SEMAER214

Installing aircraft mechanical fasteners

Overview

This standard identifies the competences you need to install aircraft mechanical fasteners, in accordance with approved procedures. You will be required to select the appropriate tools and equipment to use, based on the operations to be performed and the type of mechanical fasteners 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 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 installation 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 also be required to seek approval, where appropriate, to rectify any faults in the installation of the fasteners.

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 installation techniques and procedures. You will understand the mechanical fasteners being installed, and their application, and will know about the tooling and ancillary equipment, materials and consumables, in adequate depth to provide a sound basis for carrying out the activities and for 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 responsibilities 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 with problems within your control and report those that cannot be solved

P7 complete and store all relevant documentation in accordance with organisational requirements

P8 check that the installation is complete and that all components are free from damage

Knowledge and understanding

You need to know and understand:

K1 how to work safely at all times, complying with health and safety and other relevant and other relevant regulations, directives and guidelines

K2 the hazards associated with installing mechanical fasteners, and with the tools and equipment used, and how they can be minimised

K3 the importance of wearing the appropriate personal protective equipment (PPE), and of keeping the work area clean and tidy

K4 the importance of working to the installation instructions and appropriate specifications

K5 why you must obtain design approval before removing and replacing any faulty fasteners

K6 the purpose and use of joint sealing agents and anti-electrolysis barriers, and the precautions to be taken when using them

K7 regulations concerning electrical bonding and anti-electrolysis barriers

K8 the various types and ranges of screwed fasteners used on aircraft fittings, and the methods of installing them

K9 the types and applications of aircraft rivets, and the advantages of hollow rivets over solid rivets

K10 the reasons for using screw fastenings rather than rivets

K11 the purpose and use of a countersink cage

K12 the various locking devices used with fastenings

K13 the purpose and use of locating dowels, gripping pins and gauges, when carrying out fastening operations

K14 the importance of using the specified and correct fasteners for the particular assembly, and why you must not use substitutes

K15 the procedures to be adopted when removing rivets and other fasteners

K16 the term quilting', its occurrence and avoidance K17 bolt break offs' and where they occur

K18 how to check that riveting guns, power tools and attachments are in a safe and usable condition, and the action to be taken in the event of identifying defective equipment

K19 types of gauges used to measure angles, depths, countersinks and torque

K20 how and why tools are calibrated, and how to check that the tools you are using are within calibration dates

K21 the recording documentation to be completed for the installation activities undertaken and, where appropriate, the importance of marking and identifying specific pieces of work in relation to the documentation

K22 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 activities during the installation:
   1.1 ensure that you have the correct documentation for the installation of the fasteners (such as drawings, job instructions, aircraft standards)
   1.2 adhere to procedures or systems in place for risk assessment, personal protective equipment and other relevant safety regulations and procedures to realise a safe system of work
   1.3 ensure that all tools and equipment used are within current calibration dates
   1.4 maintain safe access and working arrangements for the area in which the activities take place
   1.5 deal with defects in fasteners, components and equipment, in accordance with specified procedures
   1.6 dispose of waste items in a safe and environmentally acceptable manner, in line with company procedures
   1.7 return all tools and equipment to the correct location on completion of the activities
   1.8 leave the work area in a safe condition and free from foreign object debris
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 bonded fasteners
   2.8 collared fasteners
   2.9 wire locks
   2.10 sleeved fasteners
   2.11 other specific locking devices
3. Use four types of equipment from the following:
   3.1 gauges for intrusions
   3.2 jigs
   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 four 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 two 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. Install fasteners in compliance with one of the following standards:
6.1 Civil Aviation Authority (CAA)/European Aviation Safety Agency (EASA)
6.2 Ministry of Defence (MoD)
6.3 Military Aviation Authority (MAA)
6.4 Aerospace Quality Management Standards (AS)
6.5 Federal Aviation Authority (FAA)
6.6 BS, ISO or BSEN standards and procedures
6.7 customer standards and requirements
6.8 organisational standards and procedures
6.9 manufacturers standards and procedures

7. Complete the relevant paperwork, to include one from the following, and pass it to the appropriate people:
7.1 build records
7.2 log cards
7.3 job cards
7.4 aircraft log
7.5 other specific recording method

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