SEMPEO1-28 - SQA Unit Code H02V 04
Assembling composite components

Overview

This standard covers a broad range of basic competences that you need to produce composite assemblies from composite and non-composite components. It will prepare you for entry into the engineering or manufacturing sectors, creating a progression between education and employment, or it will provide a basis for the development of additional skills and occupational competences in the working environment.

You will be expected to prepare for the composite assembly activities by obtaining all the necessary job instructions, materials, tools, equipment and any documentation that may be required.

In carrying out the assembly operations, you will be required to use appropriate or specified assembly and joining techniques and methods for the composite components to be assembled. This will include a range of features such as loose and close fit tolerances, permanent and non-permanent fixing, shape location, staggered, return and overlap joins. On completion of the composite assembly activities, you will be expected to return all tools and equipment to the correct location, and to leave the work area in a safe and tidy condition.

Your responsibilities will require you to comply with health and safety requirements and organisational policy and procedures for the composite assembly activities undertaken. You will need to report any difficulties or problems that may arise with the assembly activities, and to carry out any agreed actions. You will work under a high level of supervision, whilst taking responsibility for your own actions and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will provide an understanding of your work, and will enable you to apply appropriate composite assembly techniques and procedures safely. You will understand the composite assembly techniques used, and their application, and will know about the equipment, materials and consumables, to the required 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 composite assembly activities, and when using the associated tools and equipment. You will be required to demonstrate safe working practices throughout, and will understand the responsibility you owe to yourself and others in the workplace.

Specific Standard Requirements

At least one of the assemblies produced must combine different operations and

assembly techniques, such as the bonding of thread inserts into body panels and assembling those using mechanical fasteners.

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Performance criteria

You must be able to:

P1 work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines

P2 obtain the appropriate components, tools and equipment

P3 use the appropriate methods and techniques to assemble the components in their correct positions

P4 secure the components, using the specified methods and securing devices

P5 check that all the required assembly operations have been completed to specification

P6 report any difficulties or problems that may arise with the moulding activities, and carry out any agreed actions

P7 leave the work area in a safe and tidy condition on completion of the assembly activities

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Knowledge and understanding

You need to know and understand:

K1 the health and safety precautions to be taken, and the procedures to be used, when producing composite assemblies and working with composite materials, consumables, tools and equipment in the specific work area

K2 the hazards associated with assembling composite materials, and with the consumables, tools and equipment used, and how to minimise these in the work area

K3 the protective equipment that is needed for personal protection (PPE) and, where required, the protection of others

K4 the specific workshop environmental conditions the must be observed when producing composite assemblies (such as temperature, humidity, styrene levels to threshold limits, fume/dust extraction systems and equipment)

K5 how to use and extract information from engineering drawings and related specifications (to include symbols and conventions to appropriate British, European or relevant International standards in relation to work undertaken)

K6 how to use the correct system of measurement such as metric and imperial

K7 terminology used for the composite assembly activities (such as types of components used, types of fittings and fasteners, materials and adhesives used)

K8 preparations to be undertaken on the composite components prior to assembly

K9 the assembly/joining methods, techniques and procedures to be used, and the importance of adhering to these procedures (such as screw fasteners, rivets, special purpose fittings)

K10 where appropriate, the application of sealants and adhesives within the assembly activities, and the precautions that must be taken when working with them

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

K12 the tools and equipment used in assembly activities, and how to check that the tools and equipment to be used are in a safe and serviceable condition

K13 the problems that can occur with the assembly activities, and how they can be avoided

K14 when to act on your own initiative and when to seek help and advice from others

K15 the importance of leaving the work area in a safe and clean condition on completion of the assembly activities (such as returning hand tools and equipment to the designated location, cleaning the work area, and

removing and disposing of waste)

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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 composite assembly activities:
   - 1.1 adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment (PPE) and other relevant safety regulations
   - 1.2 follow job instructions, assembly drawings and procedures
   - 1.3 use the correct tools and equipment for the activity, and ensure that they are safe to use
   - 1.4 ensure that components to be used are of the correct type, and that all mouldings are free from defects
   - 1.5 apply safe and appropriate assembly techniques at all times
   - 1.6 return all tools and equipment to the correct location on completion of the assembly activities

2. Produce composite assemblies for **one** of the following:
   - 2.1 one-off assemblies
   - 2.2 batch assemblies
   - 2.3 assembly line

3. Produce composite assemblies that incorporate **two** of the following features:
   - 3.1 loose fit tolerances
   - 3.2 non-permanent fixing
   - 3.3 joggle joins
   - 3.4 return joins
   - 3.5 close fit tolerances
   - 3.6 shape location
   - 3.7 permanent fixing
   - 3.8 overlap joins

4. Produce composite assemblies that require **two** of the following methods to be used:
   - 4.1 trimming/fettling
   - 4.2 clamping
   - 4.3 aligning
   - 4.4 drilling
   - 4.5 pinning
   - 4.6 trial fitting
   - 4.7 use of assembly jigs
   - 4.8 countersinking/counterboring

5. Produce composite assemblies that use **one** of the following joining methods:
   - 5.1 thread inserts
   - 5.2 mechanical fasteners
   - 5.3 quick-release fasteners
   - 5.4 anchor nuts
   - 5.5 rivets
   - 5.6 bonding/adhesives

6. Use **one** of the following types of composite components in the assemblies:
   - 6.1 trim
   - 6.2 tubes
   - 6.3 core materials
   - 6.4 inserts
   - 6.5 closing panels
   - 6.6 structural components
   - 6.7 sections
   - 6.8 housings
   - 6.9 body panels
   - 6.10 aerodynamic components
   - 6.11 other specific components

7. Use **one** of the following types of non-composite components in the assemblies:
   - 7.1 brackets
   - 7.2 fittings
   - 7.3 tapes
   - 7.4 films
   - 7.5 fixtures
   - 7.6 trim
   - 7.7 memory foam
   - 7.8 other specific components

8. Produce assemblies which comply with **all** of the following:
   - 8.1 assemblies are dimensionally accurate within specification requirements
   - 8.2 all components are correctly assembled and aligned, in accordance with the specification
   - 8.3 all fastenings are correctly fitted and are secure
   - 8.4 where appropriate, moving parts are correctly adjusted and have appropriate clearances
   - 8.5 finished assemblies meet the required shape/geometry and are free from defects (such as square, straight, angle, free from twists)

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