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**Overview**

This standard is about removing and replacing units and components where dismantling and re-assembly of transmission and driveline systems is required. It is also about evaluating the performance of replaced units and components.

The units and components concerned are not those replaced as part of normal routine, vehicle maintenance (servicing) activities.

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**Performance****criteria**

- You must be able to:
- P1 use suitable personal and vehicle protective equipment throughout all removal and replacement activities
  - P2 support your removal and replacement activities by reviewing:
    - P2.1 vehicle technical data
    - P2.2 removal and replacement procedures
    - P2.3 legal requirements
  - P3 prepare the vehicle systems and work area for safe working procedures (where appropriate)
  - P4 prepare, check and use all the **equipment** required following manufacturers' instructions
  - P5 carry out all removal and replacement activities following:
    - P5.1 manufacturers' instructions
    - P5.2 recognised repair methods
    - P5.3 health, safety and environmental requirements
    - P5.4 your workplace procedures
  - P6 work in a way which minimises the risk of:
    - P6.1 damage to other vehicle systems
    - P6.2 damage to other vehicle units and components
    - P6.3 contact with leakage
    - P6.4 contact with hazardous substances
    - P6.5 damage to your working environment
  - P7 ensure replacement transmission or driveline **units and components** conform to the vehicle operating specification and any legal requirements
  - P8 promptly record and report any additional faults you notice during the course of your work
  - P9 use suitable **testing methods** to evaluate the performance of the reassembled system accurately
  - P10 ensure the reassembled transmission or driveline system performs to the vehicle operating specification and meets any legal requirements prior to return to the customer
  - P11 ensure your records are accurate, complete and passed to the relevant person(s) within the agreed timescale and in the format required

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P12 complete all removal and replacement activities within the agreed timescale

P13 promptly report any expected delays in completion to the relevant person(s)

## Knowledge and understanding

You need to know and understand:

### Legislative and organisational requirements and procedures

- K1 the legal requirements relating to the vehicle
- K2 the legislation and workplace procedures relevant to
  - K2.1 health and safety
  - K2.2 the environment (including waste disposal)
  - K2.3 personal and vehicle protective equipment
- K3 your workplace procedures for:
  - K3.1 recording removal and replacement information
  - K3.2 the referral of problems
  - K3.3 reporting delays to the completion of work
- K4 the importance of documenting removal and replacement information
- K5 the importance of working to agreed timescales and keeping others informed progress
- K6 the relationship between time and costs
- K7 the importance of promptly reporting anticipated delays to the relevant person(s)

### Use of technical information

- K8 how to find, interpret and use sources of information applicable to units and component removal and replacement within **transmission and driveline systems**
- K9 the importance of using suitable sources of technical information
- K10 the purpose of and how to use identification codes

### Electrical and electronic principles

- K11 vehicle earthing principles and earthing methods
- K12 electrical and electronic principles associated with **transmission and driveline systems**
- K13 types of circuit protection and why these are necessary
- K14 electrical safety procedures electric symbols, units and terms
- K15 electrical and electronic control system principles
- K16 the hazards associated with working on or near high energy electrical vehicle components

**Transmission and driveline system operation and construction**

- K17 how **transmission and driveline systems** and their related **units and components** are constructed, removed and replaced for the classification of vehicle worked upon
- K18 how **transmission and driveline systems** and their related **units and components** operate for the classification of vehicle worked upon

**Equipment**

- K19 how to prepare, check and use all the removal and replacement **equipment** required

**Transmission and driveline system units and components removal and replacement**

- K20 how to remove and replace **transmission and driveline system** mechanical, electrical and hydraulic/pneumatic **units and components** for the classification of vehicle worked upon
- K21 how to select and use gaskets, sealants, seals, fittings and fasteners
- K22 how to test and evaluate the performance of replacement **transmission and driveline system units and components** and the reassembled system against the vehicle operating specifications and any legal requirements
- K23 how to select the appropriate test method when checking transmission and driveline systems following replacement of components
- K24 when replacement **units and components** must meet the original **equipment** specification (OES) for warranty or other requirements
- K25 how to work safely avoiding damage to other vehicle systems, units and components and contact with leakage and hazardous substances

**Scope/range**

- 1. Equipment is:**
  - 1.1. hand tools
  - 1.2. special workshop tools
  - 1.3. general workshop equipment
  - 1.4. electrical testing equipment
  
- 2. Testing methods are:**
  - 2.1. sensory
  - 2.2. functional
  - 2.3. measurement
  
- 3. Units and components are:**
  - 3.1. mechanical
  - 3.2. electrical
  - 3.3. hydraulic/pneumatic
  
- 4. Transmission and driveline systems are:**
  - 4.1. gearbox
  - 4.2. hubs and bearings
  - 4.3. final drive assembly
  - 4.4. driveline components (including propeller shafts and drive shafts)
  - 4.5. clutch

**Additional  
Information****Glossary**

*This section contains examples and explanations of some of the terms used but does not form part of the standard.*

**Agreed timescales**

Examples include: manufacturer's recommended work times, job times set by your company or a job time agreed with a specific customer.

**Alternative fuel**

This is defined as any type of fuel that may be used to power an internal combustion engine, examples would include LPG, bio ethanol etc.

**Functional testing**

Examples include: use of brake roller tester, chassis dynamometer, transmission stall test.

**Units and components**

Any unit or component from the transmission and driveline systems defined in the scope/range above.

**Vehicles**

These can be any of the following types of light vehicle: SI, CI, Hybrid, Electric or Alternative fuel vehicles.

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