

## Overview

This standard identifies the competences you need to carry out corrective maintenance activities on mechanical equipment, in accordance with approved procedures. This will involve dismantling, removing and replacing or repairing faulty components, in line with company procedures, on a variety of different types of mechanical equipment such as machine tools, gearboxes, portable tools, engines, pumps, process control valves, compressors, process plant, conveyers and elevators, lifting and handling devices, transfer equipment, mechanical structures, workholding devices and other company-specific equipment.

You will be expected to cover a range of maintenance activities, such as labelling/proof marking to aid reassembly, dismantling components to the required level, setting, aligning and adjusting components, replacing 'lived' items, replenishing oils, greases or other fluids, torque loading components and making 'off-load' checks before testing and starting up the maintained equipment, using appropriate techniques and procedures.

Your responsibilities will require you to comply with organisational policy and procedures for the maintenance activities undertaken, and to report any problems with these activities, or with the tools and equipment used, that you cannot personally resolve or are outside your permitted authority, to the relevant people. You must ensure that all tools, equipment and materials used in the maintenance activities are removed from the work area on completion of the activities, and that all necessary job/task documentation is completed accurately and legibly. You will be expected to work to instructions, alone or in conjunction with others, taking personal responsibility for your own actions, and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will be sufficient to provide a sound basis for your work, and will enable you to adopt an informed approach to applying mechanical maintenance procedures. You will have an understanding of dismantling and reassembly methods and procedures, and their application. You will know how the equipment functions and the purpose of individual components, in adequate depth to provide a sound basis for carrying out any maintenance, repair or adjustment. In addition, you will have sufficient knowledge of these components to ensure that they are fit for purpose and meet the specifications, thus providing a sound basis for carrying out reassembly.

You will understand the safety precautions required when carrying out the maintenance activities, especially those for isolating the equipment. You will

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also understand your responsibilities for safety, and the importance of taking the necessary safeguards to protect yourself and others in the workplace.

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### Performance criteria

*You must be able to:*

- P1 work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
- P2 follow the relevant maintenance schedules to carry out the required work
- P3 carry out the maintenance activities within the limits of your personal authority
- P4 carry out the maintenance activities in the specified sequence and in an agreed time scale
- P5 report any instances where the maintenance activities cannot be fully met or where there are identified defects outside the planned schedule
- P6 complete relevant maintenance records accurately and pass them on to the appropriate person
- P7 dispose of waste materials in accordance with safe working practices and approved procedures

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### Knowledge and understanding

*You need to know and understand:*

- K1 the health and safety requirements of the area in which the maintenance activity is to take place, and the responsibility these requirements place on you
- K2 the isolation and lock-off procedure or permit-to-work procedure that applies
- K3 the specific health and safety precautions to be applied during the maintenance procedure, and their effects on others
- K4 the hazards associated with carrying out mechanical maintenance activities (handling oils, greases, stored pressure/force, misuse of tools, using damaged or badly maintained tools and equipment, not following laid-down maintenance procedures), and how to minimise them
- K5 the importance of wearing protective clothing and other appropriate safety equipment (PPE) during maintenance process
- K6 how to obtain and interpret information from job instructions and other documentation used in the maintenance activities (such as drawings, specifications, manufacturers' manuals, symbols and terminology)
- K7 the methods and techniques used to dismantle/assemble mechanical equipment (such as release of pressures/force, proof marking, extraction, pressing, alignment)
- K8 methods of checking that components are fit for purpose, how to identify defects and wear characteristics, and the need to replace 'lived' items (such as seals and gaskets)
- K9 the basic principles of how the equipment functions, its operating sequence, the working purpose of individual units/components and how they interact
- K10 the uses of measuring equipment (such as micrometers, verniers, run-out devices and other measuring devices)
- K11 how to make adjustments to components/assemblies to ensure that they function correctly (such as setting working clearance, setting travel, setting backlash in gears, preloading bearings)
- K12 the importance of making 'off-load' checks before running the equipment under power
- K13 how to check that tools and equipment are free from damage or defects, are in a safe and usable condition, and are configured correctly for the intended purpose
- K14 the importance of maintenance documentation and/or reports following the maintenance activity, and how to generate them
- K15 the equipment operating and control procedures to be applied during the maintenance activity
- K16 how to use lifting and handling equipment in the maintenance activity

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- K17 the activities that can go wrong when carrying out routine maintenance, and what to do if they occur
  - K18 the organisational procedure(s) to be adopted for the safe disposal of waste of all types of materials
  - K19 the extent of your own authority and to whom you should report if you have a problem that you cannot resolve

## **Additional Information**

### **Scope/range related to performance criteria**

*You must be able to:*

1. Carry out **all** of the following during the maintenance activity:
  - 1.1. undertake the maintenance activities to cause minimal disruption to normal working
  - 1.2. use the correct issue of maintenance documentation (such as drawings, manuals, maintenance records)
  - 1.3. adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment and other relevant safety regulations
  - 1.4. ensure the safe isolation of equipment (such as mechanical, electricity, gas, air or fluids)
  - 1.5. ensure that safe access and working arrangements have been provided for the maintenance area
  - 1.6. report or take action with regard to any defects that require immediate attention (such as replacing non-‘lified’ components)re-connect and return the equipment to service on completion of the maintenance activities
  - 1.7. dispose of waste items in a safe and environmentally acceptable manner
  - 1.8. leave the work area in a safe and tidy condition
  
2. Carry out maintenance activities on **two** of the following types of equipment:
  - 2.1. gearboxes
  - 2.2. machine tools
  - 2.3. lifting and handling devices
  - 2.4. process plant
  - 2.5. portable power tools
  - 2.6. engines
  - 2.7. pumps
  - 2.8. transfer equipment
  - 2.9. process control valves
  - 2.10. compressors
  - 2.11. conveyers and elevators
  - 2.12. mechanical structures
  - 2.13. workholding devices
  - 2.14. company-specific equipment
  
3. Maintain and/or replace **six** of the following types of components:
  - 3.1. hoses and connectors
  - 3.2. pulleys and belts/wires
  - 3.3. chains and sprockets
  - 3.4. levers and links
  - 3.5. springs

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- 3.6. sub-assemblies/replacement units
  - 3.7. structural components (such as guards, fences, supports, housings)
  - 3.8. locking and retaining devices (such as keys, pins, screw fasteners)
  - 4. Carry out **all** of the following maintenance activities:
    - 4.1. dismantling equipment to the required level
    - 4.2. labelling/proof marking of components
    - 4.3. checking components for serviceability
    - 4.4. replacing all 'lived' items (such as seals, gaskets)
    - 4.5. replacing or repairing damaged/defective components
    - 4.6. setting, aligning and adjusting components
    - 4.7. tightening fastenings to the required torque
    - 4.8. making 'off-load' checks before starting up
    - 4.9. replenishing oils, greases or other fluids
    - 4.10. functionally testing the maintained equipment
  - 5. Maintain mechanical equipment, in accordance with **one** of the following:
    - 5.1. organisational guidelines and codes of practice
    - 5.2. equipment manufacturer's operation range
    - 5.3. BS, ISO and/or BSEN standards
  - 6. Complete **one** of the following maintenance records, and pass it to the appropriate person:
    - 6.1. job cards
    - 6.2. permit to work/formal risk assessment
    - 6.3. maintenance log and action report
    - 6.4. company-specific documentation

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<b>Developed by</b>	SEMTA
<b>Version number</b>	2
<b>Date approved</b>	February 2015
<b>Indicative review date</b>	March 2018
<b>Validity</b>	Current
<b>Status</b>	Original
<b>Originating organisation</b>	SEMTA
<b>Original URN</b>	SEMEMI2-06
<b>Relevant occupations</b>	Maintenance fitter
<b>Suite</b>	Engineering Maintenance And Installation Suite 2
<b>Key words</b>	Engineering; manufacturing; maintenance; mechanical; gearboxes; pumps; machine tools; control systems; engines