Overview

This unit identifies the competences you need to carry out assembly operations to produce mechanical assemblies, in accordance with approved procedures. You will be required to prepare the work area, and ensure it is safe and free from hazards. You will also be required to check the 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 assemble the mechanical product.

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 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 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.
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 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 assemble 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  deal promptly and effectively with problems within your control and report those that cannot be solved
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 these requirements 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 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 how to interpret first and third angle drawings, imperial and metric systems of measurement, workpiece reference points and system of tolerancing

K8 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)

K9 preparations that need to be undertaken on the components prior to fitting them into the assembly

K10 the assembly/joining methods, techniques and procedures to be used, and the importance of adhering to these procedures

K11 how the components are to be aligned, adjusted and positioned prior to securing, and the tools and equipment that is used

K12 the importance of using the specified components and joining devices for the assembly, and why you must not use substitutes

K13 where appropriate, the application of sealants and adhesives within the assembly activities, and the precautions that must be taken when working with them

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 and completeness of the assembly

K16 how to detect assembly defects, and what to do to rectify them (such as ineffective joining techniques, foreign objects, component damage)

K17 the methods and equipment used to transport, lift and handle components and assemblies
K18 how to check that the tools and equipment to be used are correctly calibrated and are in a safe and serviceable condition
K19 the importance of ensuring that all tools are used correctly and within their permitted operating range
K20 the importance of ensuring that all tools, equipment and components are accounted for and returned to their correct location on completion of the assembly activities
K21 problems with the assembly operations, and the importance of informing appropriate people of non-conformances
K22 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 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 follow safe practice/approved fitting procedures at all times
   1.4 check that all cables, extension leads or air supply hoses are in a serviceable condition
   1.5 check that all tools and measuring equipment are within current calibration/certification dates
   1.6 use lifting and slinging equipment in accordance with health and safety guidelines and procedures
   1.7 ensure that the components and pipes used are free from foreign objects, dirt or other contamination before assembling them
   1.8 return all tools and equipment to the correct location on completion of the fitting activities
   1.9 leave the work area and machine in a safe and appropriate condition on completion of the activities

2. Produce assemblies using four of the following methods and techniques:
   2.1 assembling 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 assembling 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 torque setting
   2.16 soldering/brazing
   2.17 fusion (non-critical joints)
   2.18 riveting

3. Assemble products to meet the required specification, using at least
Assembling Mechanical Products

seven of the following components:

3.1 assembly structure (such as framework, support, casings, panels)
3.2 fabricated components
3.3 pre-machined components
3.4 levers/linkages
3.5 pipework/hoses
3.6 cams and followers
3.7 bearings
3.8 bushes
3.9 shafts
3.10 couplings
3.11 keys
3.12 gears
3.13 belts
3.14 seals
3.15 gaskets
3.16 chains
3.17 sprockets
3.18 pulleys
3.19 springs
3.20 other

4. Assemble products using two of the following assembly aids and 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 the required quality checks, to include eight from the following, using appropriate equipment:

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 company standards and procedures
   6.2 BS, ISO or BSEN standards and procedures
   6.3 specific system requirements
   6.4 customer standards and requirements
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