

Assessment Requirements

Unit LV04K – Knowledge of Light Vehicle Chassis Units and Components

Content:

Steering

- a. The action and purpose of steering geometry:
 - i. castor angle
 - ii. camber angle
 - iii. kingpin or swivel pin inclination
 - iv. negative offset
 - v. wheel alignment (tracking) (toe in and toe out)
 - vi. toe out on turns
 - vii. steered wheel geometry
- b. The following terms associated with steering:
 - i. Ackerman principle
 - ii. slip angles
 - iii. self-aligning torque oversteer and understeer
 - iv. neutral steer
- c. The components and layout of hydraulic power steering systems:
 - i. piston and power cylinders
 - ii. drive belts and pumps
 - iii. hydraulic valve (rotary, spool and flapper type)
 - iv. hydraulic fluid
- d. The advantages of power assisted steering
- e. The operation of hydraulic power steering.
- f. The principles of electronic power steering systems.
- g. The procedures used for inspecting the serviceability and condition of:
 - i. manual steering
 - ii. power steering
- h. Steering system defects to include:
 - i. uneven tyre wear
 - ii. wear on outer edge of tyre
 - iii. wear on inner edge of tyre
 - iv. uneven wear
 - v. flats on tread
 - vi. steering vibrations
 - vii. wear in linkage
 - viii. damage linkage
 - ix. incorrect wheel alignment
 - x. incorrect steering geometry

Suspension

- a. The layout and components of suspension systems:
 - i. non-independent suspensions
 - ii. independent front suspension (IFS)
 - iii. independent rear suspension (IRS)
 - iv. hydraulic
 - v. hydro-pneumatic
 - vi. rigid axle types
- b. The operation of suspension systems and components:

- i. leaf and coil springs
- ii. torsion bar
- iii. rubber springs
- iv. Macpherson strut system
- v. hydraulic
- vi. hydro-pneumatic
- vii. hydraulic dampers
- viii. trailing arms
- ix. wish bones
- x. ball joints
- xi. track control arms
- xii. bump stops
- xiii. anti-roll bars
- xiv. stabiliser bars
- xv. swinging arms
- xvi. parallel link
- xvii. swinging half-axles
- xviii. transverse link
- xix. semi-swinging arms
- 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
- j. Suspension system defects:
 - i. wheel hop
 - ii. ride height (unequal and low)
 - iii. wear
 - iv. noises under operation
 - v. fluid leakage
 - vi. excessive travel
 - vii. excessive tyre wear
 - viii. bounce
 - ix. poor vehicle handling
 - x. worn dampers
 - xi. worn joints
 - xii. damaged linkages

Brakes

- a. The construction and operation of drum brakes:
 - i. leading and trailing shoe construction
 - ii. self-servo action
 - iii. automatic adjusters
 - iv. backing plates
 - v. parking brake system
- b. The construction and operation of disc brakes:
 - i. disc pads
 - ii. calliper
 - iii. brake disc
 - iv. ventilated disc
 - v. disc pad retraction
 - vi. parking brake system
 - vii. electrical and electronic components
 - viii. wear indicators and warning lamps
- c. The construction and operation of the hydraulic braking system:
 - i. single and dual line layout
 - ii. master cylinders
 - iii. wheel cylinders
 - iv. disc brake calliper & pistons
 - v. brake pipe
 - vi. brake servo
 - vii. warning lights
 - viii. parking brakes
 - ix. equalising valves
- d. The principles and components of electronic ABS systems, electrical and electronic components.
- e. The requirements and hazards of brake fluid:
 - i. boiling point
 - ii. hygroscopic action
 - iii. manufacturer's change periods
 - iv. fluid classification and rating
 - v. potential to damage paint surfaces
- f. Terms associated with mechanical and hydraulic braking systems:
 - i. braking efficiency
 - ii. brake fade
 - iii. brake balance
 - iv. ABS
- g. The procedures used for inspecting the serviceability and condition of the braking system
- h. Braking system defects:
 - i. worn shoes or pads
 - ii. worn or scored brake surfaces
 - iii. abnormal brake noises
 - iv. brake judder
 - v. fluid contamination of brake surfaces
 - vi. fluid leaks
 - vii. pulling to one side
 - viii. poor braking efficiency
 - ix. lack of servo assistance
 - x. brake drag
 - xi. brake grab
 - xii. brake fade

Wheel and Tyres

- a. The construction of different types of tyre:
 - i. radial
 - ii. cross ply
 - iii. bias belted
 - iv. tread patterns
 - v. tyre mixing regulations
 - vi. tyre applications
- b. Tyre markings:
 - i. tyre and wheel size markings
 - ii. speed rating
 - iii. direction of rotation
 - iv. profile
 - v. load rating
 - vi. ply rating
 - vii. tread-wear indicators
- c. Wheel construction:
 - i. light alloy
 - ii. pressed steel and wire wheels
 - iii. flat-edge and double hump rims
- d. Types of wheel bearing arrangements:
 - i. non-driving
- e. Types of bearing used for wheel bearing arrangements:
 - i. roller
 - ii. taper roller
 - iii. needle
 - iv. ball and plain
- f. The procedures used for inspecting the serviceability and condition of:
 - iii. tyres & wheels
 - iv. bearings
- g. The defects associated with tyres and wheels:
 - i. abnormal tyre wear
 - ii. cuts
 - iii. side wall damage
 - iv. wheel vibrations
 - v. tyre noise (squeal during cornering)
 - vi. tyre over heating (low pressure)
 - vii. tread separation

General

The procedures for dismantling, removal and replacement of chassis 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 chassis systems and components
- b. Appropriate safety precautions:
 - i. PPE
 - ii. vehicle protection when dismantling
 - iii. removing and replacing chassis systems and components
- c. The importance of logical and systematic processes.
- d. The inspection and testing of chassis systems and components.
- e. The preparation of replacement units for re-fitting or replacement of chassis 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