

# SEMEMI2-58 - SQA Unit Code H2B7 04

## Assisting in the installation of compressed air equipment



### Overview

This unit identifies the competences you need to assist in the installation of compressed air equipment and systems, in accordance with approved procedures. You will be required to assist in the installation of a range of compressed air equipment, which will include compressed air generation, distribution and control systems. This will also include installing system components such as pumps, driers, motors, regulators, compressor components, sensors, pipework and hoses, filters, electrical wiring, gaskets and seals.

This unit 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 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.

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 the installation of compressed air equipment procedures. You will have an understanding of the equipment being installed and its installation requirements, in adequate depth to provide a sound basis for carrying out the installation process safely and effectively.

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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 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 deal promptly and effectively with problems within your control and report those that cannot be solved
- P7 assist in the completion of installation documentation

#### Knowledge and understanding

*You need to know and understand:*

- K1 the health and safety requirements of the area in which the installation 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 installation procedure, and their effects on others
- K4 the hazards associated with installing compressed air equipment, and with the tools and equipment used, and how they can be minimised
- K5 the importance of wearing protective clothing and other appropriate safety equipment during the installation
- K6 how to obtain and interpret information from job instructions and other documents needed in the installation process (such as drawings, specifications, manufacturers' manuals, BS7671/IEE regulations, symbols and terminology)
- K7 the basic principles of how the equipment functions, and its operating sequence
- K8 methods of marking out the site for positioning the equipment, and the tools and equipment used for this
- K9 methods of drilling holes for rag bolts and expanding bolts (including the use of grouting and adhesives)
- K10 the various mechanical fasteners that will be used, and their method of installation (including, threaded fasteners, dowels, special securing devices, masonry fixing devices)
- K11 procedures for ensuring that you have the correct tools, equipment, and fasteners for the installation activities
- K12 the types of tools and instruments used to position, secure and align the equipment (such as spanners, wrenches, crowbars, torque wrenches, engineers' levels, alignment telescopes and laser devices)
- K13 the techniques used to position, align, level, adjust and secure the equipment
- K14 methods of lifting, handling and supporting the equipment during the installation activities (to include chain and rope hoists, pull-lifts/tirfors, rollers and skates, high lifts and the use of levers and crowbars)
- K15 the correct pipes, hoses and other equipment to accommodate the various pressure ranges
- K16 how to make adjustments to components to ensure that they function correctly
- K17 methods of connecting equipment to service supplies (such as electrical, fluid power, compressed air oil and fuel supplies)
- K18 why electrical bonding is critical, and why it must be both mechanically

- and electrically secure
- K19 the procedure for the safe disposal of waste materials
- K20 how to conduct any necessary checks to ensure the equipment integrity, functionality, accuracy and quality of the installation (including the fitting of guards to all moving parts and covers on electrical connections)
- K21 how to recognise installation defects (such as leaks, poor seals, misalignment, ineffective fasteners, foreign object damage or contamination)
- K22 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)
- K23 the fault finding techniques to be used if the equipment fails to operate correctly
- K24 the recording documentation to be completed for the activities undertaken
- K25 the extent of your own responsibility and to whom you should report if you have problems 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 installation of the compressed air equipment:
  - 1.1 adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment and other relevant safety regulations
  - 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 **two** of the following types of compressed air system:
  - 2.1 compressed air generation
  - 2.2 compressed air distribution
  - 2.3 compressed air control
- 3 assist in the installation of **eight** of the following compressed air system components:
  - 3.1 pipework
  - 3.2 regulators
  - 3.3 sensors
  - 3.4 hoses
  - 3.5 valves
  - 3.6 lubricators
  - 3.7 pumps
  - 3.8 control equipment
  - 3.9 safety devices
  - 3.10 driers
  - 3.11 gauges/indicators
  - 3.12 electrical wiring and connectors
  - 3.13 motors
  - 3.14 manifolds
  - 3.15 electrical components
  - 3.16 compressors
  - 3.17 monitoring equipment
  - 3.18 gaskets and seals
  - 3.19 silencers
  - 3.20 filters

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- 3.21 actuators
- 3.22 other components (specify)
- 4 apply installation methods and techniques, to include **five** of the following:
  - 4.1 marking out of locating and securing positions
  - 4.2 dressing and securing piping and hoses
  - 4.3 drilling and hole preparation
  - 4.4 fitting anti-vibration mountings
  - 4.5 positioning equipment/components
  - 4.6 securing by using mechanical fixings
  - 4.7 aligning pipes, ducting and equipment
  - 4.8 securing by using masonry fixings
  - 4.9 making installation connections (such as mechanical, electrical, fluid power, utilities)
  - 4.10 applying screw fastener locking devices
- 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
  - 5.9 manual handling and moving loads
- 6 use **three** of the following instruments during the installation activities:
  - 6.1 alignment devices
  - 6.2 temperature sensing devices
  - 6.3 measuring devices (mechanical and electrical)
  - 6.4 flow testing devices
  - 6.5 pressure sensing and monitoring devices
- 7 carry out **all** of the following checks and adjustments, as appropriate to the equipment being installed:
  - 7.1 topping up fluid/oil reservoirs
  - 7.2 making visual checks for completeness and freedom from damage
  - 7.3 making 'off-load' checks
  - 7.4 making sensory checks (sight, sound, smell, touch)
  - 7.5 checking level and alignment
  - 7.6 ensuring that moving parts are clear of obstruction, and are guarded
  - plus:** assist with **four** more from the following:
    - 7.7 setting working clearances
    - 7.8 checking torque settings of fasteners

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- 7.9 tensioning
- 7.10 ensuring that locking devices are fitted to fasteners (as appropriate)
- 7.11 pressurising the system
- 7.12 functionally testing to ensure that the equipment operates correctly
- 7.13 making line pressure tests
- 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 **all** of the following, as appropriate to the equipment being installed:
  - 10.1 equipment manufacturer's operation range
  - 10.2 BS, ISO and/or BSEN standards
  - 10.3 BS7671/IEE wiring regulations
  - 10.4 customer (contractual) standards and requirements
  - 10.5 company standards and procedures
- 11 assist in the completion of the relevant paperwork, to include **one** of the following:
  - 11.1 installation records
  - 11.2 company-specific documentation
  - 11.3 job card



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