

## Assessment Requirements

### Unit MET04K – Knowledge of Removing and Fitting Electronically Controlled Vehicle Mechanical Components

#### Content:

#### The construction and operating principals of electronically controlled suspension systems and assemblies

##### Suspension

- a. The components and layout of electronically controlled suspension systems
- b. The operation of electronically suspension systems and components:
- c. The advantages of different systems including:
  - i. non-independent
  - ii. independent suspension (IFS)
  - iii. independent suspension (IRS)
  - iv. hydraulic
  - v. hydro-pneumatic
  - vi. rigid axle
- d. The principles of electronic suspensions systems.
- e. The forces acting on suspension systems during braking, driving and cornering.
- f. The methods of locating the road wheels against braking, driving and cornering forces.
- g. The methods of controlling cornering forces by fitting anti-roll torsion members
- h. Suspension terms:
  - i. rebound
  - ii. bump
  - iii. float
  - iv. dive
  - v. pitch
  - vi. roll
  - vii. compliance
- i. The procedures used for inspecting the serviceability and condition of the suspension system

##### Components and operation of self-levelling suspension

- a. The components, construction and operation of a self leveling suspension system.
- b. The operation of self -leveling suspension system under various conditions:
  - i. self-energizing
  - ii. pump operated self-levelling suspension

##### Operation of fitting ride-controlled systems.

- a. The reasons for fitting ride controlled systems.
- b. The operation of driver controlled and ride controlled systems.

#### The construction and operating principals of climate control systems and assemblies

##### The function of component heater, cooling parts and climate control

- a. Components include:
  - i. heater motors
  - ii. rheostats

- ii. valves
- iii. switches
- iv. relays
- v. cooling fan motors
- vi. air conditioning units
- vii. thermostatic switches

### **The operating principles of heater, cooling systems and climate control**

#### a. Principles to include:

- i. conduction
- ii. convection
- iii. radiation
- iv. circulation
- v. boiling points
- vi. states of matter (Gas, liquid, solid)
- vii. temperature control
- viii. antifreeze mixtures
- ix. heat transfer

### **General**

The procedures for dismantling, removal and replacement of suspension/climate control system components

#### a. The preparation:

- i. testing and use of tools and equipment
- ii. electrical meters and equipment used for dismantling
- iii. removing and replacing suspension/climate control systems and components

#### b. Appropriate safety precautions:

- i. PPE
- ii. vehicle protection when dismantling
- iii. removing and replacing suspension/climate control systems and components

#### c. The importance of logical and systematic processes.

#### d. The inspection and testing of suspension/climate control systems and components.

#### e. The preparation of replacement units for re-fitting or replacement of suspension/climate control systems or components.

#### f. Identify the reasons why replacement components and units must meet the original specifications (OES):

- i. warranty requirements
- ii. to maintain performance
- iii. safety requirements

#### g. Refitting procedures.

#### h. The inspection and testing of units and systems to ensure compliance with manufacturer's, legal and performance requirements.

#### i. The inspection and re-instatement of the vehicle following repair to ensure customer satisfaction:

- i. cleanliness of vehicle interior and exterior
- ii. security of components and fittings
- iii. re-instatement of components and fittings

### **Procedures to prevent damage to the vehicle, components and contents when removing, storing and refitting components**

#### a. The methods that can be used to protect undamaged items to ensure they are removed and refitted without causing unnecessary damage:

#### b. The procedures for the correct storage of vehicle contents.

#### c. The process for identifying, evaluating and reporting of extra damage and items that may have broken when removed, refitted or unscheduled work

### **Types of clips and fixings**

- a. The following types of clips and identify reasons and limitations for their use:
  - i. speed
  - ii. 'c'
  - iii. 'd'
  - iv. 'j' type captive nut
  - v. 'r'
  - vi. 'u' type captive nut
  - vii. cable clip
  - viii. trim clips
- b. The following types of fixings and identify reasons and limitations for their use:
  - i. pop rivet
  - ii. plastic rivet
  - iii. plastic capture nut
  - iv. nut and bolt
  - v. shoulder bolt
  - vi. 'Nyloc' type nuts
  - vii. washers
  - viii. 'Spring' type washers
  - ix. self tapping screws and bolts
  - x. quick release plastic trim fastenings
  - xi. trim tapes
  - xii. adhesives and sealers

### **The processes involved when carrying out quality checks**

- a. Items that may have been 'workshop' soiled and describe processes for rectifying:
  - i. door cards
  - ii. seats
  - iii. carpets
  - iv. boot and bonnet trims
- b. Methods for checking gaps.

### **Mechanical Components**

- a. Suspension - Active Suspension
- b. Climate Control