

Producing composite assemblies

Overview

This standard identifies the competences you need to produce composite assemblies from composite components and non-composite components, in accordance with approved procedures. You will be required to work to instructions, specifications and documentation to produce the composite assemblies, using the correct techniques. You will produce a range of composite assemblies, incorporating a range of features and using a number of techniques and processes.

Your responsibilities will require you to comply with organisational policy and procedures for the composite assembly activities undertaken, and to report any problems with the assembly activities, equipment or materials 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 composite assembly techniques and procedures. You will have an understanding of the composite assembly techniques used, and their application, in adequate depth to provide a sound basis for carrying out the activities, recognising faults, and ensuring the finished assembly is to the required specification.

You will understand the safety precautions required when carrying out the 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.

Performance criteria

You must be able to:

1. work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
2. follow the relevant instructions, assembly drawings and any other specifications
3. ensure that the specified components are available and that they are in a usable condition
4. use the appropriate methods and techniques to assemble the components in their correct positions
5. secure the components using the specified connectors and securing devices
6. check the completed assembly to ensure that all operations have been completed and the finished assembly meets the required specification
7. 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:

1. health and safety precautions to be taken and procedures used in the specific work area, when working with composite materials, consumables, tools and equipment
2. the hazards associated with assembling composite materials, and with the consumables, tools and equipment used, and how to minimise these and reduce any risks in the work area
3. protective equipment (PPE) that is needed for personal protection and, where required, the protection of others
4. the application of COSHH regulations in relation to the storage, use and disposal of composite materials and consumables
5. the specific environmental conditions that must be observed when assembling composite mouldings (such as temperature, humidity, fume/dust extraction systems and equipment)
6. 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
7. how to use imperial and metric systems of measurement, work piece reference points and system of tolerance
8. quality procedures used in the workplace to ensure production control
9. the basic conventions and terminology used for assembly activities (such as metric and imperial threads, rivet specifications, clearances, types of fittings)
10. methods of assembling composite components using mechanical methods (such as screw fasteners, rivets, special purpose fittings)
11. methods for handling composite assemblies throughout the assembly activities
12. the correct assembly operations and their sequence
13. tools and equipment used in assembly activities, and their care, preparation and control procedures
14. the problems that can occur with the assembly activities, and how they can be avoided
15. the extent of your own authority and to whom you should report if you have problems that you cannot resolve

Scope/range related to performance criteria

1. Carry out all of the following during the assembly activities:
 - 1.1. use the appropriate documentation (such as job instructions, drawings, material data sheets, specifications, planning and 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 all tools and equipment to be used are correct for the operation to be carried out and are in a safe and usable condition
 - 1.4. maintain a safe working environment for the composite assembly activities
 - 1.5. check that all tools and equipment to be used are in a safe and usable condition
 - 1.6. follow safe practice/approved composite assembly techniques at all times
 - 1.7. return all tools and equipment to the correct location on completion of the assembly activities
 - 1.8. segregate and dispose of waste materials using the correct procedure
 - 1.9. leave the work area in a safe and appropriate condition on completion of the activities
 - 1.10. complete relevant production documentation
2. Carry out four of the following activities when preparing for the assembly activity:
 - 2.1. check that mouldings are correct and complete
 - 2.2. check for any defects in the mouldings
 - 2.3. check that components are correct and complete
 - 2.4. confirm that the equipment selected for the activity is correct
 - 2.5. check availability of ancillary materials required
 - 2.6. confirm that equipment is suitable for use
 - 2.7. identify and protect the moulding and components in the work area
3. Produce one of the following types of composite assembly:
 - 3.1 trail assemblies
 - 3.2 one-off assemblies
 - 3.3 batch assemblies
 - 3.4 assembly line
4. Produce assemblies that incorporate three of the following features:
 - 4.1 loose fit tolerances
 - 4.2 close fit tolerances
 - 4.3 non-permanent fixing
 - 4.4 shape location
 - 4.5 joggle joins
 - 4.6 permanent fixing
 - 4.7 return joins
 - 4.8 strap joins

Producing composite assemblies

4.9 overlap joins

5. Produce composite assemblies that require two of the following to be used:

- 5.1 fettling
- 5.2 clamping
- 5.3 aligning
- 5.4 pinning
- 5.5 trial fitting
- 5.6 tongue and groove
- 5.7 assembly jigs
- 5.8 assembly sequences
- 5.9 datum points
- 5.10 orientation

6. Produce composite assemblies that use one of the following joining methods:

- 6.1 thread inserts
- 6.2 mechanical fasteners
- 6.3 quick-release fasteners
- 6.4 blind fasteners
- 6.5 adhesive bonding
- 6.6 anchor nuts
- 6.7 pinning
- 6.8 rivets
- 6.9 thermo welding
- 6.10 other specific method

7. Assemble composite components which include two of the following:

- 7.1 trim
- 7.2 closing panels
- 7.3 body panels
- 7.4 tubes
- 7.5 structural
- 7.6 aerodynamic
- 7.7 core materials
- 7.8 sections
- 7.9 casings/covers
- 7.10 inserts
- 7.11 housings
- 7.12 other specific components

8. Produce composite assemblies which include one of the following non-composite components:

- 8.1 brackets
- 8.2 fixtures
- 8.3 metal components
- 8.4 fittings

Producing composite assemblies

- 8.5 trim
- 8.6 non-metallic components
- 8.7 finishing tapes
- 8.8 memory foam
- 8.9 labels/decals
- 8.10 surface films
- 8.11 edge bands
- 8.12 other specific component

9. Produce assemblies which comply with one of the following standards:

- 9.1 BS, ISO or BSEN standards and procedures
- 9.2 customer standards and requirements
- 9.3 company standards and procedures
- 9.4 recognised compliance agency/body standards

Producing composite assemblies

Developed by	Enginuity
Version Number	2
Date Approved	29 Feb 2016
Indicative Review Date	31 Mar 2019
Validity	Current
Status	Original
Originating Organisation	Semta
Original URN	SEMMME2-40
Relevant Occupations	Engineering, Engineering and Manufacturing Technologies, Engineering Technicians
Suite	Mechanical Manufacturing Engineering Suite 2
Keywords	engineering; manufacturing; mechanical; assembly; composite moulds; techniques; methods; procedures; fettling; pinning