise waste materials result in cost

Drying methods

- importance of referring to kit manufacturer guidelines
- use of datasheets and technical information
- different drying methods
  - chemical reaction

- air dry
- force dry
- single and two pack products

Conditioning products

- reasons and uses
- appearance
- protection

Quality control procedures

- check for overspray
- colour match
- texture
- gloss level
- final finish
- defects
- odour
- final clean up

Good housekeeping

- job cards
- inventory checklist
- damage report
- ensure safe working area
- ensure vehicle is returned to customer with repair waste removed
- clean and maintain equipment
- return tools, equipment and consumables to the appropriate place
- correct disposal of waste to include:
  - labelling of hazardous waste
  - environmental guidelines
  - registered waste disposal company

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Minimum requirements when assessing this unit

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Evidence Of Achievement

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Sample evidence checklists are available on the SEG website

Skills in Vehicle Cosmetic Interior Upholstery Repair (Leather)

Unit Reference	**F/503/4653**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**20**
Unit Summary	This unit enables the learner to develop the skills required to carry out cosmetic repair of vehicle leather upholstery
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.4)** ***The learner can***
1. Be able to work safely when carrying out cosmetic interior upholstery repairs	1.1 Wear suitable personal protective equipment and follow repair kit manufacturers guidelines on safe working practices 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support the process of cosmetic interior leather repair 2.2 Interpret technical information to support cosmetic interior leather repair

3. Be able to use appropriate tools and equipment	3.1 Select the appropriate tools and equipment necessary for carrying out all cosmetic interior leather repair operations 3.2 Check that the equipment is safe and has been calibrated to meet manufacturers requirements 3.3 Use the correct tools and equipment in the way specified by manufacturers when carrying out interior leather repairs 3.4 Leave all application equipment in a clean and serviceable condition
4. Be able to carry out Vehicle Cosmetic Interior Upholstery Repair	4.1 Identify in the vehicle the type of cosmetic interior upholstery repair for a range of leathers 4.2 Use surface cleaning agents and protect all surfaces adjacent to those being prepared using the specified method 4.3 Prepare the damaged area of interior leather 4.4 Replace any damaged foam in seat or trim 4.5 Reinforce the area of repair using backing material and appropriate adhesive 4.6 Apply suitable compounds to the area of repair 4.7 Replicate grain and leather texture using appropriate methods to match area of repair 4.8 Dry the area of repair using the appropriate methods 4.9 Match leather repair in terms of colour and finish using colour swatches

	4.10 Formulate colours using manufacturers formulation chart 4.11 Apply colours coats and blend in to original area using appropriate spraying equipment and methods 4.12 Use heat gun to dry colour coats 4.13 Apply conditioning products to protect the leather 4.14 Keep the work area clean and tidy throughout all repair activities 4.15 Dispose of waste materials to conform with legal and workplace requirements 4.16 Ensure all leather repairs are completed to an agreed standard
4. Be able to record information and make suitable recommendations	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 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards NOS not currently available	

Supporting Unit Information

Skills in Vehicle Cosmetic Interior Upholstery Repair (Leather) - F/503/4653 – Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Be observed by your assessor successfully carrying out cosmetic repair activities on at least 1 vehicle which collectively covers the learning outcomes

Acceptable repairs are:
A repair that is assessed by a qualified SMART repair assessor that would meet the normal expectations of a customer. In general terms the acceptable standard would be that the leather/faux leather is returned to the original condition without any visible sign that a repair has been carried out

Types of damage are:
Either a single area of damage or two areas of damage that are contained within a 10mm diameter

Tools

- hand tools
- power tools
- specialist SMART fabric repair kit tooling and accessories
- grain mats
- airbrush

Teaching Strategies And Learning Activities

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mechanisms put in place

Methods Of Assessment

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Evidence Of Achievement

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Knowledge of Materials, Fabrication, Tools and Measuring Devices Used In the Automotive Environment

Unit Reference	**K/601/6237**
Level	**2**
Credit Value	**4**
Guided Learning Hours	**40**
Unit Summary	This unit enables the learner to develop an understanding of • 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 automotive 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 Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.5)** ***The learner can***
1. Know how to select, use and care for hand tools and measuring devices in the automotive environment	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
2. Know how to prepare and use common workshop equipment	2.1 Describe the preparation and safe use of workshop equipment 2.2 Explain the term: safe working load
3. Know how to select materials when fabricating, modifying and repairing vehicles and fitting components	3.1 Describe the properties, application and limitations to include safe use of ferrous and non-ferrous metals 3.2 Describe the properties, application and limitations to include safe use of non-metallic materials 3.3 Define terms relating to the properties of materials

4. Know how to apply automotive engineering, fabrication and fitting principles when modifying and repairing vehicles and components	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: • gaskets and seals • sealants and adhesives • fittings and fasteners • 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
Mapping to National Occupational Standards Directly mapped to IMI SSC Generic NOS 2010, unit G4	

Supporting Unit Information

Knowledge of Materials, Fabrication, Tools and Measuring Devices Used In the Automotive Environment - K/601/6237 – Level 2

Indicative Content

Handtools. To include:

- files
- hacksaws and snips
- hammers
- screwdrivers
- pliers
- spanners
- sockets
- punches
- types of drill and drill bits
- taps and dies
- stud removers
- marking out tools

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

- rule or tape
- callipers
- feeler gauge
- volume measures
- micrometer
- dial gauges
- torque wrenches
- depth gauges

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

- ammeter
- voltmeter
- ohmmeter
- multi-meter

The preparation and safe and correct use of common electrical tools when measuring:

- voltage
- current
- resistance

The preparation and safe use of workshop equipment. To include:
- hydraulic jacks
- axle stands
- pillar drills
- air tools
- vehicle lifts
- cranes
- hoists
- electrical power tools
- appropriate PPE

The properties, application and limitations to include safe use of ferrous and non-ferrous metals. Materials to include:
- carbon steels
- alloy steels
- cast iron
- aluminium alloys
- brass
- copper
- lead

The properties, application and limitations to include safe use of non-metallic materials. Materials to include:
- glass
- plastics
- Kevlar
- rubber

Terms relating to the properties of materials. To include:
- hardness
- toughness
- ductility
- elasticity
- tenacity
- malleability
- plasticity

Automotive engineering principles used when:

- filing
- tapping threads
- cutting plastics and metals
- drilling plastics and metals
- fitting

Key fabrication principles. To include:
- marking out
- shaping and bending
- joining
- measuring

Selection and fitting procedures. To include:
- gaskets
- seals
- sealants
- fittings and fasteners
- electrical circuits
- joining materials

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Evidence Of Achievement

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Skills in Materials, Fabrication, Tools and Measuring Devices in the Automotive Environment

Unit Reference	**Y/601/6279**
Level	**2**
Credit Value	**7**
Guided Learning Hours	**60**
Unit Summary	This unit helps the learner to develop the skills required for • 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 Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.5)** ***The learner can***
1. Be able to select, maintain and use and hand tools and measuring devices in the automotive environment	1.1 Select, maintain and use suitable hand tools safely when fabricating and fitting in the automotive workplace 1.2 Select, maintain and use suitable measuring devices safely when fabricating and fitting in the automotive environment

	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
2. Be able to prepare and use common workshop equipment	2.1 Use suitably maintained workshop equipment safely 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
3. Be able to select materials when fabricating, modifying and repairing vehicles and fitting components	3.1 Select and use appropriate materials whilst constructing, fitting, modifying or repairing vehicles and components
4. Be able to apply automotive engineering, fabrication and fitting principles when modifying and repairing vehicles and components	4.1 Use correct procedures when • filing • tapping threads • cutting plastics and metals • drilling plastics and metals • fitting 4.2 Use appropriate techniques when fabricating,

	repairing and modifying vehicles and components 4.3 Select and use • gaskets • seals • sealants • fittings and fasteners 4.4 Apply modification and repair techniques to automotive electrical circuits 4.5 Select and use locking, fixing and fastening devices
Mapping to National Occupational Standards Directly mapped to IMI SSC Generic NOS 2010, unit G4	

Supporting Unit Information

Skills in Materials, Fabrication, Tools and Measuring Devices in the Automotive Environment - Y/601/6279 – Level 2

Indicative Content

- Produce evidence to show you meet all of the learning outcomes
  Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Produce evidence of undertaking basic routine checks of hand tools, measuring devices and workshop equipment covering all of those listed below:
  - electrical
  - mechanical
  - pneumatic
  - hydraulic
- Produce evidence of fabricating at least 1 item from suitable materials to known tolerances, which includes the following processes:
  - filing
  - tapping threads
  - cutting
  - drilling
  - joining
- Be observed by your assessor carrying out routine checks and during stages of fabrication

Teaching Strategies And Learning Activities

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Knowledge of How to Identify and Agree Motor Vehicle Customer Service Needs

Unit Reference	**R/601/6247**
Level	**3**
Credit Value	**5**
Guided Learning Hours	**45**
Unit Summary	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 Outcomes (1 to 3) ***The learner will***	**Assessment Criteria (1.1 to 3.4)** ***The learner can***
1. Know legislative and organisational requirements and procedures	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
2. Know how to communicate and care for customers	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
3. Know company products and services	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

Mapping to National Occupational Standards
Directly mapped to IMI SSC Generic NOS 2010, unit G8

Supporting Unit Information

Knowledge of How to Identify and Agree Motor Vehicle Customer Service Needs - R/601/6247 – Level 3

Indicative Content

Organisational requirements

- Explain the organisation's terms and conditions applicable to the acceptance of customer vehicles
- Explain the content and limitations of vehicle and component warranties for the vehicles dealt with by your organisation
- Detail what, if any, limits there are to the authority for accepting vehicles
- Detail why it is important to keep customers advised of progress and how this is achieved within the organisation
- 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

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

Company products and services

- Service standards
  - national
  - manufacturer

- organisational
- The range and type of services offered by the organisation
  - diagnostic
  - servicing
  - repair
  - warranty
  - MOT testing
  - fitment of accessories/enhancements
  - internal
- The courses of action available to resolve customer problems
  - the extent and nature of the work to be undertaken
  - the terms and conditions of acceptance
  - the cost
  - the timescale
  - required payment methods
- The effect of resource availability upon the receipt of customer vehicles and the completion of work
  - levels and availability of equipment
  - levels and availability of technicians
  - workshop loading systems
- How to access costing and work completion time information
  - manuals
  - computer based

Vehicle information systems, servicing and repair requirements

- accessing technical data including diagnostics
- servicing to manufacturer requirements/standards
- repair/operating procedures
- MOT standards/requirements
- quality controls – interim and final
- requirements for cleanliness of vehicle on return to customer
- handover procedures

Consumer legislation - to include:

- consumer protection
- sale of goods
- data protection
- product liability
- health and safety
- discrimination

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Skills to Identify and Agree Motor Vehicle Customer Service Needs

Unit Reference	**M/601/6286**
Level	**3**
Credit Value	**5**
Guided Learning Hours	**40**
Unit Summary	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 Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.3)** ***The learner can***
1. Be able to obtain relevant information from the customer	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
2. Be able to provide relevant information to the customer	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
3. Be able to agree work undertaken with the customer	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
4. Be able to ensure recording systems are implemented correctly	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
Mapping to National Occupational Standards Directly mapped to IMI SSC Generic NOS 2010, unit G8	

Supporting Unit Information

Skills to Identify and Agree Motor Vehicle Customer Service Needs - M/601/6286 – Level 3

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training
  workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Produce evidence, including records, to show that you have dealt with 3 different customers
- Be observed by your assessor on at least **1** occasion

Evidence from real activity or role-play is acceptable for this unit

Teaching Strategies And Learning Activities

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Knowledge of Routine Light Vehicle Maintenance

Unit Reference	**F/601/3716**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**20**
Unit Summary	This unit enables the learner to develop an understanding of conducting routine maintenance, adjustment and replacement activities as part of the periodic servicing of light vehicles
Learning Outcomes (1 to 2) ***The learner will***	**Assessment Criteria (1.1 to 2.2)** ***The learner can***
1. Understand how to carry out routine light vehicle maintenance	1.1 Explain how to conduct a scheduled light vehicle routine examination and assessment against the vehicle manufacturers specification 1.2 Identify the assessment methods used to check for conformity 1.3 Identify the different systems to be inspected while carrying out light vehicle routine maintenance • engine • chassis • wheels and tyres • transmission and driveline • electrical and electronic • exterior vehicle body • vehicle interior

	1.4 Describe the procedures used for checking the condition and serviceability 1.5 Describe the procedures for checking and replenishing fluid levels 1.6 Describe the procedures for checking and replacing lubricants 1.7 Identify adjustments that need to be carried out on a light vehicle routine maintenance 1.8 Explain the procedure for reporting cosmetic damage to vehicle components and units outside normal service items 1.9 Identify the operating specifications for the systems being checked while carrying out light vehicle routine maintenance
2. Understand the importance of carrying out light vehicle maintenance	2.1 Describe the requirements of correct maintenance in order to maintain the vehicle in a roadworthy and legal condition 2.2 Describe the importance of correct maintenance for warranty purposes
Mapping to National Occupational Standards Directly mapped to IMI SSC Maintenance and Repair – Light Vehicle NOS 2010, unit LV01	

Supporting Unit Information

Knowledge of Routine Light Vehicle Maintenance - F/601/3716 – Level 2

Indicative Content

- Vehicle maintenance, inspection and adjustment and record findings
- Vehicle inspection techniques used in routine maintenance including:
  - aural
  - visual and functional assessments on engine
  - engine systems
  - chassis systems
  - wheels and tyres
  - transmission system
  - electrical and electronic systems
  - exterior vehicle body
  - vehicle interior
- The procedures used for inspecting the condition and serviceability of the following:
  - filters
  - drive belts
  - wiper blades
  - brake linings
  - pads
  - tyres
  - lights
- Preparation and use appropriate use of equipment to include:
  - test instruments
  - emission equipment
  - wheel alignment
  - beam setting equipment
  - tyre tread depth gauges
- Procedures for checking and replenishing fluid levels:
  - oil
  - water
  - hydraulic fluids
- Procedures for checking and replacement of lubricants:
  - replace oil filters
  - check levels
  - types of oil

- cleanliness
- disposal of old oil and filters

- Procedures for carrying out adjustments on vehicle systems or components:
  - clearances
  - settings
  - alignment
  - operational performance (engine idle, exhaust gas)
- Procedures for checking electrical systems:
  - operation
  - security
  - performance
- Importance and process of detailed inspection procedures:
  - following inspection checklists
  - checking conformity to manufacturer's specifications
  - UK and European legal requirements
- Importance and process of completing all relevant documentation relating to routine maintenance:
  - inspection records
  - job cards
  - vehicle repair records
  - in-vehicle service history
- The need to use vehicle protection prior to repair
- Requirements and methods used for protecting:
  - vehicle body panels
  - paint surfaces
  - seats
  - carpets and floor mats
- The need to check the vehicle following routine maintenance
- The need to inspect the vehicle following routine maintenance:
  - professional presentation of vehicle
  - customer perceptions
- The checks of vehicle following routine maintenance:
  - removal of oil and grease marks
  - body panels
  - paint surfaces
  - seats
  - carpets and floor mats
  - re-instatement of components

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Skills in Routine Light Vehicle Maintenance

Unit Reference	**H/601/3871**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**20**
Unit Summary	This unit allows the learner to develop skills they can carry out light vehicle routine maintenance, adjustments and replacement activities as part of the periodic servicing of vehicles
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to work safely when carrying out light vehicle routine maintenance	1.1 Use suitable personal protective equipment and vehicle coverings throughout all light vehicle routine maintenance activities 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support light vehicle routine maintenance activities including • vehicle technical data • maintenance procedures • legal requirements 2.2 Use technical information to support light vehicle inspection activities

3. Be able to use appropriate tools and equipment	3.1 Select the appropriate tools and equipment necessary for carrying out routine maintenance 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 routine maintenance
4. Be able to carry out light vehicle routine maintenance	4.1 Carry out light vehicle maintenance using prescribed methods, adhering to the correct specifications and tolerances for the vehicle and following • the manufacturer's approved inspection methods • recognised researched inspection methods • health and safety requirements 4.2 Carry out adjustments, replacement of vehicle components and replenishment of consumable materials following the manufacturer's current specification 4.3 Ensure the examination methods identify accurately any vehicle system and or component problems falling outside the maintenance schedule are specified 4.4 Ensure any comparison of the vehicle against specification accurately identifies any • differences from the vehicle specification • vehicle appearance and condition faults • variation from legal requirements 4.5 Use suitable testing methods to evaluate the performance of all replaced and adjusted

	components and systems accurately
5. Be able to record information and make suitable recommendations	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 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Maintenance and Repair – Light Vehicle NOS 2010, unit LV01	

Supporting Unit Information

Skills in Routine Light Vehicle Maintenance - H/601/3871 – Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your
  training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Be observed by your assessor successfully carrying out servicing activities on at least 1 vehicle which collectively covers the learning outcomes

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place

Methods Of Assessment

This unit is internally assessed and internally and externally moderated.

Providers are encouraged to use innovative and stimulating assessment methods and to ensure there is an appropriate and manageable range, balance and volume of assessment across units. A number of units can be assessed via integrative assessment methods but it is essential that the evidence of achievement is clearly signposted and referenced. **Methods of assessment must include practical tasks.**

Sample assessment tasks are provided that may be used or adapted as appropriate. These are available on the SEG website

https://skillsandeducationgroup.co.uk/ Centres may wish to develop their own assessments for individual units or a number of units.

Minimum requirements when assessing this unit

SEG expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching

Evidence Of Achievement

All evidence must be clearly signposted and made available for the external moderator upon request

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the SEG web site)

Sample evidence checklists are available on the SEG website

Knowledge of Light Vehicle Engine Mechanical, Lubrication and Cooling System Units and Components

Unit Reference	**R/601/3719**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**20**
Unit Summary	This unit enables the learner to develop an understanding of the construction and operation of common engine mechanical, lubrication and cooling systems. It also covers the procedures involved in the removal and replacement of system components and the evaluation of their performance
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.4)** ***The learner can***
1. Understand how the main light vehicle engine mechanical systems operate	1.1 Identify light vehicle engine mechanical system components 1.2 Describe the construction and operation of light vehicle engine mechanical systems • four stroke • spark ignition • compression ignition • rotary 1.3 Compare key light vehicle engine mechanical system components and assemblies against

	alternatives to identify differences in construction and operation 1.4 Identify the key engineering principles that are related to light vehicle engine mechanical systems • compression ratio's • cylinder capacity • power • torque 1.5 State common terms used in light vehicle engine mechanical system design • tdc • bdc • stroke • bore
2. Understand how light vehicle engine lubrication systems operate	2.1 Identify light vehicle engine lubrication system components 2.2 Describe the construction and operation of light vehicle engine lubrication components and systems • full flow • by pass • wet sump • dry sump 2.3 Compare key light vehicle engine lubrication system components and assemblies to identify differences in construction and operation 2.4 Identify the key engineering principles that are related to light vehicle engine lubrication systems • classification of lubricants • properties of lubricants • methods of reducing friction

	2.5 State common terms used in light vehicle engine lubrication system design
3. Understand how light vehicle engine cooling, heating and ventilation systems operate	3.1 Identify light vehicle engine cooling, heating and ventilation system components 3.2 Describe the construction and operation of light vehicle engine cooling, heating and ventilation systems 3.3 Compare key light vehicle engine cooling, heating and ventilation system components and assemblies against alternatives to identify differences in construction and operation 3.4 Identify the key engineering principles that are related to light vehicle engine cooling, heating and ventilation systems • heat transfer • linear and cubical expansion • specific heat capacity • boiling point of liquids 3.5 State common terms used in key light vehicle engine cooling, heating and ventilation system design
4. Understand how to check, replace and test light vehicle engine mechanical, lubrication and cooling systems system units and components	4.1 Describe how to remove and replace engine mechanical, lubrication and cooling system units and components 4.2 Describe common types of testing methods used to check the operation of engine mechanical, lubrication and cooling systems and their purpose 4.3 Describe how to test and evaluate the performance of replacement units against vehicle specification

	4.4 Identify common faults found in light vehicle engine mechanical, lubrication and cooling systems and their causes
Mapping to National Occupational Standards Directly mapped to IMI SSC Maintenance and Repair – Light Vehicle NOS 2010, unit LV02	

Supporting Unit Information

Knowledge of Light Vehicle Engine Mechanical, Lubrication and Cooling System Units and Components - R/601/3719 – Level 2

Indicative Content

Engines

- Engine types and configurations:
  - inline
  - flat
  - vee
  - four-stroke cycle and two-stroke cycle for spark ignition and compression ignition engines
  - naturally aspirated and turbo-charged engines
  - hybrid fuel engines
- Relative advantages and disadvantages of different engine types and configurations
- Engine components and layouts:
  - single (OHC) and multi camshaft (DOHC)
  - single and multi cylinder (2, 4, 6, 8 cylinder types)
- Cylinder head layout and design, combustion chamber and piston design
- Calculate compression ratios from given data
- The procedures used when inspecting engines
- The procedures to assess:
  - serviceability
  - wear
  - condition
  - clearances
  - settings
  - linkages
  - joints
  - fluid systems
  - adjustments
  - operation and functionality
  - security
- Symptoms and faults associated with mechanical engine operation:
  - poor performance
  - abnormal or excessive mechanical noise

- erratic running
- low power
- exhaust emissions
- abnormal exhaust smoke
- unable to start
- exhaust gas leaks to cooling system
- exhaust gas leaks

Lubrication

- The advantages and disadvantages of wet and dry systems
- Engine lubrication system:
  - splash and pressurised systems
  - pumps
  - pressure relief valve
  - filters
  - oil ways
  - oil coolers
- Terms associated with lubrication and engine oil:
  - full-flow
  - hydrodynamic
  - boundary
  - viscosity
  - multi-grade
  - natural and synthetic oil
  - viscosity index
  - multi-grade
- The requirements and features of engine oil:
  - operating temperatures
  - pressures
  - lubricant grades
  - viscosity
  - multi-grade oil
  - additives
  - detergents
  - dispersants
  - anti-oxidants inhibitors
  - anti-foaming agents
  - anti-wear
  - synthetic oils
  - organic oils
  - mineral oils

- Symptoms and faults associated with lubrication systems:
  - excessive oil consumption
  - oil leaks
  - oil in water
  - low or excessive pressure
  - oil contamination
- The procedures used when inspecting lubrication system

Cooling, heating and ventilation

- The components, operating principles, and functions of engine cooling systems
- Procedures used to remove, replace and adjust cooling system components
  - cooling fans and control devices
  - header tanks, radiators and pressure caps
  - heater matrix's and temperature control systems
  - expansion tanks hoses, clips and pipes
  - thermostats impellers and coolant
  - ventilation systems
- The preparation and method of use of appropriate specialist equipment used to evaluate system performance following component replacement
  - system pressure testers
  - pressure cap testers
  - hydrometer, or anti-freeze testing equipment
  - chemical tests for the detection of combustion gas
- The layout and construction of internal heater systems
- The controls and connections within internal heater system
- Symptoms and faults associated with cooling systems:
  - water leaks
  - water in oil
  - internal heating system: efficiency, operation, leaks, controls, air filtration, air leaks and contamination
  - excessively low or high coolant temperature
- The procedures used when inspecting
  - internal heating system
  - cooling system

General

- The preparation, testing and use of tools and equipment used for:
  - dismantling

- removal and replacement of engine units and components
- Appropriate safety precautions:
  - PPE
  - vehicle protection when dismantling
  - removal and replacing engine units and components
- The important of logical and systematic processes
- The inspection and testing of engine units and components
- The preparation of replacement units for re-fitting or replacement
- The reasons why replacement components and units must meet the original specifications (OES) – warranty requirements, to maintain performance and safety requirements
- Refitting procedures
- The inspection and testing of units and system to ensure compliance with manufacturer's, legal and performance requirements
- The inspection and re-instatement of the vehicle following repair to ensure customer satisfaction:
  - cleanliness of vehicle interior and exterior
  - security of components and fittings
  - re-instatement of components and fittings

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place

Methods Of Assessment

This unit is internally assessed and internally and externally moderated.

Providers are encouraged to use innovative and stimulating assessment methods and to ensure there is an appropriate and manageable range, balance and volume of assessment across units. A number of units can be assessed via integrative assessment methods but it is essential that the evidence of achievement is clearly signposted and referenced. **Methods of assessment must include practical tasks.**

Sample assessment tasks are provided that may be used or adapted as appropriate. These are available on the SEG website https://skillsandeducationgroupawards.co.uk/. Centres may wish to develop their own assessments for individual units or a number of units.

Minimum requirements when assessing this unit

SEG expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching

Evidence Of Achievement

All evidence must be clearly signposted and made available for the external moderator upon request

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the SEG web site)

Sample evidence checklists are available on the SEG website

Knowledge of Light Vehicle Fuel, Ignition, Air and Exhaust System Units and Components

Unit Reference	**H/601/3725**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**20**
Unit Summary	This unit enables the learner to develop an understanding of the construction and operation of common fuel, ignition, air and exhaust systems. It also covers the procedures involved in the removal and replacement of system components and the evaluation of their performance
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.4)** ***The learner can***
1. Understand how light vehicle engine fuel systems operate	1.1 Identify light vehicle engine fuel system components 1.2 Describe the construction and operation of light vehicle engine fuel systems • multi point injection • single point injection 1.3 Compare key light vehicle engine fuel system components and assemblies against alternatives to identify differences in construction and operation 1.4 Identify the key engineering principles that are

	related to light vehicle engine fuel systems • properties of fuels • combustion processes • exhaust gas constituents 1.5 State common terms used in light vehicle engine fuel system design
2. Understand how light vehicle engine ignition systems operate	2.1 Identify light vehicle engine ignition system components 2.2 Describe the construction and operation of light vehicle engine ignition systems • distributor ignition systems • distributor less ignition systems 2.3 Compare key light vehicle engine ignition system components and assemblies against alternatives to identify differences in construction and operation 2.4 Identify the key engineering principles that are related to light vehicle engine ignition systems • flame travel • ignition timing 2.5 State common terms used in key light vehicle engine ignition system design
3. Understand how light vehicle engine air supply and exhaust systems operate	3.1 Identify light vehicle engine air supply and exhaust system components 3.2 Describe the construction and operation of light vehicle engine air supply and exhaust systems • supercharging • turbocharging • exhaust gas recirculation (EGR) • secondary air injection • catalytic converters

	3.3 Compare key light vehicle engine air supply and exhaust system components and assemblies against alternatives to identify differences in construction and operation 3.4 Identify the key engineering principles that are related to light vehicle engine air supply and exhaust systems • sound absorption • reduction of harmful emissions 3.5 State common terms used in key light vehicle engine air supply and exhaust system design
4. Understand how to check, replace and test light vehicle engine fuel system units and components	4.1 Describe how to remove and replace engine fuel, air supply and exhaust system units and components 4.2 Describe common types of testing methods used to check the operation of engine fuel, air supply and exhaust system systems and their purpose 4.3 Explain how to evaluate the performance of replacement units against vehicle specification 4.4 Explain common faults found in light vehicle fuel, air supply and exhaust systems and their causes
Mapping to National Occupational Standards Directly mapped to IMI SSC Maintenance and Repair – Light Vehicle NOS 2010, unit LV02	

Supporting Unit Information

Knowledge Of Light Vehicle Fuel, Ignition, Air And Exhaust System Units And Components - H/601/3725 – Level 2

Indicative Content

Fuel - Petrol

- The function and layout of petrol injection systems:
  - single and multi-point systems
  - injection components
  - injection pump
  - pump relay
  - injector valve
  - air flow sensor
  - throttle potentiometer
  - idle speed control valve
  - coolant sensor
  - MAP and air temperature sensors
  - mechanical control devices
  - electronic control units
- The operation of single and multi-point petrol injection systems and components:
  - injection pump
  - pump relay
  - injector valve
  - air flow sensor
  - throttle potentiometer
  - idle speed control valve
  - coolant sensor
  - MAP and air temperature sensors
  - electronic control units
  - fuel pressure regulators
  - fuel pump relays
  - lambda exhaust sensors
  - flywheel and camshaft sensors
  - air flow sensors (air flow meter and air mass meter)
  - EGR valve
- The procedures used when inspecting petrol system

Fuel – Diesel

- The layout and construction of inline and rotary diesel systems
- The principles and requirements of compression ignition engines
  - combustion chambers (direct and indirect injection)
- The function and operation of diesel fuel injection components:
  - fuel filters
  - sedimenters
  - injectors
  - injector types (direct and indirect injection)
  - single
  - multi-hole and pintle nozzle types
  - governors
  - fuel pipes
  - glow plugs
  - cold start devices
  - fuel cut-off solenoid
- The purpose and operation of:
  - turbochargers
  - construction
  - use of inter-coolers
- Explain the procedures for injection pump timing and bleeding the system
- The procedures used when inspecting diesel system

Fuel

- The meaning of terms related to:
  - hydro-carbon fuels
  - volatility
  - calorific value
  - flash point
  - octane value
  - cetane value
- The composition of hydro-carbon fuels:
  - % hydrogen and carbon in petrol and diesel fuels
- The composition of air (% nitrogen, oxygen), % of oxygen
- The chemically correct air/fuel ratio for petrol engines as 14.7:1 (lambda 1, stoichiometric ratio)
- Weak and rich air/fuel ratios for petrol engines
- Exhaust composition and by-products for chemically correct, rich and weak air/fuel ratios of petrol engines:
  - water vapour (H_2O)

- nitrogen (N)
- carbon monoxide (CO)
- carbon dioxide (CO_2)
- carbon (C)
- hydrocarbon (HC)
- oxides of nitrogen (NOx, NO_2, NO) and particulates

- The relative advantages and disadvantages of diesel and petrol engines
- Symptoms and faults associated with fuel systems
  - diesel fuel system: air in fuel system, water in fuel, filter blockage, leaks, difficult starting, erratic running, excessive smoke (black, blue, white), engine knock, turbocharger faults
  - petrol injection system: leaks, erratic running, excessive smoke, poor starting, poor performance, poor fuel economy, failure to start, exhaust emissions, running-on, excessive fuel consumption and surging

Ignition

- The layout of electronic ignition systems, advantages over conventional systems (points)
- Electronic ignition circuits and components:
  - LT Circuit
  - battery
  - ignition switch
  - electronic trigger devices
  - capacitor
  - HT Circuit
  - spark plugs (reach, heat range, electrode features and electrode polarity)
  - rotor arm
  - distributor (if applicable)
  - distributor cap
  - ignition leads
  - ignition coil
  - ignition timing advance system
- The operation electronic system components:
  - amplifiers
  - triggering systems
  - inductive pick-ups
  - hall generators
  - optical pulse generators

- control units
- The operation of amplifier units
- Ignition terminology:
  - dwell angle
  - dwell time
  - dwell variations
  - advance and retard of ignition timing
  - static and dynamic ignition timing
- The operation of electronic ignition systems under various conditions and loads to include:
  - engine idling
  - during acceleration
  - under full load
  - cruising
  - overrun
  - cold starting
- The principles of engine management systems:
  - closed loop system
  - integrated ignition
  - injection systems
  - sensors
- The procedures used when inspecting
  - ignition system
  - engine management
  - sensors
- Symptoms and faults associated with ignition system operation
  - failure to start hot or cold, erratic running, poor performance, misfire, exhaust emissions misfiring and ignition noise (pinking)

Air supply and exhaust systems

- The construction and purpose of air filtration systems
- The operating principles of air filtration systems
- The construction and purpose of the exhaust systems
- The operating principles of the systems
- Exhaust system design to include silencers and catalytic converters
- The procedures used when inspecting induction, air filtration and exhaust systems
- Symptoms and faults associated with air and exhaust systems
  - exhaust gas leaks
  - air leaks

General

- The preparation, testing and use of tools and equipment used for:
  - dismantling
  - removal and replacement of engine units and components
- Appropriate safety precautions:
  - PPE
  - vehicle protection when dismantling
  - removal and replacing engine units and components
- The important of logical and systematic processes
- The inspection and testing of engine units and components
- The preparation of replacement units for re-fitting or replacement
- The reasons why replacement components and units must meet the original specifications (OES) – warranty requirements, to maintain performance and safety requirements.
- Refitting procedures.
- The inspection and testing of units and system to ensure compliance with manufacturer's, legal and performance requirements.
- The inspection and re-instatement of the vehicle following repair to ensure customer satisfaction:
  - cleanliness of vehicle interior and exterior
  - security of components and fittings
  - re-instatement of components and fittings

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place

Methods Of Assessment

This unit is internally assessed and internally and externally moderated.

Providers are encouraged to use innovative and stimulating assessment methods and to ensure there is an appropriate and manageable range, balance and volume of assessment across units. A number of units can be

assessed via integrative assessment methods but it is essential that the evidence of achievement is clearly signposted and referenced. **Methods of assessment must include practical tasks.**

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Minimum requirements when assessing this unit

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Evidence Of Achievement

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Sample evidence checklists are available on the SEG website

Skills in Removing and Replacing Light Vehicle Engine Units and Components

Unit Reference	**K/601/3872**
Level	**2**
Credit Value	**5**
Guided Learning Hours	**45**
Unit Summary	This unit allows the learner to develop skills to remove and replace light vehicle engine system components. It also covers the evaluation of performance of the replaced units and systems
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to work safely when carrying out removal and replacement activities	1.1 Use suitable personal protective equipment and vehicle coverings throughout all light vehicle engine unit and component 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
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support light vehicle engine unit and component removal and replacement activities including • vehicle technical data • removal and replacement procedures

	• legal requirements 2.2 Use technical information to support light vehicle engine unitand component removal and replacement activities
3. Be able to use appropriate tools and equipment	3.1 Select the appropriate tools and equipment necessary for removal and replacement of light vehicle engine systems 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 to remove and replace light vehicle engine systems
4. Be able to carry out removal and replacement of light vehicle engine mechanical, lubrication and cooling units and components	4.1 Remove and replace the light vehicle's engine systems and components, adhering to the correct specifications and tolerances for the vehicle and following • the manufacturer's approved removal and replacement methods • recognised researched repair methods • health and safety requirements 4.2 Ensure that replacement light vehicle engine units and components conform to the vehicle operating specification and any legal requirements 4.3 Use suitable testing methods to evaluate the performance of the reassembled system 4.4 Ensure that the reassembled light vehicle engine systems performs to the vehicle operating specification and meets any legal requirements

5. Be able to record information and make suitable recommendations	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 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Maintenance and Repair – Light Vehicle NOS 2010, unit LV02	

Supporting Unit Information

Skills In Removing And Replacing Light Vehicle Engine Units And Components - K/601/3872 – Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Be observed by your assessor successfully carrying out the removal and replacement of engine mechanical units and components from 3 different systems out of the 5 listed below:
  - engine mechanical systems
  - cooling systems
  - air supply and exhaust systems
  - engine management
  - lubrication systems (not including standard external filters)

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place

Methods Of Assessment

This unit is internally assessed and internally and externally moderated.

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evidence of achievement is clearly signposted and referenced. **Methods of assessment must include practical tasks.**

Sample assessment tasks are provided that may be used or adapted as appropriate. These are available on the SEG website https://skillsandeducationgroupawards.co.uk/. Centres may wish to develop their own assessments for individual units or a number of units.

Minimum requirements when assessing this unit

SEG expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching

Evidence Of Achievement

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All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the SEG web site)

Sample evidence checklists are available on the SEG website

Knowledge of Removing and Replacing Light Vehicle Electrical Units and Components

Unit Reference	**T/601/3731**
Level	**2**
Credit Value	**6**
Guided Learning Hours	**45**
Unit Summary	This unit enables the learner to develop an understanding of the principles, construction and operation and testing methods of common electrical and electronic systems and components. It also covers the procedures involved in the removal and replacement of system components and the evaluation of their performance
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.4)** ***The learner can***
1. Understand light vehicle electrical and electronic principles	1.1 Identify electrical symbols and units found in light vehicle circuits 1.2 Describe how to interpret simple light vehicle wiring diagrams 1.3 Describe the operation of key light vehicle circuit protection devices and why these are necessary 1.4 Describe earthing principles and earthing methods

	1.5 Identify the use of different cables and connectors used in light vehicle circuits 1.6 Describe the operation of electrical and electronic sensors and actuators and their application 1.7 Describe the key electrical and electronic control principles that are related to light vehicle electrical circuits 1.8 State common terms used in light vehicle electrical circuits
2. Understand how light vehicle batteries, starting and charging systems operate	2.1 Identify light vehicle batteries, starting and charging system components 2.2 Describe the construction and operation of light vehicle batteries, starting and charging system components 2.3 Describe how to remove and replace batteries, starting and charging system units and components 2.4 Compare light vehicle batteries, starting and charging system components and assemblies against alternatives to identify differences in construction and operation 2.5 State common terms used in conjunction with light vehicle batteries, starting and charging systems
3. Understand how light vehicle auxiliary electrical systems operate	3.1 Identify light vehicle auxiliary system components 3.2 Describe the construction and operation of light vehicle auxiliary systems. Auxiliary

	systems to include • lighting • wiper • security and alarm • comfort and convenience • information and entertainment • telephone and two-way communication • electric window • monitoring and instrumentation 3.3 Compare key light vehicle auxiliary system components and assemblies against alternatives to identify differences in construction and operation 3.4 State common terms used in light vehicle auxiliary system design
4. Understand how to check, replace and test light vehicle electrical systems and components	4.1 Describe how to remove and replace light vehicle electrical system units and components 4.2 Describe common types of testing methods used to check the operation of light vehicle electrical systems and components and their purpose 4.3 Explain how to test and evaluate the performance of replacement units against specifications 4.4 Identify common faults found in light vehicle electrical systems and components
Mapping to National Occupational Standards Directly mapped to IMI SSC Maintenance and Repair – Light Vehicle NOS 2010, unit LV03	

Supporting Unit Information

Knowledge of Removing and Replacing Light Vehicle Electrical Units and Components - T/601/3731 – Level 2

Indicative Content

Electrical/electronic principles

- Electrical units:
  - volt (electrical pressure)
  - i- ampere (electrical current)
  - i- ohm (electrical resistance)
  - watt (power)
- The requirements for an electrical circuit:
  - battery
  - cables
  - switch
  - current consuming device
  - continuity
- The direction of current flow and electron flow
- Series and parallel circuits to include:
  - current flow
  - voltage of components
  - volt drop
  - resistance
  - the effect on circuit operation of open circuit component(s)
- Earth and insulated return systems
- Cable sizes and colour codes
- Different types of connectors, terminals and circuit protection devices
- Common electrical and electronic symbols
- The meaning of:
  - short circuit
  - open circuit
  - bad earth
  - high resistance
  - electrical capacity
- The principles of vehicle electronic systems and component
- Interpret vehicle wiring diagrams to include:
  - vehicle lighting
  - auxiliary circuits

- indicators
- starting and charging systems

- Function and construction of electrical components including:
  - circuit relays
  - bulb types
  - fan and heater
  - circuit protection
- The safety precautions when working on electrical and electronic systems to include:
  - disconnection and connection of battery
  - avoidance of short circuits
  - power surges
  - prevention of electric shock
  - protection of electrical and electronic components
  - protection of circuits from overload or damage
- The set-up and use of:
  - digital and analogue multi-meters
  - voltmeter
  - ammeter
  - ohmmeter
  - oscilloscope
  - manufacturer’s dedicated test equipment
- Electrical and electronic checks for electrical and electronic systems to include:
  - connections
  - security
  - functionality
  - performance to specifications
  - continuity, open circuit
  - short circuit
  - high resistance
  - volt drop
  - current consumption
  - output patterns (oscilloscope)
- Symptoms and faults associated with electrical and electronic systems to include:
  - high resistance
  - loose and corroded connections
  - short circuit
  - excessive current consumption
  - open circuit

- malfunction
- poor performance
- battery faults to include flat battery
- failure to hold charge
- low state of charge
- overheating
- poor starting

Battery and charging

- The construction and operation of vehicle batteries including:
  - low maintenance and maintenance free
  - lead acid and nickel cadmium types
  - cells
  - separators
  - plates
  - electrolyte
- The operation of the vehicle charging system:
  - alternator
  - rotor
  - stator
  - slip ring
  - brush assembly
  - three phase output
  - diode rectification pack
  - voltage regulation
  - phased winding connections
  - cooling fan
  - alternator drive system

Starting

- The layout, construction and operation of engine starting systems: inertia and pre-engaged principles
- The function and operation of the following components:
  - inertia and pre-engaged starter motor
  - starter ring gear
  - pinion
  - starter solenoid
  - ignition/starter switch
  - starter relay (if appropriate)
  - one-way clutch (pre-engaged starter motor)

Lighting

- Function and construction of electrical components including:
  - front and tail lamps
  - main and dip beam headlamps
  - fog and spot lamps
  - lighting and dip switch
  - directional indicators
- The circuit diagram and operation of components for:
  - side and tail lamps
  - headlamps
  - interior lamps
  - fog and spot lamps
  - direction indicators
- The statutory requirements for vehicle lighting when using a vehicle on the road
- Headlamp adjustment and beam setting

Auxiliary Systems

- Function and construction of electrical components including:
  - central door locking
  - anti theft devices
  - manual locking and dead lock systems
  - window winding
  - demisting systems
  - door mirror operation mechanisms
  - interior lights and switching
  - sun roof operation
- The circuit diagram and operation of components for:
  - central door locking
  - anti theft devices
  - manual locking and dead lock systems
  - window winding
  - demisting systems
  - door mirror operation mechanisms
  - sun roof operation
- Comfort and convenience systems to include:
  - heated seats
  - electrically adjusted seats
  - heated screens
  - electric mirrors

- heating
- climate control
- air conditioning

General

- The preparation, testing and use of:
  - tools and equipment
  - electrical meters and equipment used for dismantling
  - removal and replacement of electrical and electronic systems and components
- Appropriate safety precautions:
  - PPE
  - vehicle protection when dismantling
  - removal and replacing electrical and electronic components and systems
- The important of logical and systematic processes
- Preparation of replacement units for re-fitting or replacement electrical and electronic components and systems
- The reasons why replacement components and units must meet the original specifications (OES) – warranty requirements, to maintain performance, safety requirements
- Refitting procedures
- The inspection and testing of units and systems to ensure compliance with manufacturer's, legal and performance requirements.
- Inspection and re-instatement of the vehicle following repair to ensure:
  - customer satisfaction
  - cleanliness of vehicle interior and exterior
  - security of components and fittings
  - re-instatement of components and fittings

Teaching Strategies And Learning Activities

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Methods Of Assessment

This unit is internally assessed and internally and externally moderated.

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Sample assessment tasks are provided that may be used or adapted as appropriate. These are available on the SEG website https://skillsandeducationgroupawards.co.uk/. Centres may wish to develop their own assessments for individual units or a number of units.

Minimum requirements when assessing this unit

SEG expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching

Evidence Of Achievement

All evidence must be clearly signposted and made available for the external moderator upon request

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Sample evidence checklists are available on the SEG website

Skills in Removing and Replacing Light Vehicle Electrical Units and Components

Unit Reference	**T/601/3874**
Level	**2**
Credit Value	**5**
Guided Learning Hours	**45**
Unit Summary	This unit allows the learner to develop skills to remove and replace motor vehicle electrical system components. It also covers the evaluation of performance of the replaced units and systems
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.4)** ***The learner can***
1. Be able to work safely when carrying out removal and replacement activities	1.1 Use suitable personal protective equipment and vehicle coverings when working on light vehicle electrical systems and components 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support light vehicle electrical unit and component removal and replacement activities including • vehicle technical data • removal and replacement procedures • legal requirements

	2.2 Use technical information to support light vehicle electrical unit and component removal and replacement activities
3. Be able to use appropriate tools and equipment	3.1 Select the appropriate tools and equipment necessary for removal and replacement of motor vehicle electrical system components 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 to remove and replace motor vehicle electrical systems
4. Be able to carry out removal and replacement of light vehicle electrical units and components	4.1 Remove and replace the motor vehicle's electrical systems and components, adhering to the specifications and tolerances for the vehicle and following • the manufacturer's approved removal and replacement methods • recognised researched repair methods • health and safety requirements 4.2 Ensure that replacement motor vehicle electrical units and components conform to the vehicle operating specification and any legal requirements 4.3 Use suitable testing methods to evaluate the performance of the reassembled system 4.4 Ensure that the reassembled motor vehicle electrical systems performs to the vehicle operating specification and meets any legal requirements

5. Be able to record information and make suitable recommendations	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 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Maintenance and Repair – Light Vehicle NOS 2010, unit LV03	

Supporting Unit Information

Skills in Removing and Replacing Light Vehicle Electrical Units and Components - T/601/3874 - Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
  - Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Produce evidence of carrying out the removal and replacement of vehicle electrical units and components from:
  - engine starting systems
  - engine charging systems

Plus 2 different systems out of the 8 listed below:

- lighting
- wiper
- security and alarm
- comfort and convenience
- information and entertainment
- telephone and two-way communication
- electric window systems
- monitoring and instrumentation systems

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Minimum requirements when assessing this unit

SEG expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching

Evidence Of Achievement

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Sample evidence checklists are available on the SEG website

Knowledge of Removing and Replacing Light Vehicle Chassis Units and Components

Unit Reference	**A/601/3732**
Level	**2**
Credit Value	**6**
Guided Learning Hours	**45**
Unit Summary	This unit enables the learner to develop an understanding of the construction and operation of common steering, suspension and braking systems (including wheels and tyres). It also covers the procedures involved in the removal and replacement of system components and the evaluation of their performance
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.4)** ***The learner can***
1. Understand how light vehicle steering and suspension systems operate	1.1 Identify light vehicle steering and suspension system components 1.2 Describe the construction and operation of light vehicle steering and suspension systems 1.3 Compare key light vehicle steering and suspension system components and assemblies against alternatives to identify differences in construction and operation 1.4 Identify the key engineering principles that are related to light vehicle steering and suspension

	systems • steering angles • hydraulic forces • stress and strains 1.5 State common terms used in light vehicle steering and suspension system design
2. Understand how light vehicle braking systems operate	2.1 Identify light vehicle braking system components 2.2 Describe the construction and operation of light vehicle braking systems 2.3 Compare key light vehicle braking system components and assemblies against alternatives to identify differences in construction and operation 2.4 Identify the key engineering principles that are related to light vehicle braking systems • laws of friction • hydraulics • pneumatics • properties of fluids • properties of air • braking efficiency 2.5 State common terms used in light vehicle braking system design
3. Understand how light vehicle wheel and tyres systems operate	3.1 Identify light vehicle wheel and tyre components 3.2 Describe the construction and operation of light vehicle wheels and tyres 3.3 Compare key light vehicle wheel and tyre components and assemblies against

	alternatives to identify differences in construction and operation 3.4 Identify the key engineering principles that are related to light vehicle wheel and tyre systems • friction • un-sprung weight • dynamic and static balance 3.5 State common terms used in light vehicle wheel and tyre design
4. Understand how to check, replace and test light vehicle chassis units and components	4.1 Describe how to remove and replace chassis units and components 4.2 Describe common types of testing methods used to check the operation of chassis units and components and their purpose 4.3 Explain how to evaluate the performance of replacement units against vehicle specification 4.4 Identify common faults found in light vehicle chassis units and components
Mapping to National Occupational Standards Directly mapped to IMI SSC Maintenance and Repair – Light Vehicle NOS 2010, unit LV04	

Supporting Unit Information

Knowledge of Removing and Replacing Light Vehicle Chassis Units and Components - A/601/3732 - Level 2

Indicative Content

Steering

- The action and purpose of steering geometry:
  - castor angle
  - camber angle
  - kingpin or swivel pin inclination
  - negative offset
  - wheel alignment (tracking) (toe in and toe out)
  - toe out on turns
  - steered wheel geometry
- The following terms associated with steering:
  - Ackerman principle
  - slip angles
  - self-aligning torque oversteer and understeer
  - neutral steer
- The components and layout of hydraulic power steering systems:
  - piston and power cylinders
  - drive belts and pumps
  - hydraulic valve (rotary, spool and flapper type)
  - hydraulic fluid
- The advantages of power assisted steering
- The operation of hydraulic power steering
- The principles of electronic power steering systems
- The procedures used for inspecting the serviceability and condition of:
  - manual steering
  - power steering
- Steering system defects to include:
  - uneven tyre wear
  - wear on outer edge of tyre
  - wear on inner edge of tyre
  - uneven wear
  - flats on tread
  - steering vibrations
  - wear in linkage

- damage linkage
- incorrect wheel alignment
- incorrect steering geometry

Suspension

- The layout and components of suspension systems:
  - non-independent suspensions
  - independent front suspension (IFS)
  - independent rear suspension (IRS)
  - hydraulic
  - hydro-pneumatic
  - rigid axle types
- The operation of suspension systems and components:
  - leaf and coil springs
  - torsion bar
  - rubber springs
  - Macpherson strut system
  - hydraulic
  - hydro-pneumatic
  - hydraulic dampers
  - trailing arms
  - wish bones
  - ball joints
  - track control arms
  - bump stops
  - anti-roll bars
  - stabiliser bars
  - swinging arms
  - parallel link
  - swinging half-axles
  - transverse link
  - semi-swinging arms
- The advantages of different systems including:
  - non-independent
  - independent suspension (IFS)
  - independent suspension (IRS)
  - hydraulic
  - hydro-pneumatic
  - rigid axle
- The principles of electronic suspensions systems
- The forces acting on suspension systems during braking, driving and

cornering

- The methods of locating the road wheels against braking, driving and cornering forces
- The methods of controlling cornering forces by fitting anti-roll torsion members
- Suspension terms:
  - rebound
  - bump
  - float
  - dive
  - pitch
  - roll
  - compliance
- The procedures used for inspecting the serviceability and condition of the suspension system
- Suspension system defects:
  - wheel hop
  - ride height (unequal and low)
  - wear
  - noises under operation
  - fluid leakage
  - excessive travel
  - excessive tyre wear
  - bounce
  - poor vehicle handling
  - worn dampers
  - worn joints
  - damaged linkages

Brakes

- The construction and operation of drum brakes:
  - leading and trailing shoe construction
  - self-servo action
  - automatic adjusters
  - backing plates
  - parking brake system
- The construction and operation of disc brakes:
  - disc pads
  - calliper
  - brake disc
  - ventilated disc

- disc pad retraction
- parking brake system
- electrical and electronic components
- wear indicators and warning lamps

- The construction and operation of the hydraulic braking system:
  - single and dual line layout
  - master cylinders
  - wheel cylinders
  - disc brake calliper and pistons
  - brake pipe
  - brake servo
  - warning lights
  - parking brakes
  - equalising valves
- The principles and components of electronic ABS systems, electrical and electronic components.
- The requirements and hazards of brake fluid:
  - boiling point
  - hygroscopic action
  - manufacturer’s change periods
  - fluid classification and rating
  - potential to damage paint surfaces
  - Terms associated with mechanical and hydraulic braking systems:
  - braking efficiency
  - brake fade
  - brake balance
  - ABS
- The procedures used for inspecting the serviceability and condition of the braking system
- Braking system defects:
  - worn shoes or pads
  - worn or scored brake surfaces
  - abnormal brake noises
  - brake judder
  - fluid contamination of brake surfaces
  - fluid leaks
  - pulling to one side
  - poor braking efficiency
  - lack of servo assistance
  - brake drag
  - brake grab

- brake fade

Wheel and tyres

- The construction of different types of tyre:
  - radial
  - cross ply
  - bias belted
  - tread patterns
  - tyre mixing regulations
  - tyre applications
- Tyre markings:
  - tyre and wheel size markings
  - speed rating
  - direction of rotation
  - profile
  - load rating
  - ply rating
  - tread-wear indicators
- Wheel construction:
  - light alloy
  - pressed steel and wire wheels
  - flat-edge and double hump rims
- Types of wheel bearing arrangements:
  - non-driving
- Types of bearing used for wheel bearing arrangements:
  - roller
  - taper roller
  - needle
  - ball and plain
- The procedures used for inspecting the serviceability and condition of:
  - tyres and wheels
  - bearings
- The defects associated with tyres and wheels:
  - abnormal tyre wear
  - cuts
  - side wall damage
  - wheel vibrations
  - tyre noise (squeal during cornering)
  - tyre over heating (low pressure)
  - tread separation

General

The procedures for dismantling, removal and replacement of chassis system components

- The preparation:
  - testing and use of tools and equipment
  - electrical meters and equipment used for dismantling
  - removing and replacing chassis systems and components
- Appropriate safety precautions:
  - PPE
  - vehicle protection when dismantling
  - removing and replacing chassis systems and components
- The important of logical and systematic processes.
- The inspection and testing of chassis systems and components.
- The preparation of replacement units for re-fitting or replacement of chassis systems or components.
- Identify the reasons why replacement components and units must meet the original specifications (OES):
  - warranty requirements
  - to maintain performance
  - safety requirements
- Refitting procedures
- The inspection and testing of units and systems to ensure compliance with manufacturer's, legal and performance requirements
- The inspection and re-instatement of the vehicle following repair to ensure customer satisfaction:
  - cleanliness of vehicle interior and exterior
  - security of components and fittings
  - re-instatement of components and fittings

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Minimum requirements when assessing this unit

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Evidence Of Achievement

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Sample evidence checklists are available on the SEG website

Skills in Removing and Replacing Light Vehicle Chassis Units and Components

Unit Reference	**F/601/3876**
Level	**2**
Credit Value	**5**
Guided Learning Hours	**45**
Unit Summary	This unit allows the learner to develop skills to remove and replace light vehicle steering, suspension and braking units (including wheels and tyres). It also covers the evaluation of performance of the replaced units and systems
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to work safely when carrying out removal and replacement activities	1.1 Use suitable personal protective equipment and vehicle coverings throughout all light vehicle chassis unit and component 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
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support light vehicle chassis unit and component removal and replacement activities including • vehicle technical data

	• removal and replacement procedures • legal requirements 2.2 Use technical information to support light vehicle chassis unit and component removal and replacement activities
3. Be able to use appropriate tools and equipment	3.1 Select the appropriate tools and equipment necessary for removal and replacement of light vehicle chassis systems including • steering • suspension • braking • wheels and tyres 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 to remove and replace light vehicle chassis systems
4. Be able to carry out removal and replacement of light vehicle chassis units and components	4.1 Remove and replace the light vehicle's chassis systems and components, adhering to the correct specifications and tolerances for the vehicle and following • the manufacturer's approved removal and replacement methods • recognised researched repair methods • health and safety requirements. 4.2 Ensure that replacement light vehicle chassis units and components conform to the vehicle operating specification and any legal requirements 4.3 Use suitable testing methods to evaluate the performance of the reassembled system

	4.4 Ensure that the reassembled light vehicle chassis system performs to the vehicle operating specification and meets any legal requirements
5. Be able to record information and make suitable recommendations	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 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Maintenance and Repair – Light Vehicle NOS 2010, unit LV04	

Supporting Unit Information

Skills in Removing and Replacing Light Vehicle Chassis Units and Components - F/601/3876 – Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre.
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Be observed by your assessor successfully carrying out the removal and replacement of different units or components – one from each system. Your evidence must include demonstration of skill in each aspect of mechanical and hydraulic/fluid units or component removal and replacement
  - steering
  - suspension
  - braking

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Sample evidence checklists are available on the SEG website

Knowledge of Inspecting Light Vehicles Using Prescribed Methods

Unit Reference	**H/601/3742**
Level	**2**
Credit Value	**4**
Guided Learning Hours	**40**
Unit Summary	This unit enables the learner to develop an understanding of carrying out a range of inspections on light vehicles using a variety of prescribed testing and inspection methods
Learning Outcomes (1 to 1) ***The learner will***	**Assessment Criteria (1.1 to 1.10)** ***The learner can***
1. Understand how to carry out inspections on light vehicle using prescribed methods	1.1 Explain the difference between the various prescribed light vehicle inspection methods to include • pre-work • post-work • pre-delivery • maintenance inspection (brake, seasonal and tyre) 1.2 Identify the different systems to be inspected when using the prescribed inspection methods 1.3 Identify the procedures involved in carry out the systematic inspection of the prescribed inspection methods on light vehicles

	1.4 Identify correct conformity of vehicle systems and condition on light vehicles inspections 1.5 Compare test and inspection results against light vehicle specification and legal requirements 1.6 Explain how to record and complete the inspection results in the format required 1.7 Identify the recommendations that can be made based on results of the light vehicle inspections 1.8 Explain the implications of failing to carry out light vehicle inspections activities correctly 1.9 Explain the implications of signing workplace documentation and vehicle records 1.10 Explain the procedure for reporting cosmetic damage to light vehicle components and units outside normal inspection items
Mapping to National Occupational Standards Directly mapped to IMI SSC Maintenance and Repair – Light Vehicle NOS 2010, units LV05 & LV06	

Supporting Unit Information

Knowledge of Inspecting Light Vehicles Using Prescribed Methods - H/601/3742 – Level 2

Indicative Content

Pre and post work vehicle inspections and record findings

- PPE and vehicle protection relating to:
  - vehicle body panels
  - paint surfaces
  - seats
  - carpets and floor mats prior to conduction vehicle inspections
- Pre and post work vehicle inspection procedures:
  - aural
  - visual and functional assessments on engine
  - engine systems
  - chassis systems
  - wheels and tyres
  - transmission system
  - electrical and electronic systems
  - exterior vehicle body
  - vehicle interior
- The methods for carrying out inspections for: damage, corrosion, fluid leaks, wear, security, mounting security and condition to include:
  - engines and engine systems
  - chassis systems
  - brakes
  - steering
  - suspension
  - wheels
  - tyres
  - body panels
  - electrical and electronic systems and components
  - vehicle seating and vehicle interior
  - vehicle instrumentation
  - driver controls
- Check conformity to manufacturer’s specifications and legal requirements.

- Completion of documentation to include:
  - inspection records
  - job cards
  - vehicle records
- Make recommendations based on results of vehicle inspections
- The checks necessary to ensure customer satisfaction for:
  - vehicle body panels
  - paint surfaces
  - seats
  - carpets and floor mats following pre or post vehicle inspections
- Prepare and use appropriate inspection equipment and tools
- Inspection procedures following inspection checklists

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Minimum requirements when assessing this unit

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Evidence Of Achievement

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Skills in Inspecting Light Vehicles Using Prescribed Methods

Unit Reference	**A/601/3889**
Level	**2**
Credit Value	**4**
Guided Learning Hours	**40**
Unit Summary	This unit allows the learner to develop skills to carry out a range of light vehicle inspections on vehicles using a variety of prescribed testing and inspection methods
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to work safely when carrying out light vehicle inspections using prescribed methods	1.1 Use suitable personal protective equipment and vehicle coverings throughout all light vehicle inspection activities 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support light vehicle inspection activities including • vehicle technical data • inspection procedures • legal requirements

	2.2 Use technical information to support light vehicle inspection activities
3. Be able to use appropriate tools and equipment	3.1 Select the appropriate tools and equipment necessary for carrying out a range of inspections on light vehicle systems 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 a range of inspections on light vehicle systems
4. Be able to carry out light vehicle inspections using prescribed methods	4.1 Carry out light vehicle inspections using prescribed methods, adhering to the correct specifications and tolerances for the vehicle and following • the manufacturer's approved inspection methods • recognised researched inspection methods • health and safety requirements 4.2 Ensure that inspected light vehicle conforms to the vehicle operating specification and any legal requirements 4.3 Ensure any comparison of the vehicle against specification accurately identifies any • differences from the vehicle specification • vehicle appearance and condition faults 4.4 Use suitable testing methods to evaluate the performance of the inspected systems
5. Be able to record information and make suitable	5.1 Produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required

recommendations	5.2 Make suitable and justifiable recommendations for cost effective repairs 5.3 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Maintenance and Repair – Light Vehicle NOS 2010, units LV05 and LV06	

Supporting Unit Information

Skills in Inspecting Light Vehicles Using Prescribed Methods - A/601/3889 – Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre.
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Be observed by your assessor successfully carrying out at least 1 different inspection from the following**:**
  - pre and post - work inspection
  - pre-delivery inspection
  - pre-purchase inspection
  - pre-MOT test inspection
  - safety inspection
  - post repair inspection

Teaching Strategies And Learning Activities

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Methods Of Assessment

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assessed via integrative assessment methods but it is essential that the evidence of achievement is clearly signposted and referenced. **Methods of assessment must include practical tasks.**

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Minimum requirements when assessing this unit

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Evidence Of Achievement

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Sample evidence checklists are available on the SEG website

Knowledge of Light Vehicle Transmission and Driveline Units and Components

Unit Reference	**Y/601/3740**
Level	**2**
Credit Value	**6**
Guided Learning Hours	**45**
Unit Summary	This unit enables the learner to develop an understanding of the construction and operation of common transmission and driveline systems. It also covers the procedures involved in the removal and replacement of system components and the evaluation of their performance
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.4)** ***The learner can***
1. Understand how light vehicle clutch systems operate	1.1 Identify light vehicle clutch system components 1.2 Describe the construction and operation of light vehicle clutch systems 1.3 Compare key light vehicle clutch system components and assemblies against alternatives to identify differences in construction and operation 1.4 Identify the key engineering principles that are related to light vehicle clutch systems to include • principles of friction

	• principle of levers • torque transmission 1.5 State common terms used in light vehicle clutch system design
2. Understand how light vehicle manual gearbox systems operate	2.1 Identify light vehicle manual gearbox system components 2.2 Describe the construction and operation of light vehicle manual gearbox systems 2.3 Compare key light vehicle manual gearbox system components and assemblies against alternatives to identify differences in construction and operation 2.4 Identify the key engineering principles that are related to light vehicle manual gearbox systems • gear ratios • torque multiplication 2.5 State common terms used in light vehicle manual gearbox system design
3. Understand how light vehicle driveline systems operate	3.1 Identify light vehicle driveline components 3.2 Describe the construction and operation of light vehicle driveline systems 3.3 Compare key light vehicle driveline components and assemblies against alternatives to identify differences in construction and operation 3.4 Identify the key engineering principles that are related to light vehicle driveline systems • final drive and overall gear ratios

	• simple stresses 3.5 State common terms used in light vehicle driveline design
4. Understand how to check, replace and test transmission and driveline units and components	4.1 Describe how to remove and replace transmission and driveline system units and components 4.2 Describe common types of testing methods used to check the operation of transmission and driveline systems and their purpose 4.3 Explain how evaluate the performance of replacement units against vehicle specification 4.4 Identify common faults found in light vehicle transmission and driveline systems and their causes
Mapping to National Occupational Standards Directly mapped to IMI SSC Maintenance and Repair – Light Vehicle NOS 2010, unit LV12	

Supporting Unit Information

Knowledge of Light Vehicle Transmission and Driveline Units and Components - Y/601/3740 – Level 2

Indicative Content

The operation of clutch operating systems

- Clutch operating mechanisms
  - pedal and lever
  - hydraulic operated
  - mechanical
  - cable operated
  - hydraulic components
  - master cylinder
  - slave cylinder
  - hydraulic pipes
  - electrical and electronic components (fluid level indicators)

The operation of friction clutches

- The reasons for fitting a clutch
- The construction and operation of:
  - hydraulically and cable operated clutches
  - coil spring clutches
  - diaphragm spring clutches
  - single plate clutches
  - multi plate clutches

The operation of manual gearboxes

- The reasons for fitting gearboxes, to provide neutral, reverse, torque multiplication
- Different gearbox types: transverse and inline layouts
- The layout and construction of gears and shafts for 4, 5 and 6 speed gearbox designs, sliding mesh, constant mesh and synchromesh gearboxes reverse gear
- The construction and operation of:
  - gear selection linkages
  - selector forks and rods
  - detents and interlock mechanisms
- The construction and operation of synchromesh devices

- The arrangements for gearbox bearings:
  - bushes
  - oil seals
  - gaskets and gearbox lubrication
  - speedometer drive
- The electrical and electronic components including reverse lamp switch
- Calculate gear ratios and driving torque for typical gearbox specifications

The operation of driveline components

- The layout and construction of prop shafts and drive shafts used in front wheel, rear wheel and four-wheel drive systems
- The reasons for using flexible couplings and sliding joints in transmissions systems
- The reason for using constant velocity joints in drive shafts incorporating steering mechanisms
- The construction and operation of:
  - universal joints
  - sliding couplings
  - constant velocity joints
- The simple stresses applied to shafts: torsional, bending and shear
- The construction and operation of:
  - final drive units
  - crown wheel and pinion
  - bevel
  - hypoid and helical gears
  - differential gears
  - sun and planet gears
  - lubricants
  - lubrication bearings and seals
  - limited slip differential
- The reasons for fitting a differential
- Calculate final drive gear ratios
- Calculate the overall gear ratio from given data (gearbox ratio x final drive ratio)

The testing and inspection techniques used for light vehicle transmission systems

- The techniques and procedures used for inspecting and testing clutches and clutch mechanisms including:
  - clearances

- pedal and lever settings
- cables and linkages
- hydraulic system
- leaks
- adjustments
- travel

- The techniques and procedures used for inspecting and testing gearboxes including:
  - leaks
  - gear selection
  - synchromesh operation
  - abnormal noise
- The techniques and procedures used for inspecting and testing drive line systems (prop and drive shafts, couplings) including:
  - security
  - serviceability of rubber boots
  - leaks
  - alignment
  - balance weights (where applicable)
- The techniques used when inspecting and testing final drive systems including:
  - fluid levels
  - leaks
  - noise

The faults and symptoms associated with vehicle transmissions systems

- The faults and symptoms associated with transmission systems:
  - clutch faults
  - gearbox faults
  - drive line faults (prop shaft, drive shaft
  - universal and constant velocity joints)
  - universal joint alignment
  - final drive faults
- Faults and symptoms to include mechanical, electrical and hydraulic systems

The procedures for dismantling, removal and replacement of transmission units and components

- The preparation, testing and use of tools and equipment, electrical meters and equipment used for
- Dismantling removing and replacing transmission systems and

components.

- Appropriate safety precautions:
  - PPE
  - vehicle protection when dismantling
  - removing and replacing transmission systems and components
- The importance of logical and systematic processes
- The inspection and testing of transmission systems and components
- The preparation of replacement units for re-fitting or replacement of transmission systems or components
- The reasons why replacement components and units must meet the original specifications (OES):
  - warranty requirements
  - to maintain performance
  - safety requirements
- Refitting procedures
- The inspection and testing of units and system to ensure compliance with manufacturer's, legal and performance requirements
- The inspection and re-instatement of the vehicle following repair to ensure customer satisfaction:
  - cleanliness of vehicle interior and exterior
  - security of components and fittings
- Re-instatement of components and fittings
- Types of wheel bearing arrangements:
  - driven wheels
  - fully floating
  - three quarter floating
  - semi floating axles

Teaching Strategies And Learning Activities

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Methods Of Assessment

This unit is internally assessed and internally and externally moderated.

Providers are encouraged to use innovative and stimulating assessment methods and to ensure there is an appropriate and manageable range, balance and volume of assessment across units. A number of units can be assessed via integrative assessment methods but it is essential that the evidence of achievement is clearly signposted and referenced. **Methods of assessment must include practical tasks.**

Sample assessment tasks are provided that may be used or adapted as appropriate. These are available on the SEG website https://skillsandeducationgroupawards.co.uk/. Centres may wish to develop their own assessments for individual units or a number of units.

Minimum requirements when assessing this unit

SEG expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching

Evidence Of Achievement

All evidence must be clearly signposted and made available for the external moderator upon request

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the SEG web site)

Sample evidence checklists are available on the SEG website

Skills in Removing and Replacing Light Vehicle Driveline Units and Components

Unit Reference	**K/601/3886**
Level	**2**
Credit Value	**5**
Guided Learning Hours	**45**
Unit Summary	This unit allows the learner to develop skills in removing and replacing light vehicle transmission and driveline units. It also covers the evaluation of performance of the replaced units and systems
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to work safely when carrying out removal and replacement activities	1.1 Use suitable personal protective equipment and vehicle coverings throughout all light vehicle transmission and driveline unit and component 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
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support light vehicle transmission and driveline unit and component removal and replacement activities including • vehicle technical data • removal and replacement procedures

	• legal requirements 2.2 Use technical information to support light vehicle transmission and driveline unit and component removal and replacement activities
3. Be able to use appropriate tools and equipment	3.1 Select the appropriate tools and equipment necessary for removal and replacement of light vehicle transmission and driveline systems 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 to remove and replace light vehicle transmission and driveline systems
4. Be able to carry out removal and replacement of light vehicle transmission and driveline units and components	4.1 Remove and replace the light vehicle's transmission and driveline systems and components, adhering to the correct specifications and tolerances for the vehicle and following • the manufacturer's approved removal and replacement methods • recognised researched repair methods • health and safety requirements 4.2 Ensure that replacement light vehicle transmission and driveline units and components conform to the vehicle operating specification and any legal requirements 4.3 Use suitable testing methods to evaluate the performance of the reassembled system 4.4 Ensure that the reassembled light vehicle transmission and driveline system performs to the vehicle operating specification and meets

	any legal requirements
5. Be able to record information and make suitable recommendations	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 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Maintenance and Repair – Light Vehicle NOS 2010, unit LV12	

Supporting Unit Information

Skills in Removing and Replacing Light Vehicle Driveline Units and Components - K/601/3886 – Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre.
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Be observed by your assessor successfully carrying out the removal and replacement of 1 unit or component from 2 of the areas as listed below:
  - clutch
  - gearbox
  - drive line (shafts, couplings, hubs and bearings)
  - final drive
- Produce evidence of removing and replacing 1 unit or component on 2 separate occasions

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Knowledge of Routine Motorcycle Maintenance

Unit Reference	**F/601/5515**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**20**
Unit Summary	This unit enables the learner to develop an understanding of conducting routine maintenance, adjustment and replacement activities as part of the periodic servicing of motorcycles
Learning Outcomes (1 to 2) ***The learner will***	**Assessment Criteria (1.1 to 2.6)** ***The learner can***
1. Understand how to carry out routine motorcycle maintenance	1.1 Explain how to conduct a scheduled motorcycle routine examination and assessment against the motorcycle manufacturers specification, legal and road safety requirements 1.2 Identify the different systems to be inspected while carrying out motorcycle routine maintenance 1.3 Identify adjustments that need to be carried out on a motorcycle routine maintenance
2. Understand the procedures required to carry out routine motorcycle maintenance	2.1 Describe the procedures used for checking the condition and serviceability of motorcycle units and components 2.2 Describe the procedures used for checking

	gaps and clearances 2.3 Describe the procedures for checking and replenishing fluid levels 2.4 Describe the procedures for checking and replacing lubricants 2.5 Explain the procedure for reporting cosmetic damage to motorcycle components and units outside normal service items 2.6 Identify the operating specifications for the systems being checked while carrying out motorcycle routine maintenance
Mapping to National Occupational Standards Directly mapped to IMI SSC Maintenance and Repair – Motorcycle NOS 2010, unit MC01	

Supporting Unit Information

Knowledge of Routine Motorcycle Maintenance - F/601/5515 – Level 2

Indicative Content

- Motorcycle maintenance, inspection and adjustment and record findings
- Motorcycle inspection techniques used in routine maintenance including:
  - aural
  - visual and functional assessments on engine systems
  - visual and functional assessments on transmission power train
  - chassis systems
  - wheels and tyres
  - electrical and electronic systems
  - motorcycle fame and components
- The procedures used for inspecting the condition and serviceability of the following:
  - filters
  - drive belts
  - cables
  - brake linings
  - pads
  - ignition components
  - hoses
  - tyres
  - lights
  - chain and sprockets
  - steering and suspension
  - battery and charging
- The procedures used for checking gaps and clearances:
  - ignition components
  - carburettor
  - valve clearances
  - clutch
  - drive train
  - brakes
- Preparation and use appropriate use of equipment to include:
  - test instruments

- emission equipment
- wheel alignment
- beam setting equipment
- tyre tread depth gauges

- Procedures for checking and replenishing fluid levels:
  - oil
  - water
  - hydraulic fluids
  - greases
- Procedures for checking and replacement of lubricants:
  - replace oil filters
  - check levels
  - types of oil
  - cleanliness
  - disposal of old oil and filters
- Procedures for carrying out adjustments on motorcycle systems or components:
  - clearances
  - settings
  - alignment
  - operational performance (engine idle, exhaust gas)
- Procedures for checking electrical systems:
  - operation
  - security
  - performance
- Importance and process of detailed inspection procedures:
  - following inspection checklists
  - checking conformity to manufacturer's specifications
  - UK and European legal requirements
- Importance and process of completing all relevant documentation relating to motorcycle maintenance:
  - inspection records
  - job cards
  - motorcycle repair records
  - motorcycle service history
- The need to use motorcycle protection prior to service and repair
- Requirements and methods used for protecting:
  - motorcycle body panels
  - paint surfaces
  - chrome surfaces
- The need to check the motorcycle prior to routine maintenance

- The need to inspect the motorcycle following routine maintenance:
  - professional presentation of motorcycle
  - customer perceptions
- The basic checks of motorcycle following routine maintenance:
  - removal of oil and grease marks
  - body panels
  - chrome
  - paint surfaces
  - motorcycle controls
  - re-instatement of components
- Different systems to be inspected while carrying out motorcycle routine maintenance.
  - engine and power train systems
  - chassis systems
  - wheels and tyres
  - electrical and electronic systems
  - motorcycle frame and components

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Skills in Routine Motorcycle Maintenance

Unit Reference	**F/601/5594**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**20**
Unit Summary	This unit allows the learner to develop skills they can carry out motorcycle routine maintenance, adjustments and replacement activities as part of the periodic servicing of motorcycles
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to work safely when carrying out motorcycle routine maintenance	1.1 Use suitable personal protective equipment and motorcycle coverings throughout all motorcycle routine maintenance activities 1.2 Work in a way which minimises the risk of damage or injury to the motorcycle, people and the environment
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support motorcycle routine maintenance activities including • motorcycle technical data • maintenance procedures • legal requirements 2.2 Use technical information to support

	motorcycle inspection activities
3. Be able to use appropriate tools and equipment	3.1 Select the appropriate tools and equipment necessary for carrying out routine maintenance 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 routine maintenance
4. Be able to carry out motorcycle routine maintenance	4.1 Carry out motorcycle inspections using prescribed methods, adhering to the correct specifications and tolerances for the motorcycle and following • the manufacturer's approved inspection methods • recognised researched inspection methods • health and safety requirements 4.2 Carry out adjustments, replacement of motorcycle components and replenishment of consumable materials following the manufacturer's current specification 4.3 Ensure the examination methods identify accurately any motorcycle system and or component problems falling outside the maintenance schedule are specified 4.4 Ensure that the inspected motorcycle conforms to the motorcycle operating specification and any legal requirements 4.5 Use suitable testing methods to evaluate the performance of all replaced and adjusted components and systems accurately

5. Be able to record information and make suitable recommendations	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 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Maintenance and Repair – Motorcycle NOS 2010, unit MC01	

Supporting Unit Information

Skills in Routine Motorcycle Maintenance - F/601/5594 – Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Be observed by your assessor successfully carrying out servicing activities on at least 1 vehicles which collectively covers the Learning Outcomes.

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Knowledge of Motorcycle Internal Engine Systems

Unit Reference	**Y/601/5519**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**20**
Unit Summary	This unit enables the learner to develop an understanding of the construction and operation of common engine power train mechanical, lubrication and cooling systems, clutch and transmission systems
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.4)** ***The learner can***
1. Understand how the main motorcycle engine mechanical systems operate	1.1 Identify motorcycle engine mechanical system components 1.2 Describe the construction and operation of motorcycle engine mechanical systems 1.3 Compare key engine mechanical system components and assemblies against alternatives to identify differences in construction and operation 1.4 Identify the key engineering principles that are related to engine mechanical systems • compression ratio's • cylinder capacity

	• power • torque 1.5 State common terms used in motorcycle engine mechanical system design • tdc • bdc • stroke • bore
2. Understand how motorcycle engine lubrication systems operate	2.1 Identify motorcycle engine lubrication system components 2.2 Describe the construction and operation of motorcycle engine lubrication components and systems. 2.3 Compare key motorcycle engine lubrication system components and assemblies to identify differences in construction and operation 2.4 Identify the key engineering principles that are related to motorcycle engine lubrication systems • classification of lubricants • properties of lubricants • methods of reducing friction 2.5 State common terms used in motorcycle engine lubrication system design
3. Understand how motorcycle engine cooling systems operate	3.1 Identify motorcycle engine cooling system components 3.2 Describe the construction and operation of motorcycle engine cooling systems 3.3 Compare key motorcycle engine cooling system components and assemblies against

	alternatives to identify differences in construction and operation 3.4 Identify the key engineering principles that are related to motorcycle engine cooling systems • heat transfer • linear and cubical expansion • specific heat capacity • boiling point of liquids 3.5 State common terms used in key motorcycle engine cooling system design
4. Understand how motorcycle clutch and transmission systems operate	4.1 Identify motorcycle clutch and transmission system components 4.2 Describe the construction and operation of motorcycle clutch and transmission system components 4.3 Compare key motorcycle clutch and transmission system components and assemblies against alternatives to identify differences in construction and operation
5. Understand how to check, replace and test power train systems, units and components	5.1 Describe how to remove and replace power train systems, units and components 5.2 Describe common types of testing methods used to check the operation of engine power train systems and their purpose 5.3 Explain how to test and evaluate the performance of replacement units against motorcycle specification 5.4 Explain common faults found in motorcycle power train systems and their causes

Mapping to National Occupational Standards
Directly mapped to IMI SSC Maintenance and Repair – Motorcycle NOS 2010, unit MC02

Supporting Unit Information

Knowledge of Motorcycle Internal Engine Systems - Y/601/5519 – Level 2

Indicative Content

Engines

- Engine types and configurations:
  - inline
  - flat
  - vee
  - four-stroke and two-stroke cycle for spark ignition engines
  - naturally aspirated and turbo-charged engines
- Relative advantages and disadvantages of different engine types and configurations
- Engine components and layouts:
  - single (OHC) and multi camshaft (DOHC)
  - single and multi cylinder (2, 3, 4, 6 cylinder types)
  - port design: inlet, transfer and exhaust
- Cylinder head layout and design, combustion chamber and piston design
- The procedures used when inspecting engines
- The procedures to assess:
  - serviceability
  - wear
  - condition
  - clearances
  - settings
  - linkages
  - joints
  - fluid systems
  - adjustments
  - operation and functionality
  - security
- Symptoms and faults associated with mechanical engine operation:
  - poor performance
  - abnormal or excessive mechanical noise
  - erratic running
  - low power
  - exhaust emissions

- abnormal exhaust smoke
- unable to start
- exhaust gas leaks to cooling system
- exhaust gas leaks

Lubrication

- The advantages and disadvantages of wet and dry systems.
- Engine lubrication system:
  - splash and pressurised systems
  - pumps
  - pressure relief valve
  - filters
  - oil ways
  - oil coolers
- Terms associated with lubrication and engine oil:
  - full-flow
  - hydrodynamic
  - boundary
  - viscosity
  - multi-grade
  - natural and synthetic oil
  - viscosity index
  - multi-grade
- The requirements and features of engine oil:
  - operating temperatures
  - pressures
  - lubricant grades
  - viscosity
  - multi-grade oil
  - additives
  - detergents
  - dispersants
  - anti-oxidants inhibitors
  - anti-foaming agents
  - anti-wear
  - synthetic oils
  - organic oils
  - mineral oils
- Symptoms and faults associated with lubrication systems:
  - excessive oil consumption
  - oil leaks

- oil in water
- low or excessive pressure
- oil contamination

- The procedures used when inspecting lubrication system

Cooling

- The components, operating principles, and functions of engine cooling systems
- Procedures used to remove, replace and adjust cooling system components
  - cooling fans and control devices
  - fins and cowlings
  - header tanks, radiators and pressure caps
  - expansion tanks hoses, clips and pipes
  - thermostats impellers and coolant
- The preparation and method of use of appropriate specialist equipment used to
  evaluate system performance following component replacement
  - system pressure testers
  - pressure cap testers
  - anti-freeze testing equipment
  - chemical tests for the detection of combustion gas
- Symptoms and faults associated with cooling systems:
  - water leaks
  - water in oil
  - blocked fins
  - excessively low or high coolant temperature
- The procedures used when inspecting
  - cooling systems

Clutch

- The components, operating principles, and functions of clutch's
  - wet clutch
  - dry clutch
  - centrifugal
  - cable control
  - hydraulic control
- Procedures used to remove, replace and adjust clutch systems and components
- The preparation and method of use of appropriate specialist equipment used to evaluate system performance following component

replacement
- Symptoms and faults associated with clutch systems
  - slip
  - drag

Transmission
- The components, operating principles, and function of transmission systems
  - conventional gear
  - CVT
  - Automatic
- The operating components within transmission systems
  - gears
  - shafts
  - selectors
  - shift lever and drum mechanisms
  - bearings
  - pulleys
- The preparation and method of use of appropriate specialist equipment used to evaluate transmission system performance following component replacement
- Procedures used to remove, replace and adjust transmission systems and components
- Symptoms and faults associated with transmission systems
  - abnormal noises
  - vibration
  - fluid leaks
  - wear
  - gear selection

General
- The preparation, testing and use of tools and equipment used for:
  - dismantling
  - removal and replacement of engine mechanical and power train system components
- Appropriate safety precautions:
  - PPE
  - motorcycle protection when dismantling
  - removal and replacing engine mechanical and power train units and components
- The important of logical and systematic processes

- The inspection and testing of engine mechanical and power train units and components
- The preparation of replacement units for re-fitting or replacement
- The reasons why replacement components and units must meet the original specifications (OES) – warranty requirements, to maintain performance and safety requirements
- Refitting procedures
- The inspection and testing of units and system to ensure compliance with manufacturer's, legal and performance requirements.
- The inspection and re-instatement of the motorcycle following repair to ensure customer satisfaction
  - cleanliness of motorcycle
  - security of components and fittings
  - re-instatement of components and fittings
- Construction and operation of motorcycle engine mechanical systems
  - four stroke
  - two stroke
- Key engineering principles that are related to engine mechanical systems
  - compression ratio's
  - volumetric efficiency
  - cylinder capacity
- Common terms used in motorcycle engine mechanical system design
  - tdc
  - bdc
  - stroke
  - bore
  - ports
- Construction and operation of motorcycle engine lubrication components and systems
  - full flow
  - by pass
  - wet sump
  - dry sump
  - total loss
- Key engineering principles that are related to motorcycle engine lubrication systems
  - classification of lubricants
  - properties of lubricants
  - methods of reducing friction
- Common terms used in motorcycle engine lubrication system design

- Identify motorcycle engine cooling system components
  - air cooling
  - liquid cooling
- Key engineering principles that are related to motorcycle engine cooling systems
  - heat transfer
  - linear and cubical expansion
  - specific heat capacity
  - boiling point of liquids
- Construction and operation of motorcycle clutch and transmission system components
  - dry clutch
  - wet clutch
  - constant mesh
  - CVT
  - automatic
  - chain and sprocket
  - shaft and gear
  - belt and pulley

Teaching Strategies And Learning Activities

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Knowledge of Motorcycle Fuel, Ignition, Air and Exhaust System Units and Components

Unit Reference	**T/601/5527**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**20**
Unit Summary	This unit enables the learner to develop an understanding of the construction and operation of common fuel, ignition, air and exhaust systems. It also covers the procedures involved in the removal and replacement of system components and the evaluation of their performance
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.4)** ***The learner can***
1. Understand how motorcycle engine fuel systems operate	1.1 Identify motorcycle engine fuel system components 1.2 Describe the construction and operation of motorcycle engine fuel systems 1.3 Compare key motorcycle engine fuel system components and assemblies against alternatives to identify differences in construction and operation 1.4 Identify the key engineering principles that are related to motorcycle engine fuel systems • properties of fuels

	• combustion processes • exhaust gas constituents 1.5 State common terms used in motorcycle engine fuel system design
2. Understand how motorcycle engine ignition systems operate	2.1 Identify motorcycle engine ignition system components 2.2 Describe the construction and operation of fundamental motorcycle engine ignition systems 2.3 Compare key motorcycle engine ignition system components and assemblies against alternatives to identify differences in construction and operation 2.4 Identify the key engineering principles that are related to motorcycle engine ignition systems • flame travel • ignition timing 2.5 State common terms used in key motorcycle engine ignition system design
3. Understand how motorcycle engine air supply and exhaust systems operate	3.1 Identify motorcycle engine air supply and exhaust system components 3.2 Describe the construction and operation of motorcycle engine air supply and exhaust systems 3.3 Compare key motorcycle air supply and exhaust system components and assemblies against alternatives to identify differences in construction and operation 3.4 Identify the key engineering principles that are

	related to motorcycle engine air supply and exhaust systems • sound absorption • reduction of harmful emissions 3.5 State common terms used in key motorcycle engine air supply and exhaust system design
4. Understand how to check, replace and test fuel, ignition, air and exhaust systems, units and components	4.1 Describe how to remove and replace fuel, ignition, air and exhaust systems, units and components 4.2 Describe common types of testing methods used to check the operation of fuel, ignition, air and exhaust systems and their purpose 4.3 Explain how to test and evaluate the performance of replacement units against motorcycle specification 4.4 Explain common faults found in motorcycle fuel, ignition, air and exhaust systems, units and components and their causes
Mapping to National Occupational Standards Directly mapped to IMI SSC Maintenance and Repair – Motorcycle NOS 2010, unit MC02	

Supporting Unit Information

Knowledge Of Motorcycle Fuel, Ignition, Air And Exhaust System Units And Components - T/601/5527 – Level 2

Indicative Content

Fuel - Petrol

- The function and layout of carburettor systems:
  - carburettor, single and multi-type
  - fuel tank and control lever
  - fuel pumps
- The operation of carburettor systems
  - carburettor, single and multi-type
  - float chamber and designs
  - vacuum and piston assembly
  - needles and jets
  - adjustment for idle and mixture
  - choke and enrichment devise
  - fuel tank and control lever
  - fuel pumps
- The function of petrol injection systems and components
  - petrol injection systems
  - injection components
  - injection pump
  - pump relay
  - injector valve
  - air flow sensor
  - throttle potentiometer
  - idle speed control valve
  - coolant sensor
  - MAP and air temperature sensors
  - mechanical control devices
  - electronic control units
- The operation petrol injection systems and components:
  - injection pump
  - pump relay
  - injector valve
  - air flow sensor
  - throttle potentiometer

- idle speed control valve
- coolant sensor
- MAP and air temperature sensors
- electronic control units
- fuel pressure regulators
- fuel pump relays
- lambda exhaust sensors
- flywheel and camshaft sensors
- air flow sensors (air flow meter and air mass meter)

- The procedures used when inspecting petrol system
- The chemically correct air/fuel ratio for petrol engines
- weak and rich air/fuel ratios for petrol engines
- Exhaust composition and by-products for chemically correct, rich and weak air/fuel ratios of petrol engines:
  - water vapour (H_2O)
  - nitrogen (N)
  - carbon monoxide (CO)
  - carbon dioxide (CO_2)
  - carbon (C)
  - hydrocarbon (HC)
  - oxides of nitrogen (NOx, NO_2, NO) and particulates
- Symptoms and faults associated with fuel systems
  - erratic running
  - weak mixture
  - rich mixture
  - two stroke mixtures
  - excessive smoke
  - leaks
  - failure to start
  - poor economy
  - failure to meet emission control

Ignition

- The layout of ignition systems,
- ignition circuits and components:
  - LT Circuit
  - battery
  - ignition switch
  - electronic trigger devices
  - HT Circuit
  - spark plugs (reach, heat range, electrode features

- ignition leads
- ignition coil
- ignition timing advance system

- The operation electronic system components:
  - amplifiers
  - triggering systems
  - inductive pick-ups
  - amplifier units
  - control units
- Ignition terminology:
  - dwell angle
  - dwell time
  - advance and retard of ignition timing
  - static and dynamic ignition timing
- The operation of electronic ignition systems under various conditions and loads to include:
  - engine idling
  - during acceleration
  - under full load
  - cruising
  - overrun
  - cold starting
- Basic principle of engine management systems:
  - closed loop system
  - integrated ignition
  - injection systems
  - sensors
- The procedures used when inspecting
  - ignition system
  - engine management
  - sensors
- Symptoms and faults associated with ignition system operation
  - failure to start hot or cold
  - exhaust emissions
  - poor performance
  - ignition noise
  - misfire
  - damp

Air supply and exhaust systems

- The construction and purpose of air filtration systems

- The operating principles of air filtration systems
- The construction and purpose of the exhaust systems
- The operating principles of the systems
- Exhaust system design to include silencers and catalytic converters
- The procedures used when inspecting induction, air filtration and exhaust systems
- Symptoms and faults associated with air and exhaust systems

General

- The preparation, testing and use of tools and equipment used for:
  - dismantling
  - removal and replacement of engine units and components
- Appropriate safety precautions:
  - PPE
  - motorcycle protection when dismantling
  - removal and replacing engine units and components
- The important of logical and systematic processes
- The inspection and testing of engine units and components
- The preparation of replacement units for re-fitting or replacement
- The reasons why replacement components and units must meet the original specifications (OES) – warranty requirements, to maintain performance and safety requirements
- Refitting procedures
- The inspection and testing of units and system to ensure compliance with manufacturer's, legal and performance requirements
- The inspection and re-instatement of the motorcycle following repair to ensure customer satisfaction:
  - cleanliness of motorcycle interior and exterior
  - security of components and fittings
- Re-instatement of components and fittings
- Construction and operation of motorcycle engine fuel systems
  - carburettor
  - multi point injection
- Key engineering principles that are related to motorcycle engine fuel systems
  - properties of fuels
  - combustion processes
  - exhaust gas constituents
- Key engineering principles that are related to motorcycle engine ignition systems
  - flame travel

- ignition timing
- voltages

- Construction and operation of motorcycle engine air supply and exhaust systems
  - manifolds
  - filters
  - silencers, including two stroke
  - catalytic converter
- Key engineering principles that are related to motorcycle engine air supply and exhaust systems
  - sound absorption
  - reduction of harmful emissions

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place

Methods Of Assessment

This unit is internally assessed and internally and externally moderated.

Providers are encouraged to use innovative and stimulating assessment methods and to ensure there is an appropriate and manageable range, balance and volume of assessment across units. A number of units can be assessed via integrative assessment methods but it is essential that the evidence of achievement is clearly signposted and referenced. **Methods of assessment must include practical tasks.**

Sample assessment tasks are provided that may be used or adapted as appropriate. These are available on the SEG website https://skillsandeducationgroupawards.co.uk/. Centres may wish to develop their own assessments for individual units or a number of units.

Minimum requirements when assessing this unit

SEG expects that staff will be appropriately qualified to assess learners

against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching

Evidence Of Achievement

All evidence must be clearly signposted and made available for the external moderator upon request

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the SEG web site)

Sample evidence checklists are available on the SEG website

Skills in Motorcycle Internal Engine Systems

Unit Reference	**R/601/5597**
Level	**2**
Credit Value	**5**
Guided Learning Hours	**45**
Unit Summary	This unit allows the learner to develop skills to remove and replace motorcycle engine power train mechanical, lubrication, cooling systems, clutch and transmission systems
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to work safely when carrying out removal and replacement activities	1.1 Use suitable personal protective equipment and motorcycle coverings throughout all light motorcycle routine maintenance activities 1.2 Work in a way which minimises the risk of damage or injury to the motorcycle, people and the environment
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support motorcycle engine power train unit and component removal and replacement activities including • motorcycle technical data • removal and replacement procedures • legal requirements

	2.2 Use technical information to support motorcycle engine power train unit and component removal and replacement activities
3. Be able to use appropriate tools and equipment	3.1 Select the appropriate tools and equipment necessary for removal and replacement of motorcycle engine power train systems 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 to remove and replace light motorcycle engine systems
4. Be able to carry out removal and replacement of motorcycle electrical units and components	4.1 Remove and replace the motorcycle electrical systems and components, adhering to the correct specifications and tolerances for the motorcycle and following • the manufacturer's approved and workplace removal and replacement methods • recognised researched repair methods • health and safety requirements 4.2 Check that replaced motorcycle electrical units and components conform to the motorcycle operating specification and any legal requirements 4.3 Use suitable testing methods to evaluate the performance of the reassembled system 4.4 Ensure that the reassembled motorcycle electrical systems performs to the motorcycle operating specification and meets any legal requirements

5. Be able to record information and make suitable recommendations	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 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Maintenance and Repair – Motorcycle NOS 2010, unit MC02	

Supporting Unit Information

Skills in Motorcycle Internal Engine Systems - R/601/5597 – Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Be observed by your assessor successfully carrying out the removal and replacement of engine mechanical units and components from 3 different
  systems out of the 6 listed below:
  - cooling systems
  - air supply and exhaust systems
  - fuel and ignition systems
  - lubrication systems (not including standard external filters)
  - transmission systems
  - clutch systems

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place

Methods Of Assessment

This unit is internally assessed and internally and externally moderated.

Providers are encouraged to use innovative and stimulating assessment methods and to ensure there is an appropriate and manageable range,

balance and volume of assessment across units. A number of units can be assessed via integrative assessment methods but it is essential that the evidence of achievement is clearly signposted and referenced. **Methods of assessment must include practical tasks.**

Sample assessment tasks are provided that may be used or adapted as appropriate. These are available on the SEG website https://skillsandeducationgroupawards.co.uk/. Centres may wish to develop their own assessments for individual units or a number of units.

Minimum requirements when assessing this unit

SEG expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching

Evidence Of Achievement

All evidence must be clearly signposted and made available for the external moderator upon request

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the SEG web site)

Sample evidence checklists are available on the SEG website

Knowledge of Removing and Replacing Motorcycle Electrical Units and Components

Unit Reference	**H/601/5555**
Level	**2**
Credit Value	**6**
Guided Learning Hours	**45**
Unit Summary	This unit enables the learner to develop an understanding of the principles, construction and operation and testing methods of common electrical and electronic systems and components. It also covers the procedures involved in the removal and replacement of system components and the evaluation of their performance
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.4)** ***The learner can***
1. Understand motorcycle electrical and electronic principles	1.1 Identify electrical symbols and units found in motorcycle circuits 1.2 Describe how to interpret motorcycle wiring diagrams 1.3 Describe the operation of key motorcycle circuit safety protection devices and why these are necessary 1.4 Describe motorcycle earthing principles and earthing methods

	1.5 Identify the use of different cables and connectors used in motorcycle circuits 1.6 Describe the operation of electrical and electronic sensors and actuators and their application 1.7 Describe the key electrical and electronic control principles that are related to motorcycle electrical circuits 1.8 State common terms used in motorcycle electrical circuits
2. Understand how motorcycle batteries, starting and charging systems operate	2.1 Identify motorcycle batteries, starting and charging system components 2.2 Describe the construction and operation of motorcycle batteries, starting and charging system components 2.3 Compare motorcycle batteries, starting and charging system components and assemblies against alternatives to identify differences in construction and operation 2.4 State common terms used in conjunction with motorcycle batteries, starting and charging systems
3. Understand how motorcycle auxiliary electrical systems operate	3.1 Identify motorcycle auxiliary system components 3.2 Describe the construction and operation of motorcycle auxiliary systems 3.3 Compare key motorcycle auxiliary system components and assemblies against alternatives to identify differences in

	construction and operation 3.4 State common terms used in motorcycle auxiliary system design
4. Understand how to check, replace and test electrical and electronic systems, units and components	4.1 Describe how to remove and electrical and electronic systems, units and components 4.2 Describe common types of testing methods used to check the operation of electrical and electronic systems and their purpose 4.3 Explain how to test and evaluate the performance of replacement units against motorcycle specification 4.4 Identify common faults found in motorcycle electrical and electronic systems and their causes
Mapping to National Occupational Standards Directly mapped to IMI SSC Maintenance and Repair – Motorcycle NOS 2010, unit MC03	

Supporting Unit Information

Knowledge of Removing and Replacing Motorcycle Electrical Units and Components - H/601/5555 – Level 2

Indicative Content

Electrical/Electronic Principles

- Electrical units:
  - volt (electrical pressure)
  - ampere (electrical current)
  - ohm (electrical resistance)
  - watt (power)
- The requirements for an electrical circuit:
  - battery
  - cables
  - switch
  - current consuming device
  - continuity
- The direction of current flow and electron flow.
- Series and parallel circuits to include:
  - current flow
  - voltage of components
  - volt drop
  - resistance
  - the effect on circuit operation of open circuit component(s)
- Earth and insulated return systems.
- Cable sizes and colour codes.
- Different types of connectors, terminals and circuit protection devices.
- Common electrical and electronic symbols.
- The meaning of:
  - short circuit
  - open circuit
  - bad earth
  - high resistance
  - electrical capacity
- The principles of motorcycle electronic systems and component.
- Interpret motorcycle wiring diagrams to include:
  - motorcycle lighting
  - auxiliary circuits

- indicators
- starting and charging systems

- Function and construction of electrical components including:
  - circuit relays
  - bulb types
  - cooling fan
  - circuit protection
- The safety precautions when working on electrical and electronic systems to include:
  - disconnection and connection of battery
  - avoidance of short circuits
  - power surges
  - prevention of electric shock
  - protection of electrical and electronic components
  - protection of circuits from overload or damage
- The set-up and use of:
  - digital and analogue multi-meters
  - voltmeter
  - ammeter
  - ohmmeter
  - oscilloscope
  - manufacturer’s dedicated test equipment
- Electrical and electronic checks for electrical and electronic systems to include:
  - connections
  - security
  - functionality
  - performance to specifications
  - continuity, open circuit
  - short circuit
  - high resistance
  - volt drop
  - current consumption
  - output patterns (oscilloscope)
- Symptoms and faults associated with electrical and electronic systems to include:
  - high resistance
  - loose and corroded connections
  - short circuit
  - excessive current consumption
  - open circuit

- malfunction
- poor performance
- battery faults to include flat battery
- failure to hold charge
- low state of charge
- overheating
- poor starting

Battery and Charging

- The construction and operation of motorcycle batteries including:
  - low maintenance and maintenance free
  - lead acid and nickel cadmium types
  - cells
  - separators
  - plates
  - electrolyte
- The operation of the motorcycle charging system:
  - alternator
  - rotor
  - stator
  - slip ring
  - brush assembly
  - three phase output
  - diode rectification pack
  - voltage regulation
  - phased winding connections
  - cooling fan
  - alternator drive

Starting

- The layout, construction and operation of engine starting systems:
- The function and operation of the following components:
  - starter motor
  - starter clutch mechanism
  - pinion
  - starter solenoid
  - clutch and gear safety switch
  - ignition/starter switch
  - stand switches
  - starter relay (if appropriate)

Lighting

- Function and construction of electrical components including:
  - front and tail lamps
  - main and dip beam headlamps
  - lighting and dip switch
  - directional indicators
  - flash
- The circuit diagram and operation of components for:
  - side and tail lamps
  - headlamps
  - direction indicators
- The statutory requirements for motorcycle lighting when using a motorcycle on the road
- Headlamp adjustment and beam setting

Auxiliary Systems

- Function and construction of electrical components including:
  - anti theft devises
  - horn
  - heated grips
  - power screen
- The circuit diagram and operation of components for:
  - anti theft devises
  - horn
  - heated grips
  - power screen

General

- The preparation, testing and use of:
  - tools and equipment
  - electrical meters and equipment used for dismantling
  - removal and replacement of electrical and electronic systems and components
- Appropriate safety precautions:
  - PPE
  - motorcycle protection when dismantling
  - removal and replacing electrical and electronic components and systems
- The important of logical and systematic processes
- Preparation of replacement units for re-fitting or replacement electrical and electronic components and systems

- The reasons why replacement components and units must meet the original specifications (OES) – warranty requirements, to maintain performance, safety requirements.
- Refitting procedures.
- The inspection and testing of units and systems to ensure compliance with manufacturer's, legal and performance requirements.
- Inspection and re-instatement of the motorcycle following repair to ensure:
  - customer satisfaction
  - cleanliness of motorcycle interior and exterior
  - security of components and fittings
  - re-instatement of components and fittings
- Construction and operation of motorcycle auxiliary systems. Auxiliary systems to include:
  - lighting systems
  - security and alarm systems
  - comfort and convenience systems
  - information system
  - communication systems
  - monitoring and instrumentation systems

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place

Methods Of Assessment

This unit is internally assessed and internally and externally moderated.

Providers are encouraged to use innovative and stimulating assessment methods and to ensure there is an appropriate and manageable range, balance and volume of assessment across units. A number of units can be assessed via integrative assessment methods but it is essential that the evidence of achievement is clearly signposted and referenced. **Methods of assessment must include practical tasks.**

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Minimum requirements when assessing this unit

SEG expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching

Evidence Of Achievement

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All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the SEG web site)

Sample evidence checklists are available on the SEG website

Skills in Removing and Replacing Motorcycle Electrical Units and Components

Unit Reference	**D/601/5604**
Level	**2**
Credit Value	**5**
Guided Learning Hours	**45**
Unit Summary	This unit allows the learner to develop skills to remove and replace motorcycle electrical system components. It also covers the evaluation of performance of the replaced units and systems
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to work safely when carrying out removal and replacement activities	1.1 Use suitable personal protective equipment and motorcycle coverings throughout all light motorcycle routine maintenance activities 1.2 Work in a way which minimises the risk of damage or injury to the motorcycle, people and the environment
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support motorcycle electrical unit and component removal and replacement activities including • motorcycle technical data and codes • removal and replacement procedures • legal requirements

	2.2 Use technical information to support motorcycle electrical unit and component removal and replacement activities
3. Be able to use appropriate tools and equipment	3.1 Select the appropriate tools and equipment necessary for removal and replacement of motorcycle electrical system 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 to remove and replace motorcycle electrical systems
4. Be able to carry out removal and replacement of motorcycle electrical units and components.	4.1 Remove and replace the motorcycle electrical systems and components, adhering to the correct specifications and tolerances for the motorcycle and following • the manufacturer's approved and workplace removal and replacement methods • recognised researched repair methods • health and safety requirements 4.2 Ensure that replaced motorcycle electrical units and components conform to the motorcycle operating specification and any legal requirements 4.3 Use suitable testing methods to evaluate the performance of the reassembled system 4.4 Ensure that the reassembled motorcycle electrical systems performs to the motorcycle operating specification and meets any legal requirements

5. Be able to record information and make suitable recommendations	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 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Maintenance and Repair – Motorcycle NOS 2010, unit MC03	

Supporting Unit Information

Skills in Removing And Replacing Motorcycle Electrical Units And Components - D/601/5604 – Level 2

Indicative Content

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre.
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Be observed by your assessor carrying out the removal and replacement of at least **1** of the following:
  - engine starting
  - battery charging
- Be observed by your assessor successfully carrying out the removal and replacement of Vehicle Electrical Units and Components from 3 different systems out of the 5 listed below:
  - lighting
  - security and alarm
  - information and entertainment
  - telephone and two-way communication
  - monitoring and instrumentation systems

Teaching Strategies And Learning Activities

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Methods Of Assessment

This unit is internally assessed and internally and externally moderated.

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Minimum requirements when assessing this unit

SEG expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching

Evidence Of Achievement

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Sample evidence checklists are available on the SEG website

Knowledge of Removing and Replacing Motorcycle Chassis Units and Components

Unit Reference	**T/601/5558**
Level	**2**
Credit Value	**6**
Guided Learning Hours	**45**
Unit Summary	This unit enables the learner to develop an understanding of the construction and operation of common steering, suspension and braking systems (including wheels and tyres). It also covers the procedures involved in the removal and replacement of system components and the evaluation of their performance
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.4)** ***The learner can***
1. Understand how motorcycle steering and suspension systems operate	1.1 Identify motorcycle and suspension system components 1.2 Describe the construction and operation of motorcycle steering and suspension systems 1.3 Compare key motorcycle steering and suspension system components and assemblies against alternatives to identify differences in construction and operation 1.4 Identify the key engineering principles that are related to motorcycle steering and suspension

	systems • steering angles • hydraulic forces • stress and strain 1.5 State common terms used in motorcycle steering and suspension system design
2. Understand how motorcycle braking systems operate	2.1 Identify motorcycle braking system components 2.2 Describe the construction and operation of motorcycle braking systems 2.3 Compare key motorcycle braking system components and assemblies against alternatives to identify differences in construction and operation 2.4 Identify the key engineering principles that are related to motorcycle braking systems • laws of friction • hydraulics • properties of fluids • properties of air • braking efficiency 2.5 State common terms used in motorcycle braking system design
3. Understand how motorcycle wheel and tyres systems operate	3.1 Identify motorcycle wheel and tyre components 3.2 Describe the construction and operation of motorcycle wheels and tyres 3.3 Compare key motorcycle wheel and tyre components and assemblies against alternatives to identify differences in construction and operation

	3.4 Identify the key engineering principles that are related to motorcycle wheel and tyre systems • friction • un-sprung weight • dynamic and static balance 3.5 State common terms used in motorcycle wheel and tyre design
4. Understand how to check, replace and test chassis units, parts, and components	4.1 Describe how to remove and replace chassis units and components 4.2 Describe common types of testing methods used to check the operation of chassis units and components and their purpose 4.3 Explain how to test and evaluate the performance of replacement units against vehicle specification 4.4 Identify common faults found in motorcycle chassis units and components
Mapping to National Occupational Standards Directly mapped to IMI SSC Maintenance and Repair – Motorcycle NOS 2010, unit MC04	

Supporting Unit Information

Knowledge of Removing and Replacing Motorcycle Chassis Units and Components - T/601/5558 – Level 2

Indicative Content

Steering

- The action and purpose of steering geometry:
  - castor angle
  - trail angle
  - wheel alignment
- The following terms associated with steering:
  - castor angle
  - trail angle
  - rake angle
  - wheel alignment
- The components and layout of steering systems:
  - handlebar
  - conventional steering head
  - leading link
  - bearings
  - steering stem
  - yolk
- The procedures used for inspecting the serviceability and condition of:
  - conventional steering head
  - leading link
- Steering system defects to include:
  - uneven tyre wear
  - steering vibrations
  - wear in linkage
  - bearing failure
  - damage linkage
  - excessive play
  - incorrect fork alignment
  - incorrect steering geometry

Suspension

- The layout and components of suspension systems:
  - conventional telescopic fork and tube

- upside down telescopic fork and tube
- hossack/Fior (Duolever) fork
- springer fork
- leading link

- The operation of suspension systems and components:
  - convention telescopic fork and tube
  - upside down telescopic fork and tube
  - hydraulic damper
  - double swinging arm
  - single swing arm
  - mono shock
  - adjustable damper
  - adjustable spring
- The advantages of different systems including:
  - convention telescopic fork and tube
  - upside down telescopic fork and tube
  - hydraulic damper
  - double swinging arm
  - single swing arm
  - mono shock
  - adjustable damper
  - adjustable spring
- The forces acting on suspension systems during braking, riding and cornering
- The methods of locating the road wheels against braking, driving and cornering forces
- Suspension terms:
  - rebound
  - bump
  - dive
- The procedures used for inspecting the serviceability and condition of the suspension system
- Suspension system defects:
  - wheel hop
  - ride height
  - wear
  - noises under operation
  - fluid leakage
  - excessive travel
  - excessive tyre wear
  - poor handling

- worn dampers
- worn joints
- damaged linkages

Brakes

- The construction and operation of drum brakes:
  - leading and trailing shoe construction
  - drum designs
  - cable
  - hydraulic
  - self-servo action
  - adjustment
- The construction and operation of disc brakes:
  - disc pads
  - calliper
  - brake disc
  - ventilated disc
  - disc pad retraction
- The construction and operation of the hydraulic braking system:
  - master cylinders
  - disc brake calliper and pistons
  - brake pipe
  - warning lights
- The principles and components of electronic ABS systems, electrical and electronic components
- The requirements and hazards of brake fluid:
  - boiling point
  - hygroscopic action
  - manufacturer's change periods
  - fluid classification and rating
  - potential to damage paint surfaces
- Terms associated with mechanical and hydraulic braking systems:
  - braking efficiency
  - brake fade
  - ABS
- The procedures used for inspecting the serviceability and condition of the braking system
- Braking system defects:
  - worn brake shoes or pads
  - worn or scored brake drums
  - worn or scored brake discs

- abnormal brake noises
- brake judder
- brake adjustments
- fluid contamination of brake surfaces
- antilock brake failure
- fluid leaks
- poor braking efficiency
- brake bind
- brake grab
- brake fade

Wheel and tyres

- The construction of different types of tyre:
  - radial
  - tread patterns
  - tyre mixing regulations
  - tyre applications
- Tyre markings:
  - tyre and wheel size markings
  - speed rating
  - direction of rotation
  - profile
  - tread-wear indicators
- Wheel construction:
  - light alloy
  - wire wheels
  - bearing arrangement
  - roller ball
  - taper
- The procedures used for inspecting the serviceability and condition of:
  - tyres and wheels
  - bearings
- The defects associated with tyres and wheels:
  - abnormal tyre wear
  - cuts
  - side wall damage
  - wheel vibrations

General

The procedures for dismantling, removal and replacement of motorcycle chassis units, parts and system components

- The preparation:
  - testing and use of tools and equipment
  - electrical meters and equipment used for dismantling
- Appropriate safety precautions:
  - PPE
  - vehicle protection when dismantling
  - removing and replacing chassis motorcycle chassis units, parts and system components
- The important of logical and systematic processes.
- The inspection and testing systems and components.
- The preparation of replacement units for re-fitting or replacement of motorcycle chassis units, parts and system components Identify the reasons why replacement components and units must meet the original specifications (OES):
  - warranty requirements
  - to maintain performance
  - safety requirements
- Refitting procedures
- The inspection and testing of units and systems to ensure compliance with manufacturer's, legal and performance requirements
- The inspection and re-instatement of the vehicle following repair to ensure customer satisfaction:
  - cleanliness of motorcycle
  - security of components and fittings
  - re-instatement of components and fittings
- Construction and operation of motorcycle steering and suspension systems
  - conventional steering head
  - leading link
  - swinging arm
  - single swing arm
- Key engineering principles that are related to motorcycle steering and suspension systems
  - steering geometry
  - steering angles
  - hydraulic damping
  - stress and strain
- Key engineering principles that are related to motorcycle steering and suspension systems
  - steering geometry
  - steering angles

- hydraulic damping
- stress and strain

- Construction and operation of motorcycle braking systems
  - cable
  - hydraulic braking
  - electronic ABS system
- Key engineering principles that are related to motorcycle braking systems
  - laws of friction
  - hydraulics
  - properties of fluids
  - braking efficiency
- Construction and operation of motorcycle wheels and tyres
  - tyre construction
  - tyre markings
  - wheel construction
- Key engineering principles that are related to motorcycle wheel and tyre systems
  - friction
  - un-sprung weight
  - dynamic and static balance

Teaching Strategies And Learning Activities

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Methods Of Assessment

This unit is internally assessed and internally and externally moderated.

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of assessment must include practical tasks.

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Minimum requirements when assessing this unit

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Evidence Of Achievement

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Sample evidence checklists are available on the SEG website

Skills in Removing and Replacing Motorcycle Chassis Units and Components

Unit Reference	**M/601/5610**
Level	**2**
Credit Value	**5**
Guided Learning Hours	**45**
Unit Summary	This unit allows the learner to develop skills to remove and replace motorcycle steering, suspension and braking units (including wheels and tyres). It also covers the evaluation of performance of the replaced units and systems
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to work safely when carrying out removal and replacement activities	1.1 Use suitable personal protective equipment and motorcycle coverings throughout all motorcycle routine maintenance activities 1.2 Work in a way which minimises the risk of damage or injury to the motorcycle, people and the environment
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support motorcycle chassis unit and component removal and replacement activities including • motorcycle technical data • removal and replacement procedures

	• legal requirements 2.2 Use technical information to support motorcycle chassis unit and component removal and replacement activities
3. Be able to use appropriate tools and equipment	3.1 Select the appropriate tools and equipment necessary for removal and replacement of motorcycle chassis systems including • steering • suspension • braking • wheels and tyres 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 to remove and replace motorcycle chassis systems
4. Be able to carry out removal and replacement of motorcycle chassis units and components	4.1 Remove and replace the motorcycle chassis systems and components, adhering to the correct specifications and tolerances for the motorcycle and following • the manufacturer's approved removal and replacement methods • recognised researched repair methods • health and safety requirements 4.2 Ensure that replaced motorcycle chassis units and components conform to the motorcycle operating specification and any legal requirements 4.3 Use suitable testing methods to evaluate the performance of the reassembled system 4.4 Ensure that the reassembled motorcycle

	chassis system performs to the vehicle operating specification and meets any legal requirements
5. Be able to record information and make suitable recommendations	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 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Maintenance and Repair – Motorcycle NOS 2010, unit MC04	

Supporting Unit Information

Skills in Removing and Replacing Motorcycle Chassis Units and Components - M/601/5610 – Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Be observed by your assessor successfully carrying out the removal and replacement of 3 different units or components – one from each system. Your evidence must include demonstration of skill in each aspect of mechanical and hydraulic/fluid units or component removal and replacement:
  - steering
  - suspension
  - braking

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Evidence Of Achievement

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Knowledge of Motorcycle Preparation and Inspections

Unit Reference	**F/601/5563**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**20**
Unit Summary	This unit enables the learner to develop knowledge in order to carry out preparation activities and inspections of both new and used motorcycles
Learning Outcomes (1 to 1) ***The learner will***	**Assessment Criteria (1.1 to 1.10)** ***The learner can***
1. Understand how to carry out preparation activities and inspections of motorcycles	1.1 Explain the difference between the various motorcycle preparation activities and inspections 1.2 Identify the different systems to be inspected when using inspection methods 1.3 Identify the procedures involved in carrying out the preparation and inspection of motorcycles 1.4 Identify correct conformity of motorcycle systems and condition on motorcycle inspections 1.5 Compare test and inspection results against motorcycle specifications and legal requirements

	1.6 Explain how to record and complete the preparation and inspection results in the format required 1.7 Identify the recommendations that can be made based on results of the motorcycle inspections 1.8 Explain the implications of failing to carry out motorcycle preparation and inspection activities correctly 1.9 Explain the implications of signing workplace documentation and motorcycle records 1.10 Explain the procedure for reporting cosmetic damage to motorcycle components and units outside normal inspection items
Mapping to National Occupational Standards Directly mapped to IMI SSC Maintenance and Repair – Motorcycle NOS 2010, unit MC05	

Supporting Unit Information

Knowledge of Motorcycle Preparation and Inspections - F/601/5563 – Level 2

Indicative Content

Assembly, pre and post work motorcycle inspections

- PPE and motorcycle protection relating to:
  - motorcycle body panels and frame
  - paint surfaces
  - polished surfaces
  - seats
- Assembly, pre and post work motorcycle inspection procedures:
  - aural
  - visual and functional assessments on engine
  - engine systems
  - chassis systems
  - wheels and tyres
  - transmission system
  - electrical and electronic systems
  - exterior motorcycle body panels and frame
- The methods for carrying out inspections for: damage, corrosion, fluid leaks, wear, security, mounting security and condition to include:
  - engines and engine systems
  - chassis systems
  - transmission systems
  - brakes
  - steering
  - suspension
  - wheels
  - tyres
  - body panels and frame
  - electrical and electronic systems and components
  - motorcycle seating and mirrors
  - motorcycle instrumentation
  - driver controls
- Check conformity to manufacturer’s specifications and legal requirements.
- Completion of documentation to include:

- inspection records
- job cards
- motorcycle records

- Make recommendations based on results of motorcycle inspections.
- The checks necessary to ensure customer satisfaction for:
  - motorcycle body panels
  - paint surfaces
  - polished surfaces
  - chromed surfaces
  - seats and mirrors
- Prepare and use appropriate inspection equipment and tools
- Inspection procedures following inspection checklists
- Various motorcycle preparation activities and inspections to include:
  - new motorcycle assembly
  - pre and post work
  - pre-delivery on new and used motorcycles
  - MOT test
  - safety
  - post repair

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Skills in Motorcycle Preparation and Inspection

Unit Reference	**Y/601/5617**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**20**
Unit Summary	This unit enables the learner to develop skills in order to carry out preparation activities and inspections on both old and new motorcycles. In accordance of manufacturers and legal requirements
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to work safely when carrying out motorcycle preparation activities and inspections	1.1 Use suitable personal protective equipment and use suitable motorcycle coverings throughout all light motorcycle inspection activities 1.2 Work in a way which minimises the risk of damage or injury to the motorcycle, people and the environment
2. Be able to use relevant information to carry out preparation activities and inspections of motorcycles	2.1 Select suitable sources of technical information to support motorcycle inspection activities including • motorcycle technical data • inspection procedures • legal requirements

	2.2 Use technical information to support motorcycle inspection activities
3. Be able to use appropriate tools and equipment to carry out preparation activities and inspections of motorcycles	3.1 Select the appropriate tools and equipment necessary when carrying out preparation and inspections 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 a range of inspections on motorcycle systems
4. Be able to carry out the preparation activities and inspections of motorcycles	4.1 Carry out motorcycle preparation and inspections using prescribed methods, adhering to the correct specifications and tolerances for the motorcycle 4.2 Ensure that inspected motorcycle conforms to the motorcycle operating specification and any legal requirements 4.3 Ensure any comparison of the motorcycle against specification accurately identifies any differences from the motorcycle specification 4.4 Use suitable testing methods to evaluate the performance of the inspected systems
5. Be able to record information and make suitable recommendations	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 Record and report any additional faults noticed

	during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Maintenance and Repair – Motorcycle NOS 2010, unit MC05	

Supporting Unit Information

Skills in Motorcycle Preparation and Inspection - Y/601/5617 – Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Be observed by your assessor successfully carrying out at least 1 different inspection from the following:
  - pre-work inspection
  - post - work inspection
  - pre-delivery inspection
  - pre-purchase inspection
  - MOT test inspection
  - safety inspection
  - post repair inspection

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Knowledge of Removing and Fitting Electrical Components

Unit Reference	**K/601/6030**
Level	**2**
Credit Value	**5**
Guided Learning Hours	**45**
Unit Summary	This unit enables the learner to develop knowledge in order to carry out the removal and fitting of a range of electrical components. It also covers functional testing of fitting components
Learning Outcomes (1 to 2) ***The learner will***	**Assessment Criteria (1.1 to 2.2)** ***The learner can***
1. Understand how to carry out the removal and fitting of electrical components	1.1 Identify the procedures involved in carrying out the systematic removal and fitting of common electrical components 1.2 Explain the methods and procedures for storing removed vehicle electrical components 1.3 Identify the procedures involved in working with supplementary safety systems when fitting vehicle components 1.4 Identify the procedures involved in working with gas discharge headlamp systems 1.5 Describe the procedures, methods and reasons for ensuring correct alignment of vehicle

	electrical components 1.6 Identify the quality checks that can be used to ensure correct alignment and operation of components to manufacturers specification 1.7 Identify correct conformity of vehicle systems against vehicle specification and legal requirements on completion 1.8 Explain the procedure for reporting damage to vehicle electrical components and units
2. Understand how electrical systems operate	2.1 Identify common electrical system components 2.2 Describe the construction and operation of the main electrical systems
Mapping to National Occupational Standards Directly mapped to IMI SSC Accident Repair – Mechanical, Electrical and Trim NOS 2010, unit MET02	

Supporting Unit Information

Knowledge of Removing and Fitting Electrical Components - K/601/6030 – Level 2

Indicative Content

Basic electrical and electronic principles and electrical circuits

- Quantities:
  - basic volt (electrical pressure)
  - ampere (electrical current)
  - ohm (electrical resistance)
  - watt (power)
- The requirements of an electrical circuit:
  - battery
  - cables
  - switch
  - current consuming device
- The direction of current flow and electron flow
- Simple series and parallel circuits
- Earth and insulated return
- Cable sizes and colour codes
- Types of connectors, terminals and circuit protection devices
- Common electrical and electronic symbols
- The meaning of:
  - short circuit
  - open circuit
  - bad earth
  - high resistance
  - electrical capacity
- The basic principle of vehicle electronics and solid state.
- Procedures involved in carrying out the systematic removal and fitting of electrical components
  - batteries
  - headlamps
  - wiper systems
  - electric window systems
- Electrical system components
  - batteries
  - headlamps

- wiper systems
- electric window systems

Vehicle electrical wiring diagrams

- Interpret circuits to include:
  - vehicle lighting
  - auxiliary circuits
  - indicators

Vehicle batteries

- The construction and principles of vehicle batteries

Vehicle lighting and auxiliary systems

- Identify the function and operating principles of:
  - types of switches
  - circuit protection devices
  - relays
  - types of bulb
  - front and tail lamps
  - main and dip beam headlamps
  - lighting and dip switch
  - window winding
  - heating and ventilation systems, fan and heater
  - door mirror mechanisms
  - interior lights and switching
  - directional indicators
- The statutory lighting requirements when using a vehicle on the road.
- The need for headlamp adjustment.

Requirements of electrical and electronic systems

- The requirements for checking security and cleanliness of components, connections, correct operation of components and instruments, battery electrolyte, headlamp alignment, drive belt wear and tension.
- The basic procedures for checking the operation of electrical circuits:
  - use of multi-meters, volt, amps, ohms
  - checking voltage supply
  - checking current flow and consumption
  - checking resistance and volt drop
  - checking lamp operation, dip and main beam
  - checking indicators
- Safety precautions when working on electrical and electronic circuits

to include:
- disconnection and connection of battery
- avoidance of short circuits
- circuit protection

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

- The methods that can be used to protect undamaged items to ensure they are removed and refitted without causing unnecessary damage
- The procedures for the correct storage of vehicle contents
- The process for the reporting of extra damage and items that may have broken when removed or refitted

Types of clips and fixings

- The following types of clips and identify reasons and limitations for their use:
  - speed
  - 'c'
  - 'd'
  - 'j' type captive nut
  - 'r'
  - 'u' type captive nut
  - cable clip
  - trim clips
- The following types of fixings and identify reasons and limitations for their use:
  - pop rivet
  - plastic rivet
  - plastic capture nut
  - nut and bolt
  - shoulder bolt
  - 'Nyloc' type nuts
  - washers
  - 'Spring' type washers
  - self tapping screws and bolts
  - quick release plastic trim fastenings
  - trim tapes
  - adhesives and sealers

The processes involved when carrying out quality checks

- Items that may have been 'workshop' soiled and describe processes

for rectifying:
- door cards
- seats
- carpets
- boot and bonnet trims

- Methods for checking gaps
- The process for checking and aligning headlamps:
  - address handling procedures for halogen bulbs
  - address handling and health and safety issues relating to xenon bulbs and systems
- Operational checks and rectification methods to include:
  - lights
  - washers and wipers
  - Supplementary Restraint Structure (SRS) systems (checking not rectification)
  - charging system (checking not rectification)
  - horn
  - fluid levels
  - interior switches
  - operation of door lock mechanisms

Electrical Components

- Batteries
- Headlamps
- Wiper systems
- Electric Window Systems

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Skills in Removing and Fitting Electrical Components

Unit Reference	**Y/601/6055**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**20**
Unit Summary	This unit will help the learner to develop skills in order to carry out removal and fitting of a range of electrical vehicle components. It also covers functional testing of fitting components
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to work safely when carrying out the removal and fitting of electrical vehicle components	1.1 Wear suitable personal protective equipment and use suitable vehicle coverings throughout all motor vehicle removal and fitting of electrical vehicle components 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support vehicle removal and fitting activities including • vehicle technical data • removal and fitting procedures • legal requirements

	2.2 Use technical information to support vehicle removal and fitting activities
3. Be able to use appropriate tools and equipment	3.1 Select the appropriate tools and equipment necessary for carrying out the removal and fitting of electrical components 3.2 Ensure that equipment has been calibrated and is in a safe working condition 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 electrical components
4. Be able to carry out the removal and fitting of electrical vehicle components	4.1 Remove and refit common electrical vehicle components 4.2 Remove and refit the electrical vehicle components adhering to the correct specifications and tolerances for the vehicle and following • the manufacturer's approved removal and fitting methods • recognised researched removal and fitting methods 4.3 Ensure that the removal and fitting of electrical vehicle components conforms to the vehicle operating specification and any legal requirements 4.4 Ensure no damage occurs to other components when removing and fitting electrical vehicle components 4.5 Ensure all components are stored safely and in the correct location

5. Be able to record information and make suitable recommendations	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 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Accident Repair – Mechanical, Electrical and Trim NOS 2010, unit MET02	

Supporting Unit Information

Skills In Removing And Fitting Electrical Components - Y/601/6055 – Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined in the IMI Assessment Strategy
- Remove and replace key electrical components from 2 of the systems listed below
  - battery / charging
  - lighting – low voltage
  - electric window systems
  - electrical auxiliary systems

Teaching Strategies And Learning Activities

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Knowledge of Tools and Equipment Used In Vehicle Refinishing

Unit Reference	**J/601/6116**
Level	**2**
Credit Value	**5**
Guided Learning Hours	**45**
Unit Summary	This unit enables the learner to develop an understanding for • the correct selection, maintenance and use of hand and power tools used in vehicle refinishing • the correct preparation, use and maintenance of vehicle refinishing equipment
Learning Outcomes (1 to 2) ***The learner will***	**Assessment Criteria (1.1 to 2.3)** ***The learner can***
1. Understand how to select, use and care for hand and power tools used in vehicle refinishing	1.1 Describe the use of common types of hand and power tools used for vehicle refinishing 1.2 Identify the main components of a spray gun 1.3 Describe, within the scope of their responsibilities, how to select, prepare and maintain hand and power tools used in vehicle refinishing 1.4 State the limitations of hand and power tools used in vehicle refinishing

	1.5 Explain how hand and power tools used in vehicle refinishing should be stored 1.6 Describe the methods of adjusting compressed air pressures by use of • transformer/regulator • spray gun pressure gauge 1.7 Describe the operation of gun cleaning machines to include the use of solvent and water based gun cleaners 1.8 Describe the cleaning and maintenance of suction/gravity feed guns 1.9 Identify spray gun faults, their cause and how they should be rectified
2. Understand how to prepare, use and care for vehicle refinishing equipment	2.1 Identify workshop equipment used in vehicle refinishing 2.2 Describe the preparation and safe use of workshop equipment 2.3 Describe the maintenance requirements of a compressed air system oil level
Mapping to National Occupational Standards Directly mapped to IMI SSC Accident Repair – Paint NOS 2010, unit PO01	

Supporting Unit Information

Knowledge Of Tools And Equipment Used In Vehicle Refinishing – J/601/6116 - Level 2

Indicative Content

Equipment used in vehicle refinishing

- flatting block
- sponge
- squeegee
- chamois leather
- trimming knife
- polishing mop
- denibbing blocks
- sealer gun
- air duster
- rotary sander
- DA random orbital sander
- orbital flat bed sander
- belt sander
- vacuum extraction sander
- specialist extraction for aluminium particles (explosive)
- suction feed spray gun
- gravity feed spray gun
- pressure feed spray gun
- HVLP spray guns
- identify spray gun cleaning machines

Workshop equipment

- combi-booth
- separate oven
- infra-red drying
- compressor
- main air line
- transformer/regulator
- water traps
- flexible air and fluid hoses
- pressure gauges
- automatic paper/tape dispenser

- plastic sheeting dispenser
- complete car covers dispenser
- wheel covers dispenser
- viscosity measuring equipment
- paint mixing schemes
- air feed breathing equipment
- smart scales

Paint gun cleaning and maintenance

- loading
- cleaning cycle
- coagulant (water-based paints only)
- filtration of solids
- partial strip of paint spaying gun
- complete strip of paint spraying gun
- washer cycle
- blow through
- re-assembly
- lubrication

Main parts of a Spray gun:

- trigger
- body
- packing gland
- air valve
- fluid needle
- fluid tip (nozzle)
- air cap
- paint volume control
- fan width control
- material cup
- filters

Compressed air systems:

- tank drainage
- ring drainage
- regular maintenance and service logs
- air quality checks (breathable air)
- Air filter/cartridge changes (breathable air)

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Minimum requirements when assessing this unit
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Evidence Of Achievement

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Sample evidence checklists are available on the SEG website

Skills in Tools and Equipment Used In Vehicle Refinishing

Unit Reference	**Y/601/6153**
Level	**2**
Credit Value	**5**
Guided Learning Hours	**45**
Unit Summary	This unit allows the learner to develop skills in • the correct selection, maintenance and use of hand and power tools used in vehicle refinishing • the correct preparation, use and maintenance of vehicle refinishing equipment
Learning Outcomes (1 to 2) ***The learner will***	**Assessment Criteria (1.1 to 2.3)** ***The learner can***
1. Be able to select, use and care for hand and power tools used in vehicle refinishing	1.1 Select, prepare, safely use and maintain suitable hand and power tools when vehicle refinishing 1.2 Report any faulty or damaged tools to the relevant person(s) clearly and promptly 1.3 Store work tools in a clean, serviceable and safe manner, which permits ease of access and identification for use
2. Be able to prepare and use vehicle	2.1 Select, prepare and safely use vehicle refinishing workshop equipment

refinishing equipment	2.2 Report any faulty or damaged equipment to the relevant person(s) clearly and promptly 2.3 Store work equipment in a clean, serviceable and safe manner, which permits ease of access and use
Mapping to National Occupational Standards Directly mapped to IMI SSC Accident Repair – Paint NOS 2010, unit PO01	

Supporting Unit Information

Skills In Tools And Equipment Used In Vehicle Refinishing – Y/601/6153 - Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Be observed by an assessor preparing and using all of the tools listed below:
  - flatting block
  - sponge
  - squeegee
  - chamois leather
  - trimming knife
  - polishing mop
  - sealer gun
  - water traps
  - pressure gauges
  - paper/tape dispenser
  - viscosity measuring equipment
  - combi-booth
  - infra-red dryer
  - compressor
  - air line
  - transformer/regulator
  - vacuum extraction sander

- spray gun cleaning machines
- plastic sheeting dispenser
- random orbital sander

- Be observed by an assessor preparing and using at least 2 compliant spray guns below
  - suction feed spray gun
  - gravity feed spray gun
  - pressure feed spray gun

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Minimum requirements when assessing this unit
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Knowledge of Working with Plastic Materials and Components

Unit Reference	**Y/601/6119**
Level	**3**
Credit Value	**6**
Guided Learning Hours	**45**
Unit Summary	This unit enables the learner to develop an understanding for identifying substrates and plastics whilst undertaking paint operations following guidelines and procedures
Learning Outcomes (1 to 3) ***The learner will***	**Assessment Criteria (1.1 to 3.11)** ***The learner can***
1. Understand how to identify plastic body surfaces requiring the application of foundation materials in vehicle refinishing	1.1 Identify the types of substrate likely to be found in vehicle refinishing 1.2 Identify the main methods used to determine the vehicle substrate 1.3 Identify the properties of the substrate 1.4 Identify substrate to determine the selection of the preparation process and suitable foundation material 1.5 Identify the types of plastic likely to be found in vehicle body manufacturing

2. Understand how to prepare plastic body surfaces prior to application of foundation materials	2.1 Describe the choice and use of surface cleaning agents prior to applying foundation materials to plastics 2.2 Describe how to condition and clean surfaces prior to the application of foundation coatings to ensure adequate adhesion
3. Understand how to mix and apply foundation materials onto plastics in vehicle refinishing	3.1 Describe how to mix and check the viscosity of foundation materials 3.2 Describe the importance of viscosity and its effects on the surface finish 3.3 Describe the properties of the foundation materials 3.4 Describe the principles of paint mixing, the importance of the right additive (hardener or thinner) in the correct ratio 3.5 Describe the curing and drying recommendations for the various foundation materials to plastics 3.6 Describe how to apply foundation coatings 3.7 Describe how to find and interpret sources of information relevant to the mixing and application of foundation coatings relating to plastics 3.8 Describe how to avoid application defects 3.9 Outline and describe the masking procedures, methods and techniques for part or whole vehicles 3.10 Describe how to carry out masking

	procedures to avoid material wastage and vehicle contamination for each stage of the process 3.11 Identify the requirements for protecting the vehicle and contents from damage before, during and after preparing and applying foundation materials to plastics
Mapping to National Occupational Standards Directly mapped to IMI SSC Accident Repair – Paint NOS 2010, unit PO03	

Supporting Unit Information

Knowledge of Working with Plastic Materials and Components – Y/601/6119 - Level 3

Indicative Content

The types of substrates likely to be found in vehicle refinishing

- Types of substrate to include:
  - all plastics
  - high bake Enamels (O E finishes)
  - 2 K Paints
  - 1K Paints
  - clear over bases
  - polyester fillers
  - repaired panels
  - primed panels
- Substrates to determine selection of undercoat with reference to:
  - condition of surface
  - type of substrate
  - process requirements
  - material requirement
- List the physical properties of a substrate to include:
  - surface condition
  - adhesion
  - flexibility
  - porosity
  - texture

Methods used in determining vehicle substrates

- Workshop tests to determine substrates to include:
  - visual test for plastics and identification of plastic type through identification code
- For determination of paint type:
  - compound small area
  - solvent wipe test (1k or 2k)
  - colour of flatting sludge (straight colour or C O B)

The properties and correct use of conditioning materials

- That a vehicle must be thoroughly washed and cleaned prior to

refinishing to include:

- outside body panels
- frame (where applicable, ie motorcycle)
- under arches/mudguards
- under bonnet (where applicable)
- all apertures (where applicable)
- degreased

- The reasons for masking components adjacent to repair areas.
- The correct preparation of parts prior to painting to include products used for the removal of:
  - wax
  - grease
  - skin oils
  - dust
  - water
  - abrasive contaminates
  - environmental pollution
- Materials used for conditioning processes such as:
  - wax and grease removers
  - spirit wipes
  - acid based
  - water based
- The correct and safe use of the above materials.
- The properties of pre-preparation material to include:
  - neutralisation
  - ability to alter the surface
  - reaction with oxide

The types and properties of foundation materials in common use

- The types of undercoat in common use to include:
  - adhesion promoters
  - primer surfacer
  - primer filler
  - stopper/putty
  - sealers
  - anti stone chip
  - polyester fillers
- The characteristics of these undercoats such as:
  - protection
  - flexibility
  - build

- drying
- flatting

The factors affecting the choice and use of foundation materials

- The reasons for using paint to include:
  - protection
  - filling
  - decoration
  - identification
  - safety
- Undercoat materials for plastics to include:
  - adhesion promoters
  - flexible additives
  - texture additives
- The procedures for the preparation of plastics to include:
  - identification
  - cleaning
  - adhesion promotion
  - elastic primers
- Identify the preparation requirements for textured and special effect coatings to include:
  - spoilers
  - bumpers
  - exterior trim
  - fairings
  - mudguards
  - panniers

The procedures for mixing foundation materials to the correct ratio with hardeners and thinners

- Procedures for mixing undercoats such as:
  - anti-stone chip primers
  - surfacers
  - primer fillers
  - plastic adhesion promoters
  - elastic primers
  - sealers
  - spraying polyester fillers
- Listed additives such as:
  - adhesion promoters
  - flexible additives

- texture finishes
- UV absorbers
- drying agents (accelerator)

The importance of checking and adjusting paint viscosity and its effect on surface finish

- Why the viscosity of a paint is important to application to include:
  - build
  - surface finish
  - speed of application
  - describe the procedure for checking viscosity
- Describe the effects on viscosity of:
  - temperature
  - additions of thinner/reducer

Foundation material technical data sheets to extract listed information. The importance of correctly interpreting and following manufacturers' instructions and the consequences of failing to do so

- The process data sheets to determine information such as:
  - mixing ratios
  - viscosity
  - number of coats
  - flash off times
  - build film thickness
  - spray gun type
  - spray gun set up
  - air pressure requirements
  - substrate requirements
  - suitability as a substrate
  - drying times
  - suitability to be applied by methods other than spraying
- The main information sourced from data sheets to include:
  - product identification
  - product description
  - substrate suitability
  - pre-treatment requirement
  - mixing ratio
  - pot life
  - method of application
  - spray viscosity

- nozzle/air cap set up
- number of coats
- flash off times
- drying times
- recoatability

- Common pictograms and state their meaning including those for:
  - cleaning information
  - mixing ratios
  - use a measuring stick
  - addition of hardener
  - application viscosity
  - type of spray gun
  - spray coats information
  - flash-off
  - drying time
  - drying with infrared
  - sanding
  - polishing
  - technical data required
  - hand stirring

Masking procedures for part and whole vehicles. Describe masking processes and techniques

- Common masking systems, materials and techniques to include:
  - masking paper
  - plastic sheeting
  - masking tape
  - foam tape
  - wheel covers
  - liquid masking
  - roll-back masking
- The characteristics of a quality masking tape to include:
  - ability to turn corners
  - non-aggressive adhesive/non-drying
  - clean edges to painted areas
- The properties of these masking materials such as:
  - economy of use
  - costs per unit
  - absorption
  - flexibility
- Where and how these masking materials and systems should be used.

- The masking procedures for listed items such as:
  - door glass and windscreens
  - handles
  - lights
  - mirrors
  - wheels
  - handle bars
  - fairings
  - mechanical components
  - seat
- Masking schedule for the type of repair to include:
  - time efficiency
  - material costs
  - given protection
- Faults which are caused by careless masking such as:
  - flash lines
  - bridging
  - creep
  - hard edges

Teaching Strategies And Learning Activities

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Skills in Working with Plastic Materials and Components

Unit Reference	**J/601/6231**
Level	**3**
Credit Value	**5**
Guided Learning Hours	**45**
Unit Summary	This unit will help the learner to develop the skills required to carry out the identification of plastic substrates. Mixing and adjusting the viscosity of foundation materials. Applying foundation materials to plastics following guidelines and procedures
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to work safely when carrying out preparation and application of foundation materials to plastics used in vehicle refinishing	1.1 Use suitable personal protective equipment and vehicle coverings throughout all preparation and application of foundation materials to plastics used in vehicle refinishing 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support preparation and application of foundation materials to plastics in vehicle refinishing

	2.2 Use technical information to support preparation and application of foundation materials to plastics in vehicle refinishing
3. Be able to use appropriate tools and equipment	3.1 Select the appropriate tools and equipment necessary for carrying out preparation and application of foundation materials to plastics in vehicle refinishing 3.2 Ensure that equipment has been calibrated to meet manufacturers requirements 3.3 Use the correct tools and equipment in the way specified by manufacturers when carrying out preparation and application of foundation materials to plastics in vehicle refinishing 3.4 Leave all application equipment in a clean and serviceable condition
4. Be able to carry out preparation and application of foundation materials to plastics used in vehicle refinishing	4.1 Identify the type of plastic component prior to working on the vehicle 4.2 Remove and store safely any components likely to be affected by the preparation process 4.3 Keep the work area clean and tidy throughout all preparation activities 4.4 Use surface cleaning agents and protect adjacent panels to those being repaired 4.5 Leave the prepared areas free from contamination and ready for the application of foundation materials 4.6 Check the viscosity of foundation materials

	4.7 Prepare and apply all foundation materials to plastics 4.8 Dry and cure all foundation materials to plastics 4.9 Dispose of waste material to conform with legal and workplace requirements 4.10 Ensure all completed repairs are finished to an agreed standard ready for the next process
5. Be able to record information and make suitable recommendations	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 Record and report any additional faults identified during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Accident Repair – Paint NOS 2010, unit PO03	

Supporting Unit Information

Skills in Working with Plastic Materials and Components – J/601/6231 - Level 3

Indicative Content

General Requirements
You must:

- Produce evidence to show you meet all of the learning outcomes Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Be observed by an assessor carrying out each of the following listed below, which covers the learning outcomes
  - apply foundation coats including adhesion promoters
  - applying top coats
  - use flexible additive

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Knowledge of Repairing Minor Paint Defects

Unit Reference	**Y/601/6122**
Level	**2**
Credit Value	**6**
Guided Learning Hours	**45**
Unit Summary	This unit enables the learner to develop an understanding about the causes and rectification of minor paint defects using a range of tools, equipment and materials
Learning Outcomes (1 to 2) ***The learner will***	**Assessment Criteria (1.1 to 2.8)** ***The learner can***
1. Understand how to identify the body surface requiring the rectification of minor paint defects	1.1 Describe how to identify the existing paint surface finish on which the minor paint defect has occurred 1.2 Identify the minor paint defects, their cause and methods of rectification suitable for the paint finish
2. Understand how to repair minor paint defects	2.1 Describe how to carry out flatting, burnishing, polishing and touch in techniques to correct minor paint defects 2.2 Describe how to use polishing machines, denibbing blocks and flatting equipment 2.3 Describe how to use compounds, flatting

	papers, polishes, pre-prepared paints and glazes 2.4 Identify the factors affecting the choice and use of materials in the rectification of minor paint defects 2.5 Describe how to prevent further paint damage during rectification 2.6 Describe the importance of proper cleaning to the vehicle and work area prior to and after rectification work 2.7 Describe the importance of keeping equipment and materials clean and free from contamination during rectification work 2.8 Identify the requirements for protecting the vehicle and contents from damage before, during and after repairing minor paint defects
Mapping to National Occupational Standards Directly mapped to IMI SSC Accident Repair – Paint NOS 2010, unit PO06	

Supporting Unit Information

Knowledge of Repairing Minor Paint Defects – Y/601/6122 - Level 2

Indicative Content

Minor surface defects to include:

- scratches
- chips
- dents
- corrosion
- contamination
- blisters (including micro-blisters)
- fading
- loss of gloss
- chalking

Types of paint finishes likely to be found in modern vehicles

- Types of substrate to include:
  - steel
  - aluminium
  - all plastics
  - coated steels
  - high bake enamels (OE finishes)
  - 2 k paints
  - 1 k paints
  - clear over bases
  - polyester fillers
- Substrates to determine selection of undercoat with reference to:
  - condition of surface
  - type of substrate
  - process requirements
  - material requirement
- The physical properties of a substrate to include:
  - surface condition
  - adhesion
  - flexibility
  - porosity
  - texture

Methods used in determining types of vehicle paint finishes

- Workshop tests to determine paint substrates to include:
  - compound small area
  - solvent wipe test (1k or 2k)
  - colour of flatting sludge (straight colour or c o b)
  - VIN plate

Vehicle cleaning and protection procedures during paint defect rectification processes

- Vehicle must be thoroughly washed and cleaned prior to refinishing to include:
  - outside body panels
  - under arches
  - under bonnet
  - all apertures
  - degreased
- The reasons for masking components adjacent to repair areas.
- The correct preparation of parts prior to painting to include products used for the removal of:
  - wax
  - grease
  - skin oils
  - dust
  - water
  - abrasive contaminates
  - environmental pollution
- Materials used for conditioning processes such as:
  - wax and grease removers
  - spirit wipes
  - acid based
  - water based
- The correct and safe use of the above materials.
- The properties of pre-preparation material to include:
  - neutralisation
  - ability to alter the surface
  - reaction with oxide

Identification of the common minor paint defects and list their causes

- The reasons for the defects in vehicle finish such as:
  - environmental pollution

- ultra violet reaction
- industrial pollution
- accidental damage

Which rectification procedure to use for each of the minor paint defects

- The procedures for the rectification of minor defects to include:
  - compound/polish surface
  - flat/polish surface
  - local paint removal/repaint
  - panel/edge-to-edge repaint

Tools and equipment used for the rectification of minor paint defects

- The hand tools and equipment used by a paint refinisher to include:
  - flatting block
  - squeegee
  - leather
  - trimming knife
  - masking dispensers
  - sander
  - DA random orbital
  - orbital flat bed
  - belt sander
  - polishing equipment
  - spray guns
  - sealer guns
  - air dusters
  - vacuum extraction
  - compressed air systems

The selection, operation and maintenance of listed tools and equipment for paint defect rectification

- The above tools and equipment with regard to their:
  - selection
  - correct and safe use
  - adjustment
  - maintenance
  - accessories
- The function and correct use of each of the sanders listed:
  - rotary

- DA random orbital
- orbital flat bed
- belt

- Comparison of the above sanders in terms of:
  - selection
  - abrasive pattern produced
  - aggressiveness
  - heat produced
  - adjustment
  - abrasive change
- The equipment required for polishing to include:
  - air polisher
  - electric polisher
  - foam compound mop
  - foam polishing mop
  - lambs-wool mop
  - types of paste compound
  - types of liquid compound
  - types of polishing cloth
  - lubricants
  - specialist de-nib equipment
- The maintenance requirement of these tools.

Adjust, set up and use listed tools and equipment for paint defect rectification

- The process of using a polishing machine to refurbish paint work to include:
  - speed of polishing machine
  - application of the machine to the surface
  - application of compound to the surface
  - operation of polishing machine
  - awareness of polishing near to edges and swage lines
  - avoiding burn marks
  - removal of dried polish
- The process of using sanders to prepare surface defects to include:
  - choosing correct sander for job in hand
  - selection of appropriate grade of abrasive
  - correct technique with regard to pressure applied
  - avoiding sanding to bare metal on edges
  - use of dust extraction

- The methods of paint application for defect repair to include:
  - touch-up brushes
  - coloured film patches
  - aerosols
  - touch-up spray guns and air brushes
  - standard spray guns
  - adjusting spray guns for optimum atomisation

Tools and equipment must be kept free from contamination to avoid further defects

- The methods of cleaning tools and equipment after use:
  - washing polishing/compound heads to remove residues
  - cleaning spray guns and brushes with appropriate solvents
  - explain that failure to carry out these procedures may lead to defects to include:
  - surface scratches
  - surface contamination
  - silicone cratering
  - staining of painted surfaces
  - equipment malfunction

Materials used for the rectification of minor paint defects

- Types and uses of abrasives to include:
  - aluminium oxide
  - silicon carbide
  - wet and dry types
  - open coat
  - closed coat
  - p grades
  - papers, pastes and woven plastics
- The properties of compounds used to refurbish paintwork including:
  - cutting compounds
  - cutting creams
  - surface polishes
  - protective waxes
  - sponge cutting heads
  - polishing mops
  - polishing cloths
- Types and uses of filler materials to include:
  - 2k polyester filler paste
  - 2k and 1k stopper

- Types and uses of paints to include:
  - touch-up pots
  - self-adhesive coloured paint film
  - aerosols
  - standard 2k and 1k paints

Select the correct materials for rectifying listed paint defects

- Selection of materials for rectification will depend on:
  - type of surface defect to be repaired
  - severity of defect
  - size of area to be repaired
  - equipment available
  - expertise of operator
  - customer preference

Correct preparation and use of materials for rectifying paint defects

- The preparation of listed materials for defect rectification to include:
  - replacing worn or used abrasive papers, pads and discs
  - checking compound and polish pastes for contamination
  - mixing of 2k fillers and stoppers to correct ratios
- The preparation required prior to paint application to include:
  - stirring/shaking paint containers
  - mixing touch-up and standard paints to correct ratios
  - carrying out viscosity checks on mixed paint materials

Touch-in techniques as required for the rectification of some paint defects

- Touch-in techniques:
  - may not exactly match factory (OE) finish
  - may be viewed as a temporary repair
  - should be confined to small areas

Procedures for the safe disposal of waste material and the consequences of failing to follow disposal regulations

- How the disposal of products is influenced by the duty of care regulations.
- The disposal procedures for used products to include:
  - waste paper and card
  - empty containers
  - waste thinners
  - body filler dust
  - spray booth filters

- soiled rags
- body panels
- damaged vehicle parts

- Documentation required for correct disposal of the above items
- The penalties for non compliance
- The effects on the environment of non compliance

Teaching Strategies And Learning Activities

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Skills in Repairing Minor Paint Defects

Unit Reference	**F/601/6244**
Level	**2**
Credit Value	**5**
Guided Learning Hours	**45**
Unit Summary	This unit will help the learner to develop the skills required to carry out the rectification of minor paint defects using a range of tools, equipment and materials. It also covers the importance of following guidelines and recommended procedures
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to work safely when carrying out the rectification of minor paint defects	1.1 Use suitable personal protective equipment and vehicle coverings when carrying out the rectification of minor paint defects 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support the rectification of minor paint defect 2.2 Use technical information to support the rectification of minor paint defects

3. Be able to use appropriate tools and equipment	3.1 Select the appropriate tools and equipment necessary for carrying out the rectification of minor paint defects 3.2 Ensure that the equipment is safe and has been calibrated to meet manufacturers requirements 3.3 Use the correct tools and equipment in the way specified by manufacturers when carrying out the rectification of minor paint defects 3.4 Leave all equipment in a clean and serviceable condition
4. Be able to carry out the rectification of minor paint defects	4.1 Identify the type of paint defect prior to working on the vehicle 4.2 Use surface cleaning agents and protect all surfaces adjacent to those being prepared and rectified using the specified method 4.3 Remove and store safely any components likely to be affected by the preparation and rectification process 4.4 Correct defects using the approved tools and equipment required 4.5 Keep the work area clean and tidy throughout all rectification activities 4.6 Dispose of waste materials to conform with legal and workplace requirements 4.7 Ensure all minor paint defects are rectified to a commercially acceptable standard

5. Be able to record information and make suitable recommendations	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 Record and report any additional faults identified during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Accident Repair – Paint NOS 2010, unit PO06	

Supporting Unit Information

Skills in Repairing Minor Paint Defects – F/601/6244 - Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
  Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre.
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Be observed by an assessor repairing 3 out of 5 defects listed below, which covers the learning outcomes
  - loss of gloss
  - scuffs and scratches to the manufacturers finish
  - dirt inclusion in a newly applied finish
  - runs or sags in a newly applied finish
  - orange peel

Teaching Strategies And Learning Activities

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Methods Of Assessment

This unit is internally assessed and internally and externally moderated.

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Minimum requirements when assessing this unit

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Evidence Of Achievement

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Sample evidence checklists are available on the SEG website

Knowledge of Vehicle Colour Matching

Unit Reference	**R/601/6135**
Level	**3**
Credit Value	**6**
Guided Learning Hours	**45**
Unit Summary	This unit enables the learner to develop an understanding of colours, undercoats paints, identification, mixing and matching of vehicle paint colours including the use of tinters and preparation of test cards
Learning Outcomes (1 to 3) ***The learner will***	**Assessment Criteria (1.1 to 3.9)** ***The learner can***
1. Understand about colour theory	1.1 Describe the colours of the spectrum 1.2 Identify the primary colours 1.3 Explain the effect by which pigments produce visible colour, including black and white 1.4 Identify and recognise colour classification systems 1.5 Describe the terms colour, strength, hue, chroma 1.6 Explain the effects of the viewing environment on colour matching

	1.7 Explain the terms gloss, opacity and metamerism and there effects on colour matching
2. Understand about vehicle paint coatings, ingredients and their application	2.1 Explain the purpose of paint materials 2.2 Describe the kinds of undercoats, their functions and use on motor vehicles 2.3 Describe the kinds of topcoats, their functions and use on motor vehicles including • solid colours • clear over base colours • metallic colours • pearl colours 2.4 Identify and explain the basic ingredients of paints 2.5 Explain the types of paints available and their function including • single pack • two pack • acrylic 2.6 Explain the types of pigments available and their function 2.7 Explain the types of solvents available and their function 2.8 Explain the purpose of testing paint materials
3. Understand about mixing and matching vehicle paint colours	3.1 Describe how to find, interpret and use sources of information relevant to the mixing and matching of vehicle paint colours 3.2 Describe how to identify the paint substrate and the importance of doing so

	3.3 Explain how to compare, mix, test and adjust colour tones and effects, including metallic and mica effects 3.4 Explain the consequences of adding too much of one type of tinter and the process for correcting and adjusting it 3.5 Describe how to use test panels and colour test cards including drying and the importance of doing so 3.6 Explain how spray equipment adjustments can alter colour 3.7 Explain how to identify the causes of colour mismatch and how to rectify 3.8 Explain how to assess and evaluate the need for blending techniques to achieve and acceptable colour match 3.9 Describe the importance of correctly preparing the existing finish for colour matching and checking the match using the correct light source

Mapping to National Occupational Standards
Directly mapped to IMI SSC Accident Repair – Paint NOS 2010, unit PO13

Supporting Unit Information

Knowledge of Vehicle Colour Matching – R/601/6135 - Level 3

Indicative Content

The effects of the viewing environment on colour matching:

- artificial light
- natural light
- light box
- direct sunlight
- shaded light
- reflection

The purpose of paint materials :

- anti-corrosion
- protection
- reflection
- visual
- body sound deadening (all list to go in content)

Types of undercoats and their function:

- primer
- primer surfacer
- anti corrosion
- etch primers
- plastic primers
- primer fillers
- electrodepositing (e-coating)
- e-coat replacement products
- sealers/isolators
- anti chip/texture coatings

Types of paints and their function:

- single pack
- two pack
- acrylic
- alkyd
- epoxy
- polyurethane

- phenolic
- polyester

Types of pigments available and their function:
- coloured
- metallic
- pearl
- anti corrosion
- extender
- special effects

The purpose of testing paint materials:
- adhesion
- durability
- corrosion
- resistance to chemicals
- abrasion
- acid rain
- ultraviolet

Types of topcoat
- solid colours
- clear over base colours
- metallic colours
- pearl colours

Methods and importance of correctly identifying paint substrates prior to undertaking any refinishing work
- Workshop tests to determine substrates to include:
  - solvent wipe test (1k or 2k)
  - colour of flatting sludge (straight colour or C O B)
  - VIN plate
- Substrates to determine selection of undercoat with reference to:
  - condition of surface
  - type of substrate
  - process requirements
  - material requirements
- The physical properties of a substrate to include:
  - surface condition
  - adhesion
  - flexibility

- porosity

- The technical properties of a substrate to include:
  - type of paint
  - steel
  - aluminium
  - plastic
  - coated steels
  - repaired panels
  - OE finish

How to prepare existing paint substrates for colour matching

- The required preparation for the listed substrates to include:
  - steel
  - aluminium alloys
  - GR plastics
  - thermo plastics
  - cured 2k materials
  - synthetic enamels
- The procedures for the preparation of paint finishes to include:
  - thorough cleaning and drying
  - compounding to restore original colour
- The procedures for the preparation of plastics to include:
  - identification
  - tempering
  - pore filling
  - release agent removal
  - cleaning
  - adhesion promotion
  - elastic primers
- The preparation requirements for textured and special effect coatings to include:
  - spoilers
  - bumpers
  - exterior trim

How different light sources can affect the perception of colour for matching purposes

- Colour in terms of light reflected from a surface to include:
  - light quality
  - surface quality
  - absorbed light

- reflected light
- The effects of metamerism under:
  - sodium light
  - mercury vapour
  - explain how this phenomenon is created

Types of refinishing materials by their film forming characteristics

- The different types of paints to include:
  - non convertible
  - nitro cellulose
  - 1k acrylic
  - convertible
  - oil based synthetics
  - 2k acrylics
  - 2k polyurethane
  - polyesters
  - isocyanate resins
  - waterborne basecoats
  - microgel
  - latex
- The properties of binders to include:
  - convertible
  - oxidise
  - high temperature reactants
  - chemical reactants
- Non-convertible:
  - solvent evaporation
- The forms of binder such as:
  - nitro-cellulose
  - alkyds
  - urethanes
  - polyesters
  - isocyanates
  - acrylics
- The uses of binders in paints:
  - film forming
  - binding the pigments
  - adhesion
  - cohesion
  - flexibility
- The principles of operation of water based materials

- The materials used in water based paint technology
- The environmental advantages of using water based paints

Distinguish between paint system classification, such as MS, HS, UHS, waterbased, etc

- The difference between paint systems to include:
  - medium solids
  - high solids
  - ultra high solids
  - water based

The properties of different types of solvents, thinners and hardeners

- The properties of different types of solvent, thinners and hardeners such as:
  - evaporation rate
  - ability to dissolve the binder
  - ability to be tolerated by the binder
  - fade out properties
  - drying rate
- The forms of solvent/thinner such as:
  - alcohols
  - ketones
  - glycol ethers
  - blends
- The use of solvent/thinner
  - to make the paint fluid in the tin
  - to reduce the paint to a spraying/ application viscosity
- The properties of 2K hardeners to include:
  - effectiveness at blocking out harmful ultra violet light
  - necessity for adding to 2k paints to effect curing
  - inclusion of isocyanates requires special H&S procedures

The properties of paint system additives

- Listed additives and describe their properties to include:
  - adhesion promoters
  - flexible additives
  - texture finishes
  - extenders
  - UV absorbers
  - flow aids
- The characteristics of additives to be added to textured paints such as

those for:

- textured finish
- leather look finishes
- crackle finishes
- metallic additives other than aluminium

The factors to be considered when choosing and using refinishing systems

- The characteristics and properties of surface coatings to include:
  - nitro-cellulose- non convertible-low build –fast surface dry
  - oil based synthetics-convertible-slow dry through uptake of oxygen
  - two packs- convertible- chemical reaction –high build
  - basecoats- solvent or water borne -non convertible-very low build-high opacity have to be overcoated with clearcoat

- The listed paint materials in terms of their:
  - preparation of substrates
  - mixing procedures
  - application
  - drying processes
  - working techniques
  - covering and hiding power
  - rectification
  - cleaning processes

Spraying equipment adjustments can alter the colour of refinishing materials

- The spray gun adjustments that can be made to determine the surface finish of a colour coat to include:
  - air pressure
  - fluid volume
  - fan width

Sources of information relevant to the mixing and matching of vehicle paint colours

- The information that may be gained from the Vehicle Identification No. (VIN) plate with regard to paint codes
- Alternative areas of the vehicle where the paint code may be found
- The sources of information relevant to paint finishing to include:
  - PC based material
  - paint manufacturers information

- trade magazines
- specialist magazines (customising periodicals)
- vehicle manufacturers information sheets
- paint data sheets
- microfiche
- world wide web
- Thatcham methods manuals

- Types of information recoverable from the above sources to include:
  - product and mixing information
  - health and safety information
  - first aid procedures
  - application techniques
  - rectification procedures
  - colour information
- The meaning of the symbols used on most microfiche such as:
  - colour data
  - formula field
  - technical field
  - on line finish
  - coding field
  - formula in development
  - special technical information
  - variants
  - respray
  - poor opacity
  - 3-stage colour
  - colours for mouldings/bumpers
  - revised formula
- The extra colour information available such as:
  - colour variants
  - colour 'wheel'
  - on-line colour back up
- The sources of tinting information available to the painter to aid colour matching of metallics

The principles of colour, the colour wheel, and Munsell's Notation

- The theory of colour matching to include:
  - primary and secondary colours
  - metamerism
  - quality of light source
  - colour circles

- The terminology used to describe the matching of metallic colours with reference to:
  - the Munsell colour circle
  - the variant shade
  - hue
  - chroma
  - value
- What is meant by subtractive mixing
- What is meant by additive mixing

The factors affecting colour and colour perception, including metamerism

- Factors affecting colour variation such as:
  - orientation of metallic particles
  - flip and face tones
  - coating thickness and viscosity
  - spraying temperatures
  - spraying pressures
- How each of the above has an effect on the colour match
- How the above problems can be overcome
- The process of light and pigment interaction with reference to:
  - colour spectrum
  - colour effects
  - refraction
  - diffusion
  - light wavelengths
  - thickness of pigment particles
  - type of pigment particles
- The function of a light box testing unit as:
  - testing under normal daylight conditions
  - testing for metamerism
  - comparison of colour standards
- The operation of a light testing unit with reference to:
  - operation
  - type of light used

How to obtain matching colours and how to compare them with the original finish in terms of colour, tone and effect, including the use of dried test cards or panels

- The procedures and principles for using colour chips such as:
  - cleaning the panel

- matching in daylight conditions
- matching adjacent panels

- What is meant by subtractive mixing
- What is meant by additive mixing
- The mixing of basecoat materials to include:
  - mixing tinters
  - thinners, solvents or water
  - additives
- The preparation of a clearcoat material to include:
  - hardeners
  - thinners/solvents
  - additives
- The types of 'advanced pigments' used in modern paints:
  - metallic (aluminium and titanium)
  - pearlescents (micas)
  - 'multi flip' pigments
- The operation and characteristics of different pigments to include:
  - acicular-noodle shaped-add strength and reinforcing
  - lamollar - flakes-increased durability
  - nodular- roughly spherical-most common
- The function of spray out cards to determine:
  - opacity of colour
  - hiding power
  - colour comparison
  - as a reference for future use
- The functions of spray out cards with reference to a 'colour library':
  - reference functions
  - colour tinting information
  - information required
  - recording of information

Different application techniques

- The differences to applying a base coat material compared with one stage solid colours such as:
  - gun distance
  - gun speed
  - air pressure
  - 'drop coats'
  - flash off
- The application of clear coat with reference to:
  - gun speed

- flash off
- number of coats
- MS, HS and UHS

The importance of using material application methods which assist in achieving colour match

- The differences to applying a base coat material compared with one stage solid colours such as:
  - gun distance
  - gun speed
  - air pressure
  - 'drop coats'
  - flash off
- The effects of applying metallic colours:
  - wet
  - dry
- The application of clear coat with reference to:
  - gun speed
  - flash off
  - number of coats
  - MS, HS and UHS

The use of blending techniques as an aid to achieving an acceptable colour match

- The procedure for carrying out paint blend to include:
  - panel preparation
  - masking
  - gun technique
  - final thinning
  - spraying onto adjacent areas and panels to assist in matching colours

The methods used to rectify mismatches caused by over tinting

- The requirements of tinting colours to:
  - lighten the colour
  - darken the colour
  - tint the colour
  - 'clean' the colour
- The procedure of colour matching with reference to:
  - identifying the mismatch
  - describing the hue and value

- identifying the required tinter
- regulating the tinter additions

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Sample evidence checklists are available on the SEG website

Skills in Vehicle Colour Matching

Unit Reference	**T/601/6256**
Level	**3**
Credit Value	**5**
Guided Learning Hours	**45**
Unit Summary	This unit will help the learner to develop the skills required to identify, mix and match vehicle paint colours including the use of tinters and preparation of test cards
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to work safely when carrying out vehicle mixing and matching	1.1 Use suitable personal protective equipment and vehicle coverings when carrying vehicle mixing and matching 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to use relevant information to carry out the task	2.1 Select suitable sources of technical information to support paint mixing and matching activities 2.2 Use technical information to support paint mixing and matching activities
3. Be able to use	3.1 Select the appropriate tools and equipment

appropriate tools and equipment	necessary for carrying out paint mixing and matching activities 3.2 Ensure that equipment has been calibrated to meet manufacturers requirements 3.3 Use the correct tools and equipment in the way specified by manufacturers when carrying out paint mixing and matching activities 3.4 Leave all mixing and application equipment in a clean and serviceable condition
4. Be able to carry out vehicle mixing and matching activities	4.1 Identify prior to working on the vehicle the type of substrate to be painted 4.2 Prepare all the refinishing systems and materials required following health and safety requirements 4.3 Mix, compare and adjust colour tones and effects using suitable mixing and matching techniques 4.4 Ensure all refinishing systems and materials prepared meet the specification required for colour and viscosity prior to application 4.5 Apply refinishing systems and materials to colour test cards 4.6 Dry all colour test cards before checking colour 4.7 Ensure the colour produced meets the material manufacturer's requirements, the customer requirements and is a blendable match to the existing colour 4.8 Dispose of waste materials to conform with legal and workplace requirements

5. Be able to record information and make suitable recommendations	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 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Accident Repair – Paint NOS 2010, unit PO13	

Supporting Unit Information

Skills in Vehicle Colour Matching - T/601/6256 - Level 3

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training
  workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Be observed by an assessor matching and mixing 1 non-metallic colour and 1 metallic or mica colour, which covers the learning outcomes

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Knowledge in Inspection, Repair and Replacement of Standard Light Vehicle Tyres

Unit Reference	**D/601/6025**
Level	**1**
Credit Value	**3**
Guided Learning Hours	**24**
Unit Summary	This unit will help the learner to develop knowledge of inspecting, fitting, repairing and maintaining standard light vehicle tyres and wheels
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.6)** ***The learner can***
1. Know about light vehicle standard tyre's, legislation and special workplace procedures	1.1 State the main purpose of tyres 1.2 Identify the different types of standard light vehicle wheel and rim construction 1.3 Identify the types and application of light vehicle tyre construction 1.4 State the legal requirements for light vehicle tyres 1.5 State the relevant parts of the British and European Standard for the repair of light vehicle tyres 1.6 Give examples of how to deal with specialist waste materials in their workplace

2. Know about the tools and equipment used when working with light vehicle tyres	2.1 List the tools and equipment used when working with standard light vehicle tyres 2.2 State specialist maintenance requirements of wheel balancing and tyre removal and refitting machinery
3. Know about materials used in the repair of light vehicle tyres	3.1 State the types of repair materials available and when they would be used
4. Know about the inspection, removal and replacement of light vehicle tyres	4.1 State the meaning of markings on standard light vehicle tyres 4.2 State the inspection and fault identification methods and procedures associated with light vehicle tyres 4.3 Give examples of the common faults associated with standard light vehicle tyres and wheels 4.4 Describe standard light vehicle tyre, wheel and valve removal and refitting methods and procedures 4.5 Outline the principles of interchanging tyres or wheels 4.6 Outline the principles of wheel balancing. To include: • static balancing • dynamic balancing
Mapping to National Occupational Standards Directly mapped to IMI SSC Vehicle fitting NOS 2010, unit VF01	

Supporting Unit Information

Knowledge in Inspection, Repair and Replacement of Standard Light Vehicle Tyres - D/601/6025 - Level 1

Indicative Content

Main purpose of tyres

- Interaction between tyres, other components and vehicle handling
- Steering, drive and suspension
- Passenger comfort

Types of standard light vehicle wheel and rim construction

- Light alloy, pressed steel and wire wheels
- Standard and safety rims

Markings on standard light vehicle tyres

- Speed rating
- Size Markings
- Aspect ratio
- Load handling
- Ply rating
- Tread wear indicators
- EC markings and specialist application markings e.g. 'M&S'

Inspection and fault identification methods and procedures

- Inspection:
  - on the rim visual (external)
  - removed from wheel (internal)
- Use of tread depth indicators, tyre probes and pressure gauges
- Information sources including tyre and vehicle manufacturers' technical data

Limits of standard light vehicle tyre wear and serviceability

- Tread depth and tyre damage
- Limitations under BS159 and Construction and Use Regulations
- Tyre pressure and maintenance requirements
- Suitability for minor repairs

Common faults associated with standard light vehicle tyres and

wheels

- Excessive tyre wear and abnormal tread wear patterns (centre, outer edges, worn patches)
- Damage to tread or side walls
- Bulging, separation of tread, carcass distortion
- Impact damage, wheels running out of true, buckled wheels
- Incorrect tyre pressure
- Wrong tyre for vehicle or run flat

Methods and materials used in the repair of standard light vehicle tyres

- Tyre inspection
- Damage limitation
- Accurate measurement
- Repair techniques and methods:
  - preparation of tyre
  - mechanical and chemical buffing
- Repair materials:
  - plug patch
  - patch and filler
  - solutions and chemicals
- Economic use of materials
- Correct storage of materials (including shelf life)

Principles of interchanging tyres/wheels

- Over sizing tyre/wheel fitment
- Longitudinal and diagonal
- Mixing radial, cross-ply and bias-belted tyres on same axle or different axles

Teaching Strategies And Learning Activities

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Skills in Inspection, Repair and Replacement of Standard Light Vehicle Tyres

Unit Reference	**H/601/6091**
Level	**1**
Credit Value	**5**
Guided Learning Hours	**46**
Unit Summary	This unit will enable the learner to develop the skills required to inspect, fit, repair and maintain standard light vehicle tyres
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to work safely when carrying out removal and replacement activities	1.1 Use suitable personal protective equipment and vehicle coverings when working on vehicles 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to use light vehicle tyre inspection techniques	2.1 Carry out inspection of wheels and tyres using appropriate techniques, suitable tools, and equipment and manufacturer's instructions where relevant. To include: • visual inspection • measurement of tread depth • tyre pressures • balance

3. Be able to carry out the repair and replacement of standard light vehicle tyres	3.1 Carry out tyre repair activities within appropriate timescales, using: • suitable tools and equipment • correct repair and replacement techniques • correct type and size of replacement components • correct materials 3.2 Carry out tyre replacement activities within appropriate timescales
4. Be able to balance wheels and carry out final checks on the vehicle	4.1 Carry out wheel balancing to within acceptable limits 4.2 Carry out final vehicle safety checks in the workshop, prior to releasing the vehicle to the customer
5. Be able to record information and make suitable recommendations	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 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Vehicle fitting NOS 2010, unit VF01	

Supporting Unit Information

Skills in Inspection, Repair and Replacement of Standard Light Vehicle Tyres - H/601/6091 - Level 1

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre.
- Be observed by an assessor as defined by the IMI Assessment Strategy.
- Produce evidence of inspecting wheel, tyre and valve assemblies and the removal and replacement or refitting of at least 1 of the 3 types of tyre listed below on at least 2
  occasions
  - radial
  - cross ply
  - bias belted
- Produce evidence of repairing at least 1 of the 3 types of tyre listed above.
- Produce evidence of balancing at least 2 wheels to manufacturers' tolerances
- Produce evidence of carrying out final safety checks on a vehicle prior to repair

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Knowledge of Inspection, Repair and Replacement of High Performance Light Vehicle Tyres

Unit Reference	**T/601/6032**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**24**
Unit Summary	This unit enables the learner to develop knowledge of inspection, fitting, repairing and maintaining high performance light vehicle tyres
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.6)** ***The learner can***
1. Know high performance light vehicle wheel and tyre construction, legislation and special workplace procedures	1.1 Describe the purpose, function and construction of high performance light vehicle wheels and tyres 1.2 Describe the types and functions of pressure monitoring systems 1.3 Describe the current legal requirements for high performance light vehicle tyres 1.4 Describe the relevant parts of the British and European Standard for the repair of high performance light vehicle tyres 1.5 Give examples of how to deal with specialist waste materials in their workplace

2. Know about the tools and equipment used when working with high performance light vehicle tyres	2.1 Give examples of how to select, prepare, and use tools and equipment appropriate to working with high performance light vehicle tyres 2.2 Describe specialist maintenance requirements of wheel balancing and tyre removal and refitting machinery
3. Know about materials used in the repair of high performance light vehicle tyres	3.1 Describe the types of repair materials available and when it is permissible for them to be used
4. Know about the inspection, removal, repair and replacement of high performance light vehicle tyres	4.1 Describe the different types of valve construction used with high performance light vehicle tyres and their installation techniques 4.2 Give examples of the meanings of markings used on standard and high performance light vehicle tyres and where these can be found 4.3 Describe the inspection and fault identification methods and procedures associated with high performance light vehicle tyres 4.4 Give examples of the common faults associated with high performance light vehicle tyres and wheels 4.5 Describe high performance light vehicle tyre and wheel removal, replacement and refitting methods and procedures 4.6 Describe the principles of wheel balancing. To include

	• static balancing • dynamic balancing
Mapping to National Occupational Standards Directly mapped to IMI SSC Vehicle fitting NOS 2010, unit VF02	

Supporting Unit Information

Knowledge of Inspection, Repair and Replacement of High Performance Light Vehicle Tyres - T/601/6032 - Level 2

Indicative Content

Tyres are

- Directional tread
- Asymmetric tread
- Composite tread
- High speed ratings
- An aspect ratio of 55% or below
- Run flat capability

Main function of tyres

- Interaction between tyres, other components and vehicle handling
- Steering, drive and suspension
- Passenger comfort

Types of standard and high performance light vehicle wheel and rim construction

- Light alloy, pressed steel and wire wheels
- Standard and safety rims (runflat)
- Asymmetric rims
- Space saver rims

Markings on standard light vehicle tyres

- Speed rating
- Size Markings
- Aspect ratio
- Load handling
- Ply rating
- Tread wear indicators
- EC markings and specialist application markings e.g. 'M&S'

Inspection and fault identification methods and procedures

- Inspection:
  - on the rim visual (external)
  - removed from wheel (internal)

- Use of tread depth indicators, tyre probes and pressure gauges
- Information sources including tyre and vehicle manufacturers' technical data

Limits of standard light vehicle tyre wear and serviceability

- Tread depth and tyre damage
- Limitations under BS159 and Construction & Use Regulations
- Tyre pressure and maintenance requirements
- Suitability for minor repairs

Common faults associated with standard light vehicle tyres and wheels

- Excessive tyre wear and abnormal tread wear patterns (centre, outer edges, worn patches)
- Damage to tread or side walls
- Bulging, separation of tread, carcass distortion,
- Impact damage, wheels running out of true, buckled wheels
- Incorrect tyre pressure
- Wrong tyre for vehicle or run flat

Methods and materials used in the repair of standard light vehicle tyres

- Tyre inspection
- Damage limitation
- Accurate measurement
- Repair techniques and methods:
  - preparation of tyre
  - mechanical and chemical buffing
- Repair materials:
  - plug patch
  - patch and filler
  - solutions and chemicals
- Economic use of materials
- Correct storage of materials (including shelf life)

Principles of interchanging tyres/wheels

- Over sizing tyre and wheel fitment
- Longitudinal and diagonal
- Mixing radial, cross-ply and bias-belted tyres on same axle or different axles
  - lifting and supporting equipment

- tyre fitting and removal tools and machinery
- hand tools
- tyre repair tools
- measuring equipment
- wheel balancing equipment
- tyre inflation equipment

Teaching Strategies And Learning Activities

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Methods Of Assessment

This unit is internally assessed and internally and externally moderated.

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Minimum requirements when assessing this unit
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Evidence Of Achievement

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Sample evidence checklists are available on the SEG website

Skills in Inspection, Repair and Replacement Of High Performance Light Vehicle Tyre

Unit Reference	**K/601/6092**
Level	**2**
Credit Value	**4**
Guided Learning Hours	**36**
Unit Summary	This unit will enable the learner to develop the skills required to inspect, fit, repair and maintain high performance light vehicle tyres
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to work safely when carrying out removal and replacement activities	1.1 Use suitable personal protective equipment and vehicle coverings when working on vehicles 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to inspect high performance light vehicle tyres	2.1 Inspect light vehicle wheels and tyres using suitable tools, sources of information, and equipment. To include • visual inspection • measurement of tread depth • tyre pressures • balance

3. Be able to repair and replace high performance light vehicle tyres	3.1 Carry out tyre repair activities within appropriate timescales, using • suitable tools and equipment • correct repair and replacement techniques • correct type and size of replacement components • correct materials 3.2 Carry out tyre replacement activities within appropriate timescales
4. Be able to balance wheels and tyres and carry out final checks on high performance light vehicles	4.1 Carry out wheel balancing to within acceptable limits 4.2 Carry out final vehicle safety checks in the workshop, prior to releasing the vehicle to the customer
5. Be able to record information and make suitable recommendations	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 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Vehicle fitting NOS 2010, unit VF02	

Supporting Unit Information

Skills in Inspection, Repair and Replacement of High Performance Light Vehicle Tyre - K/601/6092 - Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Produce evidence of inspecting wheel, tyre and valve assemblies and the removal and replacement or refitting of at least 2 of the 5 types of tyre listed below. Those:
  - with high speed ratings, for example V, W, Y, or Z.(nb as before in k)
  - having and aspect ratio of 55% or below
  - with run flat capability
  - with directional and asymmetric tread patterns
  - with composite tread patterns
- Produce evidence of repairing at least 1 of the 5 types of tyre listed above
- Produce evidence of balancing a wheel and tyre assembly to manufacturers' tolerances

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Knowledge of Inspection, Repair and Replacement of Commercial Vehicle Tyres

Unit Reference	**L/601/6036**
Level	**1**
Credit Value	**3**
Guided Learning Hours	**26**
Unit Summary	This unit enables the learner to develop knowledge of inspecting, fitting, repairing and maintaining tyres on medium and large commercial vehicles (3500 kg gross vehicle mass and above)
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.7)** ***The learner can***
1. Know commercial vehicle wheel and tyre construction, legislation and special workplace procedures	1.1 State the purpose, function and construction of commercial vehicle wheels and tyres 1.2 State the current legal requirements for commercial vehicle tyres 1.3 State the relevant parts of the prevailing British and European Standard for the repair of commercial vehicle tyres 1.4 Give examples of how to deal with specialist waste materials in their workplace 1.5 Outline manufacturers' recommendations on the 'repairability' of their tyres

2. Know about the tools and equipment used when working with commercial vehicle tyres	2.1 Give examples of how to select, prepare and use tools and equipment appropriate to working with commercial vehicle tyres 2.2 State specialist maintenance requirements of commercial vehicle wheel and tyre removal and refitting machinery
3. Know about the construction of and materials used in the manufacture and repair of commercial vehicle tyres	3.1 State the types of repair materials available and when they should be used 3.2 State the difference between a 'remould' and 'retread' when applied to commercial vehicle tyre
4. Know about the inspection, removal, repair and replacement of commercial vehicle tyres	4.1 State the different types of commercial vehicle tyre valve and their installation techniques 4.2 State the meaning of markings on commercial vehicle tyres and where these can be found 4.3 State the inspection and fault identification methods and procedures associated with commercial vehicle tyres 4.4 Give examples of the common faults associated with commercial vehicle tyres and wheels 4.5 Describe commercial vehicle tyre, tube and wheel and rim removal and refitting methods and procedures 4.6 Outline the principles of wheel balancing. To include • Static balancing • Dynamic balancing 4.7 State the process to re-groove a commercial

	vehicle tyre

Mapping to National Occupational Standards
Directly mapped to IMI SSC Vehicle fitting NOS 2010, unit VF03

Supporting Unit Information

Knowledge of Inspection, Repair and Replacement of Commercial Vehicle Tyres - L/601/6036 - Level 1

Indicative Content

Tyre construction

- Radial
- Diagonal (cross) ply
- Tube type
- Tubeless
- Tread designs (e.g. traction, steer, universal etc)

Types of commercial vehicle wheel and rim construction

- 15º Drop centre rims with diameter codes of 17.5, 19.5, 22.5
- 15º EVA/EVH Drop centre rims
- 15º Wide single drop centre rims
- Wide base or semi drop centre split rims
- British Standard conical, DIN spherical and ISO Metric wheel fixings
- Heavy commercial valves

Tools and equipment used to identify faults or serviceability

- Tyre safety inflation equipment (e.g. safety cages, portable 'H' cages and 'bag-it' type devices)
- Tyre tread depth gauges
- Tyre probes
- Bead spreaders
- Tyre pressure gauges
- Hand lamps or torches
- Stud hole gauges

Re-fitting and removal methods and procedures for commercial tyres, tubes, wheels and rims

- Fitting instructions
- Vehicle protection
- Use of impact tools
- Correct tyre safety inflation
- Final inspection

Tools, equipment and information used for removal and replacement of commercial wheels, tyres and tubes

- Technical information relating to safe jacking points and wheel torque/tyre pressure data
- Equipment for securing the vehicle and making the area safe (e.g. wheel chocks, traffic cones, 'Do Not Move' signs)
- Jacks, axle/chassis stands, loading boards.
- Sockets, extensions, 'L' bars, pneumatic impact wrenches, torque wrenches.
- Bead unseating tools inc specialist tools for EVA/EVH rims, tyre levers, lock-ring levers, bead
- Lubricant, and tyre stands
- Tyre inflation equipment, safety inflation equipment (e.g. safety cages, portable 'H' cages and 'bag-it' type devices)

Tools and equipment used

- Tyre re-grooving equipment
- Tyre safety inflation equipment
- Specialist bead and unseating tools for external valve aperture (EVA) and hole (EVH)

Inspection and fault identification methods and procedures

- Fault identification coverage
- Accurate measurement
- Adjustments to acceptable tolerances for the vehicle
- Inspection:
  - on the rim visual (external)
  - removed from wheel (internal)
- Use of tread depth indicators, tyre probes and pressure gauges
- Information sources including tyre and vehicle manufacturers' technical data

Common faults associated with commercial vehicle tyres and wheels

- Worn tread through normal use
- Abnormal wear (e.g. camber, wheel misalignment, incorrect twinning, worn dampers, braking flatspots over/under-inflation)
- Carcass damage (e.g. lumps/bulges, cuts, exposed cords, run-flat damage, penetrations, chemical damage)
- Incorrect fitment (e.g. load rating, speed rating, size, construction)
- Worn or damaged wheels and components (eg cracks, elongated or

worn stud holes, deformations)
- Worn, damaged or incorrect wheel fixings
- Worn or damaged valves
- Worn, damaged or incorrect tubes and flaps

Tools, equipment and information used for minor repairs to tyres and tubes

- Technical information relating to minor repair areas, repair unit application instructions and injury limitations
- Suitable personal protective equipment for tyre and inner tube repairing
- Measuring equipment for determining repairable areas
- Reamers, buffers and tyre bead spreaders
- Plug patch applicators, tyre probes, cover scrapers, roller stitchers, pliers and side cutters
- Liquid buffing solutions, chemical vulcanising fluids, liner seal solutions and tyre talc (French Chalk)
- Combination plug/patches, patch and filler materials, inner tube patches

Methods and materials used in the repair of commercial vehicle tyres

- Internal inspection of tyre for secondary damage
- Preparation of the tyre for application of repair materials
- Preparation of inner tube for application of repair materials
- Inspection of tyre and tube after repair
- Correct storage of materials (including shelf life)
- Inflation of tyre and tube to check for leaks
- Repair Materials:
  - rubber only plug patch
  - rubber only patch and filler material
  - solutions and chemicals

Tools and equipment used for regrooving of heavy commercial tyres

- Technical information relating to heavy commercial vehicle tyre regrooving
- Suitable personal protective equipment for regrooving
- Measuring equipment for determining tread depths and blade settings
- Tyre probes, regrooving equipment, tyre regrooving stand
- Cutting blades

Methods used to carry out regrooving to heavy commercial tyres

- Inspection of tyre for damage and suitability for regrooving
- Tread measurement to determine blade depth setting
- Preparation of tyre for regrooving
- Regrooving following manufacturer's instructions and legal requirements
- Inspection of tyre following regrooving

Dealing with waste materials including

- Scrapped tyres
- Repair materials
- Wheel weights

Legal requirements to include

- Tread depth
- Tyre wall and casing damage
- Tyre pressure
- Mixing of tyre types
- Re-grooving legislation

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Evidence Of Achievement

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Skills in Inspection Repair and Replacement of Commercial Vehicle Tyres

Unit Title	**M/601/6093**
Level	**1**
Credit Value	**5**
Guided Learning Hours	**44**
Unit Summary	This unit will enable the learner to develop the skills required to inspect, fit, repair and maintain tyres on medium and large commercial vehicles (3500kg gross vehicle mass and above)
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to work safely when carrying out removal and replacement activities	1.1 Use suitable personal protective equipment and vehicle coverings when working on vehicles 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to inspect commercial vehicle wheels and tyres	2.1 Inspect commercial vehicle wheels and tyres using appropriate techniques, suitable tools, equipment, technical information and manufacturers instructions where relevant. To include • visual inspection • measurement of tread depth • tyre pressures

3. Be able to carry out the repair and replacement of commercial vehicle tyres, wheels and tubes	3.1 Carry out tyre repair activities within appropriate timescales using • suitable tools and equipment • correct repair techniques • correct type and size of replacement components • correct materials 3.2 Carry out tyre replacement activities within appropriate timescales 3.3 Carry out final checks to ensure that replaced and refitted tyres and valves are correctly fitted and conform to legal requirements prior to releasing the vehicle to the customer
4. Be able to carry out tread re-grooving on commercial vehicle tyres	4.1 Carry out tread re-grooving on suitable tyres, complying with legal requirements using • suitable tools and equipment • correct re-grooving techniques • suitable personal protection 4.2 Carry out final checks to ensure that re-grooved tyres meet manufacturer's and legal requirements prior to release to the customer
5. Be able to record information and make suitable recommendations	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 Record and report any additional faults noticed during the course of their work promptly in the format required

Mapping to National Occupational Standards
Directly mapped to IMI SSC Vehicle fitting NOS 2010, unit VF03

Supporting Unit Information

Skills in Inspection Repair and Replacement of Commercial Vehicle Tyres - M/601/6093 - Level 1

Indicative Content

General Requirements
You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training
  workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Produce evidence of inspecting wheel, tyre and valve assemblies and the removal and replacement or refitting of tyres to at least 2 of the 4 types of wheel rim listed below.
  - 17.5, 19.5 and 22.5 diameter code rims
  - external valve aperture or hole rims (EVA / EVH)
  - split rims
  - wide single rims
- Produce evidence of repairing a commercial vehicle tyre / assembly on 1 occasion.
- Produce evidence of regrooving tyres and carrying out final checks on tyre safety and legal requirements on 1 occasion

Teaching Strategies And Learning Activities

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Knowledge of Inspection, Repair and Replacement of Motorcycle Tyres

Unit Reference	**R/601/6040**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**24**
Unit Summary	This unit enables the learner to develop and understanding of inspection, fitting, repairing and maintaining motorcycle, quad bike, tricycle, scooter, moped and sidecar combination wheels and tyres
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.6)** ***The learner can***
1. Know motorcycle tyre construction, legislation and special workplace procedures	1.1 Describe the purpose, function and construction of motorcycle wheels and tyres 1.2 Describe the current legal requirements for motorcycle tyres 1.3 Describe the relevant parts of the British and European Standard for the repair of motorcycle tyres 1.4 Give examples of how to deal with specialist waste materials in their workplace
2. Know about the	2.1 Give examples of how to select, prepare and

tools and equipment used when working with motorcycle tyres	use tools and equipment appropriate to working with motorcycle wheels and tyres 2.2 Describe specialist maintenance requirements of wheel balancing and tyre removal and refitting machinery
3. Know about materials used in the repair of motorcycle tyres	3.1 Understand the materials used in the repair of motorcycle tyres 3.2 Describe the types of repair materials available and when it may be permissible for them to be used
4. Know about the inspection, removal, repair and replacement of motorcycle tyres	4.1 Describe the types of valve used in motorcycle tyres and their removal and installation techniques 4.2 Give examples of the meanings of markings used on motorcycle tyres and tubes and where these can be found 4.3 Describe the inspection and fault identification methods and procedures associated with motorcycle tyres, rims and valves. 4.4 Give examples of the common faults associated with motorcycle tyres, wheels and valves 4.5 Describe motorcycle wheel, tyre and tube removal and refitting methods and procedures 4.6 Describe the principles of wheel balancing. To include • static balancing • dynamic balancing

Mapping to National Occupational Standards
Directly mapped to IMI SSC Vehicle fitting NOS 2010, unit VF04

Supporting Unit Information

Knowledge of Inspection, Repair and Replacement of Motorcycle Tyres - R/601/6040 - Level 2

Indicative Content

Note - the term '*motorcycle*' also refers to: quad bike, tricycle, scooter, moped and sidecar combination tyres.

Identify the different types of motorcycle tyre construction

- Radial
- Bias and bias belted
- Tube type
- Tubeless
- Tread and sidewall designs (for example, high speed, rotational, off road)

Identify the different types of motorcycle wheel drive arrangements

- Shaft drive
- Chain drive

Identify sidewall markings on motorcycle tyres

- Service description (load and speed markings)
- Size designations
- Aspect ratios
- Construction markings (bias and bias belted, radial, tube type, tubeless)
- Type approval markings
- Date of manufacture markings
- Tread wear indicators
- Sidewall fitting instructions
- Special service markings

Identify the tools and equipment used to identify faults relating to motorcycle tyres and wheels and confirm them safe to use

- Tyre tread depth gauges
- Tyre probes
- Bead spreaders

- Tyre pressure gauges
- Hand lamps or torches

Identify the faults relating to motorcycle tyres and wheels

- Suitable personal protective equipment for conducting Motorcycle tyre and rim inspections
- Worn tread through normal use
- Abnormal wear (wheel misalignment, over and under-inflation, incorrect application and adjustment)
- Carcass damage (lumps and bulges, cuts, exposed cords, run-flat damage, penetrations, chemical damage)
- Incorrect fitment (load rating, speed rating, size, construction, tread design, sidewall information)
- Worn or damaged wheels and components (cracks, deformations)
- Worn, damaged or incorrect wheel fixings and axle
- Worn or damaged valves
- Worn, damaged or incorrect tubes

Make recommendations relating to motorcycle tyres and wheels

- Suitability for fitting
- Suitability for minor repair
- Isolate scrapped tyres for correct disposal
- Recommend tyres as suitable for re-moulding
- Isolate scrapped wheel rims and components for correct disposal
- Consequences of improper disposal of scrap tyres and wheels

Identify the tools and equipment used for the removal and fitting of motorcycle wheels and tyres and confirm them safe to use

- Technical information relating to safe lifting points and wheel torque and tyre pressure data
- Motorcycle stands
- Hand tools and torque wrenches
- Bead unseating tools, tyre levers, bead lubricant
- Tyre inflation equipment
- Wheel balancing equipment

Remove and fit motorcycle tyres and wheels

- Manufacturer and sidewall fitting instructions
- Protecting the motorcycle during wheel and tyre removal and fitting
- Suitable personal protective equipment for motorcycle tyre and wheel removal and fitting
- Use and positioning of lifting and supporting devices
- Wheel removal and fitting using hand tools

- Tyre removal and fitting using hand or powered tools
- Valve replacement for wheel rims
- Safe tyre inflation
- Wheel balancing
- Informing relevant persons of anticipated delays
- Keeping relevant persons informed of progress
- The relationship between time and cost

Identify the tools and equipment used for the minor repair of motorcycle tyres and inner tubes and confirm them safe to use

- Technical information relating to minor repair areas, repair unit application instructions and injury limitations
- Suitable personal protective equipment for tyre and inner tube repairing
- Measuring equipment for determining repairable areas
- Reamers, buffers and tyre bead spreaders
- Plug patch applicators, tyre probes, cover scrapers, roller stitchers, pliers and side cutters
- Liquid buffing solutions, chemical vulcanising fluids, liner seal solutions and tyre talc (French Chalk) combination plug/patches, patch and filler materials, inner tube patches

Carry out minor repairs to motorcycle tyres and inner tubes

- Internal inspection of tyre for secondary damage
- Preparation of the tyre for application of repair materials
- Preparation of inner tube for application of repair materials
- Inspection of tyre and tube after repair
- Inflation of tyre/tube to check for leaks

Main function of tyres

- Interaction between tyres, other components and handling
- Steering, drive and suspension
- Passenger comfort
- Lifting and supporting equipment
- Tyre fitting and removal tools and machinery
- Hand tools
- Tyre repair tools
- Measuring equipment
- Wheel balancing equipment
- Tyre inflation equipment

Teaching Strategies And Learning Activities

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Skills in Inspection, Repair and Replacement of Motorcycle Tyres

Unit Reference	**T/601/6094**
Level	**2**
Credit Value	**4**
Guided Learning Hours	**36**
Unit Summary	This unit will enable the learner to develop the skills required to inspect, fit, repair and maintain motorcycle, quad bike, tricycle, scooter, moped and sidecar combination tyres
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to work safely when carrying out removal and replacement activities	1.1 Use suitable personal protective equipment and vehicle coverings when working on vehicles 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to inspect motorcycle tyres	2.1 Inspect motorcycle wheels and tyres using suitable tools, sources of information, and equipment. To include • visual inspection • measurement of tread depth • tyre pressures • balance

3. Be able to repair and replace motorcycle tyres and tubes	3.1 Remove front and rear wheels from motorcycles to facilitate tyre removal and refitment 3.2 Carry out tyre repair activities using • suitable tools and equipment • correct repair and replacement techniques • correct type and size of replacement components • correct materials 3.3 Carry out tyre replacements activities within appropriate timescales 3.4 Use suitable equipment to align front and rear wheels following wheel refitment
4. Be able to balance wheels and tyres as part of final checks on motorcycles	4.1 Carry out wheel balancing to manufacturers' tolerances 4.2 Carry out final vehicle safety checks in the workshop, prior to releasing the motorcycle to the customer
5. Be able to record information and make suitable recommendations	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 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Vehicle fitting NOS 2010, unit VF04	

Supporting Unit Information

Skills in Inspection, Repair and Replacement of Motorcycle Tyres
- T/601/6094 - Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Produce evidence of inspecting wheel, tyre and valve assemblies and the removal and replacement or refitting motorcycle tyres on at least 2 different occasions
- Produce evidence of repairing a motorcycle tyre
- Produce evidence of successfully balancing 1 wheel and tyre assembly to manufacturers' tolerances
- Produce evidence of carrying out final wheel and tyre related safety checks on 1 motorcycle

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place

Methods Of Assessment

This unit is internally assessed and internally and externally moderated.

Providers are encouraged to use innovative and stimulating assessment methods and to ensure there is an appropriate and manageable range, balance and volume of assessment across units. A number of units can be

assessed via integrative assessment methods but it is essential that the evidence of achievement is clearly signposted and referenced. **Methods of assessment must include practical tasks.**

Sample assessment tasks are provided that may be used or adapted as appropriate. These are available on the SEG website https://skillsandeducationgroupawards.co.uk/. Centres may wish to develop their own assessments for individual units or a number of units.

Minimum requirements when assessing this unit

SEG expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching

Evidence Of Achievement

All evidence must be clearly signposted and made available for the external moderator upon request

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Sample evidence checklists are available on the SEG website

Knowledge of Light Vehicle Four Wheel Alignment

Unit Reference	**F/601/6051**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**24**
Unit Summary	This unit enables the learner to develop knowledge of testing and adjusting light vehicle four wheel alignment
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.3)** ***The learner can***
1. Know steering and suspension system principles	1.1 Describe the Ackerman principle 1.2 Describe the principles of steering and suspension and their effects on tyre wear and vehicle handling 1.3 Describe the purpose, function and location of steering and suspension components and how wear can affect wheel alignment 1.4 Give examples of abnormal tyre wear associated with misalignment
2. Know how to measure four wheel alignment	2.1 Describe appropriate specialist tools, their selection and calibration when measuring four wheel alignment

	2.2 Describe pre-checks to be applied to the vehicle prior to measuring four wheel alignment 2.3 Describe how to find and use vehicle data relating to working tolerances on four wheel alignment 2.4 Explain the importance of and how to take and record accurate measurements
3. Know how to adjust four wheel alignment	3.1 Describe the use of appropriate specialist tools, when adjusting four wheel alignment 3.2 Describe four wheel alignment adjustment techniques, including the use of weights, how to apply them and record adjustments 3.3 Describe the importance of ensuring any adjustments are within acceptable tolerances for the vehicle and the possible consequences of inaccurate adjustment
4. Know the importance of testing completed adjustments	4.1 Describe how to check that the adjusted items function correctly 4.2 Explain the importance of checking the operation of adjusted items prior to return to the customer and the implications for safety and customer satisfaction 4.3 Describe the impact of adjustment on electronic systems
Mapping to National Occupational Standards Directly mapped to IMI SSC Vehicle fitting NOS 2010, unit VF07	

Supporting Unit Information

Knowledge of Light Vehicle Four Wheel Alignment - F/601/6051 -Level 2

Indicative Content

Four wheel alignment pre-checks cover

- Tyre pressures
- Wheel bearing and ball joint condition
- Suspension condition and ride height

Four wheel alignment covers

- Individual toe
- Combined toe
- Steering wheel position
- Thrust angle

Abnormal tyre wear

- Edge wear
- Feathering
- Tread wear pattern due to incorrect inflation pressures
- Hand tools
- Lifting and supporting equipment
- Specialist alignment measuring equipment
- Turn plates (turntables)
- Steering clamp

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Skills in Light Vehicle Four Wheel Alignment

Unit Reference	**F/601/6745**
Level	**2**
Credit Value	**4**
Guided Learning Hours	**36**
Unit Summary	This unit will enable the learner to develop the skills required to carry out testing and adjustment of four wheel alignment on light vehicles
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.3)** ***The learner can***
1. Be able to work safely when carrying out testing and adjustment activities	1.1 Use suitable personal protective equipment and vehicle coverings when working on vehicles 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to check light vehicle four wheel alignment	2.1 Perform four wheel alignment pre-checks to vehicle and equipment prior to testing 2.2 Carry out light vehicle four wheel alignment using suitable tools and equipment, carrying out calibration as appropriate 2.3 Use vehicle data relating to working tolerances. To include • technical information

	• manufacturers instructions where relevant
3. Be able to adjust light vehicle four wheel alignment	3.1 Carry out adjustment activities within appropriate timescales. To include • suitable tools and equipment • correct adjustment techniques • calibration of equipment as appropriate 3.2 Carry out final checks to ensure that adjustments and settings are within the tolerances allowed for the vehicle and conform to legal requirements, prior to releasing the vehicle to the customer
4. Be able to record information and make suitable recommendations	4.1 Produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 4.2 Make suitable and justifiable recommendations for cost effective repairs 4.3 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Vehicle fitting NOS 2010, unit VF07	

Supporting Unit Information

Skills in Light Vehicle Four Wheel Alignment – F/601/6745 - Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Produce evidence of carrying out checks and adjustments of four wheel alignment on 1 vehicle

Teaching Strategies And Learning Activities

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Knowledge of Inspection and Repair of Light Vehicle Clutches

Unit Reference	**H/601/6060**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**12**
Unit Summary	This unit enables the learner to develop knowledge of the inspection, repair and replacement of light vehicle clutches and components
Learning Outcomes (1 to 3) ***The learner will***	**Assessment Criteria (1.1 to 3.5)** ***The learner can***
1. Know the specialist tools and equipment used when inspecting and replacing clutches	1.1 Describe the types, function and use of clutch removal, alignment and replacement tools and equipment
2. Know about different types of light vehicle clutches	2.1 Describe different types of clutch and operating systems and how they and their associated components operate
3. Know how to inspect and replace light vehicle clutches	3.1 Describe different types of clutch inspection techniques and how to carry them out 3.2 Explain how to make checks and adjustments to clutches

	3.3 Describe the common faults associated with clutch systems, their causes and how to identify and rectify them 3.4 Describe removal and replacement procedures associated with clutch systems 3.5 Describe how to adjust clutch working tolerances
Mapping to National Occupational Standards Directly mapped to IMI SSC Vehicle fitting NOS 2010, unit VF08	

Supporting Unit Information

Knowledge of Inspection and Repair of Light Vehicle Clutches – H/601/6060 - Level 2

Indicative Content

Tools and equipment used in the repair and maintenance of manual clutches

- Hand tools
- Lifting equipment
- Ramps, jacks and axle stands
- Specialist tools: alignment tools
- Use, maintenance storage and cleaning
- Safety procedures to be observed while carrying out work

The purpose and basic function and layout of manual clutches

- Front wheel drive and rear wheel drive
- Types of clutches (single plate dry clutch – spring and diaphragm applications)
- Basic clutch operating mechanisms (mechanical and hydraulic) basic adjustments
- Hydraulic fluids
- DOT classification

Removal and refitting procedures associated with manual clutches

- Safe use of equipment and PPE
- Vehicle protection
- Sequence: logical, manufacturer recommended methods (FWD and RWD)
- Disposal of removed parts, materials, solutions and chemicals
- Final inspection and component adjustment

Clutch components

- Clutch assembly (drive plate, pressure plate and release bearing)
- Spigot bearing
- Flywheel
- Operating cable
- Hydraulic clutch components
- Automatic and manual adjusters

- Clutch fork
- Oil seals
- Input shaft
- Inspection cover
- Clutch pedal
- Bell housing
- Gear box
- Driveshaft
- Prop-shaft

Type of clutch and operating system

- Single plate
- Multi-plate
- Centrifugal
- Spring and diaphragm type pressure plates (covers)
- Cable
- Hydraulic
- Electronic

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Skills in Inspection and Repair of Light Vehicle Clutches

Unit Reference	**D/601/6753**
Level	**2**
Credit Value	**4**
Guided Learning Hours	**32**
Unit Summary	This unit will enable the learner to develop the skills required to inspect, repair and replace light vehicle clutches and components
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.3)** ***The learner can***
1. Be able to work safely when carrying out removal and replacement activities	1.1 Use suitable personal protective equipment and vehicle coverings when working on vehicles 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to inspect light vehicle clutches and components	2.1 Inspect light vehicle clutches and components using suitable tools, sources of information and equipment
3. Be able to replace light vehicle clutches and components	3.1 Carry out replacement of clutch within appropriate timescales, using • suitable equipment and technical information

	• correct repair and replacement techniques • correct type and size of replacement components • correct materials 3.2 Adjust clutch if required and carry out final vehicle safety checks in the workshop, prior to releasing the vehicle to the customer
4. Be able to record information and make suitable recommendations	4.1 Produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 4.2 Make suitable and justifiable recommendations for cost effective repairs 4.3 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Vehicle fitting NOS 2010, unit VF08	

Supporting Unit Information

Skills in Inspection and Repair of Light Vehicle Clutches – D/601/6753 - Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Produce evidence of inspecting 3 of the 4 components, assemblies or systems listed below
  - mechanical clutch operating system
  - hydraulic clutch operating system
  - clutch assemblies
  - flywheel
- Produce evidence of replacing 1 clutch assembly

Teaching Strategies And Learning Activities

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Knowledge of Inspection and Replacement of Light Vehicle Exhaust Components

Unit Reference	**Y/601/6072**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**14**
Unit Summary	This unit enables the learner to develop knowledge of the inspecting exhaust components for replacement or continued serviceability and removing replacing components identified as being faulty, damaged, deteriorated or where the customer has requested replacement
Learning Outcomes (1 to 3) ***The learner will***	**Assessment Criteria (1.1 to 3.6)** ***The learner can***
1. Know the specialist tools and equipment used when inspecting and replacing exhaust components	1.1 Describe the types, selection, safety checks and safe use of tools and equipment for the removal and replacement of exhausts 1.2 Describe how to use oxy-acetylene equipment when working on exhausts
2. Know about exhaust system components	2.1 Describe the purpose, function, construction and layout of exhaust system components 2.2 Describe exhaust related emission control systems

	2.3 Describe the legal requirements relating to exhaust systems
3. Know how to inspect and replace exhaust systems	3.1 Describe inspection techniques for exhaust system faults and how to carry them out 3.2 Describe common faults associated with exhaust systems. 3.3 Describe the effective sequence of working when removing and replacing exhaust systems 3.4 Describe how to remove, replace or re-thread broken, damaged or seized exhaust fixings 3.5 Describe how to check exhaust system components are functioning correctly after refitting or replacement
Mapping to National Occupational Standards Directly mapped to IMI SSC Vehicle fitting NOS 2010, unit VF09	

Supporting Unit Information

Knowledge of Inspection and Replacement of Light Vehicle Exhaust Components – Y/601/6072 - Level 2

Indicative Content

Tools and equipment

- Oxy-acetylene cutting equipment
- Lifting and supporting equipment
- Hand tools
- Special purpose tools – exhaust chain cutter, exhaust flaring dolly, thread cutting taps and dies, stud removal tools

Exhaust system components

- Front pipe and fittings
- Silencers - composite, absorption, expansion, baffles
- Intermediate and tail pipe - materials used in exhaust system construction: mild steel, aluminium coated, stainless steel. packing materials, joints, flexible, rigid, welded, fixings, studs, brackets, mountings
- Catalytic converter
- Lambda sensor materials used in exhaust system construction: mild steel, aluminium coated, stainless steel. packing materials
- Exhaust mountings and clamps
- Heat shields

Legal requirements associated with vehicle exhaust systems

- MOT test requirements
- Emissions
- Noise

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Skills in Inspection and Replacement of Light Vehicle Exhaust Components

Unit Reference	**A/601/6842**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**24**
Unit Summary	This unit will enable the learner to develop the skills required to inspect exhaust components for replacement or continued serviceability and removing and replacing components identified as being faulty, damaged, deteriorated or where the customer has requested replacement
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.3)** ***The learner can***
1. Be able to work safely when carrying out removal and replacement activities	1.1 Use suitable personal protective equipment and vehicle coverings when working on vehicle exhaust systems and components 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to inspect exhaust components	2.1 Inspect exhaust systems and components to identify faults using suitable tools, sources of information and equipment .

3. Be able to repair and replace exhaust components	3.1 Carry out repair and replacement of exhaust components within appropriate timescales, using • suitable equipment and technical information • suitable repair and replacement techniques • suitable type and size of replacement components and fixings • suitable materials 3.2 Carry out final adjustments and checks in the workshop, prior to releasing the vehicle to the customer. To include • correct fitment • correct alignment • leakage
4. Be able to record information and make suitable recommendations	4.1 Produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 4.2 Make suitable and justifiable recommendations for cost effective repairs 4.3 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Vehicle fitting NOS 2010, unit VF09	

Supporting Unit Information

Skills In Inspection And Replacement Of Light Vehicle Exhaust Components – A/601/6842 - Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
  Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Produce evidence of inspecting and replacing 4 out of the 6 types of exhaust components or systems listed below.
  - complete exhaust system
  - part exhaust system
  - catalytic converter
  - lambda sensor
  - studs and nuts
  - mountings and clamps
- Produce evidence of using 2 of the 4 types of tools or equipment listed below:
  - hand tools
  - special purpose tools
  - lifting and supporting equipment
  - cutting or heating equipment

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Methods Of Assessment

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Knowledge of Inspection, Testing and Replacement of Vehicle Batteries and Related Components

Unit Reference	**F/601/6082**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**18**
Unit Summary	This unit enables the learner to develop knowledge of carrying out tests which identify faulty batteries, and then the removal and replacement of them. This can be on light vehicles, medium and large goods vehicles, motorcycles, mopeds and scooters
Learning Outcomes (1 to 3) ***The learner will***	**Assessment Criteria (1.1 to 3.5)** ***The learner can***
1. Know the tools and equipment used when inspecting, testing and replacing vehicle batteries	1.1 Explain the selection, function and safe use of battery testing equipment 1.2 Describe code saving devices and how and when to use them
2. Know about different types of vehicle battery and charging system	2.1 Describe the purpose, function and layout of automotive batteries and charging systems. 2.2 Describe battery ratings and the circumstances in which differently rated batteries should be fitted

	2.3 Describe legal requirements relating to storage, selection and disposal of vehicle batteries and components
3. Know how to inspect, test and replace light vehicle batteries	3.1 Describe fault identification methods and procedures and safe testing techniques associated with batteries and components 3.2 Describe the common faults associated with batteries and charging systems 3.3 Describe safe removal and replacement procedures associated with batteries and components 3.4 Describe how to check drive belt adjustment 3.5 Describe how to check that batteries and components are • functioning correctly after refitting or replacement • of the correct type and quality for the vehicle and conform to legal requirements where relevant
Mapping to National Occupational Standards Directly mapped to IMI SSC Vehicle fitting NOS 2010, unit VF10	

Supporting Unit Information

Knowledge of Inspection, Testing and Replacement of Vehicle Batteries and Related Components – F/601/6082 - Level 2

Indicative Content

Batteries and components are

- Automotive batteries
- Battery connections
- Battery supports
- Battery hold down devices
- Generators
- Drive belts

Types of batteries are

- Standard batteries
- Low maintenance batteries
- Maintenance free batteries
- Gel filled batteries
- Generators
- Smart charging

Generators can be

- Alternators
- Dynamos
- Magnetos

Tools used for testing and maintenance to include

- Hydrometer
- Volt meter
- High rate discharge meter
- Battery chargers
- Battery savers

Basic testing of batteries and charging systems

- Electrolyte level low
- Terminal connections loose or corroded
- Drive belt slipping
- Alternator or generator not charging at the correct output (volt meter

check)

- Faulty alternator or voltage regulator
- Specific gravity low or high
- Personal protection
- Electrolyte filling and health and safety requirements
- Correct disposal of waste
- Working to agreed timescales
- Keeping others informed of progress and referral of problems
- Storage and maintenance of battery stock
- Logical sequence for disconnecting and connecting

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Skills in Inspection, Testing and Replacement of Vehicle Batteries and Related Components

Unit Reference	**K/601/8179**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**25**
Unit Summary	This unit will enable the learner to develop the skills required to carry out tests which identify faulty batteries, and then the removal and replacement of them. This can be on light vehicles, medium and large goods vehicles, motorcycles, mopeds and scooters
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.3)** ***The learner can***
1. Be able to work safely when carrying out testing and replacement activities	1.1 Use suitable personal protective equipment and vehicle coverings when working on vehicles 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to inspect and test batteries and components	2.1 Inspect and test batteries, charging systems and associated components using suitable tools, sources of information and equipment

3. Be able to remove and replace batteries and components	3.1 Perform battery removal and replacement activities within appropriate timescales, using • suitable equipment and technical information • suitable removal and replacement techniques • suitable type and size of replacement components and fixings 3.2 Perform final battery and component checks in the workshop, prior to releasing the vehicle to the customer
4. Be able to record information and make suitable recommendations	4.1 Produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 4.2 Make suitable and justifiable recommendations for cost effective repairs 4.3 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Vehicle fitting NOS 2010, unit VF10	

Supporting Unit Information

Skills in Inspection, Testing and Replacement of Vehicle Batteries and Related Components – K/601/8179 - Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
  Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Produce evidence of inspection and test activities on 1 occasion to cover all of the battery and component items listed below, using 2 out of the 3 types of inspection and testing techniques shown:
  - automotive batteries
  - battery connections
  - battery supports
  - battery hold down devices
  - generators
  - drive belts

  Inspection and testing techniques – use of:
  - visual / aural methods
  - hand held diagnostic equipment
  - battery testing equipment
- Produce evidence of replacing a battery on at least 1 occasion
- Produce evidence of inspecting and testing a generator

Teaching Strategies And Learning Activities

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Evidence Of Achievement

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Sample evidence checklists are available on the SEG website

Knowledge of Inspection and Replacement of Light Vehicle Suspension Dampers and Springs

Unit Reference	**J/601/6083**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**14**
Unit Summary	This unit enables the learner to develop knowledge of the inspection and replacement of suspension dampers and springs using a variety of equipment and testing techniques
Learning Outcomes (1 to 3) ***The learner will***	**Assessment Criteria (1.1 to 3.5)** ***The learner can***
1. Know the tools and equipment used when inspecting and replacing light vehicle suspension dampers and springs	1.1 Describe the selection, safety checks and safe use of tools and equipment for the replacement of suspension dampers and springs
2. Know about different types of suspension dampers and springs	2.1 Describe the types, purpose, function and location of light vehicle suspension dampers and springs 2.2 Describe legal requirements relating to light vehicle dampers and springs

3. Know how to inspect, test and replace suspension dampers and springs	3.1 Describe safe testing techniques and procedures associated with suspension dampers and springs 3.2 Describe the common faults associated with light vehicle suspension dampers and springs 3.3 Describe safe removal and replacement procedures associated with light vehicle suspension dampers and springs 3.4 Describe how to check camber setting and road wheel alignment 3.5 Describe how to check that components are • functioning and adjusted correctly after refitting or replacement • of the correct type and quality for the vehicle and conform to legal requirements where relevant
Mapping to National Occupational Standards Directly mapped to IMI SSC Vehicle fitting NOS 2010, unit VF11	

Supporting Unit Information

Knowledge of Inspection and Replacement of Light Vehicle Suspension Dampers and Springs – J/601/6083 - Level 2

Indicative Content

Suspension may include:

- Telescopic
- Lever arm
- Semi strut and MacPherson strut
- Gas assisted
- Coil spring
- Leaf spring
- Torsion bar
- Rubber
- Hydragas
- Torsion bar
- Hydromatic

Special purpose tools may include:

- Spring compressors
- Strut guide
- Strut insert retainer tools
- Ball joint separators

Purpose and basic function of light vehicle suspension dampers

- Damping effect
- Passenger comfort
- Road holding

- Personal protection
- Dangers and precautions to be taken when using spring compressors
- Correct disposal of waste
- Working to agreed timescales
- Keeping others informed of progress and referral of problems
- Priming of dampers

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place

Methods Of Assessment

This unit is internally assessed and internally and externally moderated.

Providers are encouraged to use innovative and stimulating assessment methods and to ensure there is an appropriate and manageable range, balance and volume of assessment across units. A number of units can be assessed via integrative assessment methods but it is essential that the evidence of achievement is clearly signposted and referenced. **Methods of assessment must include practical tasks.**

Sample assessment tasks are provided that may be used or adapted as appropriate. These are available on the SEG website https://skillsandeducationgroupawards.co.uk/. Centres may wish to develop their own assessments for individual units or a number of units.

Minimum requirements when assessing this unit
SEG expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching

Evidence Of Achievement

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Skills in Inspection and Replacement of Light Vehicle Suspension Dampers and Springs

Unit Reference	**F/601/6857**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**24**
Unit Summary	This unit will enable the learner to develop the skills required to carry out the inspection, testing and replacement of suspension dampers and springs using a variety of equipment and testing techniques
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.3)** ***The learner can***
1. Be able to work safely when carrying out removal and replacement activities	1.1 Use suitable personal protective equipment and vehicle coverings when working on vehicle suspension systems and components 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to inspect and test light vehicle suspension dampers and springs	2.1 Inspect and test suspension dampers and springs using suitable tools, sources of information and equipment

3. Be able to remove and replace light vehicle suspension dampers and springs	3.1 Perform removal and replacement activities within appropriate timescales, using • suitable equipment and technical information • suitable removal and replacement techniques • suitable type and size of replacement components and fixings 3.2 Carry out wheel alignment checks and adjustments as appropriate before release to the customer 3.3 Perform final suspension damper and spring function checks in the workshop, prior to releasing the vehicle to the customer
4. Be able to record information and make suitable recommendations	4.1 Produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 4.2 Make suitable and justifiable recommendations for cost effective repairs 4.3 Record and report any additional faults noticed during the course of their work promptly in the format required
Mapping to National Occupational Standards Directly mapped to IMI SSC Vehicle fitting NOS 2010, unit VF11	

Supporting Unit Information

Skills in Inspection and Replacement of Light Vehicle Suspension Dampers and Springs – F/601/6857 - Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Produce evidence of inspecting, testing and replacing 2 out of the 8 types of suspension dampers and springs listed below on at least 1 occasion
  - Telescopic
  - Lever arm
  - Semi / MacPherson strut
  - Gas assisted
  - Coil spring
  - Leaf spring
  - Torsion bar
  - Rubber
- Be observed on completing the inspection, removal and replacement of a suspension damper and spring using specialist tools and equipment as appropriate

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Minimum requirements when assessing this unit

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Evidence Of Achievement

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Sample evidence checklists are available on the SEG website

Knowledge of Inspection, Adjustment and Replacement of Light Vehicle Braking Systems and Components

Unit Reference	**L/601/6084**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**18**
Unit Summary	This unit enables the learner to develop knowledge of the inspection, adjustment and replacement of light vehicle braking systems
Learning Outcomes (1 to 3) ***The learner will***	**Assessment Criteria (1.1 to 3.5)** ***The learner can***
1. Know the tools and equipment used when inspecting, adjusting and replacing light vehicle braking system components	1.1 Describe the selection, safety checks and safe use of tools and equipment for the inspection, adjustment and replacement of light vehicle braking system components
2. Know about different types of light vehicle braking systems and components	2.1 Describe the purpose, function and layout of typical light vehicle braking systems 2.2 Describe legal requirements relating to light vehicle braking systems 2.3 Describe how to identify electronic braking systems

3. Know how to inspect, test, adjust and replace light vehicle braking systems and components	3.1 Describe safe inspection and testing techniques and procedures associated with braking systems 3.2 Describe the common faults associated with light vehicle braking systems 3.3 Describe safe removal and replacement procedures associated with light vehicle braking system components 3.4 Describe how to make adjustments to braking systems 3.5 Describe how to check that components are • functioning and adjusted correctly after refitting or replacement • of the correct type and quality for the vehicle and conform to legal requirements where relevant
Mapping to National Occupational Standards Directly mapped to IMI SSC Vehicle fitting NOS 2010, unit VF12	

Supporting Unit Information

Knowledge of Inspection, Adjustment and Replacement of Light Vehicle Braking Systems and Components – L/601/6084 - Level 2

Indicative Content

Function and layout of braking systems

- Basic hydraulic braking circuit
- Types of braking systems: disc/pad, drum/shoe, servo assisted, shoe/shoe, twin leading and leading trailing
- Components: master cylinders, servos, brake pads and shoes, callipers, wheel cylinders and backing plates
- Pipes, cables and servos
- Brake fluid (including testing)
- Equalising valves, load sensing valves and vacuum/pressure pumps
- Warning lights
- How to identify ABS braking systems

Hydraulic systems

- Single line
- Multi line (diagonal, triangular and 'H')

Electronic braking systems

- Anti-skid (lock) braking systems
- Electronic brake distribution
- Parking brakes

Special purpose tools

- Piston retracting tools
- Wind back tools
- Brake shoe horn (lifter)
- Brake shoe clip remover
- Brake fluid testers
- Brake hose clamps
- Brake adjusting tools
- Brake bleeding equipment

Braking system faults

- Excessive pedal travel

- Brake judder
- Excessive pedal pressure
- Imbalance/pull
- Premature deterioration
- Brakes binding
- Brake fade.
- Failed servo
- Air in system

Fault identification

- Inspection-visual, aural and measurement
- Test drive/roller brake test
- Questioning
- Dismantling
- Information sources (including manufacturers' technical data)
- Limits of wear and serviceability

Teaching Strategies And Learning Activities

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Methods Of Assessment

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assessments for individual units or a number of units.

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Sample evidence checklists are available on the SEG website

Skills in Inspection and Replacement of Light Vehicle Braking Systems and Components

Unit Reference	**L/601/6862**
Level	**2**
Credit Value	**4**
Guided Learning Hours	**32**
Unit Summary	This unit will enable the learner to develop the skills required to carry out the inspection of light vehicle braking systems and the replacement and adjustment of braking system components
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.4)** ***The learner can***
1. Be able to work safely when carrying out removal and replacement activities	1.1 Use suitable personal protective equipment and vehicle coverings when working on vehicles 1.2 Work in a way which minimises the risk of damage or injury to the vehicle, people and the environment
2. Be able to inspect and test light vehicle braking systems	2.1 Inspect and test braking systems using suitable tools, sources of information and equipment
3. Be able to replace light vehicle braking	3.1 Carry out removal and replacement activities within appropriate timescales, using

system components	• suitable equipment and technical information • suitable removal and replacement techniques • suitable type and size of replacement components and fixings 3.2 Carry out final braking system function checks in the workshop, prior to releasing the vehicle to the customer
4. Be able to record information and make suitable recommendations	4.1 Produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 4.2 Make suitable and justifiable recommendations for cost effective repairs 4.3 Record and report any additional faults noticed during the course of their work promptly in the format required 4.4 Give advice on procedures for bedding in new brakes before release to the customer
Mapping to National Occupational Standards Directly mapped to IMI SSC Vehicle fitting NOS 2010, unit VF12	

Supporting Unit Information

Skills in Inspection and Replacement of Light Vehicle Braking Systems and Components – L/601/6862 - Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
  Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Produce evidence of inspecting, replacing, testing and adjusting where appropriate, 5 different components out of the 13 shown below
  Components
  - master cylinders
  - servos
  - brake pads
  - brake shoes
  - callipers
  - disc
  - drum
  - wheel cylinders
  - backing plates
  - parking brake mechanisms, adjusters or cables
  - pipes
  - load sensing / equalizing valves
  - electronic sensors / actuators

  The evidence must include at least 1 of each: mechanical and/or electronic and hydraulic units or components. 1 piece of evidence must include brake bleeding
- Carry out the replacement of components and bleed brakes

Teaching Strategies And Learning Activities

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including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place

Methods Of Assessment

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Minimum requirements when assessing this unit
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Evidence Of Achievement

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Sample evidence checklists are available on the SEG website

Understanding Windscreen Repair and System Maintenance

Unit Reference	**L/600/7448**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**23**
Unit Summary	This unit enables the learner to develop an understanding of windscreen repair and associated system maintenance
Learning Outcomes (1 to 11) ***The learner will***	**Assessment Criteria (1.1 to 11.2)** ***The learner can***
1. Know how the windscreen repair system is designed to work and why the Manufacturer's specified process should be followed	1.1 Explain the repair process specified by the system manufacturer, with reference to Health and Safety and methods of work 1.2 Explain why the specified process should be followed and what problems can arise if this is not adhered to
2. Understand why the repair kit/system should be restocked when necessary and where and when to obtain stock from	2.1 Explain the importance of making sure the kit contains all necessary equipment and consumables 2.2 Explain where to obtain items required to replenish the repair kit and when this should be done

3. Know the purpose and properties of resins used in windscreen repair, and why only Manufacturer approved resins should be used	3.1 Describe the purpose of resins in automotive glazing repairs 3.2 Explain how to check a resin is suitable for use 3.3 Explain the problems that could arise if non approved or out of date resins are used
4. Know the different types of windscreens used in vehicles and which can be repaired	4.1 Describe the make-up of at least two types of laminated glass used in windscreens 4.2 Name any type of windscreen that cannot be repaired
5. Know why damage that extends to include the PVB Interlayer or integral heater elements should not be repaired, and how to ensure that these are not damaged during the repair process	5.1 Explain why damage that extends to the PVB interlayer or integral heater elements should not be repaired 5.2 Explain how to ensure these are not damaged during the repair process
6. Know the industry Code of Practice relating to windscreen repair	6.1 Name the industry Code of Practice referring to windscreen repairs 6.2 Explain what the Code of Practice refers to 6.3 Describe two limitations the Code of Practice states
7. Know the MOT guidelines on	7.1 Explain the MOT regulations on windscreen damage, to include

windscreen damage	• zones • size of damage permissible
8. Know the problems involved in repairing a windscreen	8.1 Give detailed explanations of four problems that could affect the feasibility of carrying out a windscreen repair, and why these affect the feasibility, for example • weather conditions • age/condition of damage • proximity of two types of damage • size of impact point
9. Know who needs to be made aware of any problems or potential problems that could occur during the repair process, when to inform them and the reasons they need to be made aware	9.1 State who should be made aware of any problems or potential problems 9.2 Explain when the people should be informed and why this is important
10. Know how to deal with a repair that is not successful	10.1 Explain how to deal with a repair that is not successful, to include the following • damage that prevents attempting the repair • damage that is made worse during the repair • damage that is not repaired to the customer's satisfaction
11. Know what information should be recorded about the repair and why the information should be complete and accurate	11.1 Explain what information should be recorded 11.2 Explain why the information should be recorded and the implications of not recording the information fully and correctly

Mapping to National Occupational Standards
Mapped to Proskills Automotive Glazing NOS 2009, unit AG15

Supporting Unit Information

Understanding Windscreen Repair and System Maintenance – L/600/7448 - Level 2

Indicative Content

Correct personal protective equipment must be used, and health and safety issues must be addressed throughout this unit.

Kit specific repair process

- Specified process and guidelines
- Health and safety issues
- Materials used
- PPE
- Limits of repair (size and type of windscreen damage)
- Results of ignoring kit specific guidelines and process

Good housekeeping

- Job Cards
- Inventory checklist
- Damage report
- Ensure safe working area
- Ensure vehicle is returned to customer with repair waste removed
- Clean and maintain equipment
- Return tools, equipment and consumables to the appropriate place
- Ensure kit is adequately stocked
- Know where top obtain replacement consumables
- Correct disposal of waste to include
  - labelling of hazardous waste
  - environmental guidelines
- Registered waste disposal company

The purpose and properties of resins used in windscreen repairs

- Material to be repaired/type of resin to be used
- Type of damage
- Repair kit manufacturers guidelines
- Durability of repair
- Results and consequences of out of date resin

Types of windscreens

- Indirect glazing
- Direct glazing
- Toughened glass
- Laminated glass
- EPG glass
- Polyvinyl butyral (PVB)

Damage to PVB interlayer or integral heater element

- Compromised strength
- Compromised safety
- Legal issues
- Depth of damage
- Deformation of resin

Industry code of practice

- BS AU 242a: 1998
- Structural and aesthetic standard
- Quality of workmanship
- Damage identification
- Size limitations of repair
- Area (zone) specific limitation of repair
- Materials and tools permitted
- Temperature
- Training standards

MOT guidelines of windscreen

- Crack or chip
- Size of damage
- Depth of damage
- Location (zone) of damage
- Line of vision

Problems involved in repairing windscreens

- Weather/dust/moisture in repair
- Milky appearance
- Structural integrity
- Resin limitations
- Dirt build up
- Weathering of damage/ frost damage

Unsuccessful repairs

- Unrepairable damage
- Reporting procedures
- Replacement windscreen
- Customer satisfaction/expectations
- Rectification activities
- Drilling damage area

Types of fabrics used in vehicle trim

- Pattern
- Non-pattern
- Weave
- Texture

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Repair Damaged Windscreen Glass In Vehicles

Unit Reference	**K/600/7442**
Level	**2**
Credit Value	**5**
Guided Learning Hours	**31**
Unit Summary	This unit enables the learner to develop the skills required to carry out the repair of damaged windscreen glass in vehicles
Learning Outcomes (1 to 8) ***The learner will***	**Assessment Criteria (1.1 to 8.1)** ***The learner can***
1. Know the industry code of practice relating to windscreen repair	1.1 Name the industry code of practice referring to windscreen repairs and explain what this means in practice
2. Be able to correctly identify the type of windscreen damage and confirm this with the customer	2.1 Correctly identify the type of windscreen damage 2.2 Correctly identify the zone in which the damage lies 2.3 Correctly determine the feasibility of repair 2.4 Clearly inform the customer of the action required, risks involved, customer expectations and obtain customer's agreement and confirmation of this action

3. Know why it is important to identify correctly the zone where the damage lies and how this affects the feasibility of repair	3.1 Explain why it is important to identify correctly the zone where the damage lies 3.2 Explain how the position and condition of the damage affects the feasibility of repair
4. Know the types of action that can be taken to rectify windscreen damage	4.1 Describe the types of action that can be taken to rectify windscreen damage. Give at least three examples
5. Be able to correctly carry out windscreen repair	5.1 Select the correct equipment to carry out the repair 5.2 Select the correct materials 5.3 Correctly carry out the repair minimising the time the vehicle is not operational
6. Be able to clearly provide necessary information to the customer	6.1 Clearly provide necessary information to the customer, for example • further action required when repair is not feasible or on completion is not satisfactory to the customer • provide the customer with advice on MOT regulations with regard to windscreen damage
7. Know the types of problems that can occur in the repair of damaged windscreens and how these can be overcome	7.1 Describe four problems that can occur in the repair of damaged windscreens and explain how these might be overcome

8. Be able to correctly record information on the repair of damaged windscreens	8.1 Correctly record information on the repair of damaged windscreens
Mapping to National Occupational Standards Mapped to Proskills Automotive Glazing NOS 2009, unit AG9	

Supporting Unit Information

Repair Damaged Windscreen Glass In Vehicles – K/600/7442 - Level 2

Indicative Content

You must:

- Produce evidence to show you meet all of the learning outcomes
- Produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre
- Be observed by an assessor as defined by the IMI Assessment Strategy
- Be observed by your assessor successfully carrying out cosmetic repair activities on at least 1 vehicle which collectively covers the learning outcomes

Teaching Strategies And Learning Activities

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Methods Of Assessment

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Introduction to Vehicle Refinishing

Unit Reference	**Y/501/7020**
Level	**1**
Credit Value	**4**
Guided Learning Hours	**40**
Unit Summary	In this unit learners will investigate bodywork and materials preparation, using correct abrasives, masking materials and different refinishing techniques. Learners will also identify and rectify paint defects and carry out surface enhancement
Learning Outcomes (1 to 7) ***The learner will:***	**Assessment Criteria (1.1 to 7.2)** ***The learner can:***
1. Work safely	1.1 Use safe working practices when undertaking vehicle refinishing
2. Know about surface preparation	2.1 Select and use abrasives to prepare various substrates for the next operation 2.2 Demonstrate the safe use of power equipment with particular attention to correct PPE
3. Understand the procedure for bodywork preparation prior to refinishing	3.1 Identify substrate to be refinished 3.2 Demonstrate the correct methods and stages of surface preparation

	3.3 Demonstrate the correct methods of masking paintwork for the refinishing operation
4. Know how to mix and apply primers	4.1 Demonstrate the correct methods of preparing a range of primers for use 4.2 Demonstrate the correct and safe methods of painting with primer/s to an acceptable standard 4.3 Prepare primed surface to accept top coat
5. Know how to apply a top coat	5.1 Demonstrate the correct methods of preparing a range of top coats and application equipment for use 5.2 Demonstrate the correct safe method of painting panels with top coat 5.3 Demonstrate the correct and safe method of servicing equipment after use with the above painting techniques
6. Know how to identify and correct basic paint defects	6.1 Identify basic paint defects 6.2 Identify cause and rectification of paint defects
7. Know how to enhance paint finishes	7.1 Demonstrate the correct procedure for compounding, machine or hand glazing 7.2 Apply polishes to protect the refinished surface
Mapping to National Occupational Standards	

IMI SSC Vehicle Body and Paint Operations 2005
BP07 (EK: 2, 3, 5, 6, 9, 10, 11, 12, 18, 24. PO: a, c, e, g, j, k, l)
BP09 (EK: 1, 3, 6, 10, 13, 20. PO: a, b, f)
BP08 (EK: 1, 3, 6, 10, 13, 15, 17, 19, 20, 21, 22, 26. PO: a, b, d, e, g, h, i, j)

Supporting Unit Information

Introduction to Vehicle Refinishing – Y/501/7020 - Level 1

Indicative Content

The learner must understand:

Surface preparation

- The correct method for preparation of different substrates i.e. metals, filler, existing paint and hazards associated with them
- The correct stages of surface preparation for painting as:
  - abrading
  - filling
  - feather edging
  - flatting
  - stopping

Bodywork preparation

- How to correctly identify correct use of masking materials

Surface refinishing

- How to correctly identify painting equipment/techniques for:
  - primers
  - top coats in water and solvent based finish – solid colour and clear over base
- How to correctly identify basic paint defects: runs, orange peel, dirt, etc

Surface enhancement

- Identification of the methods used to enhance paint finishes:
  - compounding
  - polishing
  - machine/hand glaze
  - liquid polish

Teaching Strategies And Learning Activities

Owing to the Health and Safety, EPA and COSHH implications of vehicle

refinishing it is expected that this unit will be delivered in a practical setting that has the required equipment to comply with statutory regulations.

The content in this unit could be carried out on panels removed from a vehicle or test piece(s).

Methods Of Assessment

This unit is internally assessed and externally moderated.

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Evidence Of Achievement

All evidence must be clearly signposted to individual unit learning outcomes.

Learners must provide evidence of achievement of all learning outcomes within the unit to the standard specified within the criteria for assessment in order to be awarded credit. All evidence must be clearly signposted to individual unit learning outcomes.

Sample evidence checklists are available on the SEG website.

Introduction to Vehicle Valeting

Unit Reference	**J/501/7028**
Level	**1**
Credit Value	**4**
Guided Learning Hours	**40**
Unit Summary	In this unit the learner will find out about the selection and application of correct materials when valeting the exterior, interior and engine bay of motor vehicles. They will learn about the correct handling and disposal of waste
Learning Outcomes (1 to 6) ***The learner will:***	**Assessment Criteria (1.1 to 6.1)** ***The learner can:***
1. Work safely	1.1 Use safe working practices when valeting vehicles
2. Know how to valet the exterior of vehicles	2.1 Valet vehicle exterior to include • selection and use of appropriate cleaning tools, materials and products for • washing and drying vehicle exterior ensuring removal of dirt, detergent and water • restoring surface finish to bodywork, bright work, exterior trim and glass • protecting surface finish including bodywork, bright work and exterior trim
3. Know how to valet	3.1 Valet vehicle interior to include:

the interior of vehicles	Selection and use of appropriate cleaning tools, materials and products for • carpets • upholstery • plastic trim • glass
4. Know how to valet an engine bay	4.1 Demonstrate how to protect sensitive electronic components and the air intake prior and during an engine bay valet 4.2 Select and use appropriate cleaning tools, materials, methods and products to clean engine bay
5. Know how to inspect a valeted vehicle	5.1 Perform visual inspection of a valeted vehicle for cleaning residues and surface finish 5.2 Identify key findings of inspection and rectify any imperfections
6. Be aware of environmental considerations	6.1 Demonstrate appropriate ways to dispose of waste products in accordance with environmental guidance
Mapping to National Occupational Standards IMI SSC Vehicle Maintenance and Repair 2005 MR09 (EK: 1, 2, 8, 9, 10, 12, 13, 14, 16, 17. PO: a, b, c, e, f, i, j)	

Supporting Unit Information

Introduction to Vehicle Valeting - J/501/7028 - Level 1

Indicative Content

The learner must understand:

Valeting

- The need for valeting vehicles

Exterior valet

- The correct detergent/cleaner required for particular exterior paint surfaces
- Methods of restoring surface finish to bodywork, exterior trim and glass

Interior valet

- The correct detergent/cleaner for interior surfaces on cloth, leather, plastics and glass
- The correct polishes for interior trim and the areas to be applied or avoided

Engine bay

- The precautions to be taken when cleaning the engine bay area with regard to
  - electronic components
  - personal safety
  - use of hazardous materials

Teaching Strategies And Learning Activities

By virtue of the content of this unit, it will be best delivered in a practical setting with a variety of vehicles to valet.

Methods Of Assessment

This unit is internally assessed and externally moderated.

Providers are encouraged to use innovative and stimulating assessment methods and to ensure there is an appropriate and manageable range, balance and volume of assessment across units. A number of units can be assessed via integrative assessment methods but it is essential that the evidence of achievement is clearly signposted and referenced. **Methods of assessment must include practical tasks.**

Sample assessment tasks are provided that may be used or adapted as appropriate. These are available on the SEG website https://skillsandeducationgroupawards.co.uk/. Centres may wish to develop their own assessments for individual units or a number of units.

Evidence Of Achievement

All evidence must be clearly signposted to individual unit learning outcomes.

Learners must provide evidence of achievement of all learning outcomes within the unit to the standard specified within the criteria for assessment in order to be awarded credit. All evidence must be clearly signposted to individual unit learning outcomes.

Sample evidence checklists are available on the SEG website.

Appendices

Recognition of Prior Learning (RPL), Exemption and Credit Transfer

ABC Awards policy enables learners to avoid duplication of learning and assessment in a number of ways:

- Recognition of Prior Learning (RPL) – a method of assessment that considers whether a learner can demonstrate that they can meet the assessment requirements for a unit through knowledge, understanding or skills they already possess and do not need to develop through a course of learning.
- Exemption - Exemption applies to any certificated achievement which is deemed to be of equivalent value to a unit within SEG qualification but which does not necessarily share the exact learning outcomes and assessment criteria. It is the assessor's responsibility, in conjunction with the Internal Moderator, to map this previous achievement against the assessment requirements of the SEG qualification to be achieved in order to determine its equivalence.
  Any queries about the relevance of any certificated evidence, should be referred in the first instance to your centre's internal moderator and then to SEG.
  It is important to note that there may be restrictions upon a learner's ability to claim exemption or credit transfer which will be dependent upon the currency of the unit/qualification and a learner's existing levels of skill or knowledge.
  Where past certification only provides evidence that could be considered for exemption of part of a unit, learners must be able to offer additional evidence of previous or recent learning to supplement their evidence of achievement.
- Credit Transfer – SEG may attach credit to a qualification, a unit or a component. Credit transfer is the process of using certificated credits achieved in one qualification and transferring that achievement as a valid contribution to the award of another qualification.
  Units/Components transferred must share the same learning outcomes and assessment criteria along with the same unit number. Assessors must ensure that they review and verify the evidence through sight of:
    - Original certificates OR
    - Copies of certificates that have been signed and dated by the internal moderator confirming the photocopy is a real copy

and make these available for scrutiny by the External Moderator.

- Equivalencies – opportunities to count credits from the unit(s) from other qualifications or from unit(s) submitted by other recognised organisations towards the place of mandatory or optional unit(s) specified in the rule of combination. The unit must have the same credit value or greater than the unit(s) in question and be at the same level or higher.

SEG encourages its centres to recognise the previous achievements of learners through Recognition of Prior Learning (RPL), Exemption and Credit Transfer. Prior achievements may have resulted from past or present employment, previous study or voluntary activities. Centres should provide advice and guidance to the learner on what is appropriate evidence and present that evidence to the external moderator in the usual way.

Certification

Learners will be certificated for all units and qualifications that are achieved and claimed.

ABC's policies and procedures are available on the SEG web site in the Examination Officers' Guide.

Glossary of Terms

GLH (Guided Learning Hours)
GLH is where the learner participates in education or training under the immediate guidance or supervision of a tutor (or other appropriate provider of education or training). It may be helpful to think – 'Would I need to plan for a member of staff to be present to give guidance or supervision?'
GLH is calculated at qualification level and not unit/component level.

Examples of Guided Learning include:

- Face-to-face meeting with a tutor
- Telephone conversation with a tutor
- Instant messaging with a tutor
- Taking part in a live webinar
- Classroom-based instruction

- Supervised work
- Taking part in a supervised or invigilated assessment
- The learner is being observed.

TQT (Total Qualification Time)
'The number of notional hours which represents an estimate of the total amount of time that could reasonably be expected to be required, in order for a learner to achieve and demonstrate the achievement of the level of attainment necessary for the award of a qualification.' The size of a qualification is determined by the TQT.

TQT is made up of the Guided Learning Hours (GLH) plus all other time taken in preparation, study or any other form of participation in education or training but not under the direct supervision of a lecturer, supervisor or tutor.

TQT is calculated at qualification level and not unit/component level.

Examples of unsupervised activities that could contribute to TQT include:

- Researching a topic and writing a report
- Watching an instructional online video at home/e-learning
- Watching a recorded webinar
- Compiling a portfolio in preparation for assessment
- Completing an unsupervised practical activity or work
- Rehearsing a presentation away from the classroom
- Practising skills unsupervised
- Requesting guidance via email – will not guarantee an immediate response.