

SEMEM3-82 - SQA Unit Code H2B5 04

Assisting in the installation of fluid power equipment



Overview

This unit identifies the competences you need to assist in the installation of fluid power equipment, on mobile or static plant, in accordance with approved procedures. You will be required to assist in the installation of a range of fluid power equipment, such as hydraulic, pneumatic or vacuum. This will involve the installation of components and units such as pumps, valves, actuators, sensors, intensifiers, regulators, compressors, pipes and hoses, and other specific fluid power equipment.

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, align and connect various fluid power components, and to make all necessary connections to the required service. 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 that 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 fluid power installation 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.

You will understand the safety precautions required when carrying out the

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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 dispose of waste items in a safe and environmentally acceptable manner
- P8 assist in the completion of installation documentation

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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 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 fluid power equipment, and with the tools and equipment used, and how to minimise them and reduce any risks
- 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, symbols and terminology)
- K7 methods of marking out the site for positioning the equipment, and the tools and equipment used for this
- K8 methods of drilling holes for rag bolts and expanding bolts (including the use of grouting and adhesives)
- K9 the various mechanical fasteners that will be used, and their method of installation (including threaded fasteners, dowels, special securing devices, masonry fixing devices)
- K10 the basic principles of how the equipment functions, and its operating sequence
- K11 how to identify the various components that are to be installed (such as valves, cylinders, actuators, sensors, pumps)
- K12 how to determine the direction of flow through components, and their position within the system
- K13 the application and fitting of seals
- K14 recognition of contaminants and the problems they can create, and the effects and likely symptoms of contamination in the system
- K15 techniques used to ensure the safe and correct start-up of the system
- K16 techniques used to ensure that correct checks are made on the system
- K17 techniques used to fault-find the system
- K18 procedures to follow to correctly fill the hydraulic reservoirs
- K19 the need to establish the cleanliness level of oil in the hydraulic reservoirs
- K20 the techniques used during the setting and testing of the fluid power equipment (such as controlled release of pressures/force, checking for correct actuator and valve movement, checking correct sequencing)
- K21 procedures for ensuring that you have the correct tools, equipment and

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- consumables for the installation activities
- K22 the types of tools and instruments used to position, secure and connect the equipment (such as spanners, pipe benders, torque wrenches, alignment devices, pressure testing devices)
- K23 methods of lifting, handling and supporting the equipment during the installation activities
- K24 methods of connecting equipment to service supplies (such as electrical, fluid power, compressed air, oil and any fuel supplies)
- K25 the procedure for the safe disposal of waste materials
- K26 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
- K27 completion of documentation for the activities undertaken
- K28 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 fluid power 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 **one** of the following types of fluid power system:
 - 2.1 pneumatic
 - 2.2 hydraulic
 - 2.3 vacuum
3. assist in the installation of **six** of the following fluid power components:
 - 3.1 rigid pipework
 - 3.2 receivers
 - 3.3 filters
 - 3.4 switches
 - 3.5 reservoirs/storage receivers
 - 3.6 hoses/tubing
 - 3.7 compressors
 - 3.8 cylinders
 - 3.9 accumulators
 - 3.10 valves
 - 3.11 lubricators
 - 3.12 actuators
 - 3.13 gaskets and seals
 - 3.14 sensors
 - 3.15 regulators
 - 3.16 pressure intensifiers
 - 3.17 pumps
 - 3.18 other (specify)
4. carry out the installation by applying **five** of the following methods and techniques:
 - 4.1 marking out of locating and securing positions

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- 4.2 connecting wires and cables
- 4.3 drilling and hole preparation
- 4.4 securing by using mechanical fixings
- 4.5 positioning equipment/components
- 4.6 securing by using masonry fixings
- 4.7 aligning pipework and connections
- 4.8 applying screw fastener locking devices
- 4.9 dressing and securing piping and hoses
- 4.10 applying hose/cable clips and fasteners
- 4.11 making installation connections (such as mechanical, electrical, fluid power, utilities)
5. use **three** of the following types of equipment during the installation activities:
 - 5.1 pressure testing devices
 - 5.2 electrical measuring devices
 - 5.3 flow testing devices
 - 5.4 timing devices
 - 5.5 mechanical measuring devices
 - 5.6 fluid sampling device
 - 5.7 bleeding devices
 - 5.8 flushing blocks/rigs
 - 5.9 alignment devices
6. carry out **all** of the following checks and adjustments, as appropriate to the equipment being installed:
 - 6.1 leak checks
 - 6.2 making visual checks for completeness and freedom from damage
 - 6.3 making 'off-load' checks
 - 6.4 making sensory checks (sight, sound, smell, touch)
 - 6.5 checking level and alignment
 - 6.6 ensuring that any moving parts are clear of obstruction and/or are guarded

plus: Assist in carrying out two of the following:

 - 6.7 filling the system using the correct cleanliness control procedures
 - 6.8 setting system pressure/flow
 - 6.9 check the sequencing of the system
 - 6.10 pressurising the system
 - 6.11 ensuring that locking devices are fitted to fasteners (where appropriate)
 - 6.12 line pressure checks
 - 6.13 testing to ensure that the equipment operates to the installation specifications
 - 6.14 flow checks
7. assist in dealing with **two** of the following conditions during the installation process:

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- 7.1 installations with no faults
- 7.2 partial system malfunction
- 7.3 complete malfunction of the system
- 8. assist in using fault location methods and techniques on the installed equipment, to include **one** of the following:
 - 8.1 diagnostic aids (such as company records/history, manufacturers' manuals, fault analysis charts, troubleshooting guides, circuit diagrams, function diagrams)
 - 8.2 fault finding techniques (such as six point, half-split, unit substitution, fault cause remedy, sequence chart)
 - 8.3 function testing the installation/running equipment self-diagnostics
- 9. produce installations which comply with **all** of the following, as appropriate to the equipment being installed:
 - 9.1 equipment manufacturer's operation range
 - 9.2 BS, ISO and/or BSEN standards
 - 9.3 customer (contractual) standards and requirements
 - 9.4 company standards and procedures
- 10. assist in the completion of relevant paperwork, to include **one** of the following:
 - 10.1 installation records (such as test and system performance data)
 - 10.2 company-specific documentation
 - 10.3 job card

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Developed by	SEMTA
Version number	1
Date approved	August 2008
Indicative review date	December 2014
Validity	Current
Status	Original
Originating organisation	SEMTA
Original URN	O45NEM3-82
Relevant occupations	Engineering Professionals; Engineering; Manufacturing technologies; Engineering Technicians; Process Operatives; Plant and Machine Operatives; Assemblers and Routine Operatives
Suite	Engineering Maintenance Suite 3 2008
Key words	Installation, mechanical equipment, tools and equipment, techniques, marking out, drilling, fluid power equipment