QUALIFICATION HANDBOOK

SVQ 2/3 in Vehicle Paintwork Repair at SCQF Level 5/6 (4311-22/23)

February 2018 Version 2.2

City & Guilds

Qualification at a glance

Subject area	**Vehicle Paintwork Repair**
City & Guilds number	4311
Age group approved	16-18, 19+
Assessment	Portfolio of evidence and e-assessment online multiple choice tests.
Fast track	Not available. Automatic approval applies in some cases
Support materials	Centre Handbook Exam Success Book
Registration and certification	See the Walled Garden/Online Catalogue for last dates

Title and level	City & Guilds number	Accreditation number
SVQ 2 in Vehicle Paintwork Repair at SCQF Level 5	4311-22	GD06 22
SVQ 3 in Vehicle Paintwork Repair at SCQF Level 6	4311-23	GD07 23

Version and date	Change detail	Section
1.1 Nov 2011	Evidence requirements for Unit 210 amended	Units
2.0 Feb 2013	Amendments to various unit range	Units
2.1 Oct 2013	Unit supporting information updated with introductory text	Units
2.2 Feb 2018	Amended Quality Assurance Requirements	Appendix 1

Contents

1 Introduction

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

Area	Description
Who are the qualifications for?	These Vehicle Paintwork Repair qualifications are for anyone developing a career in the motor industry. These practical qualifications demonstrate candidates' skills on the job and in their own workplace showing that they meet national standards for automotive workers. Their structure and assessment strategy have been produced by the Institute of the Motor Industry, who are the Sector Skills Council for the Automotive Industry.
What do the qualifications cover?	Candidates cover areas such as routine vehicle maintenance, removal and replacement of vehicle units and components and carrying out repairs to motor vehicles. They are assessed in the workplace by using the following methods: • workplace observation • witness testimony • verbal questioning of Essential Knowledge • City & Guilds' e-assessment online multiple choice test
Are the qualifications part of a framework or initiative?	These qualifications are part of the Scottish Automotive Maintenance and Repair Modern Apprenticeship.
What opportunities for progression are there?	After taking these qualifications candidates will have a qualification that show employers and customers they are competent and have the skills required to carry out body repairs as a result of accidents and will be able to progress into employment. In addition, candidates who enjoy leading teams of people at work could also move onto a qualification as a Team Leader or Supervisor such as qualifications at Levels 2, 3 and 4 through the Institute of Leadership and Management (ILM).

Structure

To achieve the **SVQ 2 in Vehicle Paintwork Repair at SCQF Level 5**, learners must achieve all **8** mandatory units. Some units require learners to successfully complete an online multiple choice test. Details can be found in Section 4 of this Handbook and in the assessment requirements section of each individual unit.

City & Guilds unit	Unit title	Mandatory/ optional for full qualification	SCQF level	SCQF credit value
4311-001	Contribute to housekeeping in motor vehicle environments	Mandatory	5	5
4311-002	Reduce risks to health and safety in the motor vehicle environment	Mandatory	5	5
4311-003	Maintain working relationships in the motor vehicle environment	Mandatory	6	8
4311-201	PPE, tools and equipment, health and safety in the motor vehicle environment	Mandatory	4	10
4311-202	Applying fillers and foundation materials in the motor vehicle environment	Mandatory	5	15
4311-203	Working with plastic components in the motor vehicle environment	Mandatory	5	16
4311-204	Preparing metal and pre-painted surfaces in the motor vehicle environment	Mandatory	5	16
4311-206	Repair minor paint defects on motor vehicles	Mandatory	5	16

To achieve the **SVQ 3 in Vehicle Paintwork Repair at SCQF Level 6**, learners must achieve **10** mandatory units. Some units require learners to successfully complete an online multiple choice test. Details can be found in Section 4 of this Handbook and in the assessment requirements section of each individual unit.

City & Guilds unit	Unit title	Mandatory/ optional for full qualification	SCQF level	SCQF credit value
4311-001	Contribute to housekeeping in motor vehicle environments	Mandatory	5	5
4311-002	Reduce risks to health and safety in the motor vehicle environment	Mandatory	5	5
4311-003	Maintain working relationships in the motor vehicle environment	Mandatory	6	8

City & Guilds unit	Unit title	Mandatory/ optional for full qualification	SCQF level	SCQF credit value
4311-204	Preparing metal and pre painted surfaces in the motor vehicle environment	Mandatory	5	16
4311-207	Establish defects on motor vehicles	Mandatory	5	16
4311-210	Spot repair on motor vehicles	Mandatory	6	16
4311-211	Blend/fade out repair on motor vehicles	Mandatory	6	16
4311-212	Edge to edge repair on motor vehicles	Mandatory	6	16
4311-213	Mix and match colours for motor vehicles	Mandatory	6	16
4311-214	Advanced colour matching for motor vehicles	Mandatory	7	16

2 Centre requirements

Approval

If your Centre is approved to offer the Level 2 SVQ in Automotive Maintenance and Repair – Paint Repair (4101-34), you will be granted automatic approval for the SVQ 2 in Vehicle Paintwork Repair at SCQF Level 5 (4311-22) and will be able to make registrations straight away.

If your Centre is approved to offer the Level 3 SVQ in Automotive Maintenance and Repair – Paint Repair (4101-37), you will be granted automatic approval for the SVQ 3 in Vehicle Paintwork Repair at SCQF Level 6 (4311-23).

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

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

Resource requirements

Physical resources and site agreements

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

Centre staffing

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

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

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

Assessors and internal verifiers

All assessors must:

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

All internal verifiers must:

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

Continuing professional development (CPD)

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

Candidate entry requirements

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

Age restrictions

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

3 Delivering the qualification

Initial assessment and induction

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

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

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

Support materials

City & Guilds will provide the following learning and support resources which will be posted on our website.
www.cityandguilds.com/automotive

- Useful material is available on SmartScreen www.smartscreen.co.uk.
- Exam Success book TL024290

Recording documents

Candidates and centres may decide to use a paper-based or electronic method of recording evidence. To support the delivery of vocational qualifications we offer our own ePortfolio, Learning Assistant, an easy to use and secure online tool to support and evidence candidates' progress towards achieving qualifications. Further details are available at: **www.cityandguilds.com/eportfolios**.

Simulation

The IMI SVQ units are work/competency based and therefore candidates are to be assessed under normal working conditions. It is recognised however, that there are situations where the workplace may not be appropriate or that waiting for naturally occurring evidence is impractical. In these situations centres will be allowed to set up or devise assessment situations. For example, it may not be possible to diagnose and rectify faults because they do not occur frequently, in which case a simulated environment could be used. In addition, dealing with fire and other emergencies such as recovering overturned vehicles, might be better assessed through a simulated environment because this would be a safer approach. They can only be set up after:

- all possible routes of naturally occurring evidence have been exhausted
- the exact make up and content of the centre devised assessment has been agreed and approved by the external verifier
- the assessor can assure that the simulation will provide evidence that is valid, reliable and authentic.

Any simulation must be carried out using actual vehicles; the use of engine rigs or electrical boards is not permitted. Simulated environments must not be used for the assessment of entire units.

Realistic Work Environment (RWE)

The use of approved simulation means that RWE is not to be used.

Expert witness

The use of witness testimony and expert witness testimony are appropriate methods for assessors to collect supplementary evidence on candidates' performance. Witness testimonies may be obtained from people that are occupationally competent and whom may be familiar with the NOS, such as the candidate's line manager.

The assessor must judge the validity of the witness testimony and these may vary depending on the source. Witness testimonies can only support the assessment process and may remove or reduce the need to collect supplementary evidence; however City & Guilds quality assurance requirements must be met. The person or persons providing the witness testimony must also be available to the external verifier for confirmation of evidence validity if required.

Health and safety

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

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

Data protection and confidentiality

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

Equal opportunities

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

The City & Guilds equal opportunities policy is set out on the City & Guilds website, in *Providing City & Guilds qualifications*, in the *Directory of qualifications*, and is also available from the City & Guilds Customer Relations department.

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

Access to assessment

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

Appeals

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

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

4 Assessment

Candidates must complete a portfolio of evidence for each unit (for all competence aspects of the unit).

Where stipulated, particular units require candidates to achieve an online multiple choice test, graded as Pass, Merit, Distinction. The test will cover all or part of the knowledge aspects of the unit. Where the test does not cover all of the Essential Knowledge, the criterion must be assessed in one of the following ways:

- oral or written questioning
- professional discussion.

Time constraints

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

Recognition of prior learning (RPL)

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

SVQ 2 in Vehicle Paintwork Repair at SCQF Level 5

Title	Assessment method	Unit
Contribute to housekeeping in motor vehicle environments	Portfolio	4311-001
Reduce risks to health and safety in the motor vehicle environment	Portfolio	4311-002
Maintain working relationships in the motor vehicle environment	Portfolio	4311-003
PPE, tools and equipment, health and safety in the motor vehicle environment	Portfolio	4311-201
	Multiple choice online test	4311-251
Applying fillers and foundation materials in the motor vehicle environment	Portfolio	4311-202
	Multiple choice online test	4311-252
Working with plastic components in the motor vehicle environment	Portfolio	4311-203
	Multiple choice online test	4311-253
Preparing metal and pre-painted surfaces in the motor vehicle environment	Portfolio	4311-204
	Multiple choice online test	4311-254
Repair minor paint defects on motor vehicles	Portfolio	4311-206
	Multiple choice online test	4311-256

SVQ 3 in Vehicle Paintwork Repair at SCQF Level 6

Title	Assessment method	Unit
Contribute to housekeeping in motor vehicle environments	Portfolio	4311-001
Reduce risks to health and safety in the motor vehicle environment	Portfolio	4311-002
Maintain working relationships in the motor vehicle environment	Portfolio	4311-003
Preparing metal and pre painted surfaces in the motor vehicle environment	Portfolio	4311-204
	Multiple choice online test	4311-254
Establish defects on motor vehicles	Portfolio	4311-207
	Multiple choice online test	4311-257
Spot repair on motor vehicles	Portfolio	4311-210
	Multiple choice online test	4311-259
Blend/fade out repair on motor vehicles	Portfolio	4311-211
	Multiple choice online test	4311-259
Edge to edge repair on motor vehicles	Portfolio	4311-212
	Multiple choice online test	4311-259
Mix and match colours for motor vehicles	Portfolio	4311-213
	Multiple choice online test	4311-263
Advanced colour matching for motor vehicles	Portfolio	4311-214
	Multiple choice online test	4311-263

5 Units

Availability of units

The units in this qualification are written in a standard format and comprise the following:

- City & Guilds reference number
- title
- SCQF level
- SCQF credit value
- unit aim
- unit content
- unit range

Unit 001 Contribute to housekeeping in motor vehicle environments

Level:	**5**
Credit value:	5
Endorsement by a regulatory body:	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.
Aim:	This unit is about the routine maintenance of the workplace, carrying out basic, non-specialist checks of work tools and equipment, cleaning the work area and using resources economically.

Essential knowledge

The learner will need to understand:

1. Legislative and organisational requirements and procedures	
1.1	the scope of their job responsibilities for the use and maintenance of hand tools, equipment and their work area
1.2	workplace policies and schedules for **housekeeping activities** and **equipment maintenance**
1.3	the manufacturer's requirements for the cleaning and general, non-specialist maintenance of the tools and equipment for which they are responsible
1.4	the regulations and information sources applicable to workshop cleaning and maintenance activities for which they are responsible
1.5	the importance of reporting faults quickly to the relevant person
1.6	the importance of reporting anticipated delays to the relevant person(s) promptly.

2. Equipment maintenance	
2.1	how to select and use equipment used for basic hand tool maintenance activities
2.2	how to store hand tools safely and accessibly
2.3	how to report faulty or damaged **work tools and equipment**
2.4	how to work safely when cleaning and maintaining **work tools and equipment**.

3. General work area housekeeping	
3.1	how to select and use cleaning equipment
3.2	how to use resources economically
3.3	how to use work area cleaning materials and agents
3.4	how to clean and maintain the **work tools and equipment** and work areas for which they are responsible
3.5	how to dispose of unused cleaning agents, materials and debris
3.6	the properties and hazards associated with the use of cleaning agents and materials
3.7	the importance of wearing personal protective equipment
3.8	the importance of using resources economically and for their intended purpose only.

Performance objectives

To be competent the learner must:

1. wear suitable personal protective equipment throughout all **housekeeping** and **equipment maintenance activities**
2. select and use cleaning equipment which is:
    - of the right type
    - suitable for the task
3. use resources economically and for their intended purpose only, following manufacturers' instructions and workplace procedures
4. follow workplace policies, schedules and manufacturers' instructions when cleaning and maintaining hand tools and equipment
5. clean the work area(s), for which they are responsible, at the specified time and frequency
6. carry out **housekeeping activities** safely and in a way which minimises inconvenience to customers and staff
7. follow the manufacturer's instructions when using cleaning and sanitising agents
8. ensure their **housekeeping activities** keep their work area clean and free from debris and waste materials
9. ensure their **equipment maintenance** activities keep their **work tools and equipment** fit for purpose
10. dispose of used cleaning agents, materials and debris to comply with legal and workplace requirements
11. store their **work tools and equipment** in a safe manner which permits ease of access and identification for use
12. report any faulty or damaged tools and equipment to the relevant person(s) clearly and promptly
13. report any anticipated delays in completion to the relevant person(s) promptly.

Unit 001 Contribute to housekeeping in motor vehicle environments

Supporting information

Scope of this unit

1. **Equipment maintenance** covers:
   a. routine checks on work tools and equipment
   b. cleaning work tools and equipment
   c. replacing minor parts
   d. visual inspection of electrical equipment.

2. **Housekeeping activities** cover:
   a. day to day work area cleaning
   b. clearing away
   c. dealing with spillages
   d. disposal of waste, used materials and debris.

3. **Work tools and equipment** are:
   a. hand
   b. electrical
   c. mechanical
   d. pneumatic
   e. hydraulic.

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

Economic use of resources

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

Requirement to maintain work area effectively

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

Spillages, leaks and waste materials

a. relevance of safe systems of work to the storage and disposal of waste materials
b. requirement to store and dispose of waste, used materials and debris correctly
c. safe disposal of special / hazardous waste materials

d. advantages of recycling waste materials
e. dealing with spillages and leaks.

Basic legislative requirements

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

Routine maintenance of the workplace

a. trainees' personal responsibilities and limits of their authority with regard to work equipment
b. risk assessment of the workplace activities and work equipment
c. workplace person responsible for training and maintenance of workplace equipment
d. when and why safety equipment must be used
e. location of safety equipment
f. particular hazards associated with their work area and equipment
g. prohibited areas
h. plant and machinery that trainees must not use or operate
i. why and how faults on unsafe equipment should be reported
j. storing tools, equipment and products safely and appropriately
k. using the correct PPE
l. following manufacturers' recommendations
m. location of routine maintenance information eg electrical safety check log.

Legislation relevant to Health and Safety

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

General regulations to include an awareness of:

a. Health and Safety (Display Screen Equipment) Regulations 1992
b. Health and Safety (First Aid) Regulations 1981
c. Health and Safety (Safety Signs and Signals) Regulations 1996
d. Health and Safety (Consultation with Employees) Regulations 1996
e. Employers' Liability (Compulsory Insurance) Act 1969 and Regulations 1998
f. Confined Spaces Regulations 1997
g. Noise at Work Regulations 1989
h. Electricity at Work Regulations 1989
i. Electricity (Safety) Regulations 1994
j. Fire Precautions Act 1971

k. Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1985
l. Pressure Systems Safety Regulations 2000
m. Waste Management 1991
n. Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) 2002
o. Control of Asbestos at Work Regulations 2002.

Legislative duties

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

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

a. accessing and interpreting safety information
b. seeking advice when needed
c. seeking assistance when required
d. reporting of unsafe equipment
e. storing tools, equipment and products safely and appropriately
f. using the correct PPE
g. following manufacturers' recommendations
h. following application procedures eg hazardous substances
i. the correct selection and use of extraction equipment.

PPE to include:

a. typical maintenance procedures for PPE equipment to include:
    i. typical maintenance log
    ii. cleaning procedures
    iii. filter maintenance
    iv. variation in glove types
    v. air quality checks
b. choice and fitting procedures for masks and air breathing equipment
c. typical workplace processes which would require the use of PPE to include:
    i. welding
    ii. sanding and grinding
    iii. filling
    iv. panel removal and replacement
    v. drilling
    vi. cutting
    vii. chiselling
    viii. removal of broken glass

ix. removal of rubber seals from fire damaged vehicles
x. removal of hypodermic needles
xi. servicing activities
xii. roadside recovery
xiii. unserviceable PPE

d. PPE required for a range of automotive repair activities. To include appropriate protection of:
i. eyes
ii. ears
iii. head
iv. skin
v. feet
vi. hands
vii. lungs.

Fire and extinguishers

a. classification of fire types
b. using a fire extinguisher effectively
c. types of extinguishers:
i. foam
ii. dry powder
iii. CO_2
iv. water
v. fire blanket.

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

The procedure as:

a. raise the alarm
b. fight fire only if appropriate
c. evacuate building
d. call for assistance.

Product warning labels to include:

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

Warning signs and notices

a. colours used for warning signs:
i. red
ii. blue
iii. green
b. shapes and meaning of warning signs:
i. round
ii. triangular
iii. square
c. the meaning of prohibitive warning signs in common use

d. the meaning of mandatory warning signs in common use
e. the meaning of warning notices in common use
f. general design of safe place warning signs.

Hazards and risks to include:

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

Personal responsibilities

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

Action to be taken in the event of colleagues suffering accidents

a. the typical sequence of events following the discovery of an accident such as:
    i. make the area safe
    ii. remove hazards if appropriate, ie switch off power
    iii. administer minor first aid
    iv. take appropriate action to reassure the injured party
    v. raise the alarm
    vi. get help
    vii. report on the accident

b. typical examples of first aid which can be administered by persons at the scene of an accident:
    i. check for consciousness
    ii. stem bleeding
    iii. keep the injured person's airways free
    iv. place in the recovery position if injured person is unconscious
    v. issue plasters for minor cuts
    vi. action to prevent shock, ie keep the injured party warm
    vii. administer water for minor burns or chemical injuries
    viii. wash eyes with water to remove dust or ingress of chemicals (battery acid)
    ix. need to seek professional help for serious injuries
c. examples of bad practice which may result in further injury such as:
    i. moving the injured party
    ii. removing foreign objects from wounds or eyes
    iii. inducing vomiting
    iv. straightening deformed limbs.

Evidence requirements

The learner must:

1. produce evidence to show they meet **all** of the Essential Knowledge and Performance Objectives
2. produce performance evidence resulting from work they have carried out on real vehicles in their normal workplace or as defined within the IMI SVQ Assessment Strategy as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in their normal workplace or when safety is at risk
3. be observed by an assessor as defined in the IMI SVQ Assessment Strategy
4. produce evidence of use of personal and vehicle protection, cleaning the work environment and disposal of waste on **3 separate occasions**
5. be observed by their assessor on **at least 1 occasion** carrying out the above
6. 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
7. be observed by their assessor on **at least 1 occasion** carrying out the above
8. produce evidence of following **at least 4** 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
9. be observed by their assessor following workplace policies on **at least 1 occasion**.

Unit 002 Reduce risks to health and safety in the motor vehicle environment

Level:	**5**
Credit value:	5
Endorsement by a regulatory body:	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.
Aim:	This unit covers the basic, legally required health and safety duties of everyone in the workplace. It describes the competence required to ensure that: • own actions do not create any health and safety risks • the learner does not ignore significant risks in your workplace, and • the learner takes sensible action to put things right, including reporting situations which pose a danger to people in the workplace, and seeking advice from others. This unit does **not** require the learner to undertake a full Risk Assessment. It is about having an appreciation of significant risks in the workplace and knowing how to identify them and deal with them. When the learner has completed this unit, they will have proved they can: • identify hazards and evaluate risks in their workplace • reduce the risks to health and safety in their workplace.

Essential knowledge

The learner will need to understand:

1. Health and safety legislation and workplace policies	
1.1	their legal duties for health and safety in the workplace as required by the Health and Safety at Work Act 1974, and any other policies or procedures that govern their working practices
1.2	their duties for health and safety as defined by any specific legislation covering their job role
1.3	agreed **workplace policies** relating to controlling risks to health and safety
1.4	responsibilities for health and safety in their job description
1.5	the responsible persons to whom they report health and safety matters.

2. Risks to health and safety	
2.1	what hazards may exist in their workplace (eg slips, trips and falls)
2.2	health and safety risks which may be present in their own job role and the precautions they must take
2.3	the importance of remaining alert to the presence of hazards in the whole workplace
2.4	how to deal with and report risks
2.5	the importance of dealing with or promptly reporting risks
2.6	the requirements and guidance on the precautions
2.7	the specific workplace policies covering their job role
2.8	suppliers' and manufacturers' instructions for the safe use of equipment, materials and products
2.9	safe working practices for their own job role
2.10	the importance of personal presentation in maintaining health and safety in the workplace
2.11	the importance of personal conduct in maintaining the health and safety of themselves and others
2.12	the importance of personal protective equipment, when and where it should be used and the importance of maintaining it correctly
2.13	their scope and responsibility for rectifying risks
2.14	workplace procedures for handling risks which they are unable to deal with.

Performance objectives

To be competent, the learner must:

1. carry out their working practices in accordance with legal requirements
2. identify the correct personal and vehicle protective equipment required to correctly carry out their workplace practices.
3. carry out their workplace practices using the correct personal protective equipment
4. follow the most recent **workplace policies** for their job role.
5. rectify health and safety **risks** that are within their capability and scope of their job responsibilities.
6. pass on any suggestions for reducing **risks** to health and safety within their job role to the responsible persons
7. ensure their personal conduct in the workplace does not endanger the health and safety of themselves or other persons
8. follow the **workplace policies** and suppliers' or manufacturers' instructions for the safe use of equipment, materials and products
9. report any differences between **workplace policies** and suppliers' or manufacturers' instructions as appropriate
10. ensure their personal presentation at work:
    - ensures the health and safety of themselves and others
    - meets any legal duties
    - is in accordance with workplace policies.

Unit 002 Reduce risks to health and safety in the motor vehicle environment

Supporting information

Scope of this unit

1. **Risks** resulting from:
    a. the use and maintenance of machinery and equipment
    b. the use of materials or substances
    c. working practices which do not conform to laid down policies
    d. unsafe behaviour
    e. accidental breakages and spillages
    f. environmental factors
    g. working at height
    h. lifting operations and manual handling
    i. incorrect use of personal protective equipment

2. **Workplace policies** cover:
    a. the use of safe working methods and equipment
    b. the safe use of hazardous substances
    c. smoking, eating, drinking and drugs
    d. what to do in the event of an emergency
    e. personal presentation
    f. personal protective equipment
    g. lifting operations and manual handling
    h. working at heights
    i. mobile phones and personal stereo equipment

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

Economic use of resources

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

Requirement to maintain work area effectively

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

Spillages, leaks and waste materials

a. relevance of safe systems of work to the storage and disposal of waste materials
b. requirement to store and dispose of waste, used materials and debris correctly
c. safe disposal of special / hazardous waste materials
d. advantages of recycling waste materials
e. dealing with spillages and leaks.

Basic legislative requirements

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

Routine maintenance of the workplace

a. trainees' personal responsibilities and limits of their authority with regard to work equipment
b. risk assessment of the workplace activities and work equipment
c. workplace person responsible for training and maintenance of workplace equipment
d. when and why safety equipment must be used
e. location of safety equipment
f. particular hazards associated with their work area and equipment
g. prohibited areas
h. plant and machinery that trainees must not use or operate
i. why and how faults on unsafe equipment should be reported
j. storing tools, equipment and products safely and appropriately
k. using the correct PPE
l. following manufacturers' recommendations
m. location of routine maintenance information eg electrical safety check log.

Legislation relevant to Health and Safety

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

General regulations to include an awareness of:

a. Health and Safety (Display Screen Equipment) Regulations 1992
b. Health and Safety (First Aid) Regulations 1981
c. Health and Safety (Safety Signs and Signals) Regulations 1996
d. Health and Safety (Consultation with Employees) Regulations 1996
e. Employers' Liability (Compulsory Insurance) Act 1969 and Regulations 1998

f. Confined Spaces Regulations 1997
g. Noise at Work Regulations 1989
h. Electricity at Work Regulations 1989
i. Electricity (Safety) Regulations 1994
j. Fire Precautions Act 1971
k. Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1985
l. Pressure Systems Safety Regulations 2000
m. Waste Management 1991
n. Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) 2002
o. Control of Asbestos at Work Regulations 2002.

Legislative duties

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

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

a. accessing and interpreting safety information
b. seeking advice when needed
c. seeking assistance when required
d. reporting of unsafe equipment
e. storing tools, equipment and products safely and appropriately
f. using the correct PPE
g. following manufacturers' recommendations.
h. following application procedures eg hazardous substances
i. the correct selection and use of extraction equipment.

PPE to include:

a. typical maintenance procedures for PPE equipment to include:
    i. typical maintenance log
    ii. cleaning procedures
    iii. filter maintenance
    iv. variation in glove types
    v. air quality checks
b. choice and fitting procedures for masks and air breathing equipment

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

Fire and extinguishers

a. classification of fire types
b. using a fire extinguisher effectively
c. types of extinguishers:
    i. foam
    ii. dry powder
    iii. CO_2
    iv. water
    v. fire blanket.

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

The procedure as:

a. raise the alarm
b. fight fire only if appropriate
c. evacuate building
d. call for assistance.

Product warning labels to include:

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

Warning signs and notices

a. colours used for warning signs:
    i. red
    ii. blue
    iii. green
b. shapes and meaning of warning signs:
    i. round
    ii. triangular
    iii. square
c. the meaning of prohibitive warning signs in common use
d. the meaning of mandatory warning signs in common use
e. the meaning of warning notices in common use
f. general design of safe place warning signs.

Hazards and risks to include:

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

Personal responsibilities

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

Action to be taken in the event of colleagues suffering accidents

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

Evidence requirements

The learner must:

1. produce evidence to show they meet **all** of the Essential Knowledge and Performance Objectives
2. produce performance evidence resulting from work they have carried out on real vehicles in their normal workplace or as defined within the IMI SVQ Assessment Strategy as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in their normal workplace or when safety is at risk
3. be observed by an assessor as defined in the IMI SVQ Assessment Strategy

4. produce evidence of use of personal and vehicle protection, cleaning the work environment and disposal of waste on **3 separate occasions**
5. be observed by their assessor on **at least 1 occasion** carrying out the above
6. 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
7. be observed by their assessor on **at least 1 occasion** carrying out the above
8. produce evidence of following **at least 4** 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
9. be observed by their assessor following workplace policies on **at least 1 occasion**.

Unit 003 Maintain working relationships in the motor vehicle environment

Level:	**6**
Credit value:	8
Endorsement by a regulatory body:	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.
Aim:	This unit is about maintaining good working relationships with all colleagues in the working environment by using effective communication and support skills.

Essential knowledge

The learner will need to understand:

Their responsibilities and constraints	
1.1	their own and their colleague's job role and limits of responsibility for giving advice and support
1.2	the operational constraints which may affect interaction with colleagues
1.3	lines of communication within their workplace.

2. Communication skills and working relationships	
2.1	how to use suitable and effective spoken communication skills when responding to and interacting with others
2.2	how to adapt written and spoken communication methods to satisfy the needs of colleagues
2.3	how to report problems using written and spoken methods of communication
2.4	the importance of developing positive working relationships with colleagues – the effect on morale, productivity, and company image
2.5	the importance of accepting other peoples' views and opinions
2.6	the importance of making and honouring realistic commitments to colleagues.

Performance objectives

To be competent, the learner must:
1. contribute actively to team working by initiating ideas and co-operating with colleagues 2. respond promptly and willingly to requests for assistance from **colleagues** which fall within the limits of their own job responsibilities and capabilities 3. where requests fall outside their responsibility and capability, refer colleagues to the relevant person(s) 4. give colleagues sufficient, accurate information and support to meet their work needs 5. make **requests for assistance** to **colleagues** clearly and courteously 6. use methods of communication which meet the needs of colleagues 7. treat colleagues in a way which shows respect for their views and opinions and promotes goodwill 8. make and keep achievable commitments to **colleagues** 9. inform colleagues promptly of any problems or information likely to affect their own work.

Unit 003 Maintain working relationships in the motor vehicle environment

Supporting information

Scope of this unit

1. **Colleagues** are:
    a. immediate work colleagues
    b. supervisors and managers.

2. **Requests for assistance** covering:
    a. technical assistance
    b. personal assistance.

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

Sections within a typical vehicle repair business

a. body shop
b. vehicle repair workshop
c. paint shop
d. valeting
e. vehicle parts store
f. main office
g. vehicle sales
h. reception.

Different sources of information in an automotive work environment

a. other staff
b. manuals
c. parts lists
d. computer software / internet
e. manufacturer
f. diagnostic equipment.

Locating and using correct documentation and information for:

a. recording vehicle maintenance and repairs
b. vehicle specifications
c. component specifications
d. oil and fluid specifications
e. equipment and tools
f. identification codes.

Alternative methods of communication

a. verbal
b. signs and notices
c. memos
d. telephone
e. email
f. vehicle job card
g. notice boards
h. SMS text messaging
i. letters.

Communication with a supervisor

a. referral of problems
b. reporting delays
c. additional work identified during repair or maintenance
d. keep others informed of progress.

Organisational and customer requirements

a. importance of timescales to customer and organisation
b. relationship between time and costs
c. meaning of profit.

Choice of communication

a. distance
b. location
c. job responsibility.

Importance of maintaining positive working relationships

a. morale
b. productivity
c. company image
d. customer relationships
e. colleagues.

Evidence requirements

The learner must:

1. produce evidence to show they meet **all** of the Essential Knowledge and Performance Objectives
2. produce performance evidence resulting from work they have carried out on real vehicles in their normal workplace or as defined within the IMI SVQ Assessment Strategy as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in their normal workplace or when safety is at risk
3. be observed by an assessor as defined in the IMI SVQ Assessment Strategy
4. produce evidence that they have worked well with others in the automotive industry
5. be observed by their assessor on **at least 3 occasions** carrying out the above whilst performing their normal work duties.

Unit 201 PPE, tools and equipment, health & safety in the motor vehicle environment

Level:	**4**
Credit value:	10
Endorsement by a regulatory body:	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.
Aim:	This unit is about the use of personal protective equipment, tools and paint operations equipment.
Assessment requirements:	**Performance objectives must** be assessed via a portfolio of evidence, gathered through observing the candidate at work. See the **Evidence Requirements** at the end of this unit for further details. Candidates **must** take the City & Guilds 4311-251 on-line multiple choice test, which covers most of the **Essential Knowledge** within this unit. The Essential Knowledge **not** covered by the test is: • statement number 4. This criterion **must** be assessed in one of the following ways: • oral or written questioning • professional discussion. Centres must keep an audit trail to show that candidates have covered all of the Essential Knowledge.

Essential knowledge

The learner will need to understand:
1. the health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection 2. the importance of disposing of waste safely and the consequences of not doing so to others and the environment 3. the importance of selecting, using and maintaining the appropriate personal protective equipment when preparing and applying foundation materials 4. the requirements for protecting the vehicle and contents from damage before, during and after preparing and applying foundation materials 5. how to prepare, test and adjust all the equipment.

Performance objectives

To be competent the learner must:
1. use the appropriate personal protective equipment when carrying out the preparation and application of foundation materials 2. protect the vehicle and its contents effectively when carrying out the preparation and application of foundation materials 3. prepare, test and adjust all the equipment required, following manufacturers' instructions, prior to use 4. dispose of waste materials to conform with legal and workplace requirements 5. leave all application equipment in a clean and serviceable condition.

Unit 201 PPE, tools and equipment, health & safety in the motor vehicle environment

Supporting information

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

Equipment used in vehicle refinishing

a. flatting block
b. sponge
c. squeegee
d. chamois leather
e. trimming knife
f. polishing mop
g. denibbing blocks
h. sealer gun
i. air duster
j. rotary sander
k. DA random orbital sander
l. orbital flat bed sander
m. belt sander
n. vacuum extraction sander
o. specialist extraction for aluminium particles (explosive)
p. suction feed spray gun
q. gravity feed spray gun
r. pressure feed spray gun
s. HVLP spray guns
t. identify spray gun cleaning machines.

Workshop equipment

a. combi-booth
b. separate oven
c. infra-red drying
d. compressor
e. main air line
f. transformer/regulator
g. water traps
h. flexible air and fluid hoses
i. pressure gauges
j. automatic paper/tape dispenser
k. plastic sheeting dispenser
l. complete car covers dispenser
m. wheel covers dispenser
n. viscosity measuring equipment

o. paint mixing schemes
p. air feed breathing equipment
q. smart scales.

Paint gun cleaning and maintenance

a. loading
b. cleaning cycle
c. coagulant (water based paints only)
d. filtration of solids
e. partial strip of paint spaying gun
f. complete strip of paint spraying gun
g. washer cycle
h. blow through
i. re-assembly
j. lubrication.

Main parts of a spray gun

a. trigger
b. body
c. packing gland
d. air valve
e. fluid needle
f. fluid tip (nozzle)
g. air cap
h. paint volume control
i. fan width control
j. material cup
k. filters.

Compressed air systems

a. tank drainage
b. ring drainage
c. regular maintenance and service logs
d. air quality checks (breathable air)
e. air filter/cartridge changes (breathable air).

Evidence Requirements

The learner must:

1. produce evidence to show they meet **all** of the Essential Knowledge and Performance Objectives
2. produce performance evidence resulting from work they have carried out on real vehicles in their normal workplace or as defined within the IMI SVQ Assessment Strategy as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in their normal workplace or when safety is at risk
3. be observed by an assessor as defined in the IMI SVQ Assessment Strategy
4. produce evidence from their normal workplace of preparing and using **all** of the tools listed below on **at least 2 occasions**:
    - flatting block

- sponge
- squeegee
- chamois leather
- trimming knife
- polishing mop
- sealer gun
- water traps
- pressure gauges
- automatic paper/tape dispenser
- viscosity measuring equipment
- combi-booth
- infra-red dryer
- compressor
- main air line
- transformer/regulator
- vacuum/extraction sander
- spray gun cleaning machines
- plastic sheeting dispenser
- random orbital sander

5. produce evidence from their normal workplace of preparing and using **one** compliant spray gun of the type listed below on **at least 2 occasions**:
   - suction feed spray gun
   - gravity feed spray gun
   - pressure feed spray gun

6 be observed by their assessor on **at least 1 occasion**, preparing and using **at least 4 different** tools and equipment from the list contained at 4.

Unit 202 Applying fillers and foundation materials in the motor vehicle environment

Level:	**5**
Credit value:	15
Endorsement by a regulatory body:	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.
Aim:	This unit is about identifying substrates including any unrecorded damage, mixing and adjusting the viscosity of fillers and foundation materials, applying fillers and foundation materials.
Assessment requirements:	**Performance objectives must** be assessed via a portfolio of evidence, gathered through observing the candidate at work. See the **Evidence Requirements** at the end of this unit for further details. Candidates **must** take the City & Guilds 4311-252 on-line multiple choice test, which partly covers the **Essential Knowledge** within this unit. The Essential Knowledge **not** covered by the test are statements numbered: **2** 9 **4** 12 **5** 23 **7** **8** This criteria **must** be assessed in one of the following ways: • oral or written questioning • professional discussion. Centres must keep an audit trail to show that candidates have covered all of the Essential Knowledge.

Essential knowledge

The learner will need to understand:
1. the health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection 2. the importance of disposing of waste safely and the consequences of not doing so to others and the environment 3. the importance of selecting, using and maintaining the appropriate personal protective equipment when preparing and applying foundation materials 4. the vehicle work specification agreed 5. their workplace procedures for: • the referral of problems • reporting of delays to the completion of work • personal protection 6. the requirements for protecting the vehicle and contents from damage before, during and after preparing and applying foundation materials 7. the importance of working to agreed timescales and keeping others informed of progress 8. the relationship between time and cost 9. the importance of reporting anticipated delays to the relevant person(s) promptly 10. how to prepare, test and adjust all the equipment required for the preparation and application of foundation materials 11. how to use viscosity measuring equipment, paint mixing and application equipment, heating and drying equipment, fume and dust extraction, air supply systems, and air feed breathing apparatus 12. spray gun faults, their cause and their rectification 13. how to prepare foundation materials 14. the properties of foundation materials 15. the factors affecting the choice and use of foundation materials 16. the principles of paint mixing, the importance of the right additive (hardener or thinner) in the correct ratio 17. the curing and drying recommendations for various fillers and foundation materials 18. how to find, interpret and use sources of information relevant to the mixing and application of foundation coatings 19. how to condition and clean surfaces prior to the application of foundation coats 20. how to rectify surface defects 21. how to apply foundation coatings 22. how to avoid application defects 23. how to dispose of waste materials 24. how to work safely avoiding damage to vehicles, personal injury and injury to colleagues 25. the importance of viscosity and its effect on the surface finish 26. the importance of proper cleaning and using the correct foundation material to ensure adequate adhesion of the paint system. 27. the manufacturer's approved instructions for working when applying foundation materials.

Performance objectives

To be competent the learner must:

1. use the appropriate personal protective equipment when carrying out the preparation and application of foundation materials
2. protect the vehicle and its contents effectively when carrying out the preparation and application of foundation materials
3. support the preparation and application activities by reviewing:
    - foundation materials data
    - work instructions
4. prepare, test and adjust all the equipment required, following manufacturers' instructions, prior to use
5. when necessary, apply the correct type of fillers and stoppers to rectify surface defects
6. report any unrecorded damage to surfaces and ancillary equipment to the relevant person(s) promptly and accurately
7. mix all the foundation materials required following health and safety requirements and using:
    - suitable compatible materials
    - the approved method
    - the approved equipment
8. apply all the foundation materials required following health and safety requirements and using:
    - the approved method
    - the approved equipment
9. dry and cure foundation materials following health and safety requirements and using:
    - the approved method
    - the approved equipment
10. ensure the finished surface is suitable to accept the next process
11. dispose of waste materials to conform with legal and workplace requirements
12. leave all application equipment in a clean and serviceable condition
13. complete all preparation and application activities within the agreed timescale
14. report any anticipated delays in completion to the relevant person(s) promptly.

Unit 202 Applying fillers and foundation materials in the motor vehicle environment

Supporting information

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

The types of substrates likely to be found in vehicle refinishing

a. list types of substrate to include:
    i. steel
    ii. aluminium
    iii. all plastics
    iv. coated steels
    v. high bake enamels (OE finishes)
    vi. 2K Paints
    vii. 1K Paints
    viii. clear over bases
    ix. polyester fillers
    x. repaired panels
    xi. primed panels (e-coat)
b. identify substrates to determine selection of undercoat with reference to:
    i. condition of surface
    ii. type of substrate
    iii. process requirements
    iv. material requirement
c. list the physical properties of a substrate to include:
    i. surface condition
    ii. adhesion
    iii. flexibility
    iv. porosity
    v. texture.

Methods used in determining vehicle substrates

a. workshop tests to determine substrates to include:
    i. visual test for aluminium, plastics
    ii. magnet test for steel
b. for determination of paint type:
    i. compound small area
    ii. solvent wipe test (1K or 2K)
    iii. colour of flatting sludge (straight colour or COB).

The properties and correct use of conditioning materials

a. state that a vehicle must be thoroughly washed and cleaned prior to refinishing to include:
    i. outside body panels
    ii. under arches
    iii. under bonnet
    iv. all apertures
    v. degreased
b. state the reasons for masking components adjacent to repair areas
c. state the correct preparation of parts prior to painting to include products used for the removal of:
    i. wax
    ii. grease
    iii. skin oils
    iv. dust
    v. water
    vi. abrasive contaminants
    vii. environmental pollution
d. identify materials used for conditioning processes such as:
    i. wax and grease removers
    ii. spirit wipes
    iii. acid based
    iv. water based
e. the correct and safe use of the above materials
f. state the properties of pre-preparation material to include:
    i. neutralisation
    ii. ability to alter the surface
    iii. reaction with oxide.

The types and properties of fillers and foundation materials in common use

a. state what the ingredients of paint are to include:
    i. pigment
    ii. binder/vehicle
    iii. solvent/thinner/reducer
    iv. additives
b. properties of pigments to include:
    i. opacity
    ii. colour
    iii. build
    iv. easy flatting
    v. corrosion resistance
c. state the forms of pigments that are:
    i. natural ground powders
    ii. synthetic powders and dyes
d. the uses of pigments in paints such as:
    i. stoppers/putties
    ii. etch primers
    iii. primer surfacers
    iv. primer filler

e. the properties of binders to include:
    i. film forming
    ii. binding
    iii. cohesion
    iv. adhesion
    v. flexibility
f. state the forms of binder which dry by the following methods:
    i. solvent evaporation only
    ii. oxidation
    iii. polymerisation
g. the properties of solvent/thinners to include:
    i. speed of evaporation
    ii. its ability to dissolve the binder
    iii. its ability to be tolerated by a binder
h. the use of solvent/thinner:
    i. to make the paint fluid in the tin
    ii. to reduce the paint to a spraying/application viscosity
i. state the meaning of paint terms such as:
    i. activator
    ii. adhesion
    iii. build
    iv. cohesion
    v. compatibility
    vi. curtains
    vii. degreaser
    viii. drier
    ix. enamel
    x. etch
    xi. flash off
    xii. floating
    xiii. gloss
    xiv. hardener
    xv. lacquer
    xvi. opacity
    xvii. pigment
    xviii. polymerization
    xix. pot life
    xx. shelf life
    xxi. substrate
    xxii. thermoplastic
    xxiii. thermosetting
    xxiv. thixotropic
    xxv. two pack
    xxvi. viscosity.

Explain the difference between types of paints to include:

non-convertible:

i. nitrocellulose
ii. 1K acrylics
iii. base coats

convertibles:

i. two packs
ii. oil based synthetic enamels

a. list the types of undercoat in common use to include:
    i. etch primer
    ii. primer surfacer
    iii. primer filler
    iv. stopper/putty
    v. sealers
    vi. anti stone chip
    vii. polyester fillers
b. the characteristics of these undercoats such as:
    i. protection
    ii. corrosion resistance
    iii. flexibility
    iv. build
    v. drying
    vi. flatting
c. list the types and characteristics of common protective coatings such as:
    i. zinc rich primers
    ii. bitumen based
    iii. anti stone chip
    iv. etch primer
    v. PVC.

The factors affecting the choice and use of fillers and foundation materials

a. state the reasons for using paint to include:
    i. protection
    ii. filling
    iii. decoration
    iv. identification
    v. safety
b. use process data sheets to determine information such as:
    i. material description
    ii. material properties
    iii. material characteristics
    iv. limitations
    v. related materials
    vi. mixing ratios
    vii. viscosity
    viii. build film thickness
    ix. pot life

c. describe the procedure for the preparation of minor damage to include:
    i. paint removal
    ii. feather edge
    iii. surface condition
    iv. substrate identification
    v. cleanliness
    vi. achieving correct contour
d. describe the problems of over catalysed body filled areas
e. identify the correct Health and Safety procedures associated with body fillers
f. describe aids and techniques which can be used to achieve the correct contour of a filled area
g. list undercoat materials for plastics to include:
    i. adhesion promoters
    ii. surface modifiers
    iii. flexible additives
    iv. texture additives.

The procedures for the mixing, application and curing of single and 2-pack fillers and stoppers

a. the properties of 2K stoppers to include:
    i. convertible coating
    ii. drying
    iii. build
b. the properties of 1K stoppers to include:
    i. non-convertible coating
    ii. drying
    iii. build
c. the use of 2K and 1K stoppers to include 2K used for the filling of minor imperfections in 2K system
d. that 1K stopper is ready for use
e. that 2K stopper is mixed with activator just prior to use
f. that 1K stopper has to be applied in thin layers and with adequate flash off
g. that 2K stopper can be applied in thicker layers and is cured after 20 mins (quicker with heat)
h. 1K used for the filling of minor imperfections in 1K system.

The procedures for mixing foundation materials to the correct ratio with hardeners and thinners

a. describe procedures for mixing undercoats such as:
    i. etch primers
    ii. anti stone chip primers
    iii. surfacers
    iv. wash fillers
    v. primer fillers
    vi. plastic adhesion promoters
    vii. elastic primers
    viii. sealers
    ix. spraying polyester fillers.

The importance of checking and adjusting paint viscosity and its effect on surface finish

a. state why the viscosity of a paint is important to application to include:
    i. build
    ii. surface finish
    iii. speed of application
b. describe the procedure for checking viscosity
c. describe the effects on viscosity of:
    i. temperature
    ii. additions of thinner/reducer.

Filler and 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

a. use the process data sheets to determine information:
    i. mixing ratios
    ii. viscosity
    iii. number of coats
    iv. flash off times
    v. build film thickness
    vi. spray gun type
    vii. spray gun set up
    viii. air pressure requirements
    ix. substrate requirements
    x. suitability as a substrate
    xi. drying times
    xii. suitability to be applied by methods other than spraying
b. define the main information sourced from data sheets to include:
    i. product identification
    ii. product description
    iii. substrate suitability
    iv. pre-treatment requirement
    v. mixing ratio
    vi. pot life
    vii. method of application
    viii. spray viscosity
    ix. nozzle/air cap set up
    x. number of coats
    xi. flash off times
    xii. drying times
    xiii. recoatability
c. list common pictograms and state their meaning including those for:
    i. cleaning information
    ii. mixing ratios
    iii. use a measuring stick
    iv. addition of hardener
    v. application viscosity
    vi. type of spray gun
    vii. spray coats information

viii. application with spatula
ix. application with brush
x. application with roller
xi. flash-off
xii. drying time
xiii. drying with infrared
xiv. sanding
xv. polishing
xvi. technical data required
xvii. hand stirring.

Masking procedures for part and whole vehicles. Describe masking processes and techniques

a. list common masking systems, materials and techniques to include:
   i. masking paper
   ii. plastic sheeting
   iii. masking tape
   iv. foam tape
   v. wheel covers
   vi. liquid masking
   vii. roll-back masking
b. identify the characteristics of a quality masking tape to include:
   i. ability to turn corners
   ii. non-aggressive adhesive/non-drying
   iii. clean edges to painted areas
c. describe the properties of these masking materials such as:
   i. economy of use
   ii. costs per unit
   iii. absorption
   iv. flexibility
d. identify where and how these masking materials and systems should be used
e. describe the masking procedures for listed items such as:
   i. door glass and windscreens
   ii. handles
   iii. lights
   iv. mirrors
   v. wheels
f. describe a masking schedule for the type of repair to include:
   i. time efficiency
   ii. material costs
   iii. given protection
g. identify faults which are caused by careless masking such as:
   i. flash lines
   ii. bridging
   iii. creep
   iv. hard edges.

Evidence requirements

The learner must:

1. produce evidence to show they meet **all** of the Essential Knowledge and Performance Objectives
2. produce performance evidence resulting from work they have carried out on real vehicles in their normal workplace or as defined within the IMI SVQ Assessment Strategy as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in their normal workplace or when safety is at risk
3. be observed by an assessor as defined in the IMI SVQ Assessment Strategy
4. produce evidence from their normal workplace of carrying out **each** of the following listed below on **at least 2 occasions** whilst following Health and safety regulations throughout:
    - setting up and using application equipment
    - mixing etch primer
    - applying etch primer
    - mixing wet on wet primer
    - mixing high build primer
    - applying wet on wet primer
    - applying High build primer
    - dry curing foundation materials
    - cleaning application equipment and disposing of waste products
5. be observed by their assessor on **at least 1 occasion**, applying fillers and foundation materials**.**

Unit 203 Working with plastic components in the motor vehicle environment

Level:	**5**
Credit value:	16
Endorsement by a regulatory body:	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.
Aim:	This unit is about working with plastic components whilst undertaking paint operations.
Assessment requirements:	**Performance objectives must** be assessed via a portfolio of evidence, gathered through observing the candidate at work. See the **Evidence Requirements** at the end of this unit for further details. Candidates **must** take the City & Guilds 4311-253 on-line multiple choice test, which partly covers the **Essential Knowledge** within this unit. The Essential Knowledge **not** covered by the test are statements numbered: **2** 8 **3** 9 **4** 14 **5** **7** This criteria **must** be assessed in one of the following ways: • oral or written questioning • professional discussion. Centres must keep an audit trail to show that candidates have covered all of the Essential Knowledge.

Essential knowledge

The learner will need to understand:
1. the health, safety and legal requirements relating to the preparation of panel surfaces for foundation and topcoats 2. their workplace procedures for: • the referral of problems • reporting of delays to the completion of work • completion of work records • personal protection 3. the work that needs to be done and the standard required 4. the importance of reporting anticipated delays to the relevant person(s) promptly 5. the requirements for protecting the vehicle and contents from damage before, during and after foundation and topcoat preparation activities 6. the importance of selecting, using and maintaining the appropriate personal protective equipment when preparing panel surfaces for foundation and topcoats 7. the relationship between time and cost 8. how to prepare, test and adjust hand and power sanders and masking material dispensers 9. how to use hand and power sanders, extraction and masking equipment 10. how to recognise damage to surfaces and ancillary fittings 11. how to recognise substrates 12. how the substrate affects the preparation process 13. how to interpret manufacturer's preparation schedules 14. the importance of disposing of waste safely and the consequences of not doing so to others and the environment.

Performance objectives

To be competent the learner must:
1. use the appropriate personal protective equipment when carrying out all surface preparation activities 2. protect the vehicle and its contents effectively when carrying out all surface preparation activities 3. select and use the correct tools and equipment for the type of surface preparation activities they are carrying out 4. ensure that the tools and equipment they require are in a safe working condition 5. identify the plastic components accurately prior to undertaking any preparation work 6. follow the work instructions given for the job correctly 7. clean and protect all surfaces adjacent to those being prepared using the specified method 8. report any unrecorded damage to surfaces and ancillary fittings to the relevant person(s) promptly and accurately 9. remove and store safely any components likely to be affected by the preparation process 10. keep their work area clean and tidy throughout all preparation activities 11. prepare all the panel surfaces required following health and safety requirements and using: • suitable materials for the type of surface • the approved method and technique • the approved tools and equipment 12. leave all the areas prepared free from contamination and ready for the application of foundation and topcoats 13. dispose of waste materials to conform with legal and workplace requirements 14. complete all vehicle preparation activities with the agreed timescale 15. report any anticipated delays in completion to the relevant person(s) promptly.

Unit 203 Working with plastic components in the motor vehicle environment

Supporting information

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

The types of substrates likely to be found in vehicle refinishing

a. types of substrate to include:
    i. all plastics
    ii. high bake enamels (OE finishes)
    iii. 2K Paints
    iv. 1K Paints
    v. clear over bases
    vi. polyester fillers
    vii. repaired panels
    viii. primed panels
b. substrates to determine selection of undercoat with reference to:
    i. condition of surface
    ii. type of substrate
    iii. process requirements
    iv. material requirement
c. list the physical properties of a substrate to include:
    i. surface condition
    ii. adhesion
    iii. flexibility
    iv. porosity
    v. texture.

Methods used in determining vehicle substrates

a. workshop tests to determine substrates to include:
    i. visual test for plastics and identification of plastic type through identification code
    ii. for determination of paint type:
        a. compound small area
        b. solvent wipe test (1K or 2K)
        c. colour of flatting sludge (straight colour or COB).

The properties and correct use of conditioning materials

a. that a vehicle must be thoroughly washed and cleaned prior to refinishing to include:
    i. outside body panels
    ii. under arches

iii. under bonnet
iv. all apertures
v. degreased

b. the reasons for masking components adjacent to repair areas
c. the correct preparation of parts prior to painting to include products used for the removal of:
    i. wax
    ii. grease
    iii. skin oils
    iv. dust
    v. water
    vi. abrasive contaminants
    vii. environmental pollution
d. materials used for conditioning processes such as:
    i. wax and grease removers
    ii. spirit wipes
    iii. acid based
    iv. water based
e. the correct and safe use of the above materials.
f. the properties of pre-preparation material to include:
    i. neutralisation
    ii. ability to alter the surface
    iii. reaction with oxide.

The types and properties of foundation materials in common use

a. the types of undercoat in common use to include:
    i. etch primer/adhesion promoters
    ii. primer surfacer
    iii. primer filler
    iv. stopper/putty
    v. sealers
    vi. anti stone chip
    vii. polyester fillers
b. the characteristics of these undercoats such as:
    i. protection
    ii. flexibility
    iii. build
    iv. drying
    v. flatting
c. the types and characteristics of common protective coatings such as:
    i. bitumen based
    ii. anti stone chip
    iii. etch primer
    iv. PVC.

The factors affecting the choice and use of foundation materials

a. the reasons for using paint to include:
    i. protection
    ii. filling
    iii. decoration
    iv. identification

v. safety

b. undercoat materials for plastics to include:
    i. adhesion promoters
    ii. surface modifiers
    iii. flexible additives
    iv. texture additives
c. the procedures for the preparation of plastics to include:
    i. identification
    ii. cleaning
    iii. adhesion promotion
    iv. elastic primers
d. identify the preparation requirements for textured and special effect coatings to include:
    i. spoilers
    ii. bumpers
    iii. exterior trim.

The procedures for mixing foundation materials to the correct ratio with hardeners and thinners

a. procedures for mixing undercoats such as:
    i. etch primers
    ii. anti stone chip primers
    iii. surfacers
    iv. wash fillers
    v. primer fillers
    vi. plastic adhesion promoters
    vii. elastic primers
    viii. sealers
    ix. spraying polyester fillers
b. listed additives such as:
    i. adhesion promoters
    ii. flexible additives
    iii. texture finishes
    iv. extenders
    v. UV absorbers
    vi. flow aids.

The importance of checking and adjusting paint viscosity and its effect on surface finish

a. why the viscosity of paint is important to application, to include:
    i. build
    ii. surface finish
    iii. speed of application
b. describe the procedure for checking viscosity
c. describe the effects on viscosity of:
    i. temperature
    ii. additions of thinner/reducer.

The importance of 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

a. process data sheets to determine information such as:
    i. mixing ratios
    ii. viscosity
    iii. number of coats
    iv. flash off times
    v. build film thickness
    vi. spray gun type
    vii. spray gun set up
    viii. air pressure requirements
    ix. substrate requirements
    x. suitability as a substrate
    xi. drying times
    xii. suitability to be applied by methods other than spraying
b. the main information sourced from data sheets to include:
    i. product identification
    ii. product description
    iii. substrate suitability
    iv. pre-treatment requirement
    v. mixing ratio
    vi. pot life
    vii. method of application
    viii. spray viscosity
    ix. nozzle/air cap set up
    x. number of coats
    xi. flash off times
    xii. drying times
    xiii. recoatability
c. common pictograms and their meaning including those for:
    i. cleaning information
    ii. mixing ratios
    iii. use a measuring stick
    iv. addition of hardener
    v. application viscosity
    vi. type of spray gun
    vii. spray coats information
    viii. flash-off
    ix. drying time
    x. drying with infrared
    xi. sanding
    xii. polishing
    xiii. technical data required
    xiv. hand stirring.

Masking procedures for part and whole vehicles. Describe masking processes and techniques

a. common masking systems, materials and techniques to include:
    i. masking paper
    ii. plastic sheeting
    iii. masking tape
    iv. foam tape
    v. wheel covers
    vi. liquid masking
    vii. roll-back masking
b. the characteristics of a quality masking tape to include:
    i. ability to turn corners
    ii. non-aggressive adhesive/non-drying
    iii. clean edges to painted areas
c. the properties of these masking materials such as:
    i. economy of use
    ii. costs per unit
    iii. absorption
    iv. flexibility
d. where and how these masking materials and systems should be used
e. the masking procedures for listed items such as:
    i. door glass and windscreens
    ii. handles
    iii. lights
    iv. mirrors
    v. wheels
f. masking schedule for the type of repair to include:
    i. time efficiency
    ii. material costs
    iii. given protection
g. faults which are caused by careless masking such as:
    i. flash lines
    ii. bridging
    iii. creep
    iv. hard edges.

Evidence requirements

The learner must:

1. produce evidence to show they meet **all** of the Essential Knowledge and Performance Objectives
2. produce performance evidence resulting from work they have carried out on real vehicles in their normal workplace or as defined within the IMI SVQ Assessment Strategy as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in their normal workplace or when safety is at risk
3. be observed by an assessor as defined in the IMI SVQ Assessment Strategy
4. produce evidence from their normal workplace of carrying out **each** of the following listed below on **at least 2 occasions** (only use the flexible additive on **1 occasion):**
    - apply foundation coats including adhesion promoters
    - apply topcoats
    - use flexible additive
5. be observed by their assessor on **at least 1 occasion**, applying foundation and topcoat materials.

Unit 204 Preparing metal and pre-painted surfaces in the motor vehicle environment

Level:	**5**
Credit value:	16
Endorsement by a regulatory body:	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.
Aim:	This unit is about preparing a wide variety of different panel and component surfaces to accept foundation materials and paint topcoats.
Assessment requirements:	**Performance objectives must** be assessed via a portfolio of evidence, gathered through observing the candidate at work. See the **Evidence Requirements** at the end of this unit for further details. Candidates **must** take the City & Guilds 4311-254 on-line multiple choice test, which partly covers the **Essential Knowledge** within this unit. The Essential Knowledge **not** covered by the test are statements numbered: **2** 8 25 **3** 9 26 **4** 10 **5** 13 **7** 23 This criteria **must** be assessed in one of the following ways: • oral or written questioning • professional discussion. Centres must keep an audit trail to show that candidates have covered all of the Essential Knowledge.

Essential knowledge

The learner will need to understand:

1. the health, safety and legal requirements relating to the preparation of panel surfaces for foundation and topcoats
2. their workplace procedures for:
    - the referral of problems
    - reporting of delays to the completion of work
    - completion of work records
    - personal protection
3. the work that needs to be done and the standard required
4. the importance of reporting anticipated delays to the relevant person(s) promptly
5. the requirements for protecting the vehicle and contents from damage before, during and after foundation and topcoat preparation activities
6. the importance of selecting, using and maintaining the appropriate personal protective equipment when preparing panel surfaces for foundation and topcoats
7. the relationship between time and cost
8. how to prepare, test and adjust hand and power sanders and masking material dispensers
9. how to use hand and power sanders, extraction and masking equipment
10. how to recognise damage to surfaces and ancillary fittings
11. how to recognise substrates
12. how the substrate affects the preparation process
13. how to interpret manufacturer's preparation schedules
14. how to prepare new and repaired panels using feathering out, de-greasing, flatting using guide coats, masking for foundation and topcoats, plastic preparation and tack off techniques
15. how to carry out masking procedures to avoid materials wastage and vehicle contamination for each stage of the preparation process
16. how to prepare panels and parts adjacent to the area being painted
17. the factors governing the choice of panel preparation methods for electro-coated panels, repaired panels, original manufacturer's finish, plastic components, zinc coated panels, steel panels, aluminium panels and previously primed panels
18. the types and grades of available abrasives and the factors governing their use for different substrates.
19. methods of protecting panels and parts adjacent to the areas being painted and the circumstances in which they should be used
20. methods and techniques of masking (including paper and sheet masking) and the circumstances in which they should be used
21. the importance of following manufacturers' instructions and using their approved methods of working (including use of materials and equipment)
22. the consequences of failing to follow manufacturers' instructions
23. the importance of working to agreed timescales and keeping others informed
24. how to work safely avoiding damage to vehicles, personal injury and injury to colleagues
25. how to dispose of waste materials
26. the importance of disposing of waste safely and the consequences of not doing so to others and the environment.

Performance objectives

To be competent the learner must:
1. use the appropriate personal protective equipment when carrying out all surface preparation activities 2. protect the vehicle and its contents effectively when carrying out all surface preparation activities 3. select and use the correct tools and equipment for the type of surface preparation activities they are carrying out 4. ensure that the tools and equipment they require are in a safe working condition 5. identify the body panel surfaces accurately prior to undertaking any preparation work 6. follow the work instructions given for the job correctly 7. clean and protect all surfaces adjacent to those being prepared using the specified method 8. report any unrecorded damage to surfaces and ancillary fittings to the relevant person(s) promptly and accurately 9. remove and store safely any components likely to be affected by the preparation process 10. keep their work area clean and tidy throughout all preparation activities 11. prepare all the panel surfaces required following health and safety requirements and using: • suitable materials for the type of surface • the approved method and technique • the approved tools and equipment 12. leave all the areas prepared free from contamination and ready for the application of foundation and topcoats 13. dispose of waste materials to conform with legal and workplace requirements 14. complete all vehicle preparation activities with the agreed timescale 15. report any anticipated delays in completion to the relevant person(s) promptly.

Unit 204 Preparing metal and pre-painted surfaces in the motor vehicle environment

Supporting information

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

Types of substrate likely to be found in modern vehicles

a. substrates to determine selection of undercoat with reference to:
    i. condition of surface
    ii. type of substrate
    iii. process requirements
    iv. material requirements
b. the physical properties of a substrate to include:
    i. surface condition
    ii. adhesion
    iii. flexibility
    iv. porosity
c. the technical properties of a substrate to include:
    i. type of paint
    ii. steel
    iii. aluminium
    iv. plastic
    v. coated steels
    vi. repaired panels
    vii. OE finish
    viii. primed panels (including e-coat).

Methods used in determining vehicle substrates

a. workshop tests to determine substrates to include:
    i. solvent wipe test (1K or 2K)
    ii. colour of flatting sludge (straight colour or COB)
    iii. VIN plate.

The main stages required in preparing a vehicle for refinishing, including areas adjacent to the painting area

a. Explain manufacturers' protective coatings and their warranty implications such as:
    i. electrostatic dip
    ii. under-body compounds
    iii. cavity wax
    iv. body caulking

b. a vehicle must be thoroughly washed and cleaned prior to refinishing to include:
    i. outside body panels
    ii. under arches
    iii. under bonnet
    iv. all apertures
    v. degreased
c. the reasons for vehicle masking
d. the correct preparation of parts prior to painting to include products used for the removal of:
    i. wax
    ii. grease
    iii. skin oils
    iv. dust
    v. water
    vi. abrasive contaminants
    vii. environmental pollution.

The procedures used in preparing listed substrates

a. the required preparation for the listed substrates to include:
    i. steel
    ii. aluminium alloys
    iii. GR plastics
    iv. thermo plastics
    v. cured 2K materials
b. the procedures for the preparation of plastics to include:
    i. identification
    ii. tempering
    iii. porefilling
    iv. release agent removal
    v. cleaning
    vi. adhesion promotion
    vii. elastic primers.

The procedures for the preparation and application of chemical solutions and solvents to remove paint

a. materials used for conditioning processes such as:
    i. wax and grease removers
    ii. spirit wipes
    iii. acid based
    iv. water based
b. the correct and safe use of the above materials
c. the properties of pre-preparation materials to include:
    i. neutralisation
    ii. ability to alter the surface
    iii. reaction with oxide
d. types of paint stripper available to include:
    i. aggressive
    ii. non-aggressive

e. the procedures for the preparation and application of chemical solutions and solvents to include:
    i. health and safety
    ii. PPE
    iii. mixing schedules
    iv. application schedules
    v. waste disposal
f. the process of stripping paint from:
    i. steel
    ii. aluminium
    iii. plastics.

The selection and uses of a range of abrasives in common use

a. types and uses of abrasive materials to include:
    i. aluminium oxide
    ii. silicon carbide
    iii. wet and dry types
    iv. open coat
    v. closed coat
    vi. papers, pastes and woven plastics
b. forms of abrasive to include:
    i. pad
    ii. disc
    iii. sheet
    iv. roll
    v. backing materials
    vi. methods of attachments
c. how grit sizes are classified according to the FEPA standards using 'P' grades with regard to:
    i. the process being carried out
    ii. the material being abraded
    iii. the technique being employed
d. the differences between open and closed coat abrasives:
    i. open coat
    ii. closed coat
    iii. 'P' grades.

Define the term 'feather edging' and explain why correct operation is required in achieving the required surface finish

a. the procedure for the preparation of a repaired area on a large panel in terms of:
    i. repair edge preparation
    ii. surrounding area
    iii. bare metal
b. why correct preparation is required with reference to:
    i. surface finish
    ii. film thickness
    iii. sinkage
    iv. mapping
    v. contouring.

The procedures for the preparation of minor damage prior to the application of body fillers

a. the procedure for the preparation of minor damage to include:
    i. paint removal
    ii. feather edge
    iii. surface condition
    iv. substrate identification
    v. cleanliness
    vi. achieving correct contour
b. the problems of over catalysed body filled areas
c. the correct Health and Safety procedures associated with body fillers
d. aids and techniques which can be used to achieve the correct contour of a filled area.

Evidence requirements

The learner must:

1. produce evidence to show they meet **all** of the Essential Knowledge and Performance Objectives
2. produce performance evidence resulting from work they have carried out on real vehicles in their normal workplace or as defined within the IMI SVQ Assessment Strategy as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in their normal workplace or when safety is at risk
3. be observed by an assessor as defined in the IMI SVQ Assessment Strategy
4. produce evidence from their normal workplace of preparing metal and pre-painted surfaces on **5 different vehicle body panels** out of the 8 listed below*:
    - electro-coated panels
    - repaired panels
    - original manufacturer's finish
    - plastic components
    - zinc coated panels
    - steel panels
    - aluminium panels
    - primed panel
5. produce evidence of covering **all of the techniques** listed below in carrying out the preparation listed above
    - feathering out
    - flatting using guide coats
    - hand sanding
    - machine sanding
    - dry sanding
6. be observed by their assessor on **at least 2 occasions** carrying out the preparation of different vehicle body panels.

*However, they must prove to their assessor that they have the necessary knowledge and understanding to be able to perform competently in respect of **all** the panels listed above.

Unit 206 Repair minor paint defects on motor vehicles

Level:	**5**
Credit value:	16
Endorsement by a regulatory body:	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.
Aim:	This unit is about conducting repair to minor paint defects.
Assessment requirements:	**Performance objectives must** be assessed via a portfolio of evidence, gathered through observing the candidate at work. See the **Evidence Requirements** at the end of this unit for further details. Candidates **must** take the City & Guilds 4311-256 on-line multiple choice test, which partly covers the **Essential Knowledge** within this unit. The Essential Knowledge **not** covered by the test are statements numbered: **2** 8 **4** 9 **5** 10 **6** 18 **7** 22 This criteria **must** be assessed in one of the following ways: • oral or written questioning • professional discussion. Centres must keep an audit trail to show that candidates have covered all of the Essential Knowledge.

Essential knowledge

The learner will need to understand:
1. the health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection 2. the importance of disposing of waste safely and the consequences of not doing so to others and the environment 3. the importance of selecting, using and maintaining the appropriate personal protective equipment when repairing minor paint defects 4. the vehicle work specification agreed 5. their workplace procedures for: • the referral of problems • reporting of delays to the completion of work • personal protection 6. the requirements for protecting the vehicle and contents from damage before, during and after repairing minor paint defects 7. the importance of working to agreed timescales and keeping others informed of progress 8. the relationship between time and cost 9. the importance of reporting anticipated delays to the relevant person(s) promptly 10. how to prepare, test and adjust all the tools and equipment required for the repair of minor paint defects 11. how to use polishing machines, denibbing blocks and flatting equipment 12. how to select, prepare and use compounds, flatting papers, polishes, pre-prepared paints and glazes 13. the factors affecting the choice and use of materials 14. how to identify the existing paint surface finish on which the defect has occurred 15. how to identify minor paint defects, their cause and method(s) of rectification suitable for the paint surface finish 16. how to carry out flatting, burnishing, polishing and touch in techniques to correct minor paint defects 17. how to prevent further paint damage during rectification 18. how to dispose of waste 19. how to work safely avoiding damage to vehicles, personal injury and injury to colleagues 20. the importance of proper cleaning prior to and after paint rectification work 21. the importance of keeping equipment and materials clean and free from contamination during rectification work 22. how to interpret product manufacturer's instruction.

Performance objectives

To be competent the learner must:
1. use the appropriate personal protective equipment when carrying out the repair of minor paint defects to paint surfaces 2. protect the vehicle and its contents effectively when carrying out the repair of minor paint defects to paint surfaces 3. support repair activities by reviewing: • product data • work instructions 4. prepare, test and adjust all the tools and equipment required, following manufacturer's instructions prior to use 5. correct defects using the approved tools and equipment and materials following: • manufacturer's instructions • the correct methods and techniques • health and safety requirements 6. ensure the paint surface finish produced is free from contamination and defects 7. dispose of waste materials to conform with legal and workplace requirements 8. complete all paint repair activities within the agreed timescale 9. report any anticipated delays in completion to the relevant person(s) promptly.

Unit 206 Repair minor paint defects on motor vehicles

Supporting information

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

Minor surface defects to include:

a. scratches
b. chips
c. dents
d. corrosion
e. contamination
f. blisters (including micro-blisters)
g. fading
h. loss of gloss
i. chalking.

Types of paint finishes likely to be found in modern vehicles

a. types of substrate to include:
    i. steel
    ii. aluminium
    iii. all plastics
    iv. coated steels
    v. high bake enamels (OE finishes)
    vi. 2K paints
    vii. 1K paints
    viii. clear over bases
    ix. polyester fillers
b. substrates to determine selection of undercoat with reference to:
    i. condition of surface
    ii. type of substrate
    iii. process requirements
    iv. material requirement
c. the physical properties of a substrate to include:
    i. surface condition
    ii. adhesion
    iii. flexibility
    iv. porosity
    v. texture.

Methods used in determining types of vehicle paint finishes

a. workshop tests to determine paint substrates to include:
    i. compound small area

ii. solvent wipe test (1K or 2K)
iii. colour of flatting sludge (straight colour or COB)
iv. VIN plate.

Vehicle cleaning and protection procedures during paint defect rectification processes

a. vehicle must be thoroughly washed and cleaned prior to refinishing to include:
    i. outside body panels
    ii. under arches
    iii. under bonnet
    iv. all apertures
    v. degreased
b. the reasons for masking components adjacent to repair areas
c. the correct preparation of parts prior to painting to include products used for the removal of:
    i. wax
    ii. grease
    iii. skin oils
    iv. dust
    v. water
    vi. abrasive contaminants
    vii. environmental pollution
d. materials used for conditioning processes such as:
    i. wax and grease removers
    ii. spirit wipes
    iii. acid based
    iv. water based
e. the correct and safe use of the above materials
f. the properties of pre-preparation material to include:
    i. neutralisation
    ii. ability to alter the surface
    iii. reaction with oxide.

Identification of the common minor paint defects and list their causes

a. the reasons for the defects in vehicle finish such as:
    i. environmental pollution
    ii. ultraviolet reaction
    iii. industrial pollution
    iv. accidental damage.

Which rectification procedure to use for each of the minor paint defects

a. the procedures for the rectification of minor defects to include:
    i. compound/polish surface
    ii. flat/polish surface
    iii. local paint removal/repaint
    iv. panel/edge to edge repaint.

Tools and equipment used for the rectification of minor paint defects

a. the hand tools and equipment used by a paint refinisher to include:
    i. flatting block
    ii. squeegee
    iii. leather
    iv. trimming knife
    v. masking dispensers
    vi. sander
    vii. DA random orbital
    viii. orbital flat bed
    ix. belt sander
    x. polishing equipment
    xi. spray guns
    xii. sealer guns
    xiii. air dusters
    xiv. vacuum extraction
    xv. compressed air systems.

The selection, operation and maintenance of listed tools and equipment for paint defect rectification

a. the above tools and equipment with regard to their:
    i. selection
    ii. correct and safe use
    iii. adjustment
    iv. maintenance
    v. accessories
b. the function and correct use of each of the sanders listed:
    i. rotary
    ii. DA random orbital
    iii. orbital flat bed
    iv. belt
c. comparison of the above sanders in terms of:
    i. selection
    ii. abrasive pattern produced
    iii. aggressiveness
    iv. heat produced
    v. adjustment
    vi. abrasive change
d. the equipment required for polishing to include:
    i. air polisher
    ii. electric polisher
    iii. foam compound mop
    iv. foam polishing mop
    v. lambswool mop
    vi. types of paste compound
    vii. types of liquid compound
    viii. types of polishing cloth
    ix. lubricants
    x. specialist de-nib equipment
e. the maintenance requirement of these tools.

Adjust, set up and use listed tools and equipment for paint defect rectification

a. the process of using a polishing machine to refurbish paint work to include:
    i. speed of polishing machine
    ii. application of the machine to the surface
    iii. application of compound to the surface
    iv. operation of polishing machine
    v. awareness of polishing near to edges and swage lines
    vi. avoiding burn marks
    vii. removal of dried polish
b. the process of using sanders to prepare surface defects to include:
    i. choosing correct sander for job in hand
    ii. selection of appropriate grade of abrasive
    iii. correct technique with regard to pressure applied
    iv. avoiding sanding to bare metal on edges
    v. use of dust extraction
c. the methods of paint application for defect repair to include:
    i. touch-up brushes
    ii. coloured film patches
    iii. aerosols
    iv. touch-up spray guns and air brushes
    v. standard spray guns
    vi. adjusting spray guns for optimum atomisation.

Tools and equipment must be kept free from contamination to avoid further defects

a. the methods of cleaning tools and equipment after use:
    i. washing polishing/compound heads to remove residues
    ii. cleaning spray guns and brushes with appropriate solvents
b. explain that failure to carry out these procedures may lead to defects to include:
    iii. surface scratches
    iv. surface contamination
    v. silicone cratering
    vi. staining of painted surfaces
    vii. equipment malfunction.

Materials used for the rectification of minor paint defects

a. types and uses of abrasives to include:
    i. aluminium oxide
    ii. silicon carbide
    iii. wet and dry types
    iv. open coat
    v. closed coat
    vi. ‘P’ grades
    vii. papers, pastes and woven plastics

b. the properties of compounds used to refurbish paintwork including:
    i. cutting compounds
    ii. cutting creams
    iii. surface polishes
    iv. protective waxes
    v. sponge cutting heads
    vi. polishing mops
    vii. polishing cloths
c. types and uses of filler materials to include:
    i. 2K polyester filler paste
    ii. 2K and 1K stopper
d. types and uses of paints to include:
    i. touch-up pots
    ii. self-adhesive coloured paint film
    iii. aerosols
    iv. standard 2K and 1K paints.

Select the correct materials for rectifying listed paint defects

a. selection of materials for rectification will depend on:
    i. type of surface defect to be repaired
    ii. severity of defect
    iii. size of area to be repaired
    iv. equipment available
    v. expertise of operator
    vi. customer preference.

Correct preparation and use of materials for rectifying paint defects

a. the preparation of listed materials for defect rectification to include:
    i. replacing worn or used abrasive papers, pads and discs
    ii. checking compound and polish pastes for contamination
    iii. mixing of 2K fillers and stoppers to correct ratios
b. the preparation required prior to paint application to include:
    i. stirring/shaking paint containers
    ii. mixing touch-up and standard paints to correct ratios
    iii. carrying out viscosity checks on mixed paint materials.

Touch-in techniques as required for the rectification of some paint defects

a. touch-in techniques:
    i. may not exactly match factory (OE) finish
    ii. may be viewed as a temporary repair
    iii. should be confined to small areas.

Procedures for the safe disposal of waste material and the consequences of failing to follow disposal regulations

a. how the disposal of products is influenced by the duty of care regulations
b. the disposal procedures for used products to include:
    i. waste paper and card
    ii. empty containers
    iii. waste thinners
    iv. body filler dust
    v. spray booth filters
    vi. soiled rags
    vii. body panels
    viii. damaged vehicle parts
c. documentation required for correct disposal of the above items
d. the penalties for non-compliance
e. the effects on the environment of non-compliance.

Evidence requirements

The learner must:

1. produce evidence to show they meet **all** of the Essential Knowledge and Performance Objectives
2. produce performance evidence resulting from work they have carried out on real vehicles in their normal workplace or as defined within the IMI SVQ Assessment Strategy as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in their normal workplace or when safety is at risk
3. be observed by an assessor as defined in the IMI SVQ Assessment Strategy
4. produce evidence from their normal workplace of repairing **4 out of the 5 defects** listed below*:
    - loss of gloss
    - scuffs and scratches to the manufacturer's finish
    - dirt inclusion in a newly applied finish
    - runs or sags in a newly applied finish
    - orange peel
5. be observed by their assessor carrying out **2 different rectification activities** in their normal workplace.

* However, they must prove to their assessor that they have the necessary knowledge and understanding to be able to perform competently in respect of **all categories of paint fault** listed above.

Unit 207 Establish defects on motor vehicles

Level:	**5**
Credit value:	16
Endorsement by a regulatory body:	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.
Aim:	This unit is about establishing a range faults which may often require the removal of materials to a sound substrate in order for rectification to take place.
Assessment requirements:	**Performance objectives must** be assessed via a portfolio of evidence, gathered through observing the candidate at work. See the **Evidence Requirements** at the end of this unit for further details. Candidates **must** take the City & Guilds 4311-257 on-line multiple choice test, which partly covers the **Essential Knowledge** within this unit. The Essential Knowledge **not** covered by the test are statements numbered: **2** 9 **4** 10 **5** 11 **7** 13 **8** 19 This criteria **must** be assessed in one of the following ways: • oral or written questioning • professional discussion. Centres must keep an audit trail to show that candidates have covered all of the Essential Knowledge.

Essential knowledge

The learner will need to understand:
1. the health and safety legislation and workplace procedures relevant to workshop practices and personal and vehicle protection 2. the importance of disposing of waste safely and the consequences of not doing so to others and the environment 3. the importance of selecting, using and maintaining the appropriate personal protective equipment when repairing paint defects and faults 4. the vehicle work specification agreed 5. their workplace procedures for: • the referral of problems • reporting of delays to the completion of work • personal protection 6. the requirements for protecting the vehicle and contents from damage before, during and after repairing paint defects and faults. 7. the importance of working to agreed timescales and keeping others informed of progress. 8. the relationship between time, cost and profitability. 9. the importance of reporting anticipated delays to the relevant person(s) promptly 10. how to prepare, test, use and adjust all the refinishing tools and equipment required for the repair of paint defects and faults 11. the types of fault that can be caused by faulty and misused refinishing tools and equipment and how to rectify them 12. how to prevent further paint damage during rectification 13. how to dispose of waste materials 14. how to work safely avoiding damage to vehicles, personal injury and injury to colleagues 15. the importance of proper cleaning prior to and after paint rectification work 16. the importance of keeping tools and equipment and materials clean and free from contamination during rectification work 17. the importance of following manufacturers' instructions and using their approved methods of working (including use of materials and equipment) 18. the consequences of failing to follow manufacturers' instructions 19. the importance of working to agreed timescales and keeping others informed.

Performance objectives

To be competent the learner must:
1. use the appropriate personal protective equipment when carrying out the repair of paint defects and faults 2. protect the vehicle and its contents effectively when carrying out the repair of paint defects and faults 3. support their rectification activities by reviewing: • product data • the vehicle manufacturer's technical data • colour libraries • work instructions 4. prepare, test and adjust all the tools and equipment required, following manufacturer's instructions prior to use 5. identify the body panel surfaces accurately prior to undertaking any rectification work 6. dispose of waste materials to conform with legal and workplace requirements 7. report any anticipated delays in completion to the relevant person(s) promptly.

Unit 207 Establish defects on motor vehicles

Supporting information

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

Type of defects:

a. acid spotting
b. blistering
c. blushing
d. blooming
e. bridging
f. chalking
g. checking
h. crazing
i. dirt
j. dry spray
k. edge mapping
l. etching
m. fading
n. fish eyes
o. flaking
p. haloing
q. humidity blisters
r. mottling
s. orange peel
t. overspray
u. pin holes
v. poor opacity
w. plastic bleed through
x. runs
y. rust
z. sand scratch swelling
aa. shrinking and splitting
bb. streaking
cc. solvent popping
dd. tape marks
ee. water spotting
ff. webbing.

Types of paint finishes likely to be found in modern vehicles

a. types of substrate to include:
    i. steel
    ii. aluminium
    iii. all plastics
    iv. coated steels
    v. high bake enamels (OE finishes)
    vi. 2K paints
    vii. 1K paints
    viii. clear over bases
    ix. polyester fillers
b. substrates to determine selection of undercoat with reference to:
    i. condition of surface
    ii. type of substrate
    iii. process requirements
    iv. material requirement
c. the physical properties of a substrate to include:
    i. surface condition
    ii. adhesion
    iii. flexibility
    iv. porosity
    v. texture.

Methods used in determining types of vehicle paint finishes

a. workshop tests to determine paint substrates to include:
    i. compound small area
    ii. solvent wipe test (1K or 2K)
    iii. colour of flatting sludge (straight colour or COB)
    iv. VIN plate.

Vehicle cleaning and protection procedures during paint defect rectification processes

a. vehicle must be thoroughly washed and cleaned prior to refinishing to include:
    i. outside body panels
    ii. under arches
    iii. under bonnet
    iv. all apertures
    v. degreased
b. the reasons for masking components adjacent to repair areas
c. the correct preparation of parts prior to painting to include products used for the removal of:
    i. wax
    ii. grease
    iii. skin oils
    iv. dust
    v. water
    vi. abrasive contaminants
    vii. environmental pollution

d. materials used for conditioning processes such as:
    i. wax and grease removers
    ii. spirit wipes
    iii. acid based
    iv. water based
e. the correct and safe use of the above materials
f. the properties of pre-preparation material to include:
    i. neutralisation
    ii. ability to alter the surface
    iii. reaction with oxide.

Paint defects and their causes

a. the reasons for the defects in vehicle finish such as:
    i. environmental pollution
    ii. ultraviolet reaction
    iii. industrial pollution
    iv. accidental damage.

Which rectification procedure to use for each of the paint defects

a. the procedures for the rectification of defects to include:
    i. compound/polish surface
    ii. flat/polish surface
    iii. local paint removal/repaint
    iv. panel/edge to edge repaint.

Tools and equipment must be kept free from contamination to avoid further defects

a. the methods of cleaning tools and equipment after use:
    i. washing polishing/compound heads to remove residues
    ii. cleaning spray guns and brushes with appropriate solvents
b. explain that failure to carry out these procedures may lead to defects to include:
    i. surface scratches
    ii. surface contamination
    iii. silicone cratering
    iv. staining of painted surfaces
    v. equipment malfunction.

Materials used for the rectification of paint defects

a. types and uses of abrasives to include:
    i. aluminium oxide
    ii. silicon carbide
    iii. wet and dry types
    iv. open coat
    v. closed coat
    vi. 'P' grades
    vii. papers, pastes and woven plastics

b. the properties of compounds used to refurbish paintwork including:
    i. cutting compounds
    ii. cutting creams
    iii. surface polishes
    iv. protective waxes
    v. sponge cutting heads
    vi. polishing mops
    vii. polishing cloths
c. types and uses of filler materials to include:
    i. 2K polyester filler paste
    ii. 2K and 1K stopper
d. types and uses of paints to include:
    i. touch-up pots
    ii. self-adhesive coloured paint film
    iii. aerosols
    iv. standard 2K and 1K paints.

Select the correct materials for rectifying listed paint defects

a. selection of materials for rectification will depend on:
    i. type of surface defect to be repaired
    ii. severity of defect
    iii. size of area to be repaired
    iv. equipment available
    v. expertise of operator
    vi. customer preference.

Correct preparation and use of materials for rectifying paint defects

a. the preparation of listed materials for defect rectification to include:
    i. replacing worn or used abrasive papers, pads and discs
    ii. checking compound and polish pastes for contamination
    iii. mixing of 2K fillers and stoppers to correct ratios
b. the preparation required prior to paint application to include:
    i. stirring/shaking paint containers
    ii. mixing touch-up and standard paints to correct ratios
    iii. carrying out viscosity checks on mixed paint materials.

Touch-in techniques as required for the rectification of some paint defects

a. touch-in techniques:
    i. may not exactly match factory (OE) finish
    ii. may be viewed as a temporary repair
    iii. should be confined to small areas.

Evidence requirements

The learner must:

1. produce evidence to show they meet **all** of the Essential Knowledge and Performance Objectives
2. produce performance evidence resulting from work they have carried out on real vehicles in their normal workplace or as defined within the IMI SVQ Assessment Strategy as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in their normal workplace or when safety is at risk
3. be observed by an assessor as defined in the IMI SVQ Assessment Strategy
4. produce evidence from their normal workplace of **establishing and rectifying** paint defects **from 4 out of the 8** listed below*:
    - poor application
    - environmental conditions
    - contamination
    - corrosion
    - wear and tear
    - adverse chemical reactions
    - panel deformation
    - poor preparation
5. be observed by their assessor on **at least 2 different paint defects** on **separate occasions** in their normal workplace.

* However, they must prove to their assessor that they have the necessary knowledge and understanding to be able to perform competently in respect of **all categories of paint fault** listed above.

Unit 210 Spot repair on motor vehicles

Level:	**6**
Credit value:	16
Endorsement by a regulatory body:	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.
Aim:	This unit is about the ability to undertake spot repair activities.
Assessment requirements:	**Performance objectives must** be assessed via a portfolio of evidence, gathered through observing the candidate at work. See the **Evidence Requirements** at the end of this unit for further details. Candidates **must** take the City & Guilds 4311-259 on-line multiple choice test, which partly covers the **Essential Knowledge** within this unit. The Essential Knowledge **not** covered by the test are statements numbered: **3**: 8; **4**: 9; **5**: 10; **6**: 17; **7**: 19 This criteria **must** be assessed in one of the following ways: • oral or written questioning • professional discussion. Centres must keep an audit trail to show that candidates have covered all of the Essential Knowledge.

Essential knowledge

The learner will need to understand:
1. the health and safety and environmental legislative requirements specific to vehicle refinishing operations and why it is important that these are followed 2. workplace procedures and workshop practices relevant to personal and vehicle protection before, during and after vehicle refinishing operations 3. the importance of disposing of waste safely and the consequences of not doing so to others and the environment 4. the vehicle work specification agreed 5. their workplace procedures for: • the referral of problems • reporting delays to the completion of work • personal protection 6. the importance of working to agreed timescales and keeping others informed of progress 7. the relationship between time, cost and profitability 8. the importance of reporting anticipated delays to the relevant person(s) promptly 9. how to prepare, test, adjust and use all the tools and equipment required for vehicle refinishing operations 10. spray gun faults, their cause and their rectification 11. how to prepare refinishing systems and materials for use 12. the properties of refinishing systems and materials and the factors affecting their use 13. how to recognise damage to surfaces and ancillary fittings 14. how to interpret manufacturer's preparation schedules 15. how to prepare panels and parts adjacent to the area being painted 16. methods of protecting panels and parts adjacent to the areas being painted and the circumstances in which they should be used 17. how to find, interpret and use sources of information relevant to the refinishing of vehicles 18. how to apply topcoat materials using spot repairs, avoiding contamination and defects 19. how to dispose of waste materials 20. how to work safely avoiding damage to vehicles, personal injury and injury to colleagues. 21. how to minimize the spray area when carrying out spot repairs 22. the effect of the spray environment and natural environment on vehicle finishes 23. the importance of following manufacturers' instructions and using their approved methods of working (including the use of refinishing systems and materials and equipment) 24. the consequences of failing to follow manufacturers' instructions.

Performance objectives

To be competent the learner must:

1. wear suitable personal protective equipment and use the specified environmental safety equipment throughout all vehicle refinishing operations
2. support vehicle refinishing operations by reviewing:
    - product data
    - the vehicle manufacturer's technical data
    - colour libraries
    - work instructions
3. identify the body panel surfaces accurately prior to undertaking any refinishing work
4. prepare, test and adjust all the tools and equipment required, following manufacturers' instructions, prior to use
5. prepare all the refinishing systems and materials required following health and safety requirements and using:
    - materials which conform to the specification required
    - the manufacturer's approved method
    - the manufacturer's approved equipment
6. apply all refinishing systems and materials using approved tools and equipment and following:
    - the manufacturer's instructions
    - the correct methods and techniques
    - the correct application techniques for managing colour and tone variables
    - health and safety requirements
7. dry all refinishing applied materials following health and safety requirements and using:
    - the manufacturer's approved method
    - the manufacturer's approved equipment
8. ensure the finish produced:
    - meets the requirements of the manufacturer's warranty
    - meets the refinishing specification required and customer needs
    - blends with the existing finish
    - is free from contaminants and defects
9. dispose of waste materials to conform with legal and workplace requirements
10. complete all refinishing activities within the agreed timescale
11. report any anticipated delays in completion to the relevant person(s) promptly.

Unit 210 Spot repair on motor vehicles

Supporting information

Evidence requirements

The learner must:

1. produce evidence to show they meet **all** of the Essential Knowledge and Performance Objectives
2. produce performance evidence resulting from work they have carried out on real vehicles in their normal workplace or as defined within the IMI SVQ Assessment Strategy as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in their normal workplace or when safety is at risk
3. be observed by an assessor as defined in the IMI SVQ Assessment Strategy
4. produce evidence from their normal workplace of carrying out resistance spot welding when joining a vehicle body panel to a vehicle on **at least 3 separate occasions**
5. 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
6. be observed by their assessor on **at least 2 occasions** in their normal workplace.

Unit 211 Blend/fade out repair on motor vehicles

Level:	**6**
Credit value:	16
Endorsement by a regulatory body:	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.
Aim:	This unit is about the ability to undertake blend and fade out repair activities
Assessment requirements:	**Performance objectives must** be assessed via a portfolio of evidence, gathered through observing the candidate at work. See the **Evidence Requirements** at the end of this unit for further details. Candidates **must** take the City & Guilds 4311-259 on-line multiple choice test, which partly covers the **Essential Knowledge** within this unit. The Essential Knowledge **not** covered by the test are statements numbered: **3**: 8; **4**: 9; **5**: 10; **6**: 17; **7**: 19 This criteria **must** be assessed in one of the following ways: • oral or written questioning • professional discussion. Centres must keep an audit trail to show that candidates have covered all of the Essential Knowledge.

Essential knowledge

The learner will need to understand:
1. the health and safety and environmental legislative requirements specific to vehicle refinishing operations and why it is important that these are followed 2. workplace procedures and workshop practices relevant to personal and vehicle protection before, during and after vehicle refinishing operations 3. the importance of disposing of waste safely and the consequences of not doing so to others and the environment 4. the vehicle work specification agreed 5. their workplace procedures for: • the referral of problems • reporting delays to the completion of work • personal protection 6. the importance of working to agreed timescales and keeping others informed of progress 7. the relationship between time, cost and profitability 8. the importance of reporting anticipated delays to the relevant person(s) promptly 9. how to prepare, test, adjust and use all the tools and equipment required for vehicle refinishing operations. 10. spray gun faults, their cause and their rectification. 11. how to prepare refinishing systems and materials for use 12. the properties of refinishing systems and materials and the factors affecting their use 13. how to recognise damage to surfaces and ancillary fittings 14. how to interpret manufacturer's preparation schedules 15. how to prepare panels and parts adjacent to the area being painted 16. methods of protecting panels and parts adjacent to the areas being painted and the circumstances in which they should be used 17. how to find, interpret and use sources of information relevant to the refinishing of vehicles 18. how to apply topcoat materials using fade out and blending techniques when applying topcoats avoiding contamination and defects 19. how to dispose of waste materials 20. how to work safely avoiding damage to vehicles, personal injury and injury to colleagues. 21. the importance of following manufacturers' instructions and using their approved methods of working (including the use of refinishing systems and materials and equipment) 22. the consequences of failing to follow manufacturers' instructions.

Performance objectives

To be competent the learner must:

1. wear suitable personal protective equipment and use the specified environmental safety equipment throughout all vehicle refinishing operations
2. support vehicle refinishing operations by reviewing:
    - product data
    - the vehicle manufacturer's technical data
    - colour libraries
    - work instructions
3. identify the body panel surfaces accurately prior to undertaking any refinishing work
4. prepare, test and adjust all the tools and equipment required, following manufacturers' instructions, prior to use.
5. prepare all the refinishing systems and materials required following health and safety requirements and using:
    - materials which conform to the specification required
    - the manufacturer's approved method
    - the manufacturer's approved equipment
6. apply all refinishing systems and materials using approved tools and equipment and following:
    - the manufacturer's instructions
    - the correct methods and techniques
    - the correct application techniques for managing colour and tone variables
    - health and safety requirements
7. dry all refinishing applied materials following health and safety requirements and using:
    - the manufacturer's approved method
    - the manufacturer's approved equipment
8. ensure the finish produced:
    - meets the requirements of the manufacturer's warranty
    - meets the refinishing specification required and customer needs
    - blends with the existing finish
    - is free from contaminants and defects
9. dispose of waste materials to conform with legal and workplace requirements
10. complete all refinishing activities within the agreed timescale
11. report any anticipated delays in completion to the relevant person(s) promptly.

Unit 211 Blend/fade out repair on motor vehicles

Supporting information

Evidence requirements

The learner must:

1. produce evidence to show they meet **all** of the Essential Knowledge and Performance Objectives
2. produce performance evidence resulting from work they have carried out on real vehicles in their normal workplace or as defined within the IMI SVQ Assessment Strategy as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in their normal workplace or when safety is at risk
3. be observed by an assessor as defined in the IMI SVQ Assessment Strategy
4 produce evidence from their normal workplace of applying topcoat materials using fade out or blending finish and spot repair finish when refinishing a vehicle on **at least 3 separate occasions,** ensuring the finish produced:
    - meets the requirements of the manufacturer's warranty
    - meets the refinishing specification required and customer needs
    - blends with the existing finish
    - is free from contaminants and defects
5. be observed by their assessor on **at least 2 occasions** carrying out different refinishing operations in their normal workplace.

Unit 212 Edge to edge repair on motor vehicles

Level:	**6**
Credit value:	16
Endorsement by a regulatory body:	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.
Aim:	This unit is about the ability to undertake edge to edge repair activities.
Assessment requirements:	**Performance objectives must** be assessed via a portfolio of evidence, gathered through observing the candidate at work. See the **Evidence Requirements** at the end of this unit for further details. Candidates **must** take the City & Guilds 4311-259 on-line multiple choice test, which partly covers the **Essential Knowledge** within this unit. The Essential Knowledge **not** covered by the test are statements numbered: **3**: 8; **4**: 9; **5**: 10; **6**: 17; **7**: 19 This criteria **must** be assessed in one of the following ways: • oral or written questioning • professional discussion. Centres must keep an audit trail to show that candidates have covered all of the Essential Knowledge.

Essential knowledge

The learner will need to understand:
1. the health and safety and environmental legislative requirements specific to vehicle refinishing operations and why it is important that these are followed 2. workplace procedures and workshop practices relevant to personal and vehicle protection before, during and after vehicle refinishing operations 3. the importance of disposing of waste safely and the consequences of not doing so to others and the environment 4. the vehicle work specification agreed 5. their workplace procedures for: • the referral of problems • reporting delays to the completion of work • personal protection 6. the importance of working to agreed timescales and keeping others informed of progress 7. the relationship between time, cost and profitability 8. the importance of reporting anticipated delays to the relevant person(s) promptly 9. how to prepare, test, adjust and use all the tools and equipment required for vehicle refinishing operations 10. spray gun faults, their cause and their rectification 11. how to prepare refinishing systems and materials for use 12. the properties of refinishing systems and materials and the factors affecting their use 13. how to recognise damage to surfaces and ancillary fittings 14. how to interpret manufacturer's preparation schedules 15. how to prepare panels and parts adjacent to the area being painted 16. methods of protecting panels and parts adjacent to the areas being painted and the circumstances in which they should be used 17. how to find, interpret and use sources of information relevant to the refinishing of vehicles 18. how to apply topcoat materials using edge to edge techniques when applying topcoats avoiding contamination and defects 19. how to dispose of waste materials 20. how to work safely avoiding damage to vehicles, personal injury and injury to colleagues 21. the importance of following manufacturers' instructions and using their approved methods of working (including the use of refinishing systems and materials and equipment) 22. the consequences of failing to follow manufacturers' instructions.

Performance objectives

To be competent the learner must:

1. wear suitable personal protective equipment and use the specified environmental safety equipment throughout all vehicle refinishing operations
2. support vehicle refinishing operations by reviewing:
    - product data
    - the vehicle manufacturer's technical data
    - colour libraries
    - work instructions
3. identify the body panel surfaces accurately prior to undertaking any refinishing work
4. prepare, test and adjust all the tools and equipment required, following manufacturers' instructions, prior to use
5. prepare all the refinishing systems and materials required following health and safety requirements and using:
    - materials which conform to the specification required
    - the manufacturer's approved method
    - the manufacturer's approved equipment
6. apply all refinishing systems and materials using approved tools and equipment and following:
    - the manufacturer's instructions
    - the correct methods and techniques
    - the correct application techniques for managing colour and tone variables
    - health and safety requirements
7. dry all refinishing applied materials following health and safety requirements and using:
    - the manufacturer's approved method
    - the manufacturer's approved equipment
8. ensure the finish produced:
    - meets the requirements of the manufacturer's warranty
    - meets the refinishing specification required and customer needs
    - blends with the existing finish
    - is free from contaminants and defects
9. dispose of waste materials to conform with legal and workplace requirements
10. complete all refinishing activities within the agreed timescale
11. report any anticipated delays in completion to the relevant person(s) promptly.

Unit 212 Edge to edge repair on motor vehicles

Supporting information

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

The types of substrates likely to be found in vehicle refinishing

a. list types of substrate to include:
    i. steel
    ii. aluminium
    iii. all plastics
    iv. coated steels
    v. high bake enamels (OE finishes)
    vi. 2K Paints
    vii. 1K Paints
    viii. clear over bases
    ix. polyester fillers
    x. repaired panels
    xi. primed panels (e-coat).

Methods used in determining vehicle substrates

a. workshop tests to determine substrates to include:
    i. visual test for aluminium, plastics
    ii. magnet test for steel
b. for determination of paint type:
    i. compound small area
    ii. solvent wipe test (1K or 2K)
    iii. colour of flatting sludge (straight colour or COB)
    iv. VIN plate.

The main stages required in preparing a vehicle for refinishing, including areas adjacent to the painting area

a. manufacturers' protective coatings and their warranty implications such as:
    i. electrostatic dip
    ii. under-body compounds
    iii. cavity wax
    iv. body caulking
b. vehicles must be thoroughly washed and cleaned prior to refinishing to include:
    i. outside body panels
    ii. under arches
    iii. under bonnet
    iv. all apertures

v. degreased
c. the reasons for vehicle masking
d. the correct preparation of parts prior to painting to include products used for the removal of:
    i. wax
    ii. grease
    iii. skin oils
    iv. dust
    v. water
    vi. abrasive contaminants
    vii. environmental pollution.

The procedures used in preparing listed substrates

a. the required preparation for the listed substrates to include:
    i. steel
    ii. aluminium alloys
    iii. GR plastics
    iv. thermo plastics
    v. cured 2K materials
    vi. synthetic enamels
    vii. timber (trim parts only)
b. the procedures for the preparation of plastics to include:
    i. identification
    ii. tempering
    iii. porefilling
    iv. cleaning
    v. adhesion promotion
    vi. elastic primers.

The selection and uses of a range of abrasives in common use

a. types and uses of abrasive materials to include:
    i. aluminium oxide
    ii. silicon carbide
    iii. wet and dry types
    iv. open coat
    v. closed coat
    vi. papers, pastes and woven plastics
b. forms of abrasive to include:
    i. pad
    ii. disc
    iii. sheet
    iv. roll
    v. backing materials
    vi. methods of attachments
c. how grit sizes are classified according to the FEPA standards using 'P' grades with regard to:
    i. the process being carried out
    ii. the material being abraded
    iii. the technique being employed
d. the differences between open and closed coat abrasives:
    i. open coat

ii. closed coat
iii. 'P' grades.

The term 'feather edging' and why correct operation is required in achieving the required surface finish

a. the procedure for the preparation of a repaired area on a large panel in terms of:
    i. repair edge preparation
    ii. surrounding area
    iii. bare metal
b. why correct preparation is required with reference to:
    i. surface finish
    ii. film thickness
    iii. sinkage
    iv. mapping
    v. contouring.

Masking procedures for part and whole vehicles. Masking processes and techniques

a. common masking systems, materials and techniques to include:
    i. masking paper
    ii. plastic sheeting
    iii. masking tape
    iv. foam tape
    v. wheel covers
    vi. liquid masking
    vii. roll-back masking
b. the characteristics of a quality masking tape to include:
    i. ability to turn corners
    ii. non-aggressive adhesive/non-drying
    iii. clean edges to painted areas
c. the properties of these masking materials such as:
    i. economy of use
    ii. costs per unit
    iii. absorption
    iv. flexibility
d. where and how these masking materials and systems should be used
e. the masking procedures for listed items such as:
    i. door glass and windscreens
    ii. handles
    iii. lights
    iv. mirrors
    v. wheels
f. masking schedule for the type of repair to include:
    i. time efficiency
    ii. material costs
    iii. given protection
g. faults which are caused by careless masking such as:
    i. flash lines
    ii. bridging
    iii. creep

iv. hard edges.

The factors affecting the choice and use of topcoat materials

a. the types of paints such as:
    i. non-convertible:
        - nitrocellulose
        - 1K acrylic
    ii. convertible:
        - oil based synthetics
        - 2K acrylics
        - 2K polyurethane
        - polyesters
        - isocyanate resins
    iii. waterborne base coats:
        - microgel
        - latex
b. the reasons for using paint to include:
    i. protection
    ii. filling
    iii. decoration
    iv. identification
    v. safety
c. use process data sheets to determine information such as:
    i. material description
    ii. material properties
    iii. material characteristics
    iv. limitations
    v. related materials
    vi. mixing ratios
    vii. viscosity
    viii. build film thickness
    ix. pot life
d. the procedure for the preparation of minor damage to include:
    i. paint removal
    ii. feather edge
    iii. surface condition
    iv. substrate identification
    v. cleanliness
    vi. achieving correct contour
e. the problems of over catalysed body filled areas
f. the correct Health and Safety procedures associated with body fillers
g. aids and techniques which can be used to achieve the correct contour of a filled area
h. undercoat materials for plastics to include:
    i. adhesion promoters
    ii. surface modifiers
    iii. flexible additives
    iv. texture additives

i. listed additives such as:
    i. adhesion promoters
    ii. flexible additives
    iii. texture finishes
    iv. extenders
    v. UV absorbers
    vi. flow aids.

The properties of topcoat materials

a. the ingredients of paint to include:
    i. pigment
    ii. binder/vehicle
    iii. solvent/thinner/reducer
    iv. additives
b. the different types of paints to include:
    i. non-convertible:
        - nitrocellulose
        - 1K acrylic
        - base coats
    ii. convertible:
        - two packs
        - oil based synthetic enamels
c. the characteristics and properties of surface coatings to include:
    i. nitrocellulose – non-convertible; low build; fast surface dry
    i. oil based synthetics – convertible; slow dry through uptake of oxygen
    ii. two packs – convertible; chemical reaction; high build
    iii. base coats – solvent or waterborne; non-convertible; very low build; high opacity has to be over-coated with clear coat
d. the principles of operation of water based materials
e. the materials used in water based paint technology
f. the environmental advantages of using water based paints
g. the materials in terms of their:
    i. preparation of substrates
    ii. mixing procedures
    iii. application
    iv. drying processes
    v. working techniques
    vi. covering and hiding power
    vii. rectification
    viii. cleaning process.

Evidence requirements

The learner must:

1. produce evidence to show they meet **all** of the Essential Knowledge and Performance Objectives
2. produce performance evidence resulting from work they have carried out on real vehicles in their normal workplace or as defined within the IMI SVQ Assessment Strategy as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in their normal workplace or when safety is at risk
3. be observed by an assessor as defined in the IMI SVQ Assessment Strategy
4. produce evidence from their normal workplace of carrying out **all** of the vehicle refinishing operations listed below
    - metallic or mica clear over base finish
    - textured finish
5. ensure the finish produced:
    - meets the requirements of the manufacturer's warranty
    - meets the refinishing specification required and customer needs
    - blends with the existing finish
    - is free from contaminants and defects
6. be observed by their assessor on **at least 2 occasions** carrying out different refinishing operations in their normal workplace.

Unit 213 Mix and match colours for motor vehicles

Level:	**6**
Credit value:	16
Endorsement by a regulatory body:	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.
Aim:	This unit is about the ability to identify, mix and match vehicle paint colours, including the use of tinters and the preparation of colour test cards.
Assessment requirements:	**Performance objectives must** be assessed via a portfolio of evidence, gathered through observing the candidate at work. See the **Evidence Requirements** at the end of this unit for further details. Candidates **must** take the City & Guilds 4311-263 on-line multiple choice test, which partly covers the **Essential Knowledge** within this unit. The Essential Knowledge **not** covered by the test are statements numbered: **3**: 8; **4**: 9; **5**: 11; **6**: 23; **7**: This criteria **must** be assessed in one of the following ways: • oral or written questioning • professional discussion. Centres must keep an audit trail to show that candidates have covered all of the Essential Knowledge.

Essential knowledge

The learner will need to understand:

1. the health and safety and environmental legislative requirements specific to mixing and matching vehicle colours and why it is important that these are followed
2. workplace procedures and workshop practices relevant to personal and vehicle protection before, during and after mixing and matching vehicle colours
3. the importance of disposing of waste safely and the consequences of not doing so to others and the environment
4. the vehicle work specification agreed
5. their workplace procedures for:
    - the referral of problems
    - reporting delays to the completion of work
6. the importance of working to agreed timescales and keeping others informed of progress.
7. the relationship between time, cost and profitability
8. the importance of reporting anticipated delays to the relevant person(s) promptly.
9. how to prepare, test, adjust and use all the equipment required for mixing and matching vehicle paint colours
10. how spraying equipment adjustments can alter colour
11. spray gun faults, their cause and their rectification
12. the properties of refinishing systems and materials and the factors affecting their use
13. how to find, interpret and use sources of information relevant to the mixing and matching of vehicle paint colours
14. the principles of colour, the colour wheel and the effects of light
15. how to compare, mix, test and adjust colour tones and effects, including metallic and mica effects
16. the consequences of adding too much tinter and the process for correcting and adjusting it
17. the factors affecting colour variation and tone, including the effects of metamerism
18. how to dry test panels and colour test cards and the importance of doing so
19. how to identify the causes of, and rectify, colour mismatch
20. how to assess and evaluate the need for blending techniques to achieve an acceptable colour match
21. the importance of correctly preparing the existing finish for colour matching and checking the match using the correct light source
22. how to identify the paint substrate and the importance of doing so
23. how to dispose of waste materials
24. how to work safely avoiding damage to vehicles, personal injury and injury to colleagues
25. the importance of following manufacturers' instructions and using their approved methods of working, including using of refinishing systems and materials and equipment)
26. the consequences of failing to follow manufacturers' instructions.

Performance objectives

To be competent the learner must:

1. wear suitable personal protective equipment and use the specified environmental safety equipment throughout all paint mixing and matching activities
2. support paint mixing and matching activities by reviewing:
    - the vehicle manufacturer's technical data
    - material manufacturer's data
    - colour libraries
    - work instructions
3. prepare, test and adjust all the equipment required, following manufacturers' instructions, prior to use.
4. prepare all the refinishing systems and materials required following health and safety requirements and using:
    - materials which conform to the specification required
    - the manufacturer's approved method
    - the manufacturer's approved equipment
5. mix, compare and adjust colour tones and effects correctly using suitable mixing and matching techniques
6. ensure all refinishing systems and materials prepared meet the specification required for colour and viscosity prior to application.
7. apply refinishing systems and materials to colour test cards using approved equipment and following:
    - the manufacturer's instructions
    - the correct application techniques for managing colour and tone variables
    - health and safety requirements
8. dry all colour test cards before checking colour following health and safety requirements and using:
    - the manufacturer's approved method
    - the manufacturer's approved equipment
9. ensure the colour produced:
    - meets the material manufacturer's requirements
    - meets the customer's requirements
    - is a blendable match to the existing colour
10. dispose of waste materials to conform with legal and workplace requirements
11. complete all mixing and matching activities within the agreed timescale
12. report any anticipated delays in completion to the relevant person(s) promptly.

Unit 213 Mix and match colours for motor vehicles

Supporting information

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

The effects of the viewing environment on colour matching

a. artificial light
b. natural light
c. light box
d. direct sunlight
e. shaded light
f. reflection.

The purpose of paint materials

a. anti-corrosion
b. protection
c. reflection
d. visual
e. body sound deadening.

Types of undercoats and their function

a. primer
b. primer surfacer
c. anti-corrosion
d. etch primers
e. plastic primers
f. primer fillers
g. electrodepositing (e-coating)
h. e-coat replacement products
i. sealers/isolators
j. anti-chip/texture coatings.

Types of paints and their function

a. single pack
b. two pack
c. acrylic
d. alkyd
e. epoxy
f. polyurethane
g. phenolic
h. polyester.

Types of pigments available and their function

a. coloured
b. metallic
c. pearl
d. anti-corrosion
e. extender
f. special effects.

The purpose of testing paint materials

a. adhesion
b. durability
c. corrosion
d. resistance to chemicals
e. abrasion
f. acid rain
g. ultraviolet.

Types of topcoat

a. solid colours
b. clear over base colours
c. metallic colours
d. pearl colours.

Methods and importance of correctly identifying paint substrates prior to undertaking any refinishing work

a. workshop tests to determine substrates to include:
    i. solvent wipe test (1K or 2K)
    ii. colour of flatting sludge (straight colour or COB)
    iii. VIN plate
b. substrates to determine selection of undercoat with reference to:
    i. condition of surface
    ii. type of substrate
    iii. process requirements
    iv. material requirements
c. the physical properties of a substrate to include:
    i. surface condition
    ii. adhesion
    iii. flexibility
    iv. porosity
d. the technical properties of a substrate to include:
    i. type of paint
    ii. steel
    iii. aluminium
    iv. plastic
    v. coated steels
    vi. repaired panels
    vii. OE finish.

How to prepare existing paint substrates for colour matching

a. the required preparation for the listed substrates to include:
    i. steel
    ii. aluminium alloys
    iii. GR plastics
    iv. thermo plastics
    v. cured 2K materials
    vi. synthetic enamels
b. the procedures for the preparation of paint finishes to include:
    i. thorough cleaning and drying
    ii. compounding to restore original colour
c. the procedures for the preparation of plastics to include:
    i. identification
    ii. tempering
    iii. porefilling
    iv. release agent removal
    v. cleaning
    vi. adhesion promotion
    vii. elastic primers
d. the preparation requirements for textured and special effect coatings to include:
    i. spoilers
    ii. bumpers
    iii. exterior trim.

How different light sources can affect the perception of colour for matching purposes

a. colour in terms of light reflected from a surface to include:
    i. light quality
    ii. surface quality
    iii. absorbed light
    iv. reflected light
b. the effects of metamerism under:
    i. sodium light
    ii. mercury vapour
c. explain how this phenomenon is created.

Types of refinishing materials by their film forming characteristics

a. the different types of paints to include:
    i. non-convertible
    ii. nitrocellulose
    iii. 1K acrylic
    iv. convertible
    v. oil based synthetics
    vi. 2K acrylics
    vii. 2K polyurethane
    viii. polyesters
    ix. isocyanate resins
    x. waterborne base coats
    xi. microgel
    xii. latex

b. the properties of binders to include:
    i. convertible: oxidise, high temperature reactants, chemical reactants
    ii. non-convertible: solvent evaporation
c. the forms of binder such as:
    i. nitrocellulose
    ii. alkyds
    iii. urethanes
    iv. polyesters
    v. isocyanates
    vi. acrylics
d. the uses of binders in paints:
    i. film forming
    ii. binding the pigments
    iii. adhesion
    iv. cohesion
    v. flexibility
e. the principles of operation of water based materials
f. the materials used in water based paint technology
g. the environmental advantages of using water based paints.

Distinguish between paint system classification

a. the difference between paint systems to include:
    i. medium solids
    ii. high solids
    iii. ultra high solids
    iv. water based.

The properties of different types of solvents, thinners and hardeners

a. the properties of different types of solvent, thinners and hardeners such as:
    i. evaporation rate
    ii. ability to dissolve the binder
    iii. ability to be tolerated by the binder
    iv. fade out properties
    v. drying rate
b. the forms of solvent/thinner such as:
    i. alcohols
    ii. ketones
    iii. glycol ethers
    iv. blends
c. the use of solvent/thinner:
    i. to make the paint fluid in the tin
    ii. to reduce the paint to a spraying/application viscosity

d. the properties of 2K hardeners to include:
    i. effectiveness at blocking out harmful ultraviolet light
    ii. necessity for adding to 2K paints to effect curing
    iii. inclusion of isocyanates requires special Health & Safety procedures.

The properties of paint system additives

a. list additives and describe their properties to include:
    i. adhesion promoters
    ii. flexible additives
    iii. texture finishes
    iv. extenders
    v. UV absorbers
    vi. flow aids
b. the characteristics of additives to be added to textured paints such as those for:
    i. textured finish
    ii. leather look finishes
    iii. crackle finishes
    iv. metallic additives other than aluminium.

The factors to be considered when choosing and using refinishing systems

a. the characteristics and properties of surface coatings to include:
    i. nitrocellulose – non-convertible; low build; fast surface dry
    ii. oil based synthetics – convertible; slow dry through uptake of oxygen
    iii. two packs – convertible; chemical reaction; high build
    iv. base coats – solvent or waterborne; non-convertible; very low build; high opacity has to be over-coated with clear coat
b. the listed paint materials in terms of their:
    i. preparation of substrates
    ii. mixing procedures
    iii. application
    iv. drying processes
    v. working techniques
    vi. covering and hiding power
    vii. rectification
    viii. cleaning processes.

Spraying equipment adjustments can alter the colour of refinishing materials

a. the spray gun adjustments that can be made to determine the surface finish of a colour coat to include:
    i. air pressure
    ii. fluid volume
    iii. fan width.

Sources of information relevant to the mixing and matching of vehicle paint colours

a. the information that may be gained from the Vehicle Identification No. (VIN) plate with regard to paint codes
b. alternative areas of the vehicle where the paint code may be found
c. the sources of information relevant to paint finishing to include:
    i. PC based material
    ii. paint manufacturers' information
    iii. trade magazines
    iv. specialist magazines (customising periodicals)
    v. vehicle manufacturers' information sheets
    vi. paint data sheets
    vii. microfiche
    viii. internet
    ix. Thatcham methods manuals
d. types of information recoverable from the above sources to include:
    i. product and mixing information
    ii. health and safety information
    iii. first aid procedures
    iv. application techniques
    v. rectification procedures
    vi. colour information
e. the meaning of the symbols used on most microfiche such as:
    i. colour data
    ii. formula field
    iii. technical field
    iv. online finish
    v. coding field
    vi. formula in development
    vii. special technical information
    viii. variants
    ix. respray
    x. poor opacity
    xi. 3-stage colour
    xii. colours for mouldings/bumpers
    xiii. revised formula
f. the extra colour information available such as:
    i. colour variants
    ii. colour 'wheel'
    iii. online colour back up
g. 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

a. the theory of colour matching to include:
    i. primary and secondary colours
    ii. metamerism
    iii. quality of light source
    iv. colour circles
b. the terminology used to describe the matching of metallic colours with reference to:

i. the Munsell colour circle
ii. the variant shade
iii. hue
iv. chroma
v. value

c. what is meant by subtractive mixing
d. what is meant by additive mixing.

The factors affecting colour and colour perception, including metamerism

a. factors affecting colour variation such as:
i. orientation of metallic particles
ii. flip and face tones
iii. coating thickness and viscosity
iv. spraying temperatures
v. spraying pressures

b. how each of the above has an effect on the colour match
c. how the above problems can be overcome
d. the process of light and pigment interaction with reference to:
i. colour spectrum
ii. colour effects
iii. refraction
iv. diffusion
v. light wavelengths
vi. thickness of pigment particles
vii. type of pigment particles

e. the function of a light box testing unit as:
i. testing under normal daylight conditions
ii. testing for metamerism
iii. comparison of colour standards

f. the operation of a light testing unit with reference to:
i. operation
ii. 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

a. the procedures and principles for using colour chips such as:
i. cleaning the panel
ii. matching in daylight conditions
iii. matching adjacent panels

b. what is meant by subtractive mixing
c. what is meant by additive mixing
d. the mixing of base coat materials to include:
i. mixing tinters
ii. thinners, solvents or water
iii. additives

e. the preparation of a clear coat material to include:
i. hardeners
ii. thinners/solvents
iii. additives

f. the types of 'advanced pigments' used in modern paints:
    i. metallic (aluminium and titanium)
    ii. pearlescents (micas)
    iii. 'multi-flip' pigments
g. the operation and characteristics of different pigments to include:
    i. acicular – noodle shaped; add strength and reinforcing
    ii. lamollar – flakes; increased durability
    iii. nodular – roughly spherical; most common
h. the function of spray out cards to determine:
    i. opacity of colour
    ii. hiding power
    iii. colour comparison
    iv. as a reference for future use
i. the functions of spray out cards with reference to a colour library:
    i. reference functions
    ii. colour tinting information
    iii. information required
    iv. recording of information.

Different application techniques

a. the differences to applying a base coat material compared with one stage solid colours such as:
    i. gun distance
    ii. gun speed
    iii. air pressure
    iv. 'drop coats'
    v. flash off
b. the application of clear coat with reference to:
    i. gun speed
    ii. flash off
    iii. number of coats
    iv. MS, HS and UHS.
c. the effects of applying metallic colours:
    i. wet
    ii. dry

The use of blending techniques as an aid to achieving an acceptable colour match

a. the procedure for carrying out paint blend to include:
    i. panel preparation
    ii. masking
    iii. gun technique
    iv. final thinning
    v. spraying onto adjacent areas and panels to assist in matching colours.

The methods used to rectify mismatches caused by over tinting

a. the requirements of tinting colours to:
    i. lighten the colour
    ii. darken the colour
    iii. tint the colour
    iv. 'clean' the colour

b. the procedure of colour matching with reference to:
    i. identifying the mismatch
    ii. describing the hue and value
    iii. identifying the required tinter
    iv. regulating the tinter additions.

Evidence requirements

The learner must:

1. produce evidence to show they meet **all** of the Essential Knowledge and Performance Objectives
2. produce performance evidence resulting from work they have carried out on real vehicles in their normal workplace or as defined within the IMI SVQ Assessment Strategy as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in their normal workplace or when safety is at risk
3. be observed by an assessor as defined in the IMI SVQ Assessment Strategy
4. produce evidence from their normal workplace of mixing and matching **2 non-metallic colours and 2 metallic or mica colours.**
5. be observed by their assessor on **at least 1 non-metallic and 1 metallic finish** in their normal workplace.

Unit 214 Advanced colour matching for motor vehicles

Level:	**7**
Credit value:	16
Endorsement by a regulatory body:	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.
Aim:	This unit is about the ability to identify, mix and match vehicle paint colours, including the use of tinters and the preparation of colour test cards.
Assessment requirements:	**Performance objectives must** be assessed via a portfolio of evidence, gathered through observing the candidate at work. See the **Evidence Requirements** at the end of this unit for further details. Candidates **must** take the City & Guilds 4311-263 on-line multiple choice test, which partly covers the **Essential Knowledge** within this unit. The Essential Knowledge **not** covered by the test are statements numbered: **3**: 8; **4**: 9; **5**: 11; **6**: 12; **7**: 23 This criteria **must** be assessed in one of the following ways: • oral or written questioning • professional discussion. Centres must keep an audit trail to show that candidates have covered all of the Essential Knowledge.

Essential knowledge

The learner will need to understand:

1. the health and safety and environmental legislative requirements specific to mixing and matching vehicle colours and why it is important that these are followed
2. workplace procedures and workshop practices relevant to personal and vehicle protection before, during and after mixing and matching vehicle colours
3. the importance of disposing of waste safely and the consequences of not doing so to others and the environment
4. the vehicle work specification agreed
5. their workplace procedures for:
    - the referral of problems
    - reporting delays to the completion of work
6. the importance of working to agreed timescales and keeping others informed of progress
7. the relationship between time, cost and profitability
8. the importance of reporting anticipated delays to the relevant person(s) promptly
9. how to prepare, test, adjust and use all the equipment required for mixing and matching vehicle paint colours
10. how spraying equipment adjustments can alter colour
11. spray gun faults, their cause and their rectification
12. the properties of refinishing systems and materials and the factors affecting their use
13. how to find, interpret and use sources of information relevant to the mixing and matching of vehicle paint colours
14. the principles of colour, the colour wheel and the effects of light
15. how to compare, mix, test and adjust colour tones and effects, including metallic and mica effects
16. the consequences of adding too much tinter and the process for correcting and adjusting it
17. the factors affecting colour variation and tone, including the effects of metamerism
18. how to dry test panels and colour test cards and the importance of doing so
19. how to identify the causes of, and rectify, colour mismatch
20. how to assess and evaluate the need for blending techniques to achieve an acceptable colour match
21. the importance of correctly preparing the existing finish for colour matching and checking the match using the correct light source
22. how to identify the paint substrate and the importance of doing so
23. how to dispose of waste materials
24. how to work safely avoiding damage to vehicles, personal injury and injury to colleagues
25. the importance of following manufacturers' instructions and using their approved methods of working, including using of refinishing systems and materials and equipment)
26. the consequences of failing to follow manufacturers' instructions.

Performance objectives

To be competent the learner must:

1. wear suitable personal protective equipment and use the specified environmental safety equipment throughout all paint mixing and matching activities
2. support paint mixing and matching activities by reviewing:
    - the vehicle manufacturer's technical data
    - material manufacturer's data
    - colour libraries
    - work instructions
3. prepare, test and adjust all the equipment required, following manufacturers' instructions, prior to use.
4. prepare all the refinishing systems and materials required following health and safety requirements and using:
    - materials which conform to the specification required
    - the manufacturer's approved method
    - the manufacturer's approved equipment
5. mix, compare and adjust colour tones and effects correctly using suitable mixing and matching techniques
6. ensure all refinishing systems and materials prepared meet the specification required for colour and viscosity prior to application
7. apply refinishing systems and materials to colour test cards using approved equipment and following:
    - the manufacturer's instructions
    - the correct application techniques for managing colour and tone variables
    - health and safety requirements
8. dry all colour test cards before checking colour following health and safety requirements and using:
    - the manufacturer's approved method
    - the manufacturer's approved equipment
9. ensure the colour produced:
    - meets the material manufacturer's requirements
    - meets the customer's requirements
    - is a blendable match to the existing colour
10. dispose of waste materials to conform with legal and workplace requirements
11. complete all mixing and matching activities within the agreed timescale
12. report any anticipated delays in completion to the relevant person(s) promptly.

Unit 214 Advanced colour matching for motor vehicles

Supporting information

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

The effects of the viewing environment on colour matching

a. artificial light
b. natural light
c. light box
d. direct sunlight
e. shaded light
f. reflection.

The purpose of paint materials

a. anti-corrosion
b. protection
c. reflection
d. visual
e. body sound deadening.

Types of undercoats and their function

a. primer
b. primer surfacer
c. anti-corrosion
d. etch primers
e. plastic primers
f. primer fillers
g. electrodepositing (e-coating)
h. e-coat replacement products
i. sealers/isolators
j. anti-chip/texture coatings.

Types of paints and their function

a. single pack
b. two pack
c. acrylic
d. alkyd
e. epoxy
f. polyurethane
g. phenolic
h. polyester.

Types of pigments available and their function

a. coloured
b. metallic
c. pearl
d. anti-corrosion
e. extender
f. special effects.

The purpose of testing paint materials

a. adhesion
b. durability
c. corrosion
d. resistance to chemicals
e. abrasion
f. acid rain
g. ultraviolet.

Types of topcoat

a. solid colours
b. clear over base colours
c. metallic colours
d. pearl colours.

Methods and importance of correctly identifying paint substrates prior to undertaking any refinishing work

a. workshop tests to determine substrates to include:
    i. solvent wipe test (1K or 2K)
    ii. colour of flatting sludge (straight colour or COB)
    iii. VIN plate
b. substrates to determine selection of undercoat with reference to:
    i. condition of surface
    ii. type of substrate
    iii. process requirements
    iv. material requirements
c. the physical properties of a substrate to include:
    i. surface condition
    ii. adhesion
    iii. flexibility
    iv. porosity
d. the technical properties of a substrate to include:
    i. type of paint
    ii. steel
    iii. aluminium
    iv. plastic
    v. coated steels
    vi. repaired panels
    vii. OE finish.

How to prepare existing paint substrates for colour matching

a. the required preparation for the listed substrates to include:
    i. steel
    ii. aluminium alloys
    iii. GR plastics
    iv. thermo plastics
    v. cured 2K materials
    vi. synthetic enamels
b. the procedures for the preparation of paint finishes to include:
    i. thorough cleaning and drying
    ii. compounding to restore original colour
c. the procedures for the preparation of plastics to include:
    i. identification
    ii. tempering
    iii. porefilling
    iv. release agent removal
    v. cleaning
    vi. adhesion promotion
    vii. elastic primers
d. the preparation requirements for textured and special effect coatings to include:
    i. spoilers
    ii. bumpers
    iii. exterior trim.

How different light sources can affect the perception of colour for matching purposes

a. colour in terms of light reflected from a surface to include:
    i. light quality
    ii. surface quality
    iii. absorbed light
    iv. reflected light
b. the effects of metamerism under:
    i. sodium light
    ii. mercury vapour
c. explain how this phenomenon is created.

Types of refinishing materials by their film forming characteristics

a. the different types of paints to include:
    i. non-convertible
        a. nitrocellulose
        b. 1K acrylic
    ii. convertible
        a. oil based synthetics
        b. 2K acrylics
        c. 2K polyurethane
        d. polyesters
        e. isocyanate resins
        f. waterborne base coats
        g. microgel
        h. latex

b. the properties of binders to include:
    i. convertible: oxidise, high temperature reactants, chemical reactants
    ii. non-convertible: solvent evaporation
c. the forms of binder such as:
    i. nitrocellulose
    ii. alkyds
    iii. urethanes
    iv. polyesters
    v. isocyanates
    vi. acrylics
d. the uses of binders in paints:
    i. film forming
    ii. binding the pigments
    iii. adhesion
    iv. cohesion
    v. flexibility
e. the principles of operation of water based materials
f. the materials used in water based paint technology
g. the environmental advantages of using water based paints.

Distinguish between paint system classification

a. the difference between paint systems to include:
    i. medium solids
    ii. high solids
    iii. ultra high solids
    iv. water based.

The properties of different types of solvents, thinners and hardeners

a. the properties of different types of solvent, thinners and hardeners such as:
    i. evaporation rate
    ii. ability to dissolve the binder
    iii. ability to be tolerated by the binder
    iv. fade out properties
    v. drying rate
b. the forms of solvent/thinner such as:
    i. alcohols
    ii. ketones
    iii. glycol ethers
    iv. blends
c. the use of solvent/thinner:
    i. to make the paint fluid in the tin
    ii. to reduce the paint to a spraying/application viscosity
d. the properties of 2K hardeners to include:
    i. effectiveness at blocking out harmful ultraviolet light
    ii. necessity for adding to 2K paints to effect curing
    iii. inclusion of isocyanates requires special Health & Safety procedures.

The properties of paint system additives

a. list additives and describe their properties to include:
    i. adhesion promoters
    ii. flexible additives
    iii. texture finishes
    iv. extenders
    v. UV absorbers
    vi. flow aids
b. the characteristics of additives to be added to textured paints such as those for:
    i. textured finish
    ii. leather look finishes
    iii. crackle finishes
    iv. metallic additives other than aluminium.

The factors to be considered when choosing and using refinishing systems

a. the characteristics and properties of surface coatings to include:
    i. nitrocellulose – non-convertible; low build; fast surface dry
    ii. oil based synthetics – convertible; slow dry through uptake of oxygen
    iii. two packs – convertible; chemical reaction; high build
    iv. base coats – solvent or waterborne; non-convertible; very low build; high opacity has to be over-coated with clear coat
b. the listed paint materials in terms of their:
    i. preparation of substrates
    ii. mixing procedures
    iii. application
    iv. drying processes
    v. working techniques
    vi. covering and hiding power
    vii. rectification
    viii. cleaning processes.

Spraying equipment adjustments can alter the colour of refinishing materials

a. the spray gun adjustments that can be made to determine the surface finish of a colour coat to include:
    i. air pressure
    ii. fluid volume
    iii. fan width.

Sources of information relevant to the mixing and matching of vehicle paint colours

a. the information that may be gained from the Vehicle Identification No. (VIN) plate with regard to paint codes
b. alternative areas of the vehicle where the paint code may be found
c. the sources of information relevant to paint finishing to include:
    i. PC based material
    ii. paint manufacturers' information
    iii. trade magazines
    iv. specialist magazines (customising periodicals)
    v. vehicle manufacturers' information sheets
    vi. paint data sheets
    vii. microfiche
    viii. internet
    ix. Thatcham methods manuals
d. types of information recoverable from the above sources to include:
    i. product and mixing information
    ii. health and safety information
    iii. first aid procedures
    iv. application techniques
    v. rectification procedures
    vi. colour information
e. the meaning of the symbols used on most microfiche such as:
    i. colour data
    ii. formula field
    iii. technical field
    iv. online finish
    v. coding field
    vi. formula in development
    vii. special technical information
    viii. variants
    ix. respray
    x. poor opacity
    xi. 3-stage colour
    xii. colours for mouldings/bumpers
    xiii. revised formula
f. the extra colour information available such as:
    i. colour variants
    ii. colour 'wheel'
    iii. online colour back up
g. 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

a. the theory of colour matching to include:
    i. primary and secondary colours
    ii. metamerism
    iii. quality of light source
    iv. colour circles

b. the terminology used to describe the matching of metallic colours with reference to:
    i. the Munsell colour circle
    ii. the variant shade
    iii. hue
    iv. chroma
    v. value
c. what is meant by subtractive mixing
d. what is meant by additive mixing.

The factors affecting colour and colour perception, including metamerism

a. factors affecting colour variation such as:
    i. orientation of metallic particles
    ii. flip and face tones
    iii. coating thickness and viscosity
    iv. spraying temperatures
    v. spraying pressures
b. how each of the above has an effect on the colour match
c. how the above problems can be overcome
d. the process of light and pigment interaction with reference to:
    i. colour spectrum
    ii. colour effects
    iii. refraction
    iv. diffusion
    v. light wavelengths
    vi. thickness of pigment particles
    vii. type of pigment particles
e. the function of a light box testing unit as:
    i. testing under normal daylight conditions
    ii. testing for metamerism
    iii. comparison of colour standards
f. the operation of a light testing unit with reference to:
    i. operation
    ii. 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

a. the procedures and principles for using colour chips such as:
    i. cleaning the panel
    ii. matching in daylight conditions
    iii. matching adjacent panels
b. what is meant by subtractive mixing
c. what is meant by additive mixing
d. the mixing of base coat materials to include:
    i. mixing tinters
    ii. thinners, solvents or water
    iii. additives

e. the preparation of a clear coat material to include:
    i. hardeners
    ii. thinners/solvents
    iii. additives
f. the types of 'advanced pigments' used in modern paints:
    i. metallic (aluminium and titanium)
    ii. pearlescents (micas)
    iii. 'multi-flip' pigments
g. the operation and characteristics of different pigments to include:
    i. acicular – noodle shaped; add strength and reinforcing
    ii. lamollar – flakes; increased durability
    iii. nodular – roughly spherical; most common
h. the function of spray out cards to determine:
    i. opacity of colour
    ii. hiding power
    iii. colour comparison
    iv. as a reference for future use
i. the functions of spray out cards with reference to a colour library:
    i. reference functions
    ii. colour tinting information
    iii. information required
    iv. recording of information.

Different application techniques

a. the differences to applying a base coat material compared with one stage solid colours such as:
    i. gun distance
    ii. gun speed
    iii. air pressure
    iv. 'drop coats'
    v. flash off
b. the application of clear coat with reference to:
    i. gun speed
    ii. flash off
    iii. number of coats
    iv. MS, HS and UHS.
c. the effects of applying metallic colours:
    i. wet
    ii. dry

The use of blending techniques as an aid to achieving an acceptable colour match

a. the procedure for carrying out paint blend to include:
    i. panel preparation
    ii. masking
    iii. gun technique
    iv. final thinning
    v. spraying onto adjacent areas and panels to assist in matching colours.

The methods used to rectify mismatches caused by over tinting

a. the requirements of tinting colours to:
    i. lighten the colour
    ii. darken the colour
    iii. tint the colour
    iv. 'clean' the colour
b. the procedure of colour matching with reference to:
    i. identifying the mismatch
    ii. describing the hue and value
    iii. identifying the required tinter
    iv. regulating the tinter additions.

Evidence requirements

The learner must:

1. produce evidence to show they meet **all** of the Essential Knowledge and Performance Objectives
2. produce performance evidence resulting from work they have carried out on real vehicles in their normal workplace or as defined within the IMI SVQ Assessment Strategy as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in their normal workplace or when safety is at risk
3. be observed by an assessor as defined in the IMI SVQ Assessment Strategy
4. produce evidence from their normal workplace of mixing and matching vehicle paint colours, including the use of tinters in the preparation of colour test cards
5. be observed by their assessor on **at least 1 non-metallic and 1 metallic finish** in their normal workplace.

Appendix 1 Sources of general information

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

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

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

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

- SQA Accreditation's Regulatory Principles, version 2, 1 December 2014
- NVQ Code of Practice (2006)

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

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

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

- **Walled Garden:** how to register and certificate candidates on line
- **Events**: dates and information on the latest Centre events
- **Online assessment**: how to register for e-assessments.

Useful contacts

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

If you have a complaint, or any suggestions for improvement about any of the services that we provide, email: feedbackandcomplaints@cityandguilds.com

About City & Guilds

As the UK's leading vocational education organisation, City & Guilds is leading the talent revolution by inspiring people to unlock their potential and develop their skills. We offer over 500 qualifications across 28 industries through 8500 centres worldwide and award around two million certificates every year. City & Guilds is recognised and respected by employers across the world as a sign of quality and exceptional training.

City & Guilds Group

The City & Guilds Group is a leader in global skills development. Our purpose is to help people and organisations to develop their skills for personal and economic growth. Made up of City & Guilds, City & Guilds Kineo, The Oxford Group and ILM, we work with education providers, businesses and governments in over 100 countries.

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