

Vehicle Fitting **(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
- b. Importance of maintaining positive working relationships:
- a. morale
 - b. productivity
 - c. company image
 - d. customer relationships
 - e. colleagues

Assessment Requirements

Unit G3.1K – Knowledge to Support working relationships in the Automotive Work Environment

Content:

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

Assessment Requirements

Unit G4K – Knowledge of Materials, Fabrication, Tools and Measuring Devices used in the Automotive Environment

Content:

Common types of hand tools used for fabricating and fitting in the automotive workplace.

To include:

- a. files
- b. hacksaws and snips
- c. hammers
- d. screwdrivers
- e. pliers
- f. spanners
- g. sockets
- h. punches
- i. types of drill and drill bits
- j. taps and dies
- k. stud removers
- l. marking out tools

Common measuring devices used for fabrication and fitting in the automotive workplace.

To include:

- a. rule/tape
- b. callipers
- c. feeler gauge
- d. volume measures
- e. micrometer
- f. dial gauges
- g. torque wrenches
- h. depth gauges

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

include:

- a. ammeter
- b. voltmeter
- c. ohmmeter
- d. multi-meter

Common electrical terms when measuring:

- a. voltage
- b. current
- c. resistance

Workshop equipment (including appropriate PPE). To include:

- a. hydraulic jacks
- b. axle stands
- c. pillar drills
- d. air tools
- e. vehicle lifts
- f. cranes

- g. hoists
- h. electrical power tools

Properties, application and limitations (to include safe use) of ferrous and non-ferrous metals used when constructing, modifying and repairing vehicles and components.

Materials to include:

- a. carbon steels
- b. alloy steels
- c. cast iron
- d. aluminium alloys
- e. brass
- f. copper
- g. lead

Properties, application and limitations (to include safe use) of non-metallic materials used when constructing, modifying and repairing vehicles and components. Materials to include:

- a. glass
- b. plastics (inc. GRP)
- c. Kevlar
- d. rubber

Terms relating to the properties of materials. To include:

- a. hardness
- b. toughness
- c. ductility
- d. elasticity
- e. tenacity
- f. malleability
- g. plasticity

Assessment Requirements

Unit G6K – Knowledge of how to Make Learning Possible through Demonstrations and Instruction

Content:

Separate areas of demonstration which encourage learning. To include:

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

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

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

How to structure demonstration and instruction sessions. To include:

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

How to identify individual learning needs

- a. Diagnose the learning needs of your audience to include:

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

What factors are likely to prevent learning. To include:

- i. language barriers
- ii. physical barriers
- iii. specialist knowledge
- iv. pace of learning
- v. method of delivery
- vi. environmental factors
- vii. teaching styles
- viii. dyslexia

How to check learners understanding and progress

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

How to organise information and prepare materials

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

Instructional techniques

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

Environmental factors that effect learning

- a. environmental factors that should be considered before demonstration/instruction to include:
 - i. loud noises
 - ii. bright colours
 - iii. bright lights

- iv. strong smells
- v. atmosphere
- vi. temperature
- vii. classroom seating
- viii. classroom layout
- ix. bright lights

Health and safety factors that affect learning

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

Analysis of demonstration/instruction

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

Developments in learning. To include:

- i. multimedia based materials
- ii. web based materials
- iii. interactive materials

How to choose and prepare appropriate materials. To include:

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

Assessment Requirements

Unit G8K – Knowledge of how to Identify and Agree Customer Service Needs

Content:

Organisational Requirements

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

Principles of Customer Communication and Care.

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

Company Products and Services

- a. Service standards
 - i. national
 - ii. manufacturer
 - iii. organisational
- b. The range and type of services offered by the organisation.
 - i. diagnostic.
 - ii. servicing.
 - iii. repair.
 - iv. warranty.
 - v. MOT testing.
 - vi. fitment of accessories/enhancements.
 - vii. internal.
- c. The courses of action available to resolve customer problems.
 - i. the extent and nature of the work to be undertaken.
 - ii. the terms and conditions of acceptance.
 - iii. the cost.
 - iv. the timescale.
 - v. required payment methods.

- d. The effect of resource availability upon the receipt of customer vehicles and the completion of work.
 - i. levels and availability of equipment.
 - ii. levels and availability of technicians.
 - iii. workshop loading systems.
- e. How to access costing and work completion time information.
 - i. manuals.
 - ii. computer based.

Vehicle Information Systems, Servicing and Repair Requirements

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

Consumer Legislation To include:

- a. consumer protection
- b. sale of goods
- c. data protection
- d. product liability
- e. health and safety
- f. discrimination

Assessment Requirements

Unit VF01K – Knowledge of Monitoring and Solving Customer Service Problems

Content

Types of tyre construction to include:

- a. radial
- b. cross ply
- c. bias belted
- d. directional
- e. asymmetric

Main purpose of tyres

- a. Interaction between tyres, other components and vehicle handling
- b. Steering, drive and suspension
- c. Passenger comfort

Types of standard light vehicle wheel and rim construction

- a. Light alloy, pressed steel and wire wheels
- b. Standard and safety rims

Markings on standard light vehicle tyres.

- a. Speed rating
- b. Size Markings
- c. Aspect ratio
- d. Load handling
- e. Ply rating
- f. Tread wear indicators
- g. EC markings and specialist application markings e.g. 'M&S'

Inspection and fault identification methods and procedures

- a. Inspection:
 - i. on the rim visual (external)
 - ii. removed from wheel (internal)
- b. Use of tread depth indicators, tyre probes and pressure gauges
- c. Information sources including tyre and vehicle manufacturers' technical data

Limits of standard light vehicle tyre wear and serviceability.

- a. Tread depth and tyre damage
- b. Limitations under BS159 and Construction & Use Regulations
- c. Tyre pressure and maintenance requirements
- d. Suitability for minor repairs

Common faults associated with standard light vehicle tyres and wheels.

- a. Excessive tyre wear and abnormal tread wear patterns (centre, outer edges, worn patches)
- b. Damage to tread or side walls
- c. Bulging, separation of tread, carcass distortion,
- d. Impact damage, wheels running out of true, buckled wheels
- e. Incorrect tyre pressure
- f. Wrong tyre for vehicle or run flat

Methods and materials used in the repair of standard light vehicle tyres.

- a. Tyre inspection
- b. Damage limitation
- c. Accurate measurement
- d. Repair techniques and methods:
 - i. preparation of tyre
 - ii. mechanical and chemical buffing
- e. Repair materials:
 - i. plug patch
 - ii. patch and filler
 - iii. solutions and chemicals.
- e. Economic use of materials
- f. Correct storage of materials (including shelf life)
- g. Repair Materials:
 - i.rubber only plug patch
 - ii.rubber only patch and filler material
 - iii.solutions and chemicals

Tools and equipment used to include:

- a. lifting and supporting equipment
- b. tyre fitting and removal tools and machinery
- c. hand tools
- d. tyre repair tools
- e. measuring equipment
- f. wheel balancing equipment
- g. tyre inflation equipment

Principles of interchanging tyres/wheels

- a. Over sizing tyre/wheel fitment
 - b. Longitudinal and diagonal
- Mixing radial, cross-ply and bias-belted tyres on same axle or different axles

Removal and fitting methods to include:

- a. tyre sidewall fitting instructions
- b. vehicle protection
- c. use of hand and impact tools
- d. correct tyre inflation
- e. final inspection

Dealing with waste materials including:

- a. scrapped tyres
- b. repair materials
- c. wheel weights

Legal Requirements to include:

- a. tread depth
- b. tyre wall and casing damage
- c. tyre pressure
- d. mixing of tyre types
- e. re-grooving legislation

Assessment Requirements

Unit VF02K – Knowledge of Inspection, Repair and Replacement of High Performance Light Vehicle Tyres

Content

Tyres are

- a. Directional tread
- b. Asymmetric tread
- c. Composite tread
- d. High speed ratings (V,W,Y or ZR ratings)
- e. An aspect ratio of 55% or below
- f. Run flat capability

Main function of tyres

- a. Interaction between tyres, other components and vehicle handling
- b. Steering, drive and suspension
- c. Passenger comfort

Types of standard and high performance light vehicle wheel and rim construction

- a. Light alloy, pressed steel and wire wheels
- b. Standard and safety rims (runflat)
- c. Asymmetric rims
- d. Space saver rims

Markings on standard light vehicle tyres.

- a. Speed rating
- b. Size Markings
- c. Aspect ratio
- d. Load handling
- e. Ply rating
- f. Tread wear indicators
- g. EC markings and specialist application markings e.g. 'M&S'

Inspection and fault identification methods and procedures

- a. Inspection:
 - i. on the rim visual (external)
 - ii. removed from wheel (internal)
- b. Use of tread depth indicators, tyre probes and pressure gauges
- c. Information sources including tyre and vehicle manufacturers' technical data and the importance of accurate measurements, the importance of accurate fault identification, the importance of accurate adjustments

Limits of standard light vehicle tyre wear and serviceability.

- a. Tread depth and tyre damage
- b. Limitations under BS159 and Construction & Use Regulations
- c. Tyre pressure and maintenance requirements
- d. Suitability for minor repairs

Common faults associated with standard light vehicle tyres and wheels.

- a Excessive tyre wear and abnormal tread wear patterns (centre, outer edges, worn patches)
- b Damage to tread or side walls
- c Bulging, separation of tread, carcass distortion,
- d Impact damage, wheels running out of true, buckled wheels
- e Incorrect tyre pressure
- f Wrong tyre for vehicle or run flat

Methods and materials used in the repair of standard light vehicle tyres.

- a. Tyre inspection
- b. Damage limitation
- c. Accurate measurement
- d. Repair techniques and methods:
 - iii. preparation of tyre
 - iv. mechanical and chemical buffing
- e. Repair materials:
 - iv. plug patch
 - v. patch and filler
 - vi. solutions and chemicals.
- f. Economic use of materials
- g. Correct storage of materials (including shelf life)

Principles of interchanging tyres/wheels

- a. Over sizing tyre and wheel fitment
- b. Longitudinal and diagonal
- c. Mixing radial, cross-ply and bias-belted tyres on same axle or different axles
 - i. lifting and supporting equipment
 - ii. tyre fitting and removal tools and machinery
 - iii. hand tools
 - iv. tyre repair tools
 - v. measuring equipment
 - vi. wheel balancing equipment
 - vii. tyre inflation equipment

Dealing with waste materials including

- a scrapped tyres
- b wheel weights
- c waste repair materials

Removal and fitting methods

To include:

- a. tyre sidewall fitting instructions
- b. vehicle protection
- c. use of hand and impact tools
- d. correct tyre inflation
- e. final inspection

Legal requirements to include:

- a. tread depth
- b. tyre wall and casing damage
- c. tyre pressure
- d. mixing of tyre types
- e. correct fitting

Assessment Requirements

Unit VF03K – Knowledge of Inspection, Repair and Replacement of Commercial Vehicle Tyres

Content

Tyre construction

- a. Radial
- b. Diagonal (cross) ply
- c. Tube type
- d. Tubeless
- e. Tread designs (e.g. traction, steer, universal etc)

Types of commercial vehicle wheel and rim construction

- a. 15° Drop centre rims with diameter codes of 17.5, 19.5, 22.5.
- b. 15° EVA/EVH Drop centre rims.
- c. 15° Wide single drop centre rims.
- d. Wide base or semi drop centre split rims
- e. British Standard conical, DIN spherical and ISO Metric wheel fixings
- f. Heavy commercial valves

Tools and equipment used to identify faults or serviceability

- a. Tyre safety inflation equipment (e.g. safety cages, portable 'H' cages and 'bag-it' type devices)
- b. Tyre tread depth gauges
- c. Tyre probes
- d. Bead spreaders
- e. Tyre pressure gauges
- f. Hand lamps or torches
- g. Stud hole gauges

Re-fitting and removal methods and procedures for commercial tyres, tubes, wheels and rims

- a. fitting instructions
- b. vehicle protection
- c. use of impact tools
- d. correct tyre safety inflation
- e. final inspection

Tools, equipment and information used for removal and replacement of commercial wheels, tyres and tubes

- a. Technical information relating to safe jacking points and wheel torque/tyre pressure data.
- b. Equipment for securing the vehicle and making the area safe (e.g. wheel chocks, traffic cones, 'Do Not Move' signs)
- c. Jacks, axle/chassis stands, loading boards.
- d. Sockets, extensions, 'L' bars, pneumatic impact wrenches, torque wrenches.
- e. Bead unseating tools inc specialist tools for EVA/EVH rims, tyre levers, lock-ring levers, bead lubricant, and tyre stands
- f. Tyre inflation equipment, safety inflation equipment (e.g. safety cages, portable 'H' cages and 'bag-it' type devices)

Tools and equipment used:

- a tyre re-grooving equipment
- b tyre safety inflation equipment
- c specialist bead and unseating tools for external valve aperture (EVA) and hole (EVH)

Inspection and fault identification methods and procedures

- a fault identification coverage,
- b accurate measurement
- c adjustments to acceptable tolerances for the vehicle
- d. Inspection:
 - i. on the rim visual (external)
 - ii. removed from wheel (internal)
- e. Use of tread depth indicators, tyre probes and pressure gauges
- f. Information sources including tyre and vehicle manufacturers' technical data

Common faults associated with commercial vehicle tyres and wheels.

- a. Worn tread through normal use
- b. Abnormal wear (e.g. camber, wheel misalignment, incorrect twinning, worn dampers, braking flatspots over/under-inflation)
- c. Carcass damage (e.g. lumps/bulges, cuts, exposed cords, run-flat damage, penetrations, chemical damage)
- d. Incorrect fitment (e.g. load rating, speed rating, size, construction)
- e. Worn or damaged wheels and components (e.g cracks, elongated or worn stud holes, deformations).
- f. Worn, damaged or incorrect wheel fixings
- g. Worn or damaged valves
- h. Worn, damaged or incorrect tubes and flaps.

Tools, equipment and information used for minor repairs to tyres and tubes.

- a. Technical information relating to minor repair areas, repair unit application instructions and injury limitations
- b. Suitable personal protective equipment for tyre and inner tube repairing.
- c. Measuring equipment for determining repairable areas
- d. Reamers, buffers and tyre bead spreaders
- e. Plug patch applicators, tyre probes, cover scrapers, roller stitchers, pliers and side cutters.
- f. Liquid buffing solutions, chemical vulcanising fluids, liner seal solutions and tyre talc (French Chalk)
- g. Combination plug/patches, patch and filler materials, inner tube patches

Methods and materials used in the repair of commercial vehicle tyres.

- a. Internal inspection of tyre for secondary damage.
- b. Preparation of the tyre for application of repair materials
- c. Preparation of inner tube for application of repair materials
- d. Inspection of tyre and tube after repair
- e. Correct storage of materials (including shelf life)
- f. Inflation of tyre and tube to check for leaks
- g. Repair Materials:
 - i. rubber only plug patch
 - ii. rubber only patch and filler material
 - iii. solutions and chemicals

Tools and equipment used for regrooving of heavy commercial tyres

- a. Technical information relating to heavy commercial vehicle tyre regrooving
- b. Suitable personal protective equipment for regrooving.
- c. Measuring equipment for determining tread depths and blade settings
- d. Tyre probes, regrooving equipment, tyre regrooving stand.
- e. Cutting blades

Methods used to carry out regrooving to heavy commercial tyres

- a. Inspection of tyre for damage and suitability for regrooving.
- b. Tread measurement to determine blade depth setting
- c. Preparation of tyre for regrooving.
- d. Regrooving following manufacturer's instructions and legal requirements
- e. Inspection of tyre following regrooving

Dealing with waste materials including:

- a. scrapped tyres
- b. repair materials
- c. wheel weights

Legal Requirements to include:

- a. tread depth
- b. tyre wall and casing damage
- c. tyre pressure
- d. mixing of tyre types
- e. re-grooving legislation

Assessment Requirements

Unit VF04K – Knowledge of Inspection, Repair and Replacement of Motorcycle Tyres

Content:

Note, the term ‘motorcycle’ also refers to: quad bike, tricycle, scooter, moped and sidecar combination tyres.

Describe the purpose, function and construction of Motorcycle wheels and construction

- a. tubed
- b. tubeless
- c. radial
- d. bias belted cross ply
- e. two compound technology
- f. directional
- g. spoke wheels
- h. cast wheels
- i. composite wheels
- j. split rims

Identify the different types of Motorcycle tyre construction

- a. Radial
- b. Bias and bias belted
- c. Tube type
- d. Tubeless
- e. Tread and sidewall designs (for example, high speed, rotational, off road)

Identify the different types of Motorcycle wheel drive arrangements

- a. Shaft drive
- b. Chain drive

Identify sidewall markings on Motorcycle tyres

- a. Service description (load and speed markings)
- b. Size designations
- c. Aspect ratios
- d. Construction markings (bias and bias belted, radial, tube type, tubeless)
- e. Type approval markings
- f. Date of manufacture markings
- g. Tread wear indicators
- h. Sidewall fitting instructions
- i. Special service markings

Inspection and fault identification methods and procedures

- a. Inspection:
 - iii. on the rim visual (external)
 - iv. removed from wheel (internal)
- b. Use of tread depth indicators, tyre probes and pressure gauges
- c. Information sources including tyre and vehicle manufacturers’ technical data

- d. the importance of accurate measurements
- e. the importance of accurate fault identification
- f. the importance of accurate adjustments

Identify the tools and equipment used to identify faults relating to Motorcycle tyres and wheels and confirm them safe to use

- a. Tyre tread depth gauges
- b. Tyre probes
- c. Bead spreaders
- d. Tyre pressure gauges
- e. Hand lamps or torches

Identify the faults relating to Motorcycle tyres and wheels

- a. Suitable personal protective equipment for conducting Motorcycle tyre and rim inspections
- b. Worn tread through normal use
- c. Abnormal wear (wheel misalignment, over and under-inflation, incorrect application and adjustment)
- d. Carcass damage (lumps and bulges, cuts, exposed cords, run-flat damage, penetrations, chemical damage)
- e. Incorrect fitment (load rating, speed rating, size, construction, tread design, sidewall information)
- f. Worn or damaged wheels and components (cracks, deformations).
- g. Worn, damaged or incorrect wheel fixings and axle
- h. Worn or damaged valves
- i. Worn, damaged or incorrect tubes

Make recommendations relating to Motorcycle tyres and wheels

- a. Suitability for fitting
- b. Suitability for minor repair
- c. Isolate scrapped tyres for correct disposal
- d. Isolate scrapped wheel rims and components for correct disposal
- e. Consequences of improper disposal of scrap tyres and wheels

Identify the tools and equipment used for the removal and fitting of Motorcycle wheels and tyres and confirm them safe to use

- a. Technical information relating to safe lifting points and wheel torque and tyre pressure data.
- b. Motorcycle stands.
- c. Hand tools and torque wrenches.
- d. Bead unseating tools, tyre levers, bead lubricant.
- e. Tyre inflation equipment
- f. Wheel balancing equipment

Remove and fit motorcycle tyres and wheels

- a. Manufacturer and sidewall fitting instructions
- b. Protecting the motorcycle during wheel and tyre removal and fitting.
- c. Suitable personal protective equipment for motorcycle tyre and wheel removal and fitting.
- d. Use and positioning of lifting and supporting devices.
- e. Wheel removal and fitting using hand tools
- f. Tyre removal and fitting using hand or powered tools
- g. Valve replacement for wheel rims.
- h. Safe tyre inflation
- i. Wheel balancing
- j. Wheel alignment
- k. Informing relevant persons of anticipated delays.

- l. Keeping relevant persons informed of progress
- m. The relationship between time and cost

Methods and materials used in the repair of Motorcycle tyres

- a. Repair Materials:
 - i. rubber only plug patch
 - ii. rubber only patch and filler material
 - iii. solutions and chemicals

Identify the tools and equipment used for the minor repair of Motorcycle tyres and inner tubes and confirm them safe to use

- a. Technical information relating to minor repair areas, repair unit application instructions and injury limitations
- b. Suitable personal protective equipment for tyre and inner tube repairing.
- c. Measuring equipment for determining repairable areas
- d. Reamers, buffers and tyre bead spreaders
- e. Plug patch applicators, tyre probes, cover scrapers, roller stitchers, pliers and side cutters.
- f. Liquid buffing solutions, chemical vulcanising fluids, liner seal solutions and tyre talc (French Chalk)Combination plug/patches, patch and filler materials, inner tube patches

Carry out minor repairs to Motorcycle tyres and inner tubes

- a. Internal inspection of tyre for secondary damage.
- b. Preparation of the tyre for application of repair materials
- c. Preparation of inner tube for application of repair materials
- d. Inspection of tyre and tube after repair
- e. Inflation of tyre/tube to check for leaks

Main function of tyres

- a. Interaction between tyres, other components and handling
- b. Steering, drive and suspension
- c. Passenger comfort
- d. Lifting and supporting equipment
- e. Tyre fitting and removal tools and machinery
- f. Hand tools
- g. Tyre repair tools
- h. Measuring equipment
- i. Wheel balancing equipment
- j. Tyre inflation equipment

Dealing with Waste Materials including:

- a. scrapped tyres
- b. wheel weights
- c. waste repair materials

Legal Requirements to include:

- a. tread depth
- b. tyre wall and casing damage
- c. tyre pressure
- d. mixing of tyre types
- e. correct fitting

Assessment Requirements

Unit VF05K – Knowledge of Inspection, Repair and Replacement of Plant Equipment Tyres

Content:

Note, the term ‘plant equipment’ also refers to: agricultural, horticultural and construction plant equipment.

Identify the different types of plant equipment tyre construction

- a. Radial
- b. Bias and bias belted
- c. Tube type
- d. Tubeless
- e. Tread and sidewall designs

Identify sidewall markings on plant equipment tyres

- a. Service description (load and speed markings)
- b. Size designations
- c. Aspect ratios
- d. Construction markings (bias and bias belted, radial, tube type, tubeless)
- e. Type approval markings
- f. Date of manufacture markings
- g. Tread wear indicators
- h. Sidewall fitting instructions
- i. Special service markings

Identify the tools and equipment used to identify faults relating to plant equipment tyres and wheels and confirm them safe to use

- a. Tyre tread depth gauges
- b. Tyre probes
- c. Bead spreaders
- d. Tyre pressure gauges
- e. Hand lamps or torches

Identify the faults relating to plant equipment tyres and wheels

- a. Suitable personal protective equipment for conducting Plant equipment tyre and rim inspections
- b. Worn tread through normal use
- c. Abnormal wear (wheel misalignment, over and under-inflation, incorrect application and adjustment)
- d. Carcass damage (lumps and bulges, cuts, exposed cords, run-flat damage, penetrations, chemical damage)
- e. Incorrect fitment (load rating, speed rating, size, construction, tread design, sidewall information)
- f. Worn or damaged wheels and components (cracks, deformations).
- g. Worn, damaged or incorrect wheel fixings and axle
- h. Worn or damaged valves
- i. Worn, damaged or incorrect tubes

Make recommendations relating to plant equipment tyres and wheels

- a. Suitability for fitting
- b. Suitability for minor repair

- c. Isolate scrapped tyres for correct disposal
- d. Recommend tyres as suitable for re-moulding
- e. Isolate scrapped wheel rims and components for correct disposal
- f. Consequences of improper disposal of scrap tyres and wheels

Identify the tools and equipment used for the removal and fitting of plant equipment wheels and tyres and confirm them safe to use

- a. Technical information relating to safe lifting points and wheel torque and tyre pressure data.
- b. Plant equipment stands.
- c. Hand tools and torque wrenches.
- d. Bead unseating tools, tyre levers, bead lubricant.
- e. Tyre inflation equipment
- f. Safety cages

Methods and materials used in the repair of Motorcycle tyres

- a. Repair Materials:
 - i. rubber only plug patch
 - ii. rubber only patch and filler material
 - iii. solutions and chemicals

Remove and fit plant equipment tyres and wheels

- a. Manufacturer and sidewall fitting instructions
- b. Protecting the plant equipment and personnel during wheel and tyre removal and fitting.
- c. Suitable personal protective equipment for plant equipment tyre and wheel removal and fitting.
- d. Use and positioning of lifting and supporting devices.
- e. Wheel removal and fitting using hand tools
- f. Tyre removal and fitting using hand or powered tools
- g. Valve replacement for wheel rims.
- h. Safe tyre inflation
- i. Informing relevant persons of anticipated delays.
- j. Keeping relevant persons informed of progress
- k. The relationship between time and cost

Identify the tools and equipment used for the minor repair of plant equipment tyres and inner tubes and confirm them safe to use

- a. Technical information relating to minor repair areas, repair unit application instructions and injury limitations
- b. Suitable personal protective equipment for tyre and inner tube repairing.
- c. Measuring equipment for determining repairable areas
- d. Reamers, buffers and tyre bead spreaders
- e. Plug patch applicators, tyre probes, cover scrapers, roller stitchers, pliers and side cutters.
- f. Liquid buffing solutions, chemical vulcanising fluids, liner seal solutions and tyre talc (French Chalk)
- g. Combination plug and patches, patch and filler materials, inner tube patches

Describe how to improve traction by the use of ballast, to include:

- a. water ballast
- b. wheel weights
- c. chassis weights

Carry out minor repairs to plant equipment tyres and inner tubes

- a. Internal inspection of tyre for secondary damage.
- b. Preparation of the tyre for application of repair materials
- c. Preparation of inner tube for application of repair materials
- d. Inspection of tyre and tube after repair
- e. Inflation of tyre/tube to check for leaks

Main function of tyres

- a. Interaction between tyres, other components and handling
- b. Steering, drive and suspension
- c. Passenger comfort
- d. Load carrying

Dealing with Waste Materials including:

- a. scrapped tyres
- b. wheel weights
- c. waste repair materials

Legal Requirements

- a. tread depth
- b. tyre wall and casing damage
- c. tyre pressure
- d. mixing of tyre types
- e. correct fitting

Assessment Requirements

Unit VF06K – Knowledge of Inspection, Repair and Replacement of Industrial Equipment Tyres

Content:

Note, the term 'industrial equipment' also refers to: agricultural, horticultural and construction industrial equipment.

Identify the different types of industrial equipment tyre construction

- a. Radial
- b. Bias and bias belted
- c. Tube type
- d. Tubeless
- e. Tread and sidewall designs

Identify sidewall markings on industrial equipment tyres

- a. Service description (load and speed markings)
- b. Size designations
- c. Aspect ratios
- d. Construction markings (bias and bias belted, radial, tube type, tubeless)
- e. Type approval markings
- f. Date of manufacture markings
- g. Tread wear indicators
- h. Sidewall fitting instructions
- i. Special service markings

Inspection and fault identification methods and procedures

- a. Inspection:
 - v. on the rim visual (external)
 - vi. removed from wheel (internal)
- b. Use of tread depth indicators, tyre probes and pressure gauges
- c. Information sources including tyre and vehicle manufacturers' technical data
- d. the importance of accurate measurements
- e. the importance of accurate fault identification
- f. the importance of accurate adjustments

Identify the tools and equipment used to identify faults relating to industrial equipment tyres and wheels and confirm them safe to use

- a. Tyre tread depth gauges
- b. Tyre probes
- c. Bead spreaders
- d. Tyre pressure gauges
- e. Hand lamps or torches

Identify the faults relating to industrial equipment tyres and wheels

- a. Suitable personal protective equipment for conducting Industrial equipment tyre and rim inspections
- b. Worn tread through normal use
- c. Abnormal wear (wheel misalignment, over and under-inflation, incorrect application and adjustment)

- d. Carcass damage (lumps and bulges, cuts, exposed cords, run-flat damage, penetrations, chemical damage)
- e. Incorrect fitment (load rating, speed rating, size, construction, tread design, sidewall information)
- f. Worn or damaged wheels and components (cracks, deformations).
- g. Worn, damaged or incorrect wheel fixings and axle
- h. Worn or damaged valves
- i. Worn, damaged or incorrect tubes

Make recommendations relating to industrial equipment tyres and wheels

- a. Suitability for fitting
- b. Suitability for minor repair
- c. Isolate scrapped tyres for correct disposal
- d. Recommend tyres as suitable for re-moulding
- e. Isolate scrapped wheel rims and components for correct disposal
- f. Consequences of improper disposal of scrap tyres and wheels

Identify the tools and equipment used for the removal and fitting of industrial equipment wheels and tyres and confirm them safe to use

- a. Technical information relating to safe lifting points and wheel torque and tyre pressure data.
- b. Industrial equipment stands.
- c. Hand tools and torque wrenches.
- d. Bead unseating tools, tyre levers, bead lubricant.
- e. Tyre inflation equipment
- f. Safety cages

Remove and fit industrial equipment tyres and wheels

- a. Manufacturer and sidewall fitting instructions
- b. Protecting the industrial equipment and personnel during wheel and tyre removal and fitting.
- c. Suitable personal protective equipment for industrial equipment tyre and wheel removal and fitting.
- d. Use and positioning of lifting and supporting devices.
- e. Wheel removal and fitting using hand tools
- f. Tyre removal and fitting using hand or powered tools
- g. Valve replacement for wheel rims.
- h. Safe tyre inflation
- i. Informing relevant persons of anticipated delays.
- j. Keeping relevant persons informed of progress
- k. The relationship between time and cost
- l. Final inspection

Methods and materials used in the repair of commercial vehicle tyres.

- a. Internal inspection of tyre for secondary damage.
- b. Preparation of the tyre for application of repair materials
- c. Preparation of inner tube for application of repair materials
- d. Inspection of tyre and tube after repair
- e. Correct storage of materials (including shelf life)
- f. Inflation of tyre and tube to check for leaks
- g. Repair Materials:
 - i. rubber only plug patch
 - ii. rubber only patch and filler material
 - iii. solutions and chemicals

Identify the tools and equipment used for the minor repair of industrial equipment tyres and inner tubes and confirm them safe to use

- a. mechanical, hydraulic and pneumatic (air bag) lifting and supporting equipment
- b. portable 'H' cages
- c. Technical information relating to minor repair areas, repair unit application instructions and injury limitations
- d. Suitable personal protective equipment for tyre and inner tube repairing.
- e. Measuring equipment for determining repairable areas
- f. Reamers, buffers and tyre bead spreaders
- g. Plug patch applicators, tyre probes, cover scrapers, roller stitchers, pliers and side cutters.
- h. Liquid buffing solutions, chemical vulcanising fluids, liner seal solutions and tyre talc (French Chalk)
- i. Combination plug/patches, patch and filler materials, inner tube patches

Describe how to improve traction by the use of ballast, to include if appropriate:

- a. water ballast
- b. wheel weights
- c. chassis weights

Carry out minor repairs to industrial equipment tyres and inner tubes

- a. Internal inspection of tyre for secondary damage.
- b. Preparation of the tyre for application of repair materials
- c. Preparation of inner tube for application of repair materials
- d. Inspection of tyre and tube after repair
- e. Inflation of tyre/tube to check for leaks

Main function of tyres

- a. Interaction between tyres, other components and handling
- b. Steering, drive and suspension
- c. Load carrying

Dealing with Waste Materials including:

- a. scrapped tyres
- b. wheel weights
- c. waste repair materials

Legal Requirements

- a. tread depth
- b. tyre wall and casing damage
- c. tyre pressure
- d. mixing of tyre types
- e. correct fitting

Assessment Requirements

Unit VF07K – Knowledge of Light Vehicle Four Wheel Alignment

Content:

Principles of steering and suspension and their effects on tyre wear and vehicle handling including:

- a. caster
- b. camber
- c. king pin or swivel axis inclination
- d. toe out on turns
- e. thrust angle
- f. set back
- g. wheel run out
- h. axle alignment

Four wheel alignment pre-checks cover:

- a. Tyre pressures
- b. Wheel bearing and ball joint condition
- c. Suspension condition and ride height
- d. Vehicle loading
- e. Tyre size and condition

Four wheel alignment covers:

- a. Individual toe
- b. Combined toe
- c. Steering wheel position
- d. Thrust angle

Abnormal tyre wear

- a. Edge wear
- b. Feathering
- c. Tread wear pattern due to incorrect inflation pressures

Equipment and tools

- a. Hand tools
- b. Lifting and supporting equipment
- c. Specialist alignment measuring equipment
- d. Turn plates (turntables)
- e. Steering clamp

The impact of adjustment on electronic systems to include:

- a. tyre pressure monitoring systems (tpms)
- b. steering wheel angle sensor
- c. electronic stability programme

Assessment Requirements

Unit VF08K – Knowledge of inspection and Repair of Light Vehicle Clutches

Content

Tools and equipment used in the repair and maintenance of manual clutches.

- a. Hand tools
- b. Lifting equipment
- c. Ramps, jacks and axle stands
- d. Specialist tools: alignment tools
- e. Use, maintenance storage and cleaning
- f. Safety procedures to be observed while carrying out work
- g. General workshop equipment

The purpose and basic function and layout of manual clutches.

- a. Front wheel drive and rear wheel drive
- b. Types of clutches (single plate dry clutch – spring and diaphragm applications)
- c. clutch operating mechanisms (mechanical and hydraulic) adjustments
- d. Hydraulic fluids
- e. DOT classification

Removal and refitting procedures associated with manual clutches

- a. Safe use of equipment and PPE
- b. Vehicle protection
- c. Sequence: logical, manufacturer recommended methods (FWD and RWD)
- d. Disposal of removed parts, materials, solutions and chemicals
- e. Final inspection and component adjustment

Checks and adjustments to systems and components to include:

- a. clutch operating systems
- b. clutch assemblies
- c. flywheel
- d. oil leaks

Clutch inspection techniques including:

- a. visual
- b. aural
- c. measurement
- d. functional test

Clutch components

- a. Clutch assembly (drive plate, pressure plate and release bearing)
- b. Spigot bearing
- c. Flywheel
- d. Operating cable
- e. Hydraulic clutch components
- f. Automatic and manual adjusters
- g. Clutch fork
- h. Oil seals
- i. Input shaft

- j. Inspection cover
- k. Clutch pedal
- l. Bell housing
- m. Gear box
- n. Driveshaft
- o. Prop-shaft

Type of clutch and operating system

- a. Single plate
- b. Multi-plate
- c. Centrifugal
- d. Spring and diaphragm type pressure plates (covers)
- e. Cable,
- f. Hydraulic
- g. Electronic.

Common faults associated with clutch systems, their causes and how to identify and rectify them. To include:

- a. slip
- b. drag
- c. judder
- d. noise

The removal and replacement procedures associated with clutch systems including:

- a. the effective sequence of working
- b. workplace requirements for recording
- c. measurements taken and adjustments made

Adjusting clutch working tolerances to include:

- a. finding and using data
- b. importance of accurate measurement
- c. importance of adjusting to acceptable tolerances

Assessment Requirements

Unit VF09K – Knowledge of Inspection and Replacement of Light Vehicle Exhaust Components

Content

Tools and equipment.

- a. Oxy-acetylene cutting equipment
- b. Lifting and supporting equipment
- c. Hand tools
- d. Special purpose tools – exhaust chain cutter, exhaust flaring dolly, thread cutting taps and dies, stud removal toolse. Steering clamp

Exhaust system components

- a. Front pipe and fittings
- b. Silencers - composite, absorption, expansion, baffles
- c. Intermediate and tail pipe - materials used in exhaust system construction: mild steel, aluminium coated, stainless steel. packing materials, joints, flexible, rigid, welded, fixings, studs, brackets, mountings.
- d. Catalytic converter
- e. Lambda sensor materials used in exhaust system construction: mild steel, aluminium coated, stainless steel. packing materials
- f. Exhaust mountings and clamps
- g. Heat shields

Legal requirements associated with vehicle exhaust systems

- a. MOT test requirements
- b. Emissions
- c. Noise

Use of oxy-acetylene equipment when working on exhausts, to include:

- a. straight through cuts
- b. female from male cuts
- c. male from female cuts
- d. removal of seized components

The purpose, function, construction and layout of exhaust system components, to include:

- a. exhaust system as a complete unit
- b. individual components
- c. catalytic converter
- d. lambda sensor

Inspection techniques for exhaust systems to include:

- a. visual
- b. aural
- c. functional test

Check exhaust system components functionality after refitting or replacement to include the importance of:

- a. doing so before release to the customer
- b. ensuring customers are advised of any running in procedures for new exhausts
- c. checking that replacement components are of the correct type and quality for the vehicle and conform to legal requirements where relevant

Assessment Requirements

Unit VF10K – Knowledge of Inspection, Testing and Replacement of Vehicle Batteries and Related Components

Content

The selection, function and safe use of battery testing equipment, to include:

- a. Voltmeter
- b. Multi-meter
- c. Hydrometer
- d. Battery condition tester

Batteries and components are:

- a. Automotive batteries
- b. Battery connections
- c. Battery supports
- d. Battery hold down devices
- e. Generators
- f. Drive belts

Types of batteries are:

- a. Standard batteries
- b. Low maintenance batteries
- c. Maintenance free batteries
- d. Gel filled batteries
- e. Smart charging

Generators can be:

- a. Alternators
- b. Dynamos
- c. Magnetos

Tools used for testing and maintenance to include:

- a. Hydrometer
- b. Volt meter
- c. Ammeter
- d. High rate discharge meter
- e. Battery chargers
- f. Battery savers

Testing of batteries and charging systems

- a. Electrolyte level low
 - b. Terminal connections loose or corroded
 - c. Drive belt slipping
 - d. Alternator or generator not charging at the correct output (meter check)
 - e. Faulty alternator or voltage regulator
 - f. Specific gravity low or high
-
- a. Health and safety equipment Personal protection
 - b. Electrolyte filling and health and safety requirements
 - c. Correct disposal of waste

- d. Working to agreed timescales
- e. Keeping others informed of progress and referral of problems
- f. Storage and maintenance of battery stock
- g. Logical sequence for disconnecting and connecting

Fault identification methods and procedures for batteries and components, to include:

- a. visual
- b. aural
- c. use of hand held test equipment
- d. use of battery manufacturer's test equipment

Common faults associated with batteries and charging systems, to include:

- a. internal battery faults
- b. charging faults
- c. drive belt faults
- d. wiring or connection faults
- e. battery mounting faults
- f. battery terminal and casing faults

Assessment Requirements

Unit VF11K – Knowledge of Inspection and Replacement of Light Vehicle Suspension Dampers and Springs

Content

Tools and equipment:

- a. Hand tools
- b. Lifting and supporting equipment
- c. Specialist tools

Fault identification methods and procedures for suspension dampers and springs, to include:

- a. Visual
- b. Aural
- c. damper operation (bounce test)

Suspension may include:

To include:

- a. Telescopic,
- b. Lever arm
- c. Semi strut and MacPherson strut
- d. Gas assisted
- e. Coil spring
- f. Leaf spring
- g. Torsion bar
- h. Rubber
- i. Hydragas
- j. Torsion bar
- k. Hydromatic

Special purpose tools may include:

- a. Spring compressors
- b. Strut guide
- c. Strut insert retainer tools
- d. Ball joint separators

Purpose and function of light vehicle suspension dampers.

- a. Damping effect.
 - b. Passenger comfort.
 - c. Road holding.
-
- a. Personal protection
 - b. Dangers and precautions to be taken when using spring compressors
 - c. Correct disposal of waste
 - d. Working to agreed timescales
 - e. Keeping others informed of progress and referral of problems
 - f. Priming of dampers

Common faults associated with light vehicle suspension dampers and springs, including:

- a. wear
- b. leakage
- c. damage
- d. corrosion
- e. deterioration (rubber components)

Assessment Requirements

Unit VF12K – Knowledge of Inspection, Adjustment and Replacement of Light Vehicle Braking Systems and Components

Content

Tools and equipment

- a. hand tools
- b. special purpose tools
- c. lifting and supporting equipment
- d. brake bleeding equipment
- e. measuring equipment

Inspection and testing techniques for braking systems

- a. visual
- b. aural
- c. measurement
- d. functional

Common Faults with light vehicle braking systems, to include:

- a. wear
- b. leakage
- c. damage
- b. corrosion

Removal and replacement of light vehicle braking systems and components, to include:

- a. dangers and precaution to be taken when working with brake dust
- b. correct disposal of waste
- c. working to agreed timescales
- d. keeping others informed of progress and

Function and layout of braking systems

- a. Hydraulic braking circuit
- b. Types of braking systems: disc/pad, drum/shoe, servo assisted, shoe/shoe, twin leading and leading trailing
- c. Components: master cylinders, servos, brake pads and shoes, calipers, wheel cylinders and backing plates
- d. Pipes, cables and servos
- e. Brake fluid (including testing)
- f. Equalising valves, load sensing valves and vacuum/pressure pumps
- g. Warning lights
- h. How to identify ABS braking systems

Hydraulic systems.

- a. Single line
- b. Multi line (diagonal, triangular and 'H')

Electronic braking systems:

- a. Anti-skid (lock) braking systems
- b. Electronic brake distribution
- c. Parking brakes

Special purpose tools:

- a. Piston retracting tools
- b. Wind back tools
- c. Brake shoe horn (lifter)
- d. Brake shoe clip remover
- e. Brake fluid testers
- f. Brake hose clamps
- g. Brake adjusting tools
- h. Brake bleeding equipment

Braking system faults

- a. Excessive pedal travel
- b. Brake judder
- c. Excessive pedal pressure
- d. Imbalance/pull
- e. Premature deterioration
- f. Brakes binding
- g. Brake fade.
- h. Failed servo
- i. Air in system

Fault identification

- a. Inspection-visual, aural and measurement
- b. Test drive/roller brake test
- c. Questioning
- d. Dismantling
- e. Information sources (including manufacturers' technical data)
- f. Limits of wear and serviceability

Assessment Requirements

Unit VF13K – Knowledge of Safe use of Oxy Acetylene in Automotive Applications

Content:

Specific safety precautions when working with thermal cutting equipment, to include:

- a. fire and explosion prevention
- b. protection of others
- c. working in confined spaces
- d. fume control
- e. personal protective equipment
- f. movement of heavy and sharp materials

Gases used in thermal cutting, including:

- a. gas identification and colour codes
- b. particular characteristics
- c. safety procedures

Setting up thermal cutting equipment:

- a. connection of hoses
- b. connection of regulators and flashback arrestors
- c. selection of cutting torch and nozzle size

The procedures for cutting specific materials and features, to include:

- a. pipe sections straight through
- b. female from male cuts
- c. male from female cuts

Checks on equipment to confirm safety and fit for purpose.

- a. Regulators, hoses and valves are securely connected and free from leaks and damage
- b. Correct gas nozzle is fitted to the cutting torch
- c. Flashback arrestor is fitted to gas equipment
- d. Gas pressures are set and maintained as instructed
- e. Correct procedure is used for lighting, adjusting and extinguishing the cutting flame
- f. Hoses are safely routed and protected at all times
- g. Gas cylinders are handled and stored safely and correctly

Specific personal protective equipment

- a. Leather aprons
- b. Gloves
- c. Eye protection
- d. Safety helmet
- e. Skull cap
- f. Flame retardant overalls
- g. Safety boots

Hazards associated with thermal cutting and how they can be minimized

- a. Naked flames
- b. Fumes and gases
- c. Explosive gas mixtures

- d. Oxygen enrichment
- e. Spatter
- f. Hot metal
- g. Elevated working
- h. Enclosed spaces

Safe working practices and procedures for using thermal equipment in line with British Compressed Gas Association (BCGA) codes of practice, to include:

- a. Setting up procedures
- b. Permit-to-work procedures
- c. Emergency shutdown procedures.

Preparations prior to cutting

- a. Checking connections for leaks
- b. Setting gas pressures
- c. Setting up material or work piece
- d. Checking cleanliness of materials used

Assessment Requirements

Unit VF44K – Knowledge of Receiving and Storing Stock

Contents

Different types of storage equipment available in a Fast Fit Centre, to include:

- a. Adjustable storage racking
- b. Tyre racking
- c. Exhaust racking
- d. Drawers
- e. Wall bins
- f. Battery storage
- g. Lockable cabinets

The types of stock can be stored with each type of storage equipment

Reasons for stock rotation

Methods of identifying stock location

Storage of

- a. Tyres
- b. Exhaust Components
- c. Batteries
- d. Brake Parts
- e. Oil

Workplace procedures for receipt of parts

- a. Routine deliveries
- b. Shortages
- c. Damage.
- d. Heavy or Bulky items

Administrative procedures

- a. Updating stock records
- b. Reporting damage or incomplete deliveries
- c. Special order parts

Assessment Requirements

Unit LV01K – Knowledge of Routine Light Vehicle Maintenance

Content:

- a Vehicle maintenance, inspection and adjustment and record findings
- b Vehicle inspection techniques used in routine maintenance including:
 - i. aural
 - ii. visual and functional assessments on engine
 - iii. engine systems
 - iv. chassis systems
 - v. wheels and tyres
 - vi. transmission system
 - vii. electrical and electronic systems
 - viii. exterior vehicle body
 - ix. vehicle interior
- c The procedures used for inspecting the condition and serviceability of the following:
 - a. filters
 - b. drive belts
 - c. wiper blades
 - d. brake linings
 - e. pads
 - f. tyres
 - g. lights
- d Preparation and use appropriate use of equipment to include:
 - i. test instruments
 - ii. emission equipment
 - iii. wheel alignment
 - iv. beam setting equipment
 - v. tyre tread depth gauges
- e Procedures for checking and replenishing fluid levels:
 - i. oil
 - ii. water
 - iii. hydraulic fluids
- f Procedures for checking and replacement of lubricants:
 - i. replace oil filters
 - ii. check levels
 - iii. types of oil
 - iv. cleanliness
 - v. disposal of old oil and filters
- g Procedures for carrying out adjustments on vehicle systems or components:
 - i. clearances
 - ii. settings
 - iii. alignment
 - v. operational performance (engine idle, exhaust gas)
- h Procedures for checking electrical systems:
 - i. operation
 - ii. security
 - iii. performance
- i Importance and process of detailed inspection procedures:
 - i. following inspection checklists
 - ii. checking conformity to manufacturer's specifications

- iii. UK and European legal requirements
- j. Importance and process of completing all relevant documentation relating to routine maintenance:
 - i. inspection records
 - ii. job cards
 - iii. vehicle repair records
 - iv. in-vehicle service history
- k. The need to use vehicle protection prior to repair
 - Requirements and methods used for protecting:
 - i. vehicle body panels
 - ii. paint surfaces
 - iii. seats
 - iv. carpets and floor mats
- l. The need to check the vehicle following routine maintenance
- m. The need to inspect the vehicle following routine maintenance:
 - i. professional presentation of vehicle
 - ii. customer perceptions
- n. The checks of vehicle following routine maintenance:
 - i. removal of oil and grease marks
 - ii. body panels
 - iii. paint surfaces
 - iv. seats
 - v. carpets and floor mats
 - vi. re-instatement of components

Assessment Requirements

Unit RR03K – Knowledge in Assessing and Securing the Roadside Situation

Content

Organisational requirements and procedures

The range of services and resources within a typical roadside assistance/recovery organisation.

- a. Roadside Assistance-Service vans, light, commercial, motorcycle
- b. Recovery-Light, commercial, motorcycle, breakdown, accident
- c. Customer welfare-protection at the scene, welfare facilities at base-Toilets, refreshments etc.

Operating, reporting and recording procedures for a typical roadside assistance/recovery organisation.

- a. Receiving of work-Office, dedicated control centre
- b. Distribution of work-Types of communication methods
- c. Recording of work-Database, hand held devices, Job cards

How to complete records and the importance of doing so in a roadside assistance/recovery context

- a. Risk assessment-Generic, specific, dynamic-Difference, Importance
- b. Electronic records-Hand held device job completion, Damage reports
- c. Manual recording systems-Job cards, damage reports

The legal requirements and codes of practice for site protection and recovery arrangements

The legal requirements and industry codes of practice governing site protection and recovery operations

- a. HASAWA-Employers duties, employees duties, duty of care
- b. PAS 43-Industry guidance document
- c. Sector agreement-Life On The Edge 6, regarded as the code of practice for the recovery sector

The importance of wearing personal protective equipment.

- a. Last resort-In many cases no other way of reducing the risk
- b. Personal safety-Operator safety paramount, Warns other road users

How to assess and secure a site

The difference in requirements for securing and protecting a breakdown site and an accident site.

- a. The risk assessment-Increased hazards present at an accident scene
- b. Services present-police, HATO, other emergency services
- c. Casualty occupants-Time at scene, shocked from RTC, children and babies
- d. Welfare needs-Toilet facilities, refreshments, on-going journey arrangements
- e. Temporary Traffic Management-Beacons, relaxed sign layout(signs and cones carried on the recovery vehicle), standard sign layout(signs and cones laid out by a third party), road closure

The sources of specialist advice and guidance

- a. Company procedures and risk assessments
- b. The Life on the Edge series of films
- c. PAS 43
- d. Company management, line manager, control centre, incident manager
- e. Police-Officer on scene, control room

- f. Highways Agency-traffic officer on scene, control centre

Why weather conditions affect the assessment and security of the roadside situation.

- a. Visibility-Heavy rain, snow, bright sunshine
- b. Extreme cold-Increased hazards due to ice, additional clothing required, use of gloves
- c. Extreme heat-Personal comfort, PPE
- d. High winds-Commercial vehicle risks

Approaching the scene of an incident

- a. Flow of traffic-Type of road, is there a hard shoulder? Is there a place of safety?
- b. Slowing down to park at scene-Warnings, indicators, other means
- c. Parking position-in front of casualty, behind casualty
- d. Distance to casualty vehicle
- e. Beacons-Are they needed?
- f. Personal protective equipment-Minimum requirements
- g. Exiting the recovery vehicle-Safety, checking for traffic, correct dismount
- h. Codes of Practice (PAS 43)
- i. Communication and reporting to relevant people and organizations using appropriate method.

Circumstances in which to call for specialist assistance.

- a. Injuries to passengers-Not known to emergency services, who to call, unlikely event
- b. Disabled passengers-Cannot get in to the recovery vehicle, specialist vehicle not available
- c. Hazardous substances present-Who should be called

Securing and protecting incident sites in line with current industry codes of practice

- a. 'Fend' position
- b. Recovery vehicle conspicuousness
- c. Recovery vehicle beacons
- d. Relaxed sign layout-Cones and signs on the recovery vehicle
- e. Standard sign layout-Cones and signs laid out by a third party (Police or HA)
- f. Road closure

How to take steps to secure the safety of yourself and others.

- a. Personal safety-Watching, listening, using a lookout
- b. Passengers of casualty vehicles-Control of movement, safe waiting areas, type of road
- c. The public-Safe working zones, control methods, 3rd party control (i.e. Police)

Explain how to use electronic and radio communication methods.

- a. Types of communication equipment-Radio, Mobile telephone, Mobile Data Terminal, PDA
- b. Licence requirements
- c. Use of correct language
- d. On route
- e. On scene
- f. Delays
- g. Job completion
- h. Assistance needed
- i. At base or waiting area

How to communicate with customers and relevant authorities

- a. Customers-Respect, empathy, compassion, firmly
- b. Police-Officer in charge, recovery requirements
- c. Highways Agency-Traffic officer on scene, recovery requirements
- d. Other-Other emergency services, EA, Utility managers/workers, Traffic management

How to make an initial assessment of the extent of vehicle damage and or faults.

- a. Breakdown-What is the fault? Is a repair quicker than recovery? Are parts required? Do you have the correct recovery vehicle? Prestige vehicles, Safety issues
 - b. Accident-How much damage is there? Does the casualty roll? How many casualties are there? Do you have the correct recovery vehicle? Are there special requirements by the Police? (Preservation of mechanical evidence etc)
- How to identify vehicles carrying hazardous substances.
- a. Marker plates-Types, shapes, colours, numbering system
- Describe the possible consequences of inaccurate roadside assessment
- a. Danger to recovery technician
 - b. Danger to driver/passengers of casualty
 - c. Danger to others