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AERONAUTICAL STANDARD

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STANDARD QUALIFICATION TEST SPECIFICATION FOR AIRCRAFT AIR VALVES

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1. PURPOSE

The purpose of this specification is to provide the aircraft industry with a standard to which aircraft air valves may be subjected to prove their air-worthiness for use in civil aircraft.

2. SCOPE

This specification defines the tests to be performed on electrically and pneumatically actuated, regulating, modulating, and shut-off valves. The valves may be further defined as those valves which function in response to externally applied forces or in response to variations in upstream and/or downstream duct air conditions, to maintain a calibrated duct air condition (i.e., air flow, air pressure, air temperature, air pressure ratio, etc.). The requirements of this document shall govern for all qualification tests unless different requirements are established by the detail specification.

3. CATEGORIES AND DEFINITIONS

The pneumatic valves as referenced in this specification are used to regulate, modulate or shut-off the flow of air in aircraft pneumatic systems.

3.1 Categories

For the purposes of this specification the valves will be grouped into four categories, Pneumatically Actuated Valves, Electrically Actuated Valves, Manually Actuated, and others.

3.1.1 Pneumatically Actuated Valves - Pneumatically Actuated Valves are those valves which utilize air for operation. This includes valves which are solenoid controlled but pneumatically actuated.

3.1.2 Electrically Actuated Valves - Electrically Actuated Valves are those valves which rely only on electrical power for actuation. Solenoid controlled pneumatically actuated valves are not considered Electrically Actuated Valves.

3.1.3 Manually Actuated Valves

3.1.4 Others

3.2 Definitions

3.2.1 On-Off Valve - An on-off valve controls the flow of air by opening or closing the flow passage. It is used in such a manner that it is not stopped in intermediate positions.

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- 3.2.2 Variable Position Valve-A variable position valve controls flow by selective throttling of the flow passage. Intermediate areas may be infinitely selectable or incrementally selectable.
- 3.2.3 Modulating Valve - Modulating valve is a variable position valve acting in conjunction with a control.
- 3.2.4 Check Valve - A check valve is a self-energizing valve responsive to direction of flow.
- 3.2.5 Relief Valve - Relief Valve is a single point modulating valve which limits pressure by dumping from a system or compartment to a lower pressure region. By common usage a multiple point or "scheduled" unit will normally be considered a "regulator".
- 3.2.6 Test Article - A test article is a complete functioning valve of the type to be qualified. It is normally a production article, but may (upon agreement between manufacturer and customer) be an equivalent prototype unit.

4. APPLICABLE DOCUMENTS

The following publications shall form a part of this specification to the extent specified herein and of the issue of the date determined by the detail specification.

- MIL-E-5272 Environmental Testing, Aeronautical and Associated Equipment, General Specification for
- MIL-V-5379 (ASG) Valves, Safety, Cabin Air, General Specification for
- MIL-R-9345 (USAF) Regulator, Air Pressure, Aircraft Cabin, General Specification for
- MIL-A-8064 Actuator-Actuating Systems, Aircraft Electro-Mechanical, General Requirements for
- MIL-I-6181 Interference Limits Test and Design Requirements Aircraft Electrical and Electronic Equipment
- MIL-E-7874 Electric Power, Aircraft Characteristics of

5. TEST REPORTS

One reproducible copy and two additional copies of the original test report shall be furnished to the customer. (It shall be the option of the customer to request copies of the test program, and to approve same or any changes thereto, prior to proceeding with a test program.)

- 5.1 The test report shall include the results obtained from each test performed on the valve in accordance with this specification. The test report shall further describe all aberrations, and the action taken to correct any defects that are found during qualification.

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- 5.2 The test report shall contain a complete identification of the test article including the manufacturers part no., serial no., and part name. If more than one test article is involved, the above data is to be recorded and referenced to the specific test or tests performed on each individual test article.
- 5.3 A description of the test set-up shall be given, including a schematic with all important dimensions noted. It is recommended that sketches and photographs be used wherever possible. The type, model, manufacturer, and names of all principal items of test and control equipment shall be included in the test report. A statement as to methods adhered to, to ensure general test equipment accuracy, should be made.
- 5.4 The test report shall clearly state whether or not the test requirements have been met and where failure, if any, has occurred. It shall reference the paragraphs of this document and additional requirement of the detail specification to facilitate comparison of results with the requirement.
- 5.5 The test report shall be signed by an official or other responsible member of the establishment making the test.
- 5.6 All test reports submitted by a testing organization other than the vendor shall have the same requirements as the test report prepared by the valve manufacturer and shall become a part of the formal test report.
- 5.7 In the event that previous testing has been performed on similar equipment, the test reports of those tests which demonstrate compliance of the similar test article with the requirement of this specification may be submitted to substantiate compliance of the new equipment in areas where they are similar. This similarity data shall be incorporated in the final test report, with substantiation of the similarity of the two items.

6. TEST FACILITIES

The test facilities used to perform the qualification tests shall be capable of meeting all of the conditions specified herein.

- 6.1 The facility shall include instrumentation of sufficient accuracy to define the values specified. The accuracy of the instrumentation shall be verified periodically.
- 6.2 The test facilities shall be capable of simulating the system in which the test article is to operate and with sufficient accuracy to insure that the test article will operate under the conditions specified in this or the detail specification.



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6.3 The maximum allowable tolerance on the test conditions shall be as follows:**Temperature - Plus or Minus 5°F up to 250°F****" " " 10°F up to 500°F****" " " 15°F over 500°F****Altitude - Plus or minus 5 per cent of the absolute barometric pressure.****Pressures - Plus or minus 3 per cent of the absolute value.****Flow - Plus or minus 5 per cent.****Humidity - Plus or minus 5 per cent relative.****Vibration Amplitude - Plus or minus 5 per cent. This tolerance is applicable to the amplitude measuring instruments.****Vibration Frequency - Plus or minus 2 per cent. This tolerance is applicable only to the frequency measuring instruments.****Voltage - Plus or minus 2 per cent.****Frequency - Plus or minus 1 per cent.****7. DEFINITION OF COMPLIANCE**

Satisfactory compliance with the requirements of this specification will be established when the designated number of test articles have been subjected to the tests outlined herein, and upon completion of those tests have passed the Performance Record Test outlined in paragraph 9. The only exceptions to the above are those tests in which the detail test specification establishes the level of acceptable compliance.

8. SEQUENCE OF TESTS

One, or more, production or equivalent prototype units shall be employed for the qualification test program. When three test articles are used they shall be subjected to the following tests apportioned approximately as shown:

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Test Article No. 1

Performance Record
High Temperature
Low Temperature
Acceleration
Shock
Altitude
Endurance
Performance Record
Disassembly & Inspection

Test Article No. 2

Performance Record
Radio Noise
Leakage
Pressure Drop
Vibration
Sand and Dust
Proof Pressure
Performance Record
Disassembly & Inspection
Burst Pressure
Disassembly & Inspection

Test Article No. 3

Performance Record
Humidity
Fungus Resistance
Salt Spray
Dielectric
Explosion Proof
Performance Record
Disassembly & Inspection

If two test articles are selected, the apportionment of tests should be approximately as follows:

Test Article No. 1

Performance Record
Low Temperature
High Temperature
Endurance
Altitude
Vibration
Shock
Performance Record
Disassembly & Inspection
Proof Pressure
Burst Pressure

Test Article No. 2

Performance Record
Radio Noise
Explosion Proof
Leakage
Pressure Drop
Humidity
Sand and Dust
Salt Spray
Dielectric
Fungus
Performance Record

Other performance record checks may be included at points mutually agreeable to vendor and customer.

The ultimate apportionment and sequence of conducting the tests shall be at the option of the manufacturer, unless specifically negotiated otherwise.

