

# **SVQ in Vehicle Paintwork Repair at SCQF Level 6 (5311-26)**

**August 2020 Version 1.0**

**Qualification Handbook**

## Qualification at a glance

<b>Subject area</b>	Vehicle Paintwork Repair
<b>City &amp; Guilds number</b>	5311-26
<b>Age group approved</b>	16+
<b>Entry requirements</b>	None
<b>Assessment</b>	Portfolio of evidence and e-assessment online multiple choice tests.
<b>Approvals</b>	Automatic approval applies in some cases
<b>Support materials</b>	Centre Handbook Exam Success Book
<b>Registration and certification</b>	Consult the Walled Garden/Online Catalogue for last dates

<b>Title and level</b>	<b>City &amp; Guilds number</b>	<b>Accreditation number</b>
SVQ in Vehicle Paintwork Repair at SCQF Level 6	5311-26	GN9X 46

<b>Version and date</b>	<b>Change detail</b>	<b>Section</b>
V1.0 August 2020		

# Contents

<b>Qualification at a glance</b>	<b>2</b>
<b>Contents</b>	<b>3</b>
<b>1 Introduction</b>	<b>5</b>
Structure	6
<b>2 Centre requirements</b>	<b>8</b>
Approval	8
Resource requirements	8
Learner entry requirements	9
<b>3 Delivering the qualification</b>	<b>10</b>
Initial assessment and induction	10
Support materials	10
<b>4 Assessment</b>	<b>11</b>
Summary of assessment methods	11
Assessment strategy	13
Simulation	13
Realistic Work Environment (RWE)	13
Expert witness	13
Health and safety	13
Data protection and confidentiality	14
<b>5 Units</b>	<b>15</b>
Availability of units	15
<b>Unit 001 Contribute to Housekeeping in Motor Vehicle Environments</b>	<b>16</b>
<b>Unit 002 Reduce Risk(s) to Health and Safety in the Motor Vehicle Environment</b>	<b>25</b>
<b>Unit 003 Maintain Working Relationships in the Motor Vehicle Environment</b>	<b>34</b>
<b>Unit 309+368 Apply Masking Materials to Automotive Vehicles</b>	<b>38</b>
<b>Unit 404+454 Prepare Metal and Pre-painted Substrates in an Automotive Environment</b>	<b>41</b>
<b>Unit 405+455 Establish Defects in Paintwork on Automotive Vehicles</b>	<b>48</b>
<b>Unit 406+456 Spot Repair on Motor Vehicles</b>	<b>56</b>
<b>Unit 407+457 Blend and Fade out Repairs on Automotive Vehicles</b>	<b>60</b>
<b>Unit 408+458 Carry out Edge to Edge Repairs on Automotive Vehicles</b>	<b>64</b>
<b>Unit 409+459 Mix and Match Colours for Automotive Vehicles</b>	<b>73</b>
<b>Appendix 1 Sources of general information</b>	<b>85</b>



# 1 Introduction

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

Area	Description
Who are the qualifications for?	<p>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.</p> <p>Their structure and assessment strategy have been produced by the Institute of the Motor Industry, who are the Sector Skills Council for the Automotive Industry.</p>
What do the qualifications cover?	<p>Candidates cover areas such as routine vehicle maintenance, removal and replacement of vehicle units and components and carrying out repairs to motor vehicles. They are assessed in the workplace by using the following methods:</p> <ul style="list-style-type: none"><li>• workplace observation</li><li>• witness testimony</li><li>• verbal questioning of Essential Knowledge</li><li>• City &amp; Guilds' e-assessment online multiple choice test</li></ul>
What opportunities for progression are there?	<p>After taking these qualifications candidates will have a qualification that show employers and customers they are competent and have the skills required to carry out body repairs as a result of accidents and will be able to progress into employment.</p> <p>In addition, candidates who enjoy leading teams of people at work could also move onto a qualification as a Team Leader or Supervisor such as qualifications at Levels 2, 3 and 4 through the Institute of Leadership and Management (ILM).</p>
Is it part of an apprenticeship framework or initiative?	<p>These qualifications are part of the Scottish Automotive Maintenance and Repair Modern Apprenticeship.</p>

## Structure

To achieve the **SVQ in Vehicle Paintwork Repair at SCQF Level 6**, learners must achieve **all 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	SCQF level	SCQF credit value
<b>Mandatory</b>			
5311-001	Contribute to Housekeeping in Motor Vehicle Environments	5	5
5311-002	Reduce Risk(s) to Health and Safety in the Motor Vehicle Environment	5	5
5311-003	Maintain Working Relationships in the Motor Vehicle Environment	6	7
5311-309 5311-368	Apply Masking Materials to Automotive Vehicles	5	14
5311-404 5311-454	Prepare Metal and Pre-Painted Substrates in an Automotive Environment	5	17
5311-405 5311-455	Establish Defects in Paintwork on Automotive Vehicles	6	16
5311-406 5311-456	Spot Repair on Motor Vehicles	6	16
5311-407 5311-457	Blend and Fade out Repairs on Automotive Vehicles	6	16
5311-408 5311-458	Carry out Edge to Edge Repairs on Automotive Vehicles	6	16
5311-409 5311-459	Mix and Match Colours for Automotive Vehicles	7	17

## 2 Centre requirements

### Approval

If your Centre is approved to offer the SVQ in Automotive Maintenance and Repair – Paint Repair (4101-37) or SVQ in Vehicle Paintwork Repair at SCQF Level 6 (4311-53) you will be granted automatic approval for the SVQ in Vehicle Paintwork Repair at SCQF Level 6 (5311-26).

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.

## Learner 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

City & Guilds cannot accept any registrations for candidates under 16 as these qualifications are not approved for under 16s.

## 3 Delivering the qualification

### Initial assessment and induction

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

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

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

### Support materials

The following resources are available for this qualification:

Description	How to access
Exam Success book TL024290	<a href="http://www.cityandguilds.com">www.cityandguilds.com</a>
SmartScreen	<a href="http://www.smartscreen.co.uk">www.smartscreen.co.uk</a>

### Recording documents

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

City & Guilds endorses several ePortfolio systems, including our own, **Learning Assistant**, an easy-to-use and secure online tool to support and evidence learners' progress towards achieving qualifications. Further details are available at:  
[www.cityandguilds.com/eportfolios](http://www.cityandguilds.com/eportfolios).

City & Guilds has developed a set of *Recording forms* including examples of completed forms, for new and existing centres to use as appropriate. *Recording forms* are available on the City & Guilds website. Although new centres are expected to use these forms, centres may devise or customise alternative forms, which must be approved for use by the EQA, before they are used by candidates and assessors at the centre. Amendable (MS Word) versions of the forms are available on the City & Guilds website.

## 4 Assessment

### Summary of assessment methods

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 EQA 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 in Vehicle Body Repair & Alignment at SCQF Level 6

Unit	Title	Assessment method
5311-001	Contribute to Housekeeping in Motor Vehicle Environments	Portfolio
5311-002	Reduce Risk(s) to Health and Safety in the Motor Vehicle Environment	Portfolio
5311-003	Maintain Working Relationships in the Motor Vehicle Environment	Portfolio
5311-309	Apply Masking Materials to Automotive Vehicles	Portfolio
5311-368		Portfolio
5311-404	Prepare Metal and Pre-Painted Substrates in an Automotive Environment	Portfolio
5311-454		Multiple choice online test
5311-405	Establish Defects in Paintwork on Automotive Vehicles	Portfolio
5311-455		Multiple choice online test
5311-406	Spot Repair on Motor Vehicles	Portfolio
5311-456		Multiple choice online test
5311-407	Blend and Fade out Repairs on Automotive Vehicles	Portfolio
5311-457		Multiple choice online test
5311-408	Carry out Edge to Edge Repairs on Automotive Vehicles	Portfolio
5311-458		Multiple choice online test
5311-409	Mix and Match Colours for Automotive Vehicles	Portfolio
5311-459		Multiple choice online test

## Assessment strategy

### 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 EQA
- 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 EQA 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 EQA.

## **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*.

## 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**

<b>Level:</b>	<b>5</b>
<b>Credit value:</b>	<b>5</b>
<b>Endorsement by a regulatory body:</b>	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.
<b>Aim:</b>	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:

<b>1. Legislative and organisational requirements and procedures</b>	
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 <b>housekeeping activities</b> and <b>equipment maintenance</b>
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.
<b>2. Equipment maintenance</b>	
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 <b>work tools and equipment</b>
2.4	how to work safely when cleaning and maintaining <b>work tools and equipment.</b>



### 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 309+368**

**Apply Masking Materials to Automotive Vehicles**

**Unit 001**

**Contribute to Housekeeping in Motor Vehicle Environments**

## Supporting Information

### Scope of this unit

1. **Equipment maintenance** covers:
  - routine checks on work tools and equipment
  - cleaning work tools and equipment
  - replacing minor parts
  - 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.

## 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.**

### **Economic use of resources**

Consumable materials e.g. 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 e.g. electrical safety check log.

### **Legislation relevant to Health and Safety**

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

### **General regulations to include an awareness of:**

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

### **Legislative duties**

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

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

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

**PPE to include:**

- a. typical maintenance procedures for PPE equipment to include:
  - i. typical maintenance log
  - ii. cleaning procedures
  - iii. filter maintenance
  - iv. variation in glove types
  - v. air quality checks
- b. choice and fitting procedures for masks and air breathing equipment
- c. typical workplace processes which would require the use of PPE to include:
  - i. welding
  - ii. sanding and grinding
  - iii. filling
  - iv. panel removal and replacement
  - v. drilling
  - vi. cutting
  - vii. chiselling
  - viii. removal of broken glass
  - ix. removal of rubber seals from fire damaged vehicles
  - x. removal of hypodermic needles
  - xi. servicing activities
  - xii. roadside recovery
  - 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. CO2
  - 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 policies and procedures on:
  - i. the use of safe working methods and equipment
  - ii. the safe use of hazardous substances
  - iii. smoking, eating, drinking and drugs
  - iv. emergency procedures
  - v. personal appearance
- b. the importance of personal appearance in the control of health and safety.

### **Action to be taken in the event of colleagues suffering accidents**

- a. the typical sequence of events following the discovery of an accident such as:
  - i. make the area safe
  - ii. remove hazards if appropriate, i.e. switch off power
  - iii. administer minor first aid
  - iv. take appropriate action to 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, i.e. keep the injured party warm
  - vii. administer water for minor burns or chemical injuries
  - viii. wash eyes with water to remove dust or ingress of chemicals (battery acid)
  - ix. need to seek professional help for serious injuries
- c. examples of bad practice which may result in further injury such as:
  - i. moving the injured party
  - ii. removing foreign objects from wounds or eyes
  - iii. inducing vomiting
  - iv. straightening deformed limbs.

## Evidence requirements

1. You must produce evidence of cleaning the part of the work area for which you are responsible on 3 separate occasions.
2. You must produce evidence of undertaking basic, routine checks of all the following types of work tools and equipment on 3 separate occasions:
  - a. hand
  - b. electrical
  - c. mechanical
  - d. pneumatic
  - e. hydraulic
3. You must be observed by your assessor cleaning the part of the work area for which you are responsible on at least 1 occasion and checking all the types of work tools and equipment specified above on at least 1 occasion.
4. You must produce evidence that includes at least 2 instances of you cleaning the part of the work area for which you are responsible and at least 2 instances of you checking all the types of work tools and equipment specified above within your normal workplace.



# Unit 002      Reduce Risk(s) to Health and Safety in the Motor Vehicle Environment

<b>Level:</b>	5
<b>Credit value:</b>	5
<b>Endorsement by a regulatory body:</b>	This unit is endorsed by IMI.
<b>Aim:</b>	<p>This unit covers the basic, legally required health and safety duties of everyone in the workplace. It describes the competence required to ensure that:</p> <ul style="list-style-type: none"> <li>• own actions do not create any health and safety risks</li> <li>• the learner does not ignore significant risks in your workplace, and</li> <li>• 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.</li> </ul> <p>This unit does <b>not</b> 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:</p> <ul style="list-style-type: none"> <li>• identify hazards and evaluate risks in their workplace</li> <li>• reduce the risks to health and safety in their workplace.</li> </ul>

## Essential knowledge

The learner will need to understand:

<b>1. Health and safety legislation and workplace policies</b>	
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 <b>workplace policies</b> 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 (e.g. 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 309+368

## Apply Masking Materials to Automotive Vehicles

## Unit 002

## Reduce Risk(s) 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 e.g. 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 e.g. electrical safety check log.

### **Legislation relevant to Health and Safety**

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

### **General regulations to include an awareness of:**

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

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

### **Legislative duties**

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

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

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

### **PPE to include:**

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

- viii. removal of broken glass
  - ix. removal of rubber seals from fire damaged vehicles
  - x. removal of hypodermic needles
  - xi. servicing activities
  - xii. roadside recovery
  - 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<sub>2</sub>
  - 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 policies and procedures on:
  - i. the use of safe working methods and equipment
  - ii. the safe use of hazardous substances
  - iii. smoking, eating, drinking and drugs
  - iv. emergency procedures
  - v. personal appearance
- b. the importance of personal appearance in the control of health and safety.

### **Action to be taken in the event of colleagues suffering accidents**

- a. the typical sequence of events following the discovery of an accident such as:
  - i. make the area safe
  - ii. remove hazards if appropriate, i.e. switch off power
  - iii. administer minor first aid
  - iv. take appropriate action to 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, i.e. keep the injured party warm
  - vii. administer water for minor burns or chemical injuries
  - viii. wash eyes with water to remove dust or ingress of chemicals (battery acid)
  - ix. need to seek professional help for serious injuries
- c. examples of bad practice which may result in further injury such as:
  - i. moving the injured party
  - ii. removing foreign objects from wounds or eyes
  - iii. inducing vomiting
  - iv. straightening deformed limbs.



## Evidence requirements

1. You must produce evidence to demonstrate competence in identifying hazards with reference to working activities or aspects of the workplace and acting upon your decisions as to whether the hazard presents a high or low risk.
2. You must produce evidence of identifying risks which may result from at least 2 of the items listed below:
  - a. the use and maintenance of machinery or 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
3. You must produce evidence of following at least 4 of the workplace policies listed below:
  - 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 height
  - i. mobile phones and personal stereo equipment
4. You must be observed following workplace policies on at least 2 occasions.
5. You must produce evidence of the risks you have identified from at least 1 of the items listed, and at least 3 instances of you following workplace policies, within your normal workplace.

## Unit 003

# Maintain Working Relationships in the Motor Vehicle Environment

<b>Level:</b>	<b>6</b>
<b>Credit value:</b>	<b>7</b>
<b>Endorsement by a regulatory body:</b>	This unit is endorsed by IMI.
<b>Aim:</b>	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:

#### 1. 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 309+368      Apply Masking Materials to Automotive Vehicles**

**Unit 003            Maintaining 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. reception
- b. body shop
- c. service repair workshop
- d. valeting
- e. parts
- f. sales
- g. administration.

**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. electronic mail
- f. vehicle job card
- g. notice boards
- h. SMS text messaging.

### **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.

### **Agreed timescales**

- a. relationship between time and cost
- b. customer expectation.

## **Evidence requirements**

1. You must produce evidence that you have worked in a professional manner with employers, colleagues and customers/public.
2. You must be observed by your assessor on at least 3 occasions working in a professional manner with employers, colleagues and customers/public.

<b>Level:</b>	<b>5</b>
<b>Credit value:</b>	14
<b>Endorsement by a regulatory body:</b>	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.
<b>Aim:</b>	This NOS is about the ability to undertake masking activities efficiently and effectively prior to any foundation or paint being applied to a motor vehicle.

### Essential knowledge

<p><b>The learner will need to understand:</b></p> <ol style="list-style-type: none"> <li>1. the health and safety and environmental legislative requirements specific to vehicle refinishing operations and why it is important that these are followed</li> <li>2. workplace procedures and workshop practices relevant to personal and vehicle protection before, during and after vehicle refinishing operations</li> <li>3. the importance of disposing of waste safely and the consequences of not doing so to others, the business and the environment</li> <li>4. the vehicle work specification and work instructions agreed</li> <li>5. your workplace procedures for: <ul style="list-style-type: none"> <li>• the referral of problems</li> <li>• reporting delays to the completion of work</li> <li>• personal protection</li> </ul> </li> <li>6. the relationship between time, cost and profitability</li> <li>7. the importance of working to agreed timescales and reporting anticipated delays to the relevant person(s) promptly</li> <li>8. how to prepare, test, adjust and use all the tools and equipment required for vehicle masking operations</li> <li>9. the properties of refinishing systems and materials and the factors affecting their use and their relevance to the masking process</li> <li>10. how to recognise damage to surfaces and ancillary fittings</li> <li>11. how to interpret manufacturer's preparation schedules</li> <li>12. how to carry out masking procedures to avoid materials wastage and vehicle contamination for each stage of the preparation process</li> <li>13. how to prepare panels and parts adjacent to the area being painted</li> <li>14. methods of protecting panels and parts adjacent to the areas being painted and the circumstances in which they should be used</li> <li>15. methods and techniques of masking (including paper and sheet masking) and the circumstances in which they should be used</li> <li>16. the implications of not following the correct masking process and its effect on the overall quality process</li> <li>17. the implications of rectification identified by an agreed quality control process.</li> </ol>
--

## Performance objectives

### To be competent the learner must:

1. use suitable personal and vehicle protective equipment and use the specified environmental safety equipment throughout all vehicle operations
2. ensure the vehicle is suitably prepared prior to the masking operation
3. support vehicle masking operations by reviewing product technical data and work instructions
4. identify suitable masking product for undertaking the masking process
5. prepare, test and adjust all the tools and equipment required, following manufacturer's instructions, prior to use
6. dispose of waste materials to conform with legal, environmental and workplace requirements
7. clean and make good tools and the work environment as appropriate
8. complete all masking activities efficiently and to the required standard
9. report any anticipated delays in completion to the relevant person(s) promptly.

# **Unit 309+368      Apply Masking Materials to Automotive Vehicles**

## **Supporting information**

### **Evidence requirements**

You must produce evidence from your normal workplace of carrying out 3 different masking operations out of the 8 listed below, which covers the learning outcomes:

- a) Masking a road wheel / tyre during preparation and painting
- b) Mask / 'sheet' out a full vehicle leaving the panels for priming or painting exposed
- c) Vehicle apertures – 'masking out' doors, boot, bonnet or tailgate
- d) Masking components and trim – e.g. headlight or door moulding
- e) Masking shapes, chevrons or custom designs
- f) Masking front or rear windscreens
- g) Masking areas prior to applying seam sealers and / or textured foundation materials
- h) Masking techniques prior to 'spot priming', or performing localised repairs, blending / fading techniques



## Unit 404+454

# Prepare Metal and Pre-painted Substrates in an Automotive Environment

<b>Level:</b>	<b>5</b>															
<b>Credit value:</b>	16															
<b>Endorsement by a regulatory body:</b>	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.															
<b>Aim:</b>	This unit is about preparing a wide variety of different vehicle panel and component substrates to accept foundation materials and paint topcoats.															
<b>Assessment requirements:</b>	<p><b>Performance objectives must</b> be assessed via a portfolio of evidence, gathered through observing the candidate at work. See the <b>Evidence Requirements</b> at the end of this unit for further details.</p> <p>Candidates <b>must</b> take the City &amp; Guilds 5311-454 on-line multiple choice test, which partly covers the <b>Essential Knowledge</b> within this unit.</p> <p>The Essential Knowledge <b>not</b> covered by the test are statements numbered:</p> <table><tr><td><b>2</b></td><td><b>3</b></td><td><b>4</b></td><td><b>5</b></td><td><b>7</b></td></tr><tr><td>8</td><td>9</td><td>10</td><td>13</td><td>23</td></tr><tr><td>25</td><td>26</td><td></td><td></td><td></td></tr></table> <p>This criteria <b>must</b> be assessed in one of the following ways:</p> <ul style="list-style-type: none"><li>• oral or written questioning</li><li>• professional discussion.</li></ul> <p>Centres must keep an audit trail to show that candidates have covered all of the Essential Knowledge.</p>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>7</b>	8	9	10	13	23	25	26			
<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>7</b>												
8	9	10	13	23												
25	26															

## Essential knowledge

### The learner will need to understand:

1. the health, safety and legal requirements relating to the preparation of panel substrates for foundation and topcoats
2. your workplace procedures for:
3. the referral of problems
4. reporting of delays to the completion of work
5. completion of work records
6. the use of personal and vehicle protection
7. the work that needs to be done and the standard required
8. the importance of reporting anticipated delays to the relevant person(s) promptly
9. the requirements for protecting the vehicle and contents from damage before, during and after foundation and topcoat preparation activities
10. the importance of selecting, using and maintaining the appropriate personal protective equipment when preparing panel substrates for foundation and topcoats
11. the relationship between time, cost and profitability
12. how to select, adjust and use the correct tools and equipment throughout the preparation process
13. how to recognise damage to substrates and ancillary fittings
14. how to test and recognise substrates and assess suitability for repair
15. how the substrate affects the preparation process
16. how to source, use and understand the vehicle manufacturer's methods and limitations
17. how to prepare new and repaired panels using the correct techniques
18. how to carry out repair procedures to avoid materials wastage and vehicle contamination for each stage of the preparation process
19. how to prepare and protect panels and parts adjacent to the area being painted
20. the factors governing the choice of panel preparation methods for substrate materials
21. the types and grades of available abrasives and the factors governing their use for different substrates
22. the importance of following manufacturer's methods and using their approved techniques of working (including use of materials and equipment)
23. the consequences of failing to follow manufacturer's methods and processes
24. the importance of working to agreed timescales and keeping others informed
25. how to work safely avoiding damage to vehicles, personal injury and injury to colleagues
26. how to dispose of waste materials to comply with any environmental legislation
27. the importance of disposing of waste safely and the consequences of not doing so to the business, others and the environment
28. the implications of rectification identified by an agreed quality control process.

## Performance objectives

### To be competent the learner must:

1. use the appropriate personal protective equipment when carrying out all substrate preparation activities
2. protect the vehicle and its contents effectively when carrying out all substrate preparation activities
3. select and use the correct tools and equipment for the type of substrate preparation activities you are carrying out
4. ensure that the tools and equipment you require are in a safe working condition

5. identify the body panel substrates accurately prior to undertaking any preparation work
6. follow the work instructions given for the job correctly
7. clean and protect all substrates adjacent to those being prepared using the specified method
8. report any unrecorded damage to substrates 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 (where appropriate) referring to manufacturers methods
10. keep your work area clean and tidy throughout all preparation activities
11. prepare all the panel substrates required following health and safety requirements and using:
  - suitable materials for the type of substrate
  - 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, environmental and workplace requirements
14. clean and make good tools and the work environment as appropriate
15. complete all vehicle preparation activities within the agreed timescale and to an agreed quality control process
16. report any anticipated delays in completion to the relevant person(s) promptly.

# Unit 404+454      Prepare Metal and Pre-painted Substrates in an Automotive 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 flattening 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

1. You must produce evidence from your normal workplace of preparing metal and pre-painted surfaces on 5 different vehicle body panels out of the 8 listed below\*.
  - a. electro-coated panels
  - b. repaired panels
  - c. original manufacturers finish
  - d. plastic components
  - e. zinc coated panels
  - f. steel panels
  - g. aluminium panels
  - h. primed panel
2. You must produce evidence of covering all of the techniques listed below in carrying out the preparation listed above
  - a. feathering out
  - b. flattening using guide coats
  - c. hand sanding
  - d. machine sanding
  - e. dry sanding
3. You must be observed by your assessor on at least 2 occasions carrying out the preparation of different vehicle body panels.

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

## Unit 405+455

## Establish Defects in Paintwork on Automotive Vehicles

<b>Level:</b>	<b>6</b>										
<b>Credit value:</b>	16										
<b>Endorsement by a regulatory body:</b>	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.										
<b>Aim:</b>	This unit is about establishing a range of faults in vehicle paintwork which may often require the removal of materials to a sound substrate in order for the defect to be established and rectification to take place.										
<b>Assessment requirements:</b>	<p><b>Performance objectives must</b> be assessed via a portfolio of evidence, gathered through observing the candidate at work. See the <b>Evidence Requirements</b> at the end of this unit for further details.</p> <p>Candidates <b>must</b> take the City &amp; Guilds 5311-455 on-line multiple choice test, which partly covers the <b>Essential Knowledge</b> within this unit.</p> <p>The Essential Knowledge <b>not</b> covered by the test are statements numbered:</p> <table><tr><td><b>2</b></td><td><b>4</b></td><td><b>5</b></td><td><b>7</b></td><td><b>8</b></td></tr><tr><td>9</td><td>10</td><td>11</td><td>13</td><td>19</td></tr></table> <p>This criteria <b>must</b> be assessed in one of the following ways:</p> <ul style="list-style-type: none"><li>• oral or written questioning</li><li>• professional discussion.</li></ul> <p>Centres must keep an audit trail to show that candidates have covered all of the Essential Knowledge.</p>	<b>2</b>	<b>4</b>	<b>5</b>	<b>7</b>	<b>8</b>	9	10	11	13	19
<b>2</b>	<b>4</b>	<b>5</b>	<b>7</b>	<b>8</b>							
9	10	11	13	19							



## 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 the business, others and the environment
3. the importance of selecting, using and maintaining the appropriate personal and vehicle protective equipment when establishing and repairing paint defects and faults
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 requirements for protecting the vehicle and contents from damage before, during and after establishing and repairing paint defects and faults
7. the relationship between time, cost and profitability
8. how to prepare, test, use and adjust all the investigation and refinishing tools and equipment required for establishing and repairing paint defects and faults
9. the types of fault that can be caused by environmental, industrial and faulty or misused refinishing tools and equipment and how to rectify them
10. how to prevent further paint damage during rectification
11. how to dispose of waste materials in compliance with any environmental requirements
12. how to work safely avoiding damage to vehicles, personal injury and injury to colleagues
13. the importance of proper cleaning prior to and after paint rectification work
14. the importance of keeping tools, equipment and materials clean and free from contamination during rectification work
15. the importance of following manufacturer's instructions and using their approved methods of working (including use of materials and equipment)
16. the consequences of failing to follow manufacturer's instructions
17. the importance of working to agreed timescales and keeping others informed of progress and delays
18. the implications of rectification identified by an agreed quality control process.

## Performance objectives

### To be competent the learner must:

1. use the appropriate personal protective equipment when establishing and carrying out repairs to paint defects and faults
2. protect the vehicle and its contents effectively when establishing and carrying out repairs to paint defects and faults
3. support your investigation and 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 substrate accurately prior to establishing defects and undertaking any rectification work
6. dispose of waste materials to conform with legal, environmental and workplace requirements
7. clean and make good tools and the work environment as appropriate
8. report any anticipated delays in completion to the relevant person(s) promptly.

## Unit 405+455

## Establish Defects in Paintwork on Automotive 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 flattening 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

1. You must produce evidence from your normal workplace of establishing and rectifying paint defects from 4 out of the 8 listed below\*
  - a. poor application
  - b. environmental conditions
  - c. contamination
  - d. corrosion
  - e. wear and tear
  - f. adverse chemical reactions
  - g. panel deformation
  - h. poor preparation.
2. You must be observed by your assessor on at least 2 different paint defects on separate occasions in your normal workplace.

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

## Unit 406+456

## Spot Repair on Motor Vehicles

<b>Level:</b>	<b>6</b>										
<b>Credit value:</b>	16										
<b>Endorsement by a regulatory body:</b>	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.										
<b>Aim:</b>	This unit is about the ability to undertake spot repair activities.										
<b>Assessment requirements:</b>	<p><b>Performance objectives must</b> be assessed via a portfolio of evidence, gathered through observing the candidate at work. See the <b>Evidence Requirements</b> at the end of this unit for further details.</p> <p>Candidates <b>must</b> take the City &amp; Guilds 5311-456 on-line multiple choice test, which partly covers the <b>Essential Knowledge</b> within this unit.</p> <p>The Essential Knowledge <b>not</b> covered by the test are statements numbered:</p> <table><tr><td><b>3</b></td><td><b>4</b></td><td><b>5</b></td><td><b>6</b></td><td><b>7</b></td></tr><tr><td>8</td><td>9</td><td>10</td><td>17</td><td>19</td></tr></table> <p>This criteria <b>must</b> be assessed in one of the following ways:</p> <ul style="list-style-type: none"><li>• oral or written questioning</li><li>• professional discussion.</li></ul> <p>Centres must keep an audit trail to show that candidates have covered all of the Essential Knowledge.</p>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	8	9	10	17	19
<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>							
8	9	10	17	19							



## 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. your 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 top coat 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.

**Evidence requirements**

1. You must produce evidence from your normal workplace of using a spot repair finish when refinishing a vehicle on at least 2 separate occasions ensuring the finish produced:
  - a. meets the requirements of the manufacturer's warranty
  - b. meets the refinishing specification required and customer needs
  - c. blends with the existing finish
  - d. is free from contaminants and defects
2. You must be observed by your assessor on at least 1 occasion carrying out refinishing operations in your normal workplace.

## Unit 407+457

## Blend and Fade out Repairs on Automotive Vehicles

<b>Level:</b>	<b>6</b>										
<b>Credit value:</b>	16										
<b>Endorsement by a regulatory body:</b>	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.										
<b>Aim:</b>	This unit is about the ability to undertake blend and fade out repair activities										
<b>Assessment requirements:</b>	<p><b>Performance objectives must</b> be assessed via a portfolio of evidence, gathered through observing the candidate at work. See the <b>Evidence Requirements</b> at the end of this unit for further details.</p> <p>Candidates <b>must</b> take the City &amp; Guilds 5311-457 on-line multiple choice test, which partly covers the <b>Essential Knowledge</b> within this unit.</p> <p>The Essential Knowledge <b>not</b> covered by the test are statements numbered:</p> <table><tr><td><b>3</b></td><td><b>4</b></td><td><b>5</b></td><td><b>6</b></td><td><b>7</b></td></tr><tr><td>8</td><td>9</td><td>10</td><td>17</td><td>19</td></tr></table> <p>This criteria <b>must</b> be assessed in one of the following ways:</p> <ul style="list-style-type: none"><li>• oral or written questioning</li><li>• professional discussion.</li></ul> <p>Centres must keep an audit trail to show that candidates have covered all of the Essential Knowledge.</p>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	8	9	10	17	19
<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>							
8	9	10	17	19							

## 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, the business 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 and report damage to surfaces and ancillary fittings
14. how to interpret manufacturer's technical data
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 top coat materials using fade out and blending techniques when applying top coats avoiding contamination and defects
19. how to dispose of waste materials following environment requirements
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, materials and equipment)
22. the implications of static when working with blend/fade out process
23. the implications of rectification identified by an agreed quality control process.

## 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. ensure vehicle is suitably prepared prior to the blend/fade out process
3. support vehicle refinishing operations by reviewing:
  - product data
  - the manufacturer's technical data
  - colour libraries
  - work instructions
4. identify the body panel substrates accurately prior to undertaking any refinishing work
5. prepare, test and adjust all the tools and equipment required, following manufacturers' instructions, prior to use
6. 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
7. 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
8. identify the effects of static on the refinishing process, where applicable
9. dry all refinishing applied materials following health and safety requirements and using:
  - the manufacturer's approved method
  - the manufacturer's approved equipment
10. 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
11. dispose of waste materials to conform with legal and workplace requirements
12. clean and make good tools and the work environment as appropriate
13. complete all refinishing activities within the agreed timescale and an agreed quality control process
14. report any anticipated delays in completion to the relevant person(s) promptly.

**Evidence requirements**

1. You must produce evidence from your normal workplace of applying top coat materials using fade out or blending finish when refinishing a vehicle on at least 2 separate occasions ensuring the finish produced:
  - a. meets the requirements of the manufacturer's warranty
  - b. meetings the refinishing specification required and customer needs
  - c. blends with the existing finish
  - d. is free from contaminants and defects
2. You must be observed by your assessor on at least 1 occasion carrying out refinishing operations in your normal workplace.

## Unit 408+458

## Carry out Edge to Edge Repairs on Automotive Vehicles

<b>Level:</b>	<b>6</b>										
<b>Credit value:</b>	16										
<b>Endorsement by a regulatory body:</b>	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.										
<b>Aim:</b>	This unit is about the ability to undertake edge to edge repair activities on automotive vehicles.										
<b>Assessment requirements:</b>	<p><b>Performance objectives must</b> be assessed via a portfolio of evidence, gathered through observing the candidate at work. See the <b>Evidence Requirements</b> at the end of this unit for further details.</p> <p>Candidates <b>must</b> take the City &amp; Guilds 5311-458 on-line multiple choice test, which partly covers the <b>Essential Knowledge</b> within this unit.</p> <p>The Essential Knowledge <b>not</b> covered by the test are statements numbered:</p> <table><tr><td><b>3</b></td><td><b>4</b></td><td><b>5</b></td><td><b>6</b></td><td><b>7</b></td></tr><tr><td>8</td><td>9</td><td>10</td><td>17</td><td>19</td></tr></table> <p>This criteria <b>must</b> be assessed in one of the following ways:</p> <ul style="list-style-type: none"><li>• oral or written questioning</li><li>• professional discussion.</li></ul> <p>Centres must keep an audit trail to show that candidates have covered all of the Essential Knowledge.</p>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	8	9	10	17	19
<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>							
8	9	10	17	19							



## 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, the business and the environment
4. the vehicle work specification agreed
5. your 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 and report damage to substrates and ancillary fittings
14. how to interpret manufacturer's technical data
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 refinish materials using edge to edge techniques avoiding contamination and defects
19. how to dispose of waste materials following environmental requirements
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, materials and equipment)
22. the consequences of failing to follow manufacturers' instructions
23. the implications of rectification identified by an agreed quality control process.

## 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 manufacturer's technical data
  - colour libraries
  - work instructions
3. identify the body panel substrates 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. clean and make good tools and work environment as appropriate
6. 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
7. 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
8. dry all refinishing applied materials following health and safety requirements and using:
  - the manufacturer's approved method
  - the manufacturer's approved equipment
9. 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
10. dispose of waste materials to conform with legal, environmental and workplace requirements
11. complete all refinishing activities within the agreed timescale and an agreed quality control process
12. report any anticipated delays in completion to the relevant person(s) promptly.

# Unit 408+458      Carry out Edge to Edge Repairs on Automotive 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 flattening 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**

1. You must produce evidence from your normal workplace of carrying out all of the vehicle refinishing operations listed below
  - a. metallic or mica clear over base finish
  - b. textured finish
2. You must ensure the finish produced:
  - a. meets the requirements of the manufacturer's warranty
  - b. meets the refinishing specification required and customer needs
  - c. blends with the existing finish
  - d. is free from contaminants and defects
3. You must be observed by your assessor on at least 2 occasions carrying out different refinishing operations in your normal workplace.



## Unit 409+459

## Mix and Match Colours for Automotive Vehicles

<b>Level:</b>	<b>7</b>										
<b>Credit value:</b>	17										
<b>Endorsement by a regulatory body:</b>	This unit is endorsed by IMI, the Sector Skills Council for the automotive retail industry.										
<b>Aim:</b>	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.										
<b>Assessment requirements:</b>	<p><b>Performance objectives must</b> be assessed via a portfolio of evidence, gathered through observing the candidate at work. See the <b>Evidence Requirements</b> at the end of this unit for further details.</p> <p>Candidates <b>must</b> take the City &amp; Guilds 5311-459 on-line multiple choice test, which partly covers the <b>Essential Knowledge</b> within this unit.</p> <p>The Essential Knowledge <b>not</b> covered by the test are statements numbered:</p> <table><tr><td><b>3</b></td><td><b>4</b></td><td><b>5</b></td><td><b>6</b></td><td><b>7</b></td></tr><tr><td>8</td><td>9</td><td>11</td><td>23</td><td></td></tr></table> <p>This criteria <b>must</b> be assessed in one of the following ways:</p> <ul style="list-style-type: none"><li>• oral or written questioning</li><li>• professional discussion.</li></ul> <p>Centres must keep an audit trail to show that candidates have covered all of the Essential Knowledge.</p>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	8	9	11	23	
<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>							
8	9	11	23								

## 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, the business and the environment
4. the vehicle work specification agreed
5. your 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, resource 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 and the effects of light
15. how to compare, mix, test and adjust colour tones and effects, including metallic, mica and other specialist effects
16. the consequences of adding too much tinter and the process for correcting and adjusting it
17. the implications of combining different manufacturer's paint products throughout the refinishing process
18. the factors affecting colour variation and tone, including the effects of metamerism
19. how to dry test panels and colour test cards and the importance of doing so
20. how to identify the causes of, and rectify, colour mismatch
21. how to assess and evaluate the need for blending techniques to achieve an acceptable colour match
22. the importance and implications of correctly preparing the existing finish for colour matching and checking the match using the correct light source
23. how to identify the paint substrate and the importance of doing so
24. how to dispose of waste materials following environmental requirements
25. how to work safely avoiding damage to vehicles, personal injury and injury to colleagues
26. the importance of following manufacturers' instructions and using their approved methods of working, including use of refinishing systems, materials and equipment
27. the consequences of failing to follow manufacturers' instructions
28. the advantages of creating and storing your own colour library
29. the varied range of technology used within the mixing and matching process
30. the implications of rectification identified by an agreed quality control process.

## 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 technical 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. estimate the appropriate amount of mix material
7. select an appropriate refinishing technique
8. ensure all refinishing systems and materials prepared meet the specification required for colour and viscosity prior to application
9. 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
10. dry all colour test cards before checking colour following health and safety requirements and using:
  - the manufacturer's technical data
  - the manufacturer's approved equipment
11. ensure the colour produced:
  - meets the material manufacturer's technical data
  - meets the customer's requirements
  - is a blendable match to the existing colour
12. dispose of waste materials to conform with legal, environmental and workplace requirements
13. complete all mixing and matching activities within the agreed timescale and to an agreed quality control process
14. report any anticipated delays in completion to the relevant person(s) promptly
15. clean and make good tools and the work environment as appropriate.

# **Unit 409+459      Mix and Match Colours for Automotive 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 flattening 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. lamellar – 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**

1. You must produce evidence from your normal workplace of mixing and matching 2 non-metallic colours and 2 metallic or mica colours.
2. You must be observed by your assessor on at least 1 non-metallic and 1 metallic finish in your 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](http://www.cityandguilds.com).

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

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

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

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

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

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

The **centre homepage** section of the City & Guilds website also contains useful information 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.

Centre Guide – Delivering International Qualifications 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. Specifically, the document includes sections on:

- The centre and qualification approval process and forms
- Assessment, verification and examination roles at the centre
- Registration and certification of candidates
- Non-compliance
- Complaints and appeals
- Equal opportunities
- Data protection
- Frequently asked questions.

### ***Linking to this document from web pages***

We regularly update the name of documents on our website, therefore in order to prevent broken links we recommend that you link to our web page that the document resides upon, rather than linking to the document itself.

## Useful contacts

### UK learners

General qualification information

---

**E: [learnersupport@cityandguilds.com](mailto:learnersupport@cityandguilds.com)**

### International learners

General qualification information

---

**E: [intcg@cityandguilds.com](mailto:intcg@cityandguilds.com)**

### Centres

Exam entries, Certificates, Registrations/enrolment, Invoices, Missing or late exam materials, Nominal roll reports, Results

---

**E: [centresupport@cityandguilds.com](mailto: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

---

**E: [singlesubjects@cityandguilds.com](mailto:singlesubjects@cityandguilds.com)**

### International awards

Results, Entries, Enrolments, Invoices, Missing or late exam materials, Nominal roll reports

---

**E: [intops@cityandguilds.com](mailto:intops@cityandguilds.com)**

### Walled Garden

Re-issue of password or username, Technical problems, Entries, Results, e-assessment, Navigation, User/menu option, Problems

---

**E: [walledgarden@cityandguilds.com](mailto:walledgarden@cityandguilds.com)**

### Employer

Employer solutions including, Employer Recognition: Endorsement, Accreditation and Quality Mark, Consultancy, Mapping and Specialist Training Delivery

---

**E: [business@cityandguilds.com](mailto:business@cityandguilds.com)**

Every effort has been made to ensure that the information contained in this publication is true and correct at the time of going to press. However, City & Guilds' products and services are subject to continuous development and improvement and the right is reserved to change products and services from time to time. City & Guilds cannot accept liability for loss or damage arising from the use of information in this publication.

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

## Copyright

The content of this document is, unless otherwise indicated, © The City and Guilds of London Institute and may not be copied, reproduced or distributed without prior written consent. However, approved City & Guilds centres and candidates studying for City & Guilds qualifications may photocopy this document free of charge and/or include a PDF version of it on centre intranets on the following conditions:

- centre staff may copy the material only for the purpose of teaching candidates working towards a City & Guilds qualification, or for internal administration purposes
- candidates may copy the material only for their own use when working towards a City & Guilds qualification

The Standard Copying Conditions (see the City & Guilds website) also apply.

Please note: National Occupational Standards are not © The City and Guilds of London Institute. Please check the conditions upon which they may be copied with the relevant Sector Skills Council.

Published by City & Guilds, a registered charity established to promote education and training

**Giltspur House**  
**5-6 Giltspur Street**  
**London EC1A 9DE**  
**[www.cityandguilds.com](http://www.cityandguilds.com)**

---