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## Overview

This standard identifies the competences you need to install aircraft mechanical fasteners into composite and/or metallic components, in accordance with approved procedures. It covers both fixed wing and rotary winged aircraft. You will be required to select the appropriate tools and equipment to use, based on the operations to be performed and the types of mechanical fastener to be installed. The mechanical fasteners to be installed will include hollow and solid rivets, threaded fasteners, anchor nuts, pins and other locking devices. You will need to use a range of different techniques to prepare, install and check that the mechanical fasteners are installed to the required specification.

Your responsibilities will require you to comply with organisational policy and procedures for the activities undertaken and to report any problems with the installation activities, materials or equipment used that you cannot personally resolve, or that are outside your personal authority, to the relevant people and where appropriate, to seek approval to rectify any faults in the installation of the fasteners. You must also ensure that all tools, equipment and materials are correctly accounted for on completion of the activities and must complete all necessary job/task documentation accurately and legibly. You will be expected to work 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 provide a good understanding of your work and will provide an informed approach to applying installation techniques and procedures. You will understand the mechanical fasteners being installed and their application and will know about the equipment, tooling and relevant materials, in adequate depth to provide a sound basis for carrying out the activities, correcting faults and ensuring that the fasteners are installed to the required specification.

You will understand the safety precautions required when installing the fasteners and when using the installation 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:*

- P1 work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
- P2 follow all relevant drawings and specifications for the installation being carried out
- P3 use the correct tools and equipment for the installation operations and check that they are in a safe and usable condition
- P4 install, position and secure the equipment and components in accordance with the specification
- P5 ensure that all necessary connections to the equipment are complete
- P6 deal promptly and effectively with problems within your control and report those that cannot be solved
- P7 check that the installation is complete and that all components are free from damage

## Knowledge and understanding

*You need to know and understand:*

- K1 the specific safety precautions to be taken whilst installing the mechanical fasteners (including any specific legislation, regulations or codes of practice relating to the activities, equipment or materials)
- K2 the health and safety requirements of the work area in which you are carrying out the installation activities and the responsibility these requirements place on you
- K3 the hazards associated with installing mechanical fasteners in aerospace structures and with the tools and equipment used and how to minimise them and reduce any risks
- K4 protective equipment that you need to wear for both personal protection (PPE) and protection of the aircraft
- K5 the need to work to the installation instructions and appropriate specifications
- K6 why you must obtain design approval before removing and replacing faulty fasteners
- K7 the purpose and use of joint sealing agents and anti-electrolysis barriers and the precautions to be taken when using them
- K8 regulations concerning electrical bonding and anti-electrolysis barriers
- K9 the various types and range of screwed fasteners used on aircraft and methods of installing them
- K10 the types and applications of aircraft rivets and the advantages of hollow rivets over solid rivets
- K11 methods of installing rivets (such as blind rivets, squeeze, percussion and reaction riveting)
- K12 the reasons for using screw fastenings rather than rivets
- K13 the purpose and use of a countersink cage
- K14 the various locking devices used with fastenings
- K15 the purpose and use of locating dowels, gripping pins and gauges when carrying out fastening operations
- K16 the procedures to be adopted when removing rivets and other fasteners
- K17 the term 'quilting', its occurrence and avoidance
- K18 'bolt break-offs' and where they occur
- K19 how to check that riveting guns, power tools and attachments are in a safe, tested and usable condition and the action to be taken in the event of identifying defective equipment
- K20 types of gauge used to measure angles, depths, countersinks and torque
- K21 how and why tools are calibrated and how to check that the tools you are using are within calibration dates
- K22 the extent of your own responsibility and to whom you should report if you have problems that you cannot resolve

## Additional Information

### Scope/range related to performance criteria

*You must be able to:*

1. Carry out **all** of the following during the installation activities:
  - 1.1 obtain and use the appropriate documentation (such as job instructions, installation drawings, planning and quality control documentation, specifications)
  - 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 provide and maintain a safe working environment for the installation activities
  - 1.4 obtain the correct tools and equipment for the activity, and check that they are in a safe, tested and usable condition and within current calibration date
  - 1.5 follow safe practice/approved installation techniques and procedures at all times
  - 1.6 return all tools and equipment to the correct location on completion of the installation activities
  - 1.7 dispose of waste materials in accordance with approved procedures
  - 1.8 leave the work area in a safe and appropriate condition, free from foreign object debris on completion of the activities
  
2. Install mechanical fasteners, to include **four** of the following:
  - 2.1 hollow rivets
  - 2.2 threaded fasteners
  - 2.3 pin clips
  - 2.4 anchor nuts
  - 2.5 solid rivets
  - 2.6 split pins
  - 2.7 PIT pins
  - 2.8 bonded fasteners
  - 2.9 collared fasteners
  - 2.10 wire locks
  - 2.11 sleeved fasteners
  - 2.12 other specific locking devices
  
3. Use **four** types of equipment from the following:
  - 3.1 gauges for intrusions
  - 3.2 jigs

## Installing aircraft mechanical fasteners into composite and/or metallic components

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- 3.3 drills and tools with attachments
  - 3.4 gripping pins and location dowels
  - 3.5 redline templates
  - 3.6 clamps
  - 3.7 fastener installation tool
4. Use **five** of the following installation methods and techniques:
- 4.1 countersinking
  - 4.2 solid riveting (single and double handed) squeeze, percussion, reaction
  - 4.3 milling fasteners
  - 4.4 wire locking
  - 4.5 blind riveting
  - 4.6 installing fasteners with a clearance fit
  - 4.7 through-hole
  - 4.8 installing fasteners with an interference fit
  - 4.9 taperlok
  - 4.10 bonded fasteners
5. Make **three** types of connection from:
- 5.1 wet assembly
  - 5.2 panels
  - 5.3 structures
  - 5.4 dry assembly
  - 5.5 skins
  - 5.6 repairs
6. Complete the relevant paperwork, to include **one** from the following and pass it to the appropriate people:
- 6.1 build records
  - 6.2 log cards
  - 6.3 job cards
  - 6.4 aircraft log
  - 6.5 other specific recording method
7. Install fasteners in compliance with **one** of the following:
- 7.1 Civil Aviation Authority (CAA)/European Aviation Safety Agency (EASA)
  - 7.2 Ministry of Defence (MoD)
  - 7.3 Military Aviation Authority (MAA)
  - 7.4 Aerospace Quality Management Standards (AS)
  - 7.5 Federal Aviation Authority (FAA)
  - 7.6 BS, ISO or BSEN standards and procedures
  - 7.7 customer standards and requirements
  - 7.8 company standards and procedures

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7.9 manufacturers standards and procedures

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