

**Overview**

This standard is about diagnosing and rectifying faults occurring in the lift truck power plant-source units, mechanical, electrical, hydraulic and fluid systems.

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**Performance****criteria**

- You must be able to:
- P1 wear suitable personal protective equipment and protect other systems when using diagnostic methods and carrying out rectification activities
  - P2 support the identification of faults, by reviewing lift truck:
    - P2.1 technical data
    - P2.2 diagnostic test procedures
  - P3 prepare, connect and test all the required equipment following manufacturers' instructions prior to use
  - P4 use diagnostic methods which are relevant to the symptoms presented
  - P5 collect sufficient diagnostic information in a systematic way to enable an accurate diagnosis of engine system faults
  - P6 identify and record any system deviation from acceptable limits accurately
  - P7 ensure your assessment of dismantled sub-assemblies, components and units identifies their condition and suitability for repair or replacement, accurately
  - P8 promptly inform the relevant person(s) ~~promptly~~ where repairs are uneconomic or unsatisfactory to perform
  - P9 use the equipment required, correctly and safely throughout all rectification activities
  - P10 carry out all diagnostic and rectification activities following:
    - P10.1 manufacturers' instructions
    - P10.2 recognised researched repair methods
    - P10.3 your workplace procedures
    - P10.4 health and safety requirements
  - P11 work in a way which minimises the risk of:
    - P11.1 damage to other lift truck systems
    - P11.2 damage to other components and units
    - P11.3 injury to yourself or others
    - P11.4 contact with hazardous substances
  - P12 ensure all repaired and replaced components and units conform to the lift truck operating specification and any legal requirements
  - P13 adjust components and units correctly to ensure that they operate to meet system requirements, when necessary

- P14 promptly record and report any additional faults you notice during the course of work ~~promptly~~
- P15 use testing methods which are suitable for assessing the performance of the system rectified
- P16 ensure the power plant-source system rectified performs to the lift truck operating specification and any legal requirements prior to return to the customer
- P17 ensure your records are accurate, complete and promptly passed to the relevant person(s) ~~promptly~~ in the format required
- P18 complete all system diagnostic activities within the agreed timescale
- P19 report any anticipated delays in completion to the relevant person(s)

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## Knowledge and understanding

You need to know and understand:

### Legislative and organisational requirements and procedures

- K1 the health and safety legislation and workplace procedures relevant to workshop practices and personal and lift truck protection when diagnosing and rectifying engine faults
- K2 the legal requirements relating to the lift truck
- K3 your workplace procedures for:
  - K3.1 recording fault location and correction activities
  - K3.2 reporting the results of tests
  - K3.3 the referral of problems
  - K3.4 reporting delays to the completion of work
- K4 the importance of working to recognised diagnostic and rectification procedures and processes and obtaining the correct information for diagnostic and rectification activities to proceed
- K5 the importance and purpose of recording diagnostic and rectification activities
- K6 the importance of working to agreed timescales and keeping others informed of progress
- K7 the relationship between time, costs and profitability
- K8 the importance of promptly reporting anticipated delays to the relevant person(s) in authority promptly

### Electrical and electronic principles

- K9 electrical and electronic principles associated with engine systems, including types of sensors and actuators, their application and operation
- K10 how electrical and electronic systems operate, including electrical components, electrical inputs, outputs, voltages, digital and fibre optics principles
- K11 the interaction between electrical, electronic and mechanical components within lift truck power plant-source systems
- K12 how power plant-source electrical systems interlink and interact, including multiplexing
- K13 electrical units, terms and schematics
- K14 electrical safety procedures

**Use of diagnostic and rectification equipment**

- K15 how to prepare and test the accuracy of diagnostic testing equipment
- K16 how to use diagnostic and rectification equipment for mechanical, electrical, electronic, hydraulic and fluid systems; specialist repair tools and general workshop equipment

**Engine electrical faults, their diagnosis and correction**

- K17 how power plant-source mechanical, electrical, electronic, hydraulic and fluid and fuel systems are constructed, operate, dismantled and reassembled
- K18 the types and causes of power plant-source mechanical, electrical, electronic and hydraulic and fluid system, component and unit faults and failures
- K19 power plant-source mechanical, electrical, electronic and hydraulic and fluid component and unit replacement procedures, the circumstances which will necessitate replacement and other possible courses of action
- K20 how to find, interpret and use sources of information on power plant-source electrical and electronic operating specifications, diagnostic test procedures, repair procedures and legal requirements
- K21 lift truck operating specifications for limits, fits and tolerances relating to lift truck power plant-source mechanical, electrical, electronic and hydraulic and fluid systems for the type/class of lift truck on which you work
- K22 how to select the most appropriate diagnostic testing method for the symptoms presented
- K23 how to carry out systematic diagnostic testing of power plant-source mechanical, electrical and electronic, hydraulic and fluid systems using prescribed processes or formats
- K24 how to assess the condition of mechanical, electrical, electronic, hydraulic and fluid components and units
- K25 how to interpret test results and lift truck data in order to identify the location and cause of power plant-source system faults
- K26 how to carry out the rectification activities in order to correct faults in the power plant-source mechanical, electrical, electronic and hydraulic and fluid systems
- K27 the relationship between test methodology and the faults repaired – the use of appropriate testing methods
- K28 how to make cost effective recommendations for rectification

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**Scope/range**

1. **Faults** can occur within:
  - 1.1. the pPower Plant-source mechanical system
  - 1.2. the pPower Plant-source electrical and electronic systems
  - 1.3. the Ppower Plant-source hydraulic and fluid systems
  - 1.4. the pPower Plant-source fuel systems
  
2. **Diagnostic methods** include:
  - 2.1. measurement
  - 2.2. functional testing
  - 2.3. electrical and electronic systems testing
  
3. **Equipment** includes:
  - 3.1. diagnostic and rectification equipment for mechanical systems
  - 3.2. diagnostic and rectification equipment for electrical systems
  - 3.3. diagnostic and rectification equipment for hydraulic and fluid systems
  - 3.4. specialist repair tools
  - 3.5. general workshop equipment

**Glossary**

**Diagnostic Testing is defined as:**

- verify the fault
- collect further information
- evaluate the evidence
- carry out further tests in a logical sequence
- rectify the problem
- check all systems

**Rectification activities are defined as:**

A suitable repair, replacement, re-coding or re-programming that rectifies the fault(s) identified from the diagnostic activities carried out

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