
Overview

This standard identifies the competences you need to test aircraft hydraulic systems, in accordance with approved procedures. It covers both fixed wing and rotary winged aircraft, and includes hydraulic systems associated with landing gear, flying controls, main and tail rotor control, blade fold, rotor brakes, nose wheel steering, cargo and weapon bay doors, emergency and utility systems.

You will be required to select the appropriate tools and equipment to use, based on the operations to be performed and the systems to be tested. The testing activities will include making all necessary checks and adjustments to ensure that components and systems are leak free, are operating at the correct pressure, and have the required range of movement, sequencing and timings.

Your responsibilities will require you to comply with organisational policy and procedures for the aircraft hydraulic testing activities undertaken and to report any problems with these activities that you cannot personally resolve, or that are outside your permitted authority, to the relevant people. You will ensure that all tools, equipment and materials used are correctly accounted for on completion of the testing activities and that all necessary documentation is completed, 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 the appropriate aircraft hydraulic test procedures. You will understand the aircraft hydraulic system under test, and its application, and will know about the tools and equipment used, and the testing requirements, in adequate depth to provide a sound basis for carrying out the activities, and for ensuring that the tested system performs to the required specification.

You will understand the safety precautions required when carrying out the testing activities and when using the associated tools and 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 the appropriate procedures for use of tools and equipment to carry out the required tests
- P3 set up and carry out the tests using the correct procedures and within agreed timescales
- P4 record the results of the tests in the appropriate format
- P5 review the results and carry out further tests if necessary

Knowledge and understanding

You need to know and understand:

- K1 the specific safety practices and procedures that you need to observe when testing hydraulic systems (including any specific legislation, regulations/codes of practice for the activities, equipment or materials)
- K2 the importance of maintenance on and impact upon (extended twin operations procedures) ETOpS systems, legislation and local procedures
- K3 the health and safety requirements of the work area where you are carrying out the activities and the responsibility these requirements place on you
- K4 the safety procedures that must be carried out before work is started on the aircraft
- K5 the requirements and importance of understanding and applying human factors as defined by the regulatory requirements and the potential impact if these are not adhered to
- K6 the protective clothing and equipment (PPE) to be worn and where it can be obtained
- K7 hazards associated with testing aircraft hydraulic systems, and with the tools, materials and equipment used (such as handling hydraulic fluids, working on pressurised systems, traps from moving parts) and how to minimise them and reduce any risks
- K8 what constitutes a hazardous voltage and how to recognise victims of electric shock
- K9 how to reduce the risks of a phase to earth shock (such as insulated tools, rubber matting and isolating transformers)
- K10 the correct operating procedures of the system being tested
- K11 electrical bonding specifications and their importance
- K12 how to obtain the required test schedules and specifications for the aircraft and hydraulic system being tested, and how to check their currency and validity
- K13 how to read and interpret the specifications and from whom you can seek assistance if you have problems or issues regarding the test schedules or specifications
- K14 the methods and procedures to be used to carry out the various tests on the hydraulic systems
- K15 test equipment to be used and its selection for particular tests; calibration of test equipment (where applicable); and the currency and issue checks to be made
- K16 the techniques, methods and procedures to be used during the tests
- K17 why equipment control is critical and what to do if a piece of equipment is unaccounted for on completion of the activities
- K18 the basic principle of operation of the hydraulic system under test and the function of the individual components within the system

- K19 the need to apply test pressures in incremental stages and to check all readings and pressures at each stage.
- K20 how to record the results of each individual test and the documentation that must be used
- K21 from whom to seek authorisation if you need to alter or change the test procedures
- K22 how to analyse the test results and how to make valid decisions about the acceptability of the aircraft
- K23 the procedures to be followed if the equipment or system fails to meet the test specification
- K24 problems that can occur with the testing activities and how they can be overcome
- K25 the problems that may cause errors or discrepancies in/with the test results and how to avoid these
- K26 any required environmental controls relating to the testing
- K27 the documentation to be completed at the end of the testing activities
- K28 the extent of your own authority and to whom you should report if you have a problem 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 testing of the aircraft hydraulic systems:
 - 1.1 obtain and use the appropriate documentation (such as job instructions, aircraft hydraulic system test procedures, quality control documentation, history sheets, flight logbook, aircraft standards and 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 testing 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 obtain clearance to work on the aircraft and observe all relevant isolation and safety procedures
 - 1.6 ensure that safe working distance procedures are set up (where appropriate)
 - 1.7 carry out the tests using the specified techniques and procedures
 - 1.8 make any permitted adjustments to components and equipment to bring the system to the specification requirements
 - 1.9 return all tools and equipment to the correct location on completion of the testing activities
 - 1.10 leave the aircraft and work area in a safe and appropriate condition, free from foreign object debris on completion of the activities

2. Carry out testing on **three** of the following aircraft hydraulic systems:
 - 2.1 main undercarriage
 - 2.2 rotor brakes
 - 2.3 ram air turbine
 - 2.4 nose undercarriage
 - 2.5 blade fold
 - 2.6 cargo doors
 - 2.7 tail undercarriage
 - 2.8 main rotor control
 - 2.9 weapon bay doors
 - 2.10 nose wheel steering
 - 2.11 tail rotor control

- 2.12 emergency systems
 - 2.13 wheel braking system
 - 2.14 spoilers/speed brakes
 - 2.15 utility systems
 - 2.16 damping mechanisms
 - 2.17 outriggers
 - 2.18 flying controls
 - 2.19 main gear steering
 - 2.20 other specific hydraulic systems (such as hoists)
3. Test aircraft hydraulic systems, using appropriate tools or test equipment, to include **two** of the following:
- 3.1 aircraft hydraulic pumps
 - 3.2 sampling devices
 - 3.3 hydraulic testing rigs
 - 3.4 'special-to-type' test equipment
 - 3.5 built-in test equipment (BITE)
4. Carry out **four** of the following types of test:
- 4.1 leak test
 - 4.2 fluid sampling
 - 4.3 timings
 - 4.4 functional test
 - 4.5 pressure test
 - 4.6 sequencing
 - 4.7 'special-to-type' tests
 - 4.8 range of movement
 - 4.9 BITE test
- Including the following:**
- 4.10 a full system test that incorporates **three** of the above tests
5. Carry out tests in compliance with **one** of the following:
- 5.1 Civil Aviation Authority (CAA)/European Aviation Safety Agency (EASA)
 - 5.2 extended twin operations procedures (ETOpS) (where appropriate)
 - 5.3 Ministry of Defence (MoD)
 - 5.4 Military Aviation Authority (MAA)
 - 5.5 Aerospace Quality Management Standards (AS)
 - 5.6 customer standards and requirements
 - 5.7 Federal Aviation Authority (FAA)
 - 5.8 company standards and procedures
 - 5.9 BS, ISO or BSEN standards and procedures
 - 5.10 specific system requirements
 - 5.11 aircraft manufacturer's requirements

6. Complete the relevant paperwork, to include **one** from the following, indicating the results of the tests and pass it to the appropriate people:
 - 6.1 computer records
 - 6.2 job cards
 - 6.3 aircraft log book
 - 6.4 test records
 - 6.5 aircraft service/flight log
 - 6.6 permit to work/formal risk assessment

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Carrying out tests on aircraft hydraulic systems

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