
Overview

This standard identifies the competences you need to carry out corrective maintenance activities on air conditioning and ventilation equipment, in accordance with approved procedures. This will involve dismantling, removing and replacing faulty or damaged components, in line with company procedures, on air conditioning equipment and ventilation systems such as air generation, distribution and control systems. You will be expected to apply a variety of dismantling and assembly methods and techniques, such as proof marking/labelling of components to aid the reassembly, dismantling components requiring pressure techniques, torque loading, and setting, aligning and adjusting components.

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 air conditioning and ventilation maintenance procedures. You will have an understanding of dismantling and reassembly methods and procedures, and their application. You will know how the system functions and the purpose of individual components, in adequate depth to provide a sound basis for carrying out any 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 be required to demonstrate safe working practices throughout, and will understand your responsibility for taking the necessary safeguards to protect yourself and others in the workplace.

Performance criteria

You must be able to:

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

Knowledge and understanding

You need to know and understand:

1. the health and safety requirements of the area in which the maintenance activity is to take place
2. the isolation and lock-off procedure or permit-to-work procedure that applies
3. the specific health and safety precautions to be applied during the maintenance process, and their effects on others (including the Prevention and Control of Legionellosis, and Safe Working in Confined Spaces)
4. the hazards associated with carrying out maintenance activities on air conditioning equipment (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 they can be minimised
5. the importance of wearing protective clothing and other appropriate safety equipment (PPE) during the maintenance process
6. how to obtain and interpret information from job instructions and other documents needed for the maintenance activities (such as drawings, circuit and physical layouts, charts, specifications, manufacturers' manuals, history/maintenance reports, graphical electrical symbols, BS7671/IET wiring regulations)
7. the procedure for obtaining replacement parts, materials and other consumables necessary for the maintenance
8. the sequence to be adopted for the dismantling/reassembly of various types of assemblies
9. the methods and techniques used to dismantle/assemble air conditioning equipment (such as release of pressures/force/fluid, proof marking, extraction, pressing, alignment)
10. 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)
11. how to make adjustments to components/assemblies to ensure that they function correctly
12. the basic principles of how the equipment functions, its operating sequence, the working purpose of individual units/components and how they interact
13. the correct operating ranges (including temperature and pressure of secondary heating sources (air and water))
14. the typical building design temperatures (such as for offices, factories (light and heavy work), warehouses and canteens)
15. 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 their intended purpose
16. the generation of maintenance documentation and/or reports following the maintenance activity

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17. the equipment operating and control procedures to be applied during the maintenance activity
 18. how to use lifting and handling equipment correctly and safely in the maintenance activity
 19. the problems associated with the maintenance activity, and how they can be overcome
 20. the organisational procedure to be adopted for the safe disposal of waste of all types of materials
 21. the extent of your own authority and to whom you should report if you have problems that you cannot resolve

Scope/range related to performance criteria

1. Carry out **all** of the following during the maintenance activity:
 1. undertake the maintenance activities to cause minimal disruption to normal working
 2. use the correct issue of maintenance documentation (such as drawings, manuals, maintenance records, schedules)
 3. adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment and other relevant safety regulations
 4. ensure the safe isolation of equipment (such as mechanical, electricity, gas, air or fluids)
 5. ensure that safe access and working arrangements have been provided for the maintenance area
 6. carry out the scheduled maintenance tasks, using appropriate techniques and procedures
 7. re-connect and return the equipment to service on completion of the maintenance activities
 8. dispose of waste items in a safe and environmentally acceptable manner
 9. leave the work area in a safe and tidy condition
2. Carry out maintenance activities on **two** of the following types of equipment:
 1. remote air conditioning generation
 2. local air conditioning distribution
 3. air conditioning control
3. Carry out **all** of the following maintenance activities:
 1. testing the system for leaks
 2. dismantling equipment to the appropriate level
 3. setting, aligning and adjusting components
 4. checking components for serviceability
 5. replacing damaged/defective components
 6. marking/labelling of components
 7. tightening fasteners to the required torque
 8. making 'off-line' checks before starting up
 9. functionally testing the completed system
 10. replacing all 'lifer' items (such as batteries, lamps)
 - 11.

recording the results of the maintenance activity

reporting or taking action with regard to any defects that require immediate attention (such as replacing non-'lived' components)

4. Maintain and/or replace **six** of the following air conditioning components:

1. motors
2. chiller batteries
3. pumps
4. humidifiers
5. chilled beams
6. condensers
7. evaporators
8. ducting/trunking
9. dampers
10. vents/diffusers
11. valves
12. filters
13. pipework
14. couplings
15. fans
16. manifolds/flanges
17. silencers/attenuators
18. gaskets and sealants
19. gauges/indicators
20. sensors
21. switches
22. battery heaters
23. thermostats
24. insulation
25. electrical connectors
26. electrical components
27. wiring safety devices

5. Maintain air conditioning and ventilation systems, in accordance with **one** of the following:

1. organisational guidelines and codes of practice
2. equipment manufacturer's operation range
3. BS, ISO and/or BSEN standards
4. company regulations

6. Complete **one** of the following maintenance records, and pass it to the appropriate person:

1. job cards
2. permit to work/formal risk assessment
3. maintenance log and action report

4. company-specific documentation

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Carrying out maintenance on air conditioning and ventilation equipment



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