

### Overview

This standard covers the necessity for service and maintenance operations, the construction and function of service components and the skills required to carry service and maintenance work including, cleaning before, during and after a service operation, protecting machinery and property from damage, changing and cleaning service items, bleeding and priming fuel, oil, cooling, hydraulic, pneumatic and heating systems, sealing service components, checking machine operation against manufacturers' criteria, making adjustments, e.g. drive belts, chains, hand and foot brakes, tappets, clutch linkages, control cables.

It also covers the inspection and performance testing of machinery for nonconformity, abuse, serviceability, additional repair work, leaks and wear.

This standard relates to the following application or context:

1. The service and maintenance operations carried out on land-based machinery:
  - 1.1. Changing service items
  - 1.2. Cleaning service items
  - 1.3. Adjusting service items
  - 1.4. Reinstating the machine to operational condition following a service
  
2. Inspection, and assessment methods and remedial actions to deal with:
  - 2.1. Chaffing
  - 2.2. Leakages (gases, air, water, fuel, oil, coolants)
  - 2.3. Fire hazards
  - 2.4. Wear
  - 2.5. Vibration
  - 2.6. Conformity to manufacturers specifications
  - 2.7. Loose fittings
  - 2.8. Seizure
  
3. Performance testing
  - 3.1. Machine performance at work
  - 3.2. Testing of systems and services

**Anyone undertaking mains electrical work must comply with current regulations.**

### Performance criteria

*You must be able to:*

- P1 prepare machinery and the working area prior to carrying out service and maintenance operations, e.g. clean, protect, make safe, etc
- P2 service land-based engineering vehicles and machinery to manufacturers' schedules
- P3 reinstate the machine to correct operational condition following a service
- P4 assess land-based vehicles and machines for service and maintenance requirements
- P5 carry out inspections and assessments of land-based machinery for conformity to manufacturers' specifications, e.g. unauthorised modification, excessive loading, poor maintenance, incorrect operator settings
- P6 carry out performance and operational tests on completion of service and maintenance tasks, e.g. deceleration, power, pressure, flow, related to the work that has been performed on the machine

### Knowledge and understanding

*You need to know and understand:*

- K1 legal implications of modifying falling object protection system (FOPS) and/or roll over protection system (ROPS), e.g. integrating external equipment and services, drilling, welding
- K2 the reasons for service and maintenance operations
- K3 the actions to be taken at service and maintenance intervals, e.g. daily, weekly, monthly, annually and at scheduled operating hours
- K4 what is meant by the term 'running in'/'bedding in'
- K5 the types of filter, their construction, function and service requirements, e.g. screen, suction filter, high pressure filter, centrifugal filter, oil bath, water trap, pre-cleaner, carbon filters, ventilation filters
- K6 the procedures for draining fluids in service operations, e.g. fuel, oil, brake fluid, coolants
- K7 the methods of evacuating air from fuel, cooling, heating, braking, and water from hydraulic and pneumatic circuits when carrying out maintenance work
- K8 the methods used to clean and protect a machine before and during service operations, e.g. avoiding paint, trim and bodywork damage, avoiding the introduction of contaminants
- K9 how to check and perform adjustments, e.g. belt and chain tensions, clearances, cables and linkage settings, tracking
- K10 the methods of detecting and eliminating leakages, e.g. fuel, oil, air, water, gases or a crop
- K11 assess machinery condition and prepare prior to service and maintenance operations
- K12 the methods used to performance test machinery after service and maintenance operations

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### Core land-based engineering principles – Servicing and maintenance

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