

Accident & Repair - Paint **(Syllabus content)**

Assessment Requirements

Unit G01/02K – Knowledge of Health, Safety and Good Housekeeping in the Automotive Environment

Content:

Economic use of Resources

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

Requirement to maintain work area effectively

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

Spillages, leaks and waste materials

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

Basic legislative requirements

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

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

- i. HASAWA
- ii. COSHH
- iii. EPA
- iv. Manual Handling Operations Regulations 1992
- v. PPE Regulations 1992

General regulations to include an awareness of:

- i. Health and Safety (Display Screen Equipment) Regulations 1992
- ii. Health and Safety (First Aid) Regulations 1981
- iii. Health and Safety (Safety Signs and Signals) Regulations 1996
- iv. Health and Safety (Consultation with Employees) Regulations 1996
- v. Employers Liability (Compulsory Insurance) Act 1969 and Regulations 1998
- vi. Confined Spaces Regulations 1997
- vii. Noise at Work Regulations 1989
- viii. Electricity at Work Regulations 1989
- ix. Electricity (Safety) Regulations 1994
- x. Fire Precautions Act 1971
- xi. Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1985
- xii. Pressure Systems Safety Regulations 2000
- xiii. Waste Management 1991
- xiv. Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) 2002
- xv. Control of Asbestos at Work Regulations 2002

Legislative duties

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

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

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

PPE to include:

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

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

Fire and extinguishers

- a. Classification of fire types
- b. Using a fire extinguisher effectively.
 - Types of Extinguishers
 - a. foam
 - b. dry powder
 - c. CO2
 - d. water
 - e. fire blanket

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

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

Product warning labels to include:

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

Warning signs and notices

- a. Colours used for warning signs:

- i. red
 - ii. blue
 - iii. green
- b. Shapes and meaning of warning signs:
 - i. round
 - ii. triangular
 - iii. square
- c. The meaning of prohibitive warning signs in common use.
- d. The meaning of mandatory warning signs in common use.
- e. The meaning of warning notices in common use.
- f. General design of safe place warning signs.

Hazards and risks to include:

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

Personal responsibilities

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

Action to be taken in the event of colleagues suffering accidents

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

- vi. get help
- vii. report on the accident

b Typical examples of first aid which can be administered by persons at the scene of an accident:

- i. check for consciousness
- ii. stem bleeding
- iii. keep the injured person's airways free
- iv. place in the recovery position if injured person is unconscious
- v. issue plasters for minor cuts
- vi. action to prevent shock i.e. keep the injured party warm
- vii. administer water for minor burns or chemical injuries
- viii. wash eyes with water to remove dust or ingress of chemicals (battery acid)
- ix. need to seek professional help for serious injuries

c Examples of bad practice which may result in further injury such as:

- i. moving the injured party
- ii. removing foreign objects from wounds or eyes
- iii. inducing vomiting
- iv. straightening deformed limbs

Assessment Requirements

Unit G3K – Knowledge of Support for Job Roles in the Automotive Environment

Content:

The structure of a typical vehicle repair business

a. How these areas relate to each other within the business

- i. body shop
- ii. vehicle repair workshop
- iii. paint shop
- iv. valeting
- v. vehicle parts store
- vi. main office
- vii. vehicle sales
- viii. reception

b. Sources of information

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

Communication requirements when carrying out vehicle repairs

a. Locating and using correct documentation and information for:

- i. recording vehicle maintenance and repairs
- ii. vehicle specifications
- iii. component specifications
- iv. oil and fluid specifications
- v. equipment and tools
- vi. identification codes

b. Procedures for:

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

Methods of Communication

- a. verbal
- b. signs and notices

- c. memos
 - d. telephone
 - e. electronic mail
 - f. vehicle job card
 - g. notice boards
 - h. SMS text messaging
 - i. Letters
- a. Organisational & Customer requirements:
- i. importance of time scales to customer and organization
 - ii. relationship between time and costs
 - iii. meaning of profit
- b. Choice of Communication
- a. distance
 - b. location
 - c. job responsibility
- c. Importance of maintaining positive working relationships:
- a. morale
 - b. productivity
 - c. company image
 - d. customer relationships
 - e. colleagues

Assessment Requirements

Unit BP02K – Knowledge of Removing and Fitting Non Permanently Fixed Motor Vehicle Body Panels

Content:

Removing and Fitting None Permanently fixed Body Panels

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

Assessment Requirements

Unit PO01K – Knowledge of Tools and Equipment Used in Vehicle Refinishing

Content

Equipment used in Vehicle Refinishing

- a Flatting block
- b Sponge
- c Squeegee
- d Chamois leather
- e Trimming knife
- f Polishing mop
- g Denibbing blocks
- h Sealer gun
- i Air duster
- j Rotary sander
- k DA random orbital sander
- l Orbital flat bed sander
- m Belt sander
- n Vacuum extraction sander
- o Specialist extraction for aluminium particles (explosive)
- p Suction feed spray gun
- q Gravity feed spray gun
- r Pressure feed spray gun
- s HVLP spray guns
- t Identify spray gun cleaning machines

Workshop equipment

- a. Combi-booth
- b. Separate oven
- c. Infra-red drying
- d. Compressor
- e. Main air line
- f. Transformer/regulator
- g. Water traps
- h. Flexible air and fluid hoses
- i. Pressure gauges
- j. Automatic paper/tape dispenser
- k. Plastic sheeting dispenser
- l. Complete car covers dispenser
- m. Wheel covers dispenser
- n. Viscosity measuring equipment
- o. Paint mixing schemes
- p. Air feed breathing equipment
- q. Smart scales

Paint Gun Cleaning and Maintenance

- a. Loading
- b. Cleaning cycle
- c. Coagulant (water-based paints only)
- d. Filtration of solids

- a. Partial strip of paint spaying gun
- b. Complete strip of paint spraying gun
- c. Washer cycle
- d. Blow through
- e. Re-assembly
- f. Lubrication

Main parts of a Spray gun:

- a. Trigger
- b. Body
- c. Packing gland
- d. Air valve
- e. Fluid needle
- f. Fluid tip (nozzle)
- g. Air cap
- h. Paint volume control
- i. Fan width control
- j. Material cup
- k. Filters

Compressed air systems:

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

Assessment Requirements

Unit PO0205K – Knowledge of Applying Fillers and Foundation Materials

Content:

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 (O E finishes)
 - vi. 2 K Paints
 - vii. 1K Paints
 - viii. clear over bases
 - ix. polyester fillers
 - x. repaired panels
 - xi. primed panels (E coat)
- b. Identify substrates to determine selection of undercoat with reference to:
 - i. condition of surface
 - ii. type of substrate
 - iii. process requirements
 - iv. material requirement
 - v. list the physical properties of a substrate to include:
 - vi. surface condition
 - vii. adhesion
 - viii. flexibility
 - ix. porosity
 - x. texture

Methods used in determining vehicle substrates

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

The properties and correct use of conditioning materials

- a. State that a vehicle must be thoroughly washed and cleaned prior to refinishing to include:
 - i. outside body panels
 - ii. under arches
 - iii. under bonnet
 - iv. all apertures
 - v. degreased
- b. State the reasons for masking components adjacent to repair areas.
- c. State the correct preparation of parts prior to painting to include products used for the removal of:

- i. wax
- ii. grease
- iii. skin oils
- iv. dust
- v. water
- vi. abrasive contaminates
- vii. environmental pollution
- d. Identify materials used for conditioning processes such as:
 - i. wax and grease removers
 - ii. spirit wipes
 - iii. acid based
 - iv. water based
- e. The correct and safe use of the above materials.
- f. State the properties of pre-preparation material to include:
 - i. neutralisation
 - ii. ability to alter the surface
 - iii. reaction with oxide

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

- a. State what the ingredients of paint are to include:
 - i. pigment
 - ii. binder/vehicle
 - iii. solvent/thinner/reducer
 - iv. additives
- b. Properties of pigments to include:
 - i. opacity
 - ii. colour
 - iii. build
 - iv. easy flatting
 - v. corrosion resistance
- c. State that the forms of pigments that are:
 - i. natural ground powders
 - ii. synthetic powders and dyes
- d. The uses of pigments in paints such as:
 - i. stoppers/putties
 - ii. etch primers
 - iii. primer surfacers
 - iv. primer filler
- e. The properties of binders to include:
 - i. film forming
 - ii. binding
 - iii. cohesion
 - iv. adhesion
 - v. flexibility
- f. State the forms of binder which dry by the following methods:
 - i. solvent evaporation only
 - ii. oxidation
 - iii. polymerisation
- g. The properties of solvent/thinners to include:
 - i. speed of evaporation
 - ii. its ability to dissolve the binder
 - iii. its ability to be tolerated by a binder
- h. The use of solvent/thinner:
 - i. to make the paint fluid in the tin
 - ii. to reduce the paint to a spraying/ application viscosity

i. State the meaning of paint terms such as:

- i. activator
- ii. adhesion
- iii. build
- iv. cohesion
- v. compatibility
- vi. curtains
- vii. degreaser
- viii. drier
- ix. enamel
- x. etch
- xi. flash off
- xii. floating
- xiii. gloss
- xiv. hardener
- xv. lacquer
- xvi. opacity
- xvii. pigment
- xviii. polymerization
- xix. pot life
- xx. shelf life
- xxi. substrate
- xxii. thermoplastic
- xxiii. thermosetting
- xxiv. thixotropic
- xxv. two pack
- xxvi. viscosity

Explain the difference between types of paints to include:

- i. non convertible, i.e.
- ii. nitro cellulose
- iii. 1k acrylics
- iv. basecoats

Convertibles:

- i. two packs
- ii. oil based synthetic enamels

a. List the types of undercoat in common use to include:

- i. etch primer
- ii. primer surfacer
- iii. primer filler
- iv. stopper/putty
- v. sealers
- vi. anti stone chip
- vii. polyester fillers

b. The characteristics of these undercoats such as:

- i. protection
- ii. corrosion resistance
- iii. flexibility
- iv. build
- v. drying
- vi. flatting

c. List the types and characteristics of common protective coatings such as:

- i. zinc rich primers
- ii. bitumen based
- iii. anti stone chip
- iv. etch primer

v. PVC

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

- a. State the reasons for using paint to include:
 - i. protection
 - ii. filling
 - iii. decoration
 - iv. identification
 - v. safety
- b. Use process data sheets to determine information such as:
 - i. material description
 - ii. material properties
 - iii. material characteristics
 - iv. limitations
 - v. related materials
 - vi. mixing ratios
 - vii. viscosity
 - viii. build film thickness
 - ix. pot life
- c. Describe the procedure for the preparation of minor damage to include:
 - i. paint removal
 - ii. feather edge
 - iii. surface condition
 - iv. substrate identification
 - v. cleanliness
 - vi. achieving correct contour
- d. Describe the problems of over catalysed body filled areas
- e. Identify the correct Health and Safety procedures associated with body fillers
- f. Describe aids and techniques which can be used to achieve the correct contour of a filled area
- g. List undercoat materials for plastics to include:
 - i. adhesion promoters
 - ii. surface modifiers
 - iii. flexible additives
 - iv. texture additives

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

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

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

a. Describe procedures for mixing undercoats such as:

- i. etch primers
- ii. anti-stone chip primers
- iii. surfacers
- iv. wash fillers
- v. primer fillers
- vi. plastic adhesion promoters
- vii. elastic primers
- viii. sealers
- ix. spraying polyester fillers

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

a. State why the viscosity of a paint is important to application to include:

- i. build
- ii. surface finish
- iii. speed of application
- iv. describe the procedure for checking viscosity
- v. describe the effects on viscosity of:
- vi. temperature
- vii. additions of thinner/reducer

Filler and foundation material technical data sheets to extract listed information. The importance of correctly interpreting and following manufacturers' instructions and the consequences of failing to do so

a. Use the process data sheets to determine information such as:

- i. mixing ratios
- ii. viscosity
- iii. number of coats
- iv. flash off times
- v. build film thickness
- vi. spray gun type
- vii. spray gun set up
- viii. air pressure requirements
- ix. substrate requirements
- x. suitability as a substrate
- xi. drying times
- xii. suitability to be applied by methods other than spraying

b. Define the main information sourced from data sheets to include:

- i. product identification
- ii. product description
- iii. substrate suitability
- iv. pre-treatment requirement
- v. mixing ratio
- vi. pot life
- vii. method of application
- viii. spray viscosity
- ix. nozzle/air cap set up
- x. number of coats
- xi. flash off times
- xii. drying times
- xiii. recoatability

c. List common pictograms and state their meaning including those for:

- i. cleaning information
- ii. mixing ratios
- iii. use a measuring stick
- iv. addition of hardener
- v. application viscosity
- vi. type of spray gun
- vii. spray coats information
- viii. application with spatula
- ix. application with brush
- x. application with roller
- xi. flash-off
- xii. drying time
- xiii. drying with infrared
- xiv. sanding
- xv. polishing
- xvi. technical data required
- xvii. hand stirring

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

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

Assessment Requirements

Unit PO03K – Knowledge of Working with Plastic Materials and Components

Content:

The types of substrates likely to be found in vehicle refinishing

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

Methods used in determining vehicle substrates

- a. Workshop tests to determine substrates to include:
 - i. visual test for plastics and identification of plastic type through identification code
- 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 C O B)

The properties and correct use of conditioning materials

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

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

The types and properties of foundation materials in common use

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

The factors affecting the choice and use of foundation materials

- a. The reasons for using paint to include:
 - i. protection
 - ii. filling
 - iii. decoration
 - iv. identification
 - v. safety
- b. Undercoat materials for plastics to include:
 - i. adhesion promoters
 - ii. surface modifiers
 - iii. flexible additives
 - iv. texture additives
- c. The procedures for the preparation of plastics to include:
 - i. identification
 - ii. cleaning
 - iii. adhesion promotion
 - iv. elastic primers
- d. Identify the preparation requirements for textured and special effect coatings to include:
 - i. spoilers
 - ii. bumpers
 - iii. exterior trim

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

a. Procedures for mixing undercoats such as:

- i. etch primers
- ii. anti-stone chip primers
- iii. surfacers
- iv. wash fillers
- v. primer fillers
- vi. plastic adhesion promoters
- vii. elastic primers
- viii. sealers
- ix. spraying polyester fillers

b. Listed additives such as:

- i. adhesion promoters
- ii. flexible additives
- iii. texture finishes
- iv. extenders
- v. UV absorbers
- vi. flow aids

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

a. Why the viscosity of a paint is important to application to include:

- i. build
- ii. surface finish
- iii. speed of application
- iv. describe the procedure for checking viscosity
- v. describe the effects on viscosity of:
- vi. temperature
- vii. additions of thinner/reducer

Foundation material technical data sheets to extract listed information. The importance of correctly interpreting and following manufacturers' instructions and the consequences of failing to do so

a. The process data sheets to determine information such as:

- i. mixing ratios
- ii. viscosity
- iii. number of coats
- iv. flash off times
- v. build film thickness
- vi. spray gun type
- vii. spray gun set up
- viii. air pressure requirements
- ix. substrate requirements
- x. suitability as a substrate
- xi. drying times
- xii. suitability to be applied by methods other than spraying

b. The main information sourced from data sheets to include:

- i. product identification
- ii. product description
- iii. substrate suitability
- iv. pre-treatment requirement
- v. mixing ratio
- vi. pot life
- vii. method of application
- viii. spray viscosity

- ix. nozzle/air cap set up
- x. number of coats
- xi. flash off times
- xii. drying times
- xiii. recoatability
- c. Common pictograms and state their meaning including those for:
 - i. cleaning information
 - ii. mixing ratios
 - iii. use a measuring stick
 - iv. addition of hardener
 - v. application viscosity
 - vi. type of spray gun
 - vii. spray coats information
 - viii. flash-off
 - ix. drying time
 - x. drying with infrared
 - xi. sanding
 - xii. polishing
 - xiii. technical data required
 - xvii. hand stirring

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

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



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iv. hard edges

Assessment Requirements

Unit PO0408K – Knowledge of Preparing Metal and Pre-Painted Surfaces

Content:

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 C O B)
 - iii. VIN plate

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

- a. Manufacturers protective coatings and explain 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 use for the removal of:
 - i. wax
 - ii. grease

- iii. skin oils
- iv. dust
- v. water
- vi. abrasive contaminates
- 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 abrasives 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.

Assessment Requirements

Unit PO06K – Knowledge of Repairing Minor Paint Defects

Content:

Minor surface defects to include:

- i. scratches
- ii. chips
- iii. dents
- iv. corrosion
- v. contamination
- vi. blisters (including micro-blisters)
- vii. fading
- viii. loss of gloss
- ix. chalking

Types of paint finishes likely to be found in modern vehicles

- a. Types of substrate to include:
 - i. steel
 - ii. aluminium
 - iii. all plastics
 - iv. coated steels
 - v. high bake enamels (o e finishes)
 - vi. 2 k 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 c o b)
 - iv. VIN plate

Vehicle cleaning and protection procedures during paint defect rectification processes

- a. Vehicle must be thoroughly washed and cleaned prior to refinishing to include:
 - i. outside body panels
 - ii. under arches
 - iii. under bonnet
 - iv. all apertures

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

Identification of the common minor paint defects and list their causes

The reasons for the defects in vehicle finish such as:

- i. environmental pollution
- ii. ultra violet reaction
- iii. industrial pollution
- iv. accidental damage

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

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

Tools and equipment used for the rectification of minor paint defects

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

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

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

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

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

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

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

Materials used for the rectification of minor paint defects

- a. Types and uses of abrasives to include:
 - i. aluminium oxide
 - ii. silicon carbide
 - iii. wet and dry types
 - iv. open coat
 - v. closed coat
 - vi. p grades
 - vii. papers, pastes and woven plastics
- b. The properties of compounds used to refurbish paintwork including:
 - i. cutting compounds
 - ii. cutting creams
 - iii. surface polishes
 - iv. protective waxes
 - v. sponge cutting heads
 - vi. polishing mops
 - vii. polishing cloths
- c. Types and uses of filler materials to include:
 - i. 2k polyester filler paste
 - ii. 2k and 1k stopper
- d. Types and uses of paints to include:
 - i. touch-up pots
 - ii. self-adhesive coloured paint film
 - iii. aerosols
 - iv. standard 2k and 1k paints

Select the correct materials for rectifying listed paint defects

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

Correct preparation and use of materials for rectifying paint defects

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

- iii. carrying out viscosity checks on mixed paint materials

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

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

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

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

Assessment Requirements

Unit PO07K – Knowledge of Establishing Paint Defects

Content:

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 (o e finishes)
 - vi. 2 k 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 c o b)
 - 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. ultra violet 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
 - iii. explain that failure to carry out these procedures may lead to defects to include:
 - iv. surface scratches
 - v. surface contamination
 - vi. silicone cratering
 - vii. staining of painted surfaces
 - viii. 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

- b. 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

Assessment Requirements

Unit PO0912K – Knowledge of Applying Topcoats and Completing Refinishing Operations

Content:

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 (O E finishes)
 - vi. 2 K 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 C O B)
 - 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 explain 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 abrasives 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:
- b. Non convertible
 - i. nitro cellulose
 - ii. 1k acrylic
- c. Convertible
 - i. oil based synthetics
 - ii. 2 k acrylics
 - iii. 2k polyurethane
 - iv. polyesters
 - v. isocyanate resins
- d. Waterborne basecoats
 - i. microgel
 - ii. latex
- e. The reasons for using paint to include:
 - i. protection
 - ii. filling
 - iii. decoration

- iv. identification
- v. safety
- f. 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
- g. 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
- h. The problems of over catalysed body filled areas
- i. The correct Health and Safety procedures associated with body fillers
- j. Aids and techniques which can be used to achieve the correct contour of a filled area
- k. Undercoat materials for plastics to include:
 - i. adhesion promoters
 - ii. surface modifiers
 - iii. flexible additives
 - iv. texture additives
- l. 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 include:
 - i. pigment
 - ii. binder/vehicle
 - iii. solvent/thinner/reducer
 - iv. additives
- b. The different types of paints to include:
- c. Non convertible:
 - i. nitro cellulose
 - ii. 1k acrylics
 - iii. basecoats
- d. Convertibles:
 - i. two packs
 - ii. oil based synthetic enamels
- e. The characteristics and properties of surface coatings to include:
 - i. nitro-cellulose- 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 water borne -non convertible-very low build-high opacity-have to be over

- v. coated with a clear coat
- f. The principles of operation of water based materials
- g. The materials used in water based paint technology
- h. The environmental advantages of using water based paints
- i. 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

Assessment Requirements

Unit PO013K – Knowledge of Vehicle Colour Matching

Content:

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 (all list to go in content)

Types of undercoats and their function:

- a Primer
- b Primer surfacer
- c Anticorrosion
- 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 C O B)
 - 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
 - iii. 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. nitro cellulose
 - iii. 1k acrylic
 - iv. convertible
 - v. oil based synthetics
 - vi. 2 k acrylics
 - vii. 2k polyurethane
 - viii. polyesters
 - ix. isocyanate resins
 - x. waterborne basecoats
 - xi. microgel
 - xii. latex
- b. The properties of binders to include:
 - i. convertible
 - ii. oxidise
 - iii. high temperature reactants
 - iv. chemical reactants
- c. Non-convertible:
 - a. solvent evaporation
- d. The forms of binder such as:
 - i. nitro-cellulose
 - ii. alkyds
 - iii. urethanes
 - iv. polyesters
 - v. isocyanates
 - vi. acrylics
- e. The uses of binders in paints:
 - i. film forming
 - ii. binding the pigments
 - iii. adhesion
 - iv. cohesion
 - v. flexibility
- f. The principles of operation of water based materials.

- g. The materials used in water based paint technology.
- h. The environmental advantages of using water based paints.

Distinguish between paint system classification, such as MS, HS, UHS, waterbased, etc.

- a. The difference between paint systems to include:
 - i. medium solids
 - ii. high solids
 - iii. ultra high solids
 - iv. waterbased

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 ultra violet light
 - ii. necessity for adding to 2k paints to effect curing
 - iii. inclusion of isocyanates requires special H&S procedures

The properties of paint system additives

- a. Listed 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. nitro-cellulose- 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. basecoats- solvent or water borne -non convertible-very low build-high opacity have to be overcoated with clearcoat
- 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. world wide web
 - 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. on line 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. on-line 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 basecoat materials to include:
 - i. mixing tints
 - ii. thinners, solvents or water
 - iii. additives
- e. The preparation of a clearcoat 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

The importance of using material application methods which assist in achieving colour match

- 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 effects of applying metallic colours:
 - i. wet
 - ii. dry
- c. The application of clear coat with reference to:
 - i. gun speed
 - ii. flash off
 - iii. number of coats
 - iv. MS, HS and UHS

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