

## Overview

This standard identifies the competences you need to assist in the installation of heating and ventilation equipment, in accordance with approved procedures. You will be required to assist in the installation of a range of heating and ventilation equipment, which will include one of the following primary heating sources such as gaseous, liquid, solid fuel, electricity and renewable energy. This will also include the installation of motors, fans, pumps, valves, couplings, ducting and trunking, heaters, filters, and control devices such as thermostats and switches.

This standard does not involve maintenance/repair type activities, such as removal and replacement of existing equipment.

You will be required to use the appropriate tools and equipment throughout the installation activities, and to apply a range of installation methods and techniques to position, level and align the equipment, and to make connections to the required services. The installation activities will include making checks and adjustments, in line with your permitted authority, and assisting others to ensure that the installed equipment functions to the required specification.

Your responsibilities will require you to comply with organisational policy and procedures for the installation activities undertaken, and to report any problems with the activities, tools or equipment used that you cannot personally resolve, or are outside your permitted authority, to the relevant people. You must check that all tools, equipment and materials used in the installation activities are removed from the work area on completion of the work, and that the relevant 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.

The installation activity may be carried out as a team effort, but you must demonstrate a significant personal contribution to the installation activities, in order to satisfy the requirements of the standard, and you must demonstrate competence in all the areas required by the standard.

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 heating and ventilation installation procedures. You will have an understanding of the equipment being

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installed, and its installation requirements, in adequate depth to provide a sound basis for carrying out the installation process safely and effectively.

You will understand the safety precautions required when carrying out the installation activities, especially those for ensuring the safe isolation of services. 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.

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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 all relevant instructions/documentation for the installation being carried out
- P3 use the correct tools and equipment for the installation operations, and check that they are in a safe and usable condition
- P4 assist in the installation, positioning and securing of the equipment, using appropriate methods and techniques
- P5 carry out and/or assist in checking the installation, and make any adjustments in accordance with the specification
- P6 assist in using fault location methods and techniques on the installed equipment
- P7 deal with problems within your control and report those that cannot be solved
- P8 complete and store all relevant documentation in accordance with organisational requirements

## Knowledge and understanding

### *You need to know and understand:*

- K1 how to work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
- K2 the importance of wearing the appropriate personal protective equipment (PPE), and of keeping the work area clean and tidy
- K3 how to obtain and interpret information from job instructions and other documents needed in the installation process
- K4 the basic principles of how the equipment functions, and its operating sequence
- K5 methods of marking out the site for positioning the equipment, and the tools and equipment used for this
- K6 methods of drilling holes for rag bolts and expanding bolts
- K7 the various mechanical fasteners that will be used, and their method of installation
- K8 procedures for ensuring that you have the correct tools, equipment, and fasteners for the installation activities
- K9 the techniques used to position, align, level, adjust and secure the equipment
- K10 methods of lifting, handling and supporting the equipment during the installation activities
- K11 methods of connecting equipment to service supplies
- K12 why electrical bonding is critical, and why it must be both mechanically and electrically secure
- K13 the procedure for the safe disposal of waste materials
- K14 how to conduct any necessary checks to ensure the equipment integrity, functionality, accuracy and quality of the installation
- K15 how to recognise installation defects
- K16 the importance of ensuring that the completed installation is free from dirt, swarf and foreign object damage, and of ensuring that any exposed components or pipe ends are correctly covered/protected
- K17 the issues that can occur with the installation operations, and how these can be overcome
- K18 the fault finding techniques to be used if the equipment fails to operate correctly
- K19 the recording documentation to be completed for the activities undertaken
- K20 the extent of your own responsibility 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 installation of the heating and ventilation equipment:
  - 1.1 adhere to procedures or systems in place for risk assessment, personal protective equipment and other relevant safety regulations and procedures to realise a safe system of work
  - 1.2 confirm that authorisation to carry out the installation activities has been given
  - 1.3 check that safe access and working arrangements for the installation area have been provided
  - 1.4 confirm that services have been safely isolated, ready for the installation (such as mechanical, electricity, gas, air or fluids)
  - 1.5 check that all required installation consumables are available
  - 1.6 leave the work area in a safe condition and free from foreign object debris
  
- 2 Assist in the installation of equipment for one of the following types of heating and ventilation system:
  - 2.1 liquid
  - 2.2 solid fuel
  - 2.3 electrical
  - 2.4 gaseous
  - 2.5 renewable energy
  
- 3 Assist in the installation of eight of the following components:
  - 3.1 pipework
  - 3.2 pumps
  - 3.3 condenser
  - 3.4 ducting/trunking
  - 3.5 boiler
  - 3.6 calorifiers
  - 3.7 valves
  - 3.8 electrical wiring and connectors
  - 3.9 motors
  - 3.10 gauges/indicators
  - 3.11 control devices
  - 3.12 electrical components
  - 3.13 fans

- 3.14 regulators
  - 3.15 radiators
  - 3.16 blowers
  - 3.17 sensors and actuators
  - 3.18 safety devices
  - 3.19 other specific components
- 4 Apply installation methods and techniques, to include five of the following:
- 4.1 marking out of locating and securing positions
  - 4.2 fitting anti-vibration mountings
  - 4.3 drilling and hole preparation
  - 4.4 securing by using mechanical fixings
  - 4.5 positioning equipment/components
  - 4.6 levelling the equipment
  - 4.7 securing by using masonry fixings
  - 4.8 aligning pipes, connections, ducting and equipment
  - 4.9 applying screw fastener locking devices
  - 4.10 dressing and securing piping and hoses
  - 4.11 applying hose/cable clips and fasteners
  - 4.12 making installation connections (such as mechanical, electrical, fluid power, utilities)
- 5 Assist in the movement and positioning of equipment, using two of the following:
- 5.1 slings
  - 5.2 portable lifting devices
  - 5.3 hoists
  - 5.4 cranes
  - 5.5 block and tackle
  - 5.6 jacks
  - 5.7 fork lift
  - 5.8 rollers/skates
  - 5.9 manual handling and moving loads
- 6 Use five of the following instruments during the installation activities:
- 6.1 alignment devices
  - 6.2 temperature sensing devices
  - 6.3 electrical measuring instruments

- 6.4 flow testing devices
- 6.5 mechanical measuring instruments
- 6.6 pressure sensing and monitoring devices
- 6.7 emission testing devices
- 6.8 flushing and bleeding devices

7 Carry out all of the following checks and adjustments, as appropriate to the equipment being installed:

- 7.1 setting working clearance
- 7.2 making visual checks for completeness and freedom from damage
- 7.3 leak testing
- 7.4 making sensory checks (sight, sound, smell, touch)
- 7.5 making `off-load' checks
- 7.6 ensuring that moving parts are clear of obstruction and are guarded
- 7.7 checking level and alignment

Plus: assist with four more from the following:

- 7.8 flow checks
- 7.9 checking torque settings of fasteners
- 7.10 pressurising system
- 7.11 ensuring that locking devices are fitted to fasteners (where appropriate)
- 7.12 line pressure tests
- 7.13 testing that the equipment operates to the installation specification

8 Assist in dealing with two of the following conditions during the installation process:

- 8.1 installations with no faults
- 8.2 partial equipment malfunction
- 8.3 complete malfunction of equipment

9 Assist in using fault location methods and techniques on the installed equipment, to include one of the following:

- 9.1 diagnostic aids (such as company records/history, manufacturers' manuals, fault analysis charts, troubleshooting guides)
- 9.2 fault finding techniques (such as six point, half-split, unit substitution)
- 9.3 function testing the installation/running equipment self-diagnostics

10 Produce installations which comply with one of the following:

- 10.1 equipment manufacturer's operation range

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- 10.2 BS, ISO and/or BSEN standards
  - 10.3 customer (contractual) standards and requirements
  - 10.4 organisational standards and procedures
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- 11 Assist in the completion of the relevant paperwork, to include one of the following:
    - 11.1 installation records
    - 11.2 organisational specific documentation
    - 11.3 job card
    - 11.4 electronic reports

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