

Assembling aircraft electrical components

Overview

This standard identifies the competences you need to assemble electrical components to produce aircraft electrical sub-assemblies, in accordance with approved procedures. You will be required to use appropriate drawings, methods of assembly, standards and specifications to produce the various electrical sub-assemblies and panels. The equipment to be assembled will include circuit breaker panels, control/relay panels, power generation and control, power supply, lighting and instrumentation panels.

The activities will include the assembly of a range of electrical components, such as isolator switches, fuses and circuit breakers, contactors and relays, bases for plug-in modules/devices, rail-mounted terminal blocks, trunking, earth bonding arrangements, instruments, luminaires, and sub-assemblies such as power supplies, card racks and process controller units. This will involve using a range of tools and equipment along with soldering techniques and anti-static protection techniques. The assembly activities will also include making all necessary checks and adjustments to ensure that components are free from damage, correctly positioned and secured, are terminated correctly and pass the required continuity and/or test rig checks.

Your responsibilities will require you to comply with organisational policy and procedures for the assembly activities undertaken, and to report any problems with the activities, materials or equipment used 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 electrical assembly techniques and procedures. You will understand the procedures and techniques used for assembling the various components, and will know about the tools and techniques, in adequate 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 electrical assembly activities. 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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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. 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
8. complete relevant paperwork and pass on to appropriate people

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Knowledge and understanding

You need to know and understand:

1. the specific safety precautions to be taken whilst carrying out the assembly activities (including any specific legislation, regulations or codes of practice relating to the activities, equipment or materials)
2. the health and safety requirements of the work area in which you are carrying out the electrical assembly activities, and the responsibility these requirements place on you
3. the personal protective equipment and clothing (PPE) to be worn during the electrical assembly activities
4. the hazards associated with producing aircraft electrical assemblies, and with the tools and equipment used, and how they can be minimised
5. the various types of drawing and specifications that are used during the electrical assembly activities, and how to interpret the various symbols and abbreviations
6. the types of components and sub-assemblies that are used in the electrical assembly activities (such as contactors, relays, circuit breakers/fuses, solenoids, switches, transformers, terminal blocks, sub-assemblies)
7. how to identify components to be used, and associated identification systems (such as component markers)
8. the visual checks and preparation requirements for components to be used in the electrical assembly activities
9. the assembly methods and techniques to be used when mounting the electrical equipment, switchgear or control systems (such as soldering, crimping, heat shrinking, lacing/strapping of wires)
10. how the components are to be aligned and positioned prior to securing, and the tools and equipment that are used
11. how to recognise and identify any orientation requirements for all electrical equipment, switchgear or control system components used in the assembly activities
12. methods of mounting and securing the components on the panels or enclosures, and the type of fastening devices that are used
13. methods of attaching identification markers/labels during the electrical assembly activities
14. how to deal with components incorrectly assembled, damaged or having other faults
15. the quality control procedures to be followed during the electrical assembly operations
16. how to conduct any necessary checks to ensure the accuracy and quality of the assembly produced
17. how to take electrostatic discharge (ESD) precautions, and why are they needed
18. how to check that tools and equipment are free from damage or defects, are in a safe and usable condition, and are configured

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- correctly for the intended purpose
- 19. the importance of ensuring that all tools are used correctly and within their permitted operating range
- 20. typical problems that can occur with the assembly operations, and the importance of informing appropriate people of any non-conformances
- 21. 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
- 22. the extent of your own responsibility, 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 activities during the assembly activities:
 1. ensure that you have the correct documentation for the electrical assembly operations (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. ensure that all tools and equipment used are within current calibration dates
 4. ensure that correct part numbers are used (including, where appropriate, left or right handed parts)
 5. maintain safe access and working arrangements for the area in which the assembly activities take place
 6. dispose of waste items 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. Assemble **two** of the following types of aircraft electrical sub-assemblies:
 1. circuit breaker panels
 2. power generation and control
 3. lighting equipment
 4. control/relay panels
 5. power supplies
 6. instrument panels
3. Carry out **eight** of the following activities during the assembly of the electrical components:
 1. positioning and aligning components
 2. making soldered connections
 3. securing components using mechanical fasteners/threaded devices
 4. earth bonding
 5. setting working clearance/air gaps on contactors
 6. torque setting of fasteners
 7. making clamped connections

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8. applying sealants/adhesives
9. making crimped connections
10. component marking
11. adding cable protection (such as sleeving or grommets)

4. Use **ten** of the following components:

1. isolator switches
2. connectors (co-axial)
3. card racks
4. fuses
5. power supplies
6. contacts (crimped)
7. module blocks
8. relays
9. transformers/chokes
10. contacts (soldered)
11. panels (bare)
12. lamps
13. circuit boards
14. cable ties
15. circuit breakers
16. busbars
17. solenoids
18. lacing cord
19. indicators (lamps, LEDs)
20. cables
21. plug-in modules/devices
22. terminal blocks
23. bonding leads
24. p-clips
25. ring tongue terminals
26. contactors
27. switches (push button, toggle)
28. discrete components
29. trunking
30. heat shrink devices
31. meters/instruments
32. sensors
33. connectors (multi-contact)
34. earth bonding devices
35. luminaires
36. other specific components

5. Carry out quality checks, to include **all** of the following:

1. positional accuracy of all components

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2. correct termination of all wires to components
 3. correct orientation
 4. security of all terminations
 5. correct alignment
 6. completeness
 7. component security
 8. ensuring freedom from damage
 9. ensuring enclosure is free of debris (such as cable offcuts/insulation, enclosure breakouts)
 10. continuity of cable/wiring connections (such as battery and lamp checks)
6. Produce aircraft electrical assemblies which comply with **one** of the following standards:
 1. Civil Aviation Authority (CAA)
 2. Ministry of Defence (MoD)
 3. Federal Aviation Authority (FAA)
 4. customer standards and requirements
 5. company standards and procedures
7. Complete the relevant paperwork, to include **one** from the following, and pass it to the appropriate people:
 1. build records
 2. job cards

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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