

Producing Composite Assemblies

Overview

This standard covers a broad range of basic competences that you need to assemble composite mouldings to produce assemblies/sub-assemblies. 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 necessary information, documentation, materials, tools and equipment, and to plan how you intend to carry out the required activities and the sequence of operations you intend to use.

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 joints.

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 take account of any potential difficulties or problems that may arise with the activities, and to seek appropriate help and advice in determining and implementing a suitable solution. 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.

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Specific Standard Requirements

In order to prove your ability to combine different assembly operations, at least one of the assemblies produced must be of a significant nature, and must contain a minimum

of **three** of the components listed in scopes 7 and 8.

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Performance criteria

You must be able to:

1. work safely at all times, complying with health and safety legislation, regulations, directives and other relevant guidelines
2. plan the composite assembly activities before you start them
3. obtain and prepare the appropriate components, tools and equipment
4. use the appropriate methods and techniques to assemble the components in their correct positions
5. secure the components, using the specified methods and securing devices
6. produce composite assemblies
7. check the completed assembly to ensure that all operations have been completed, and that the finished assembly meets the required specification
8. deal promptly and effectively with problems within your control, and seek help and guidance from the relevant people if you have problems that you cannot resolve
9. leave the work area in a safe and tidy condition on completion of the composite assembly activities

Knowledge and understanding

You need to know and understand:

1. Health and safety precautions to be taken and procedures used when working with composite materials, consumables, tools and equipment in the specific work area
2. The hazards associated with carrying out composite assembly activities, and with the composite materials, consumables, tools and equipment used, and how to minimise these and reduce any risks
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 producing 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 interpret drawings, imperial and metric systems of measurement, workpiece reference points and system of tolerancing
8. Quality procedures used in the workplace to ensure production control (in relation to currency, issue, meeting specification) and the completion of such documents
9. Conventions and terminology used for assembly activities (such as metric and imperial threads, rivet specifications, clearances, types of fittings)
10. The types of component trimming/cutting methods and preparation methods available
11. The visual identification of cured composite materials
12. Assembly operations and their sequence
13. Methods for handling composite assemblies throughout the assembly activities
14. The identification and rectification of defects in composite assemblies
15. The tools and equipment used in assembly activities, and their care, preparation and control procedures
16. The problems that can occur with the production of the composite assemblies
17. The extent of your own responsibility 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. adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment (PPE) and other relevant safety regulations
 2. follow job instructions, assembly drawings and procedures
 3. ensure that all power tool cables, extension leads or air supply hoses are in a safe, tested and serviceable condition
 4. check that tools and measuring instruments to be used are within calibration date
 5. use lifting and slinging equipment in accordance with health and safety guidelines and procedures (where appropriate)
 6. ensure that the components used are free from foreign objects, dirt or other contamination
 7. return all tools and equipment to the correct location on completion of the assembly activities
2. Carry out **all** of the following activities when preparing for the assembly activity:
 1. check that mouldings are correct and complete
 2. check for any defects in the mouldings
 3. check that components are correct and complete
 4. select correct equipment for the activity
 5. check availability of ancillary materials required
 6. check that equipment is suitable for use
 7. identify and protect the moulding and components in the work area
3. Produce **one** of the following types of composite assembly:
 1. trial assemblies
 2. one-off assemblies
 3. batch assemblies
 4. assembly line
4. Produce assemblies that incorporate **two** of the following features:
 1. loose fit tolerances
 2. close fit tolerances
 3. non-permanent fixing
 4. shape location
 5. joggle joins
 6. permanent fixing

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7. return joins
 8. overlap joins
 9. strap joins
5. Produce composite assemblies that require **two** of the following:
 1. fettling
 2. pinning
 3. clamping
 4. trial fitting
 5. aligning
 6. tongue and groove
 7. assembly jigs
 8. assembly sequences
 9. datum points
 10. orientation
6. Produce composite assemblies that use **two** of the following mechanical joining methods:
 1. thread inserts
 2. quick-release fasteners
 3. mechanical fasteners
 4. blind fasteners
 5. adhesive bonding
 6. anchor nuts
 7. pinning
 8. rivets
 9. thermo welding
 10. other (to be specified)
7. Produce composite assemblies that must include **two** of the following composite components:
 1. trim
 2. closing panels
 3. body panels
 4. tubes
 5. structural
 6. aerodynamic
 7. core materials
 8. sections
 9. casings/covers
 10. inserts
 11. housings
 12. other (to be specified)
8. Produce composite assemblies that must include **two** of the

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following non-composite components:

1. brackets
2. fixtures
3. metal components
4. fittings
5. trim
6. non-metallic components
7. finishing tapes
8. memory foam
9. labels/decals
10. surface films
11. edge bands
12. other (to be specified)

9. Produce a range of assemblies which comply with **all** of the following standards:

1. assemblies are dimensionally accurate within specification requirements
2. all components are correctly assembled and aligned, in accordance with the specification
3. all fastenings are correctly fitted and are secure (where applicable)
4. moving parts are correctly adjusted and have appropriate clearances (where applicable)
5. finished assemblies meet the required shape/geometry, and are free from defects (such as square, straight, angle, free from twists)

Behaviours

Additional Information

You will be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall company objectives, such as:

- strong work ethic
- positive attitude
- team player
- dependability
- responsibility
- honesty
- integrity
- motivation
- commitment

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Developed by	Enginuity
Version Number	3
Date Approved	30 Mar 2017
Indicative Review Date	31 Mar 2020
Validity	Current
Status	Original
Originating Organisation	Semta
Original URN	SEMPEO2-46
Relevant Occupations	Engineering, Engineering and Manufacturing Technologies
Suite	Performing Engineering Operations Suite 2
Keywords	performing engineering operations; Engineering; produce; composite; mouldings; components; assemblies; mark out; joining; fasteners; drawings