
Overview

This standard identifies the competences you need to carry out assembly operations to produce mechanical assemblies, 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 produce the assembly.

The assembly activities will also include making all necessary checks and adjustments to ensure the components are correctly orientated, positioned and aligned, that moving parts have the correct working clearances, all fasteners are tightened to the correct torque and that the assembled parts are checked for completeness and function as per the specification.

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 the assembly techniques and procedures. You will understand the mechanical 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.

SEMMME227 – SQA Unit Code HF40 04

Producing mechanical sub-assemblies/assemblies

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 check that the specified components are available and that they are in a usable condition
 - P4 assemble the components in their correct positions using the appropriate methods and techniques to
 - 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

SEMMME227 – SQA Unit Code HF40 04

Producing mechanical sub-assemblies/assemblies

Knowledge and understanding

You need to know and understand:

- K1 the specific safety precautions to be taken whilst carrying out the mechanical 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 they place on you
- K3 COSHH regulations with regard to the substances used in the assembly process
- K4 the hazards associated with producing mechanical assemblies, 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 mechanical assembly, and the purpose and function of the components and materials used, including component identification systems (such as codes and component orientation indicators)
- K8 preparations that need to be undertaken on the components prior to fitting them into the assembly
- K9 the assembly/joining methods, techniques and procedures to be used, and the importance of adhering to these
- K10 how the components are to be aligned, adjusted and positioned prior to securing, and the tools and equipment that is used
- K11 the importance of using the specified components and joining devices for the assembly, and why you must not use substitutes
- K12 where appropriate, the application of sealants and adhesives within the assembly activities, and the precautions that must be taken when working with them
- K13 the quality control procedures to be followed during the assembly operations
- K14 how to conduct any necessary checks to ensure the accuracy, position, security, function and completeness of the assembly
- K15 the methods and equipment used to transport, lift and handle components and assemblies
- K16 how to check that the tools and equipment to be used are in a safe and serviceable condition
- K17 the importance of ensuring that all tools are used correctly and within their permitted operating range
- K18 the problems that can occur with the assembly operations, and what to do if they occur
- K19 the extent of your own responsibility and to whom you should report if

SEMMME227 – SQA Unit Code HF40 04

Producing mechanical sub-assemblies/assemblies

you have problems that you cannot resolve

SEMMME227 – SQA Unit Code HF40 04

Producing mechanical sub-assemblies/assemblies

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 check that tools and measuring instruments to be used are fit for service
 - 1.4 use lifting and slinging equipment (where appropriate) in accordance with health and safety guidelines and procedures
 - 1.5 use appropriate and approved 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. Produce assemblies using **four** of the following methods and techniques:
 - 2.1 assembly of components by expansion/contraction
 - 2.2 applying sealants/adhesives
 - 2.3 fitting (such as filing, scraping, lapping or polishing)
 - 2.4 electrical bonding of components
 - 2.5 securing using mechanical fasteners/threaded devices
 - 2.6 assembly of products by pressure
 - 2.7 setting working clearances
 - 2.8 drilling
 - 2.9 reaming
 - 2.10 balancing components
 - 2.11 applying bolt locking methods
 - 2.12 shimming and packing
 - 2.13 blue-bedding of components
 - 2.14 aligning components
 - 2.15 riveting
 - 2.16 torque setting
 - 2.17 soldering/brazing

3. Produce assemblies constructed from **two** of the following:
 - 3.1 sub-assemblies
 - 3.2 support framework
 - 3.3 component kits
 - 3.4 fastener kits
 - 3.5 casings, panels
 - 3.6 single components

4. Assemble products using **one** of the following assembly aids and

SEMMME227 – SQA Unit Code HF40 04

Producing mechanical sub-assemblies/assemblies

equipment:

- 4.1 workholding devices
 - 4.2 lifting and moving equipment
 - 4.3 specialised assembly tools/equipment
 - 4.4 jigs and fixtures
 - 4.5 shims and packing
 - 4.6 rollers or wedges
 - 4.7 supporting equipment
5. Carry out quality checks using appropriate equipment, to include **four** of the following:
- 5.1 positional accuracy
 - 5.2 freedom of movement
 - 5.3 component security
 - 5.4 completeness
 - 5.5 dimensions
 - 5.6 orientation
 - 5.7 alignment
 - 5.8 function
 - 5.9 bearing end float
 - 5.10 operating/working clearances
 - 5.11 free from damage or foreign objects
6. Produce mechanical assemblies which comply with **one** of the following quality and accuracy standards:
- 6.1 BS, ISO or BSEN standards and procedures
 - 6.2 company standards and procedures
 - 6.3 customer standards and requirements
 - 6.4 specific system requirements

SEMMME227 – SQA Unit Code HF40 04

Producing mechanical sub-assemblies/assemblies

Developed by	SEMTA
Version number	2
Date approved	February 2016
Indicative review date	March 2019
Validity	Current
Status	Original
Originating organisation	SEMTA
Original URN	SEMMME2-27
Relevant occupations	Engineering and manufacturing technologies; Engineering; and Engineering Technicians
Suite	Mechanical Manufacturing Engineering Suite 2
Key words	engineering; manufacturing; mechanical; assembly; sub-assemblies; assembly procedures; techniques; bonding components; assembly aids; fitting