The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS 2615D

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Superseding AMS 2615C

PRESSURE TESTING, HYDRAULIC
Pressure as Specified

1. SCOPE:

1.1 Application: This specification provides requirements and procedures for hydraulic-pressure leak testing of parts.

1.1 MAM 2615 is the metric version of this AMS.

1.2 Classification: The following classes of tests establish the allowable leakage as follows:

Class A - No visible leakage permitted.
Class B - 2 mL/minute.
Class C - 2mL/minute for any area bounded by a 1-inch diameter circle.
Class D - Very slow leak allowing the surface to become slightly moist or damp.
Class E - A specified leakage rate acceptable to purchaser.

1.2.1 If a class is not specified, Class A shall apply.

1.3 Safety - Hazardous Materials: While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards which may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

2. APPLICABLE DOCUMENTS: Not applicable.

3. TECHNICAL REQUIREMENTS:

3.1 Equipment:

3.1.1 Fixtures: Test fixtures shall not seal off areas of possible leakage or Ø create excessive stresses on parts other than those induced by the pressure itself or by fittings acceptable to purchaser.

3.1.2 Gaskets: Suitable gasket material shall be used with plugs or blanking Ø plates to prevent damage to finished surfaces. Flanges or fittings designed for use with specific O-rings or gaskets shall use those for test. Formed in place gaskets that could mask dimensional or surface flaws shall not be used except for raw castings.

3.1.3 Valves: Bleeder valves shall be provided to release entrapped air.

3.1.4 Gauges: Pressure gauges shall have sufficient dial divisions to permit Ø monitoring of specified pressure, with maximum gauge capacity not more than five times test pressure and readability or marked increments not less than 5% of test pressure. Gauges shall have been calibrated, within one year of use, using either primary standards or standards traceable to the National Institute of Standards.

3.1.5 Safety Tank or Screen: A suitable tank or screen shall be provided to protect the operator in case of failure of a part. (See 8.2).

3.1.6 Drying Oven: A circulating-air oven shall be provided for drying parts subject to corrosion.

3.2 Test Media: Water, hydraulic fluid, or suitable petroleum-base test fluid Ø shall be used. The test media shall be inert to the part and shall have a viscosity of 25 centistokes or less.

3.3 Preparation:

3.3.1 Cleaning: The part shall be thoroughly cleaned and dried before testing so that any leaks will be visible. Loose particles, machine shop chips, oils, and other foreign materials shall be removed before pressure testing.

3.3.2 Processes: The part or subassembly shall be tested following all Ø machining, forming, straightening, welding, brazing, etc, and prior to application of protective finishes such as paint, plating, coating, or surface finishes that may mask or blank off areas of possible leakage.

3.3.3 Chemical Films: Chemical film protective finishes on aluminum may be applied either before or after pressure testing.

3.3.4 Impregnation: Impregnation of castings shall not be permitted except as Ø authorized by purchaser and then only to correct general seepage leaks. Impregnation shall not be used to correct poor foundry techniques, visible holes, or excessive porosity. Impregnation, when permitted or authorized by purchaser, shall be conducted after heat treatment, brazing, and welding have been completed.

3.3.5 Preliminary Tests: Tests may be performed at any stage of manufacture to Ø establish in-process integrity. However, requirements apply to finished parts prior to finish coating (See 3.3.2).

3.3.6 Material Removal: Sand blasting, pickling, or any other operation which may remove metal from surfaces shall be done before final pressure tests.

3.4 Procedure: Parts shall be fitted up for test, surfaces opposite those under pressure shall be dried, and part or passage shall be filled with water or other suitable liquid. After all air has been expelled from internal passages under test, the pressure specified by purchaser shall be applied to the liquid and maintained for sufficient time to establish the rate of leakage.

3.4.1 Duration: Parts shall be held under pressure for not less than 3 minutes to allow leakage indications to develop prior to visual inspection.

3.4.2 Entrapped Air: Care shall be exercised that no air or other gas is trapped in the part being tested or in any of the feeder lines associated with the testing fixture. Bleeders shall be provided to release entrapped air or gas so that the entire part volume is filled with liquid.

3.4.3 Cleaning: Parts shall be cleaned and dried, immediately after test, to prevent corrosion due to entrapment of moisture. Visible moisture shall be removed by air blast. Parts containing areas of entrapment and all magnesium parts shall be dried in a circulating-air oven at a temperature not higher than 250°F for sufficient time to ensure complete moisture removal.

3.4.4 Orientation: The part shall be exposed, during static pressure application, to permit overall visual inspection.

3.5 Acceptance Standards:

3.5.1 Leakage: Parts, while under pressure, shall not leak in excess of the specified requirements. The effect of any leakage of parts shall be reviewed by cognizant personnel and the parts accepted, repaired and retested, or rejected as agreed upon between purchaser and vendor. When leakage requirements have not been agreed upon, no visible leakage is acceptable.

3.5.2 Distortion: Parts that show no indication of having been weakened or abnormally distorted and which do not leak under pressure beyond the specified leakage limits are acceptable.

3.5.3 Rubber Hose: Natural or synthetic rubber hose without reinforcing braid may exhibit up to 15% enlargement of its diameter during the test provided the hose returns to within 2% of its original diameter at all places along the entire length when the pressure is released.

3.5.4 Braided Rubber Hose: Parts may show a slight extrusion through the braid during test but, when pressure is released, the hose shall show no extension outside the braid beyond that which existed before test. Braid shall fit as snugly after test as before test.