

## Overview

This standard identifies the competences you need to restore mechanical components to usable condition by repair, in accordance with approved procedures. You will be required to restore a range of mechanical components and equipment to operational condition, by repairing assemblies/sub-assemblies and components, by reworking the surface, recutting threads, or by the replacement of worn parts. You will also be required to select the appropriate equipment to use, based on the nature of the repair, the operations that will need to be carried out and the accuracy to be achieved.

In producing the components, you will be expected to use a range of hand tools, machine tools, portable power tools, and shaping and fitting techniques, appropriate to the type of material and repair being performed. These activities will include such processes as sawing (hand, band), drilling, reaming, grinding (hand or pedestal), filing, scraping or lapping, threading (internal or external), machining (turning, milling) and thermal processes.

Your responsibilities will require you to comply with organisational policy and procedures for the repairing activities undertaken, and to report any problems with these activities or with the tools, equipment or materials used, that you cannot personally resolve or are outside your permitted authority, to the relevant people. 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 provide an informed approach to applying component repair procedures. You will have an understanding of the function and operating conditions of the components being repaired, in sufficient depth to determine if a suitable repair can be made and to ensure that the repairs carried out are safe and practical in operation. You will also understand the organisational policy on repairing components, and its application.

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

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*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 specifications for the component to be repaired
- P3 prepare the component for repair
- P4 carry out the repairs within agreed timescale using approved materials and components and methods and procedures
- P5 ensure that the repaired component meets the specified operating conditions
- P6 produce accurate and complete records of all repair work carried out

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### Knowledge and understanding

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*You need to know and understand:*

- K1 the health and safety requirements of the area in which the repairing activity is to take place, and the responsibility these requirements place on you
- K2 the isolation procedure or permit-to-work procedure that applies
- K3 the specific health and safety precautions to be applied during the repairing procedure, and their effects on others
- K4 the importance of wearing protective clothing and other appropriate safety equipment (PPE) during the repairing activities
- K5 the hazards associated with the repair/restoration operations being carried out (such as sawing (hand, band), drilling, reaming, grinding (hand or machine), filing, scraping or lapping, threading (internal or external), turning, milling and thermal processes), and how they can be minimised
- K6 how to obtain and interpret information from job instructions and other documentation used in the repairing activities (such as drawings, specifications, manufacturers' manuals, maintenance schedules symbols and terminology)
- K7 the methods, techniques and company procedures to be followed for repairing mechanical equipment
- K8 the types of repairs that can be made to components in order to prolong their useful life (such as bushing/plugging of worn holes, recutting threads, joining mating surfaces by thermal process)
- K9 how to use a range of hand tools (such as files, scrapers, threading devices)
- K10 how to select saw blades (for different materials and different operations)
- K11 the types and application of portable power tools that can be used for the repairing operations
- K12 how to confirm that portable power tools and extension cables are in a safe, tested and usable condition
- K13 the operating requirements of the machine tools and accessories being used (such as guards, workholding devices, speeds and feeds, specific statutory regulations such as Abrasive Wheels Regulations)
- K14 how to handle and store tools and equipment, safely and correctly
- K15 the application of cutting fluids
- K16 the company recording procedures to be used following a repair, and how to apply them
- K17 the problems associated with repairing mechanical components, and how to resolve them
- K18 the extent of your own authority and to whom you should report if you have a problem that you cannot resolve

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### Additional Information

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#### Scope/range related to performance criteria

*You must be able to:*

1. Carry out **all** of the following activities during the repairing activity:
  - 1.1. undertake the repairing activities to cause minimal disruption to normal working
  - 1.2. adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment and other relevant safety regulations
  - 1.3. use the correct issue of drawings, job instructions and procedures
  - 1.4. check that tools and equipment to be used are fit for purpose
  - 1.5. use correct lifting techniques and equipment (where appropriate), in accordance with health and safety guidelines and procedures
  - 1.6. ensure that repaired components are clean, and free from contamination and foreign objects
  - 1.7. record the repair, using appropriate methods or documentation
  - 1.8. dispose of waste items in a safe and environmentally acceptable manner
  - 1.9. leave the work area in a safe and tidy condition
  
2. Carry out **four** of the following types of repair:
  - 2.1. recondition a unit by replacement of worn components
  - 2.2. sleeving of worn components
  - 2.3. make a temporary fix
  - 2.4. bushing/plugging of worn holes
  - 2.5. dressing internal/external threads
  - 2.6. rework a fit (such as shimming, packing)
  - 2.7. joining/bonding mating surfaces
  - 2.8. rework a component finish/shape (using techniques such as filing, scraping, grinding, lapping)
  - 2.9. other specific repair procedures
  
3. Carry out repairs on mechanical components, using **four** of the following methods
  - 3.1. sawing (hand or band)
  - 3.2. drilling
  - 3.3. reaming
  - 3.4. grinding (hand or pedestal)
  - 3.5. filing
  - 3.6. scraping or lapping
  - 3.7. tapping/cutting threads
  - 3.8. machining (turning, milling)
  - 3.9. thermal processes (such as brazing, welding, metal spraying)
  
4. Carry out repairs to mechanical equipment, in accordance with **one** of the following:

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- 4.1. organisational guidelines and codes of practice
  - 4.2. equipment manufacturer's operation range
  - 4.3. BS, ISO and/or BSEN standards
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5. Complete **one** of the following records, and pass it to the appropriate person:
    - 5.1. job cards
    - 5.2. permit to work/formal risk assessment
    - 5.3. maintenance log and action report
    - 5.4. company-specific documentation

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