

Assembling aircraft composite components

Overview

This standard identifies the competences you need to produce aircraft composite assemblies from composite 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. The assemblies will include double-curvature assemblies and stiffened assemblies. The assemblies will be built from components made from glass fibre mouldings, carbon fibre mouldings, acrylic mouldings, double-curvature mouldings, and foam/honeycomb stiffened mouldings, and will be assembled using a variety of joining methods, to include positive pressure bonding, structural bonding, contact bonding, riveting and bolting.

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 need to ensure that all tools, equipment and materials used in the assembly are correctly accounted for on completion of the activities, and you must complete all necessary job/task documentation accurately and legibly.

You will be expected to work either with a high level of supervision or as a member of a team, and you will take personal responsibility for your own actions and for the quality and accuracy of the work that you carry out. Where team working is involved, you must demonstrate a significant personal contribution during the team activities in order to satisfy the requirements of this standard, and you must demonstrate competence in all the areas required by the standard.

Your underpinning knowledge will be sufficient to provide a sound basis for your work, and will provide an informed approach to applying the appropriate composite assembly techniques and procedures. You will understand the assembly procedures and techniques used, and will know about the tools and techniques, in adequate depth to provide 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. You will also understand your responsibilities for safety, and the importance of taking the necessary safeguards to protect yourself and others in the workplace.

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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. 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. produce composite assemblies
6. secure the components using the specified connectors and securing devices
7. check the completed assembly to ensure that all operations have been completed and the finished assembly meets the required specification
8. deal promptly and effectively with problems within your control and report those that cannot be solved
9. complete relevant paperwork and pass on to appropriate people

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Knowledge and understanding

You need to know and understand:

1. the 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 hazards in the work area
3. the protective equipment that you need to use for both personal protection (PPE) and, where appropriate, 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 workshop environmental conditions that must be observed when producing aircraft composite assemblies (including items such as temperature, humidity, styrene levels to threshold limits, fume/dust extraction systems and equipment)
6. how to use and extract information from engineering drawings and related specifications (to include symbols and conventions to appropriate BS or ISO standards), in relation to work undertaken
7. how to use imperial and metric systems of measurement, workpiece reference points and system of tolerancing
8. the use of and conventions/terminology used in composite assembly
9. the types of component trimming/cutting methods and preparation methods available
10. the methods of achieving consolidation at joining/laying-up points
11. the methods of assembling composite components using mechanical methods (including items such as screw fasteners, rivets, special purpose fittings)
12. the procedures for selecting the correct type of adhesive, and the pre-treatment requirements
13. the procedures for composite riveting/drilling, and the effect of using percussion or squeeze riveting
14. the methods and techniques for lifting, handling and supporting the components/equipment/materials during the assembly activities
15. the quality control procedures to be followed during the assembly operations
16. recognition of jointing defects (including defects such as misalignment, distortion, foreign object damage, contamination and surface defects)
17. the tools and equipment used in assembly activities, and their care, preparation and control procedures
18. why tool/equipment control is critical, and what to do if a tool or piece of equipment is unaccounted for on completion of the activities
19. the problems that can occur with the assembly activities, and how they can be avoided

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20. the recording documentation to be completed for the assembly activities undertaken and, where appropriate, the importance of marking and identifying specific pieces of work in relation to the documentation
21. the procedure for the safe disposal and correct separation of waste materials
22. the extent of your own authority, and whom you should report to if you have problems that you cannot resolve

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Scope/range related to performance criteria

1. Carry out **all** of the following during the aircraft composite assembly activities:
 1. ensure that you have the correct documentation for the assembly operations (including items such as drawings, job instructions, aircraft standards)
 2. adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment and other relevant safety regulations
 3. use the correct tools and equipment for the activity, and ensure that they are safe to use
 4. ensure that components to be used are of the correct type, and that all mouldings are free from defects
 5. apply safe and appropriate assembly practices and procedures at all times
 6. dispose of waste items and materials in a safe and environmentally acceptable manner, in line with company procedures
 7. return all tools and equipment to the correct location on completion of the activities
 8. leave the work area in a safe condition and free from foreign object debris
2. Produce **one** of the following types of composite assembly:
 1. one-off assemblies
 2. batch assemblies
 3. assembly line
3. Produce aircraft composite assemblies that incorporate **two** of the following features:
 1. loose fit tolerances
 2. non-permanent fixing
 3. joggle joins
 4. return joins
 5. close fit tolerances
 6. shape location
 7. permanent fixing
 8. overlap joins
4. Produce aircraft composite assemblies that require **two** of the following methods to be used:

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1. fettling
 2. clamping
 3. aligning
 4. pinning
 5. trial fitting
 6. assembly jigs
5. Produce aircraft composite assemblies that use **one** of the following joining methods:
 1. thread inserts
 2. rivets
 3. anchor nuts
 4. quick-release fasteners
 5. mechanical fasteners
 6. adhesives
6. Assemble aircraft composite components which include **two** of the following:
 1. trim
 2. casings and covers
 3. sandwich panels
 4. moulds
 5. closing panels
 6. aerodynamic components
 7. structural
 8. jigs
 9. housings
 10. tubes
 11. galley units
 12. tanks
 13. consoles
 14. sections
 15. airframe components
 16. core materials
 17. inserts
 18. other specific components
7. Produce assemblies which include **one** of the following non-composite components:
 1. brackets
 2. trim
 3. memory foam
 4. fixtures
 5. tapes
 6. films
 7. fittings

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8. Carry out quality and accuracy checks during assembly, which include **all** of the following:
 1. cosmetic appearance
 2. accuracy of joint lines
 3. component orientation
 4. excess adhesives
 5. security of joints
 6. freedom from damage
9. Produce assemblies which comply with **one** of the following standards:
 1. Civil Aviation Authority (CAA)
 2. Ministry of Defence (MoD)
 3. customer standards and requirements
 4. Federal Aviation Authority (FAA)
 5. company standards and procedures
10. Complete the relevant paperwork, to include **one** from the following, and pass it to the appropriate people:
 1. production documentation
 2. build records
 3. quality control documentation
 4. other specific records

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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