

SEMMME229 – SQA Unit Code HF43 04

Assembling electrical or electronic components to mechanical equipment



Overview

This standard identifies the competences you need to assemble electrical or electronic components to mechanical equipment, in accordance with approved procedures. You will be required to check that specified components are available and fit for purpose, to obtain all relevant and current documentation, to obtain the tools and equipment required for the assembly operations and to check that they are in a safe and usable condition. In carrying out the assembly operations, you will be required to follow company procedures and specified assembly techniques, in order to fit the electrical or electronic components to the mechanical assembly.

The assembly activities will also include making all necessary checks and adjustments, to ensure that the electrical or electronic components are correctly orientated, positioned and secured correctly. You must also check that any cables and wires are routed correctly and are tidy in appearance, and that connections are mechanically sound and checked for electrical continuity.

Your responsibilities will require you to comply with organisational policy and procedures for the assembly activities undertaken, and to report any problems with the assembly activities, materials or equipment that you cannot personally resolve, or are outside your permitted authority, to the relevant people. You will be expected to work to instructions, with a minimum of supervision, 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 good understanding of your work, and will provide an informed approach to applying electrical or electronic fitting and assembly techniques and procedures. You will have an understanding of the product being assembled and its application, and will know about the equipment, relevant components and joining techniques, in adequate depth to provide a sound basis for carrying out the activities to the required specification.

You will understand the safety precautions required when carrying out the assembly activities. You will be required to demonstrate safe working practices throughout, and will understand the responsibility you owe to 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 the relevant instructions, assembly drawings and any other specifications
- P3 ensure that the specified components are available and that they are in a usable condition
- P4 use the appropriate methods and techniques to fit the components in their correct positions
- P5 secure the components using the specified connectors and securing devices
- P6 check the completed assembly to ensure that all operations have been completed and the finished assembly meets the required specification
- P7 complete the required production documentation
- P8 deal promptly and effectively with problems within your control and report those that cannot be solved

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Knowledge and understanding

You need to know and understand:

- K1 the specific safety precautions to be taken while carrying out the assembly (including any specific legislation, regulations or codes of practice relating to the activities, equipment or materials)
- K2 the health and safety requirements of the work area in which you are carrying out the assembly activities, and the responsibility these requirements place on you
- K3 COSHH regulations with regard to the substances used in the assembly process
- K4 the hazards associated with assembling electrical or electronic components to mechanical equipment, and how to minimise them and reduce any risks
- K5 the personal protective equipment and clothing (PPE) to be worn during the assembly activities
- K6 how to extract and use information from engineering drawings and related specifications (to include symbols and conventions to appropriate BS, ISO or BSEN standards) in relation to work undertaken
- K7 the general principles of electrical and electronic fitting techniques
- K8 the purpose and function of the components, including identification systems (such as colour codes, symbols, manufacturers specification)
- K9 preparations to be undertaken on the electrical or electronic components prior to fitting them into the assembly
- K10 the correct component handling procedures, including any relevant handling equipment
- K11 the assembly and securing methods and procedures to be used, and the importance of adhering to these
- K12 how the components are to be positioned, aligned and secured, and the tools and equipment that are used
- K13 the importance of using the specified electrical or electronic components and securing devices for the assembly, and why you must not use substitutes
- K14 the quality control procedures to be followed during the assembly operations
- K15 how to conduct any necessary checks to ensure the accuracy, position, security, function, completeness and electrical continuity of the assembly
- K16 how to detect assembly defects (such as ineffective joining techniques, component damage), and what to do to rectify them
- K17 how to check that the tools and equipment to be used are in a safe and serviceable condition
- K18 the importance of ensuring that all tools are used correctly and within their permitted operating range
- K19 the importance of ensuring all tools, equipment and components are

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accounted for and returned to their correct location on completion of the assembly activities

- K20 the problems that can occur with the assembly operations, and what to do if they occur
- K21 the extent of your own authority and to whom you should report if you have problems that you cannot resolve

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Additional Information

Scope/range related to performance criteria

You must be able to:

1. Carry out **all** of the following during the assembly activities:
 - 1.1 obtain and use the appropriate documentation (such as job instructions, drawings, quality control documentation)
 - 1.2 adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment and other relevant safety regulations and procedures to realise a safe system of work
 - 1.3 use lifting and slinging equipment (where appropriate) in accordance with health and safety guidelines and procedures
 - 1.4 check that tools and measuring instruments to be used are fit for service
 - 1.5 use appropriate and approved fitting and assembly techniques at all times
 - 1.6 ensure that the components used are free from damage, foreign objects, dirt or other contamination
 - 1.7 leave the work area in a safe and appropriate condition on completion of the activities

2. Fit electrical or electronic components using **all** of the following techniques:
 - 2.1 routeing cables and wires
 - 2.2 mounting/securing components
 - 2.3 cable fixings and fasteners

3. Terminate and join cables/wires to components using **two** of the following:
 - 3.1 screwed connections
 - 3.2 clamped connections
 - 3.3 soldering
 - 3.4 crimping
 - 3.5 cable protection devices (such as sleeving or grommets)

4. Fit **four** of the following electrical components on the mechanical equipment:
 - 4.1 cable enclosures (such as conduit, trunking, tray work)
 - 4.2 circuit connection devices (such as plugs, sockets)
 - 4.3 monitoring components (such as sensors)
 - 4.4 power generation components (such as motors, transformers)
 - 4.5 control components (such as relays, solenoids, switches)
 - 4.6 cables and wires
 - 4.7 electronic modules
 - 4.8 circuit protection devices
 - 4.9 lamps/lighting

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- 4.10 instrumentation units
- 4.11 other specific components

- 5. Carry out the required checks using the correct tools and equipment, to include **four** of the following:
 - 5.1 position
 - 5.2 completeness
 - 5.3 electrical continuity
 - 5.4 alignment
 - 5.5 free from damage or foreign objects
 - 5.6 component security

- 6. Produce mechanical assemblies which comply with **one** of the following standards:
 - 6.1 BS, ISO or BSEN standards and procedures
 - 6.2 customer standards and requirements
 - 6.3 company standards and procedures
 - 6.4 specific system requirements

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