

Producing aircraft detail assemblies

Overview

This standard covers a broad range of basic competences that you need to assemble components to produce aircraft detail assemblies, and which will prepare you for entry into the engineering or manufacturing sector, creating a progression between education and employment, or 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 assembly activities by obtaining all the necessary information, documentation, tools and equipment required, and to plan how you intend to carry out the required assembly activities and the sequence of operations you intend to use. You will be expected to select the appropriate equipment to use, based on the assembly operations to be carried out and the accuracy required.

In carrying out the assembly operations, you will be required to follow laid-down procedures and specific assembly techniques, in order to assemble the various components into detail assemblies. You will need to produce a range of assemblies, which could include stringers, frames, panels, trays, skins, ribs, tanks and other small assemblies, as appropriate.

During, and on completion of, the assembly operations, you will be expected to check the quality of the assembly, using measuring equipment appropriate to the aspects being checked and tolerances to be achieved. You will need to be able to recognise assembly defects, to take appropriate action to remedy any faults that occur and to ensure that the finished assembly is within the drawing requirements. On completion of the assembly activities, you will be expected to return all tools and equipment used to the correct locations, 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 aircraft detail assembly activities undertaken. You will need to take account of any potential difficulties or problems that may arise with the assembly 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 aircraft detail assembly techniques safely. You will understand the aircraft detail assembly process, and its 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 using aircraft detail assembly techniques, and when using hand tools, power tools and machines. 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

In order to prove your ability to combine different aircraft detail assembly operations, at least one of the assemblies produced must be of a significant nature, and must contain a minimum of **four** of the components listed in scope 2.

Producing aircraft detail assemblies

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 aircraft detail assembly activities before you start them
3. obtain the appropriate tools and equipment for the aircraft detail assembly operations, and check that they are in a safe and usable condition
4. obtain the specified components and check that they are in a usable condition
5. use the appropriate methods and techniques to assemble the components in their correct positions
6. secure the components using the specified connectors and securing devices
7. measure and check that all dimensional and geometrical aspects of the component are to the specification
8. check the completed assembly to ensure that all operations have been completed and that the finished assembly meets the required specification
9. 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
10. leave the work area in a safe and tidy condition on completion of the fitting activities

Producing aircraft detail assemblies

Knowledge and understanding

You need to know and understand:

1. the specific safety precautions to be taken whilst carrying out the detail assembly operations (including any specific legislation, regulations or codes of practice relating to the activities, equipment or materials)
2. the importance of wearing appropriate protective clothing and equipment (PPE), and of keeping the work area safe and tidy
3. the hazards associated with producing aircraft detail assemblies, and with the tools and equipment used (such as use of power tools, trailing leads or hoses, damaged or badly maintained tools and equipment), and how they can be minimised
4. the procedure for obtaining the required drawings, job instructions and other related specifications
5. the importance of working to the assembly instructions and appropriate specifications
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 interpret first and third angle drawings, imperial and metric systems of measurement, workpiece reference points and system of tolerancing
8. how to identify the components to be used; component identification systems; codes used and component orientation indicators
9. preparations to be undertaken on the components prior to fitting them into the assembly
10. the assembly methods and procedures to be used, and the importance of adhering to these procedures
11. how the components are to be aligned and positioned, and the tools and equipment that are used (including jigs and fixtures)
12. the methods used to hold the components in their correct position prior to securing them with the appropriate fasteners
13. the various mechanical fasteners that will be used, and their method of installation (including open and blind rivets, threaded fasteners, special securing devices)
14. the importance of using the specified fasteners for the particular assembly, and why you must not use substitutes
15. what to do if the components or fastening devices are not assembled correctly, are damaged, or have other faults
16. why you must obtain design approval before removing and replacing faulty fasteners
17. the application of sealants and adhesives within the assembly activities, and the precautions that must be taken when working with the various adhesives and sealants
18. the purpose and use of joint sealing agents and anti-electrolysis barriers, and the precautions to be taken when using them

Producing aircraft detail assemblies

19. the quality control procedures to be followed during the assembly operations
20. how to conduct any necessary checks to ensure the accuracy and quality of the assemblies produced
21. how and why tools are calibrated, and how to check that the tools you are using are within calibration dates
22. the importance of using all tools in the correct manner and within their permitted operating range
23. the importance of ensuring that the completed assembly is free from dirt, swarf and foreign objects
24. the problems that can occur with the detail assembly operations, and how these can be overcome
25. when to act on your own initiative and when to seek help and advice from others
26. the importance of leaving the work area in a safe and clean condition on completion of the aircraft detail assembly activities (such as removing and storing power leads, isolating machines, removing and returning drills, cleaning the equipment and removing and disposing of waste)

Scope/range related to performance criteria

1. Carry out **all** of the following activities during assembly:
 1. adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment (PPE) and other relevant safety regulations
 2. check that all tools, test and measuring equipment are within calibration date and tested
 3. ensure that all power tool cables, extension leads or air supply hoses are in a serviceable and tested condition
 4. return all tools and equipment to the correct location on completion of the assembly activities
2. Produce aircraft detail assemblies, which includes **seven** of the following components:
 1. skins
 2. frames
 3. trays
 4. jumper braids, bonding clips, earthing straps
 5. stringers
 6. ribs
 7. angles
 8. cleats
 9. panels
 10. pipes, unions and joints
 11. aircraft general supplies
 12. tanks
 13. brackets
 14. other small specific assemblies
3. Apply **all** of the following assembly methods and techniques:
 1. drilling and riveting
 2. ensuring that correct part numbers are used
 3. applying sealants/adhesives
 4. electrical bonding of components
 5. ensuring that correct hand of components is used (left or right handed)
 6. positioning and aligning components for cosmetic appearance and skin lines
 7. securing components using mechanical fasteners and threaded devices
 8. applying bolt locking methods (such as split pins, wire locking, lock nuts, stiff nuts)

Producing aircraft detail assemblies

4. Carry out quality and accuracy checks which include **three** from the following:
 1. cosmetic appearance
 2. freedom from damage
 3. electrical bonding and continuity
 4. accuracy of skin lines
 5. torque loading checks
5. Produce assemblies which comply with **all** of the following:
 1. all components are correctly assembled and aligned in accordance with the specification
 2. overall dimensions are within specification tolerances
 3. assemblies meet appropriate geometric tolerances (such as square, straight, angles free from twists)
 4. where appropriate, pitches of rivets/fasteners meet specification requirements
 5. completed assemblies have secure and firm joints, and are clean and free from burrs/flash, deformation or cracking

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

Producing aircraft detail assemblies

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	SEMPEO2-10
Relevant Occupations	Engineering, Engineering and Manufacturing Technologies
Suite	Performing Engineering Operations Suite 2
Keywords	engineering; engineering operations; aircraft detail assemblies; manufacturing; stringers; frames; panels; trays; skins; ribs