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AEROSPACE MATERIAL SPECIFICATION

SAE AMS 2616E

Issued OCT 1940
Revised OCT 1993
Cancelled NOV 2001

Superseded by AMS 2615
Superseding AMS 2616D

Pressure Testing, Hydraulic 200 psi

CANCELLATION NOTICE

This specification has been declared “CANCELLED” by the Aerospace Materials Division, SAE, as of November 2001, and has been superseded by AMS 2615 using a test pressure of 200 psi ± 10. The requirements of the latest issue of AMS 2615 using a test pressure of 200 psi ± 10 shall be fulfilled whenever reference is made to the cancelled AMS 2616. By this action, this document will remain listed in the Numerical Section of the Index of Aerospace Material Specifications noting that it is superseded by AMS 2615 using a test pressure of 200 psi ± 10.

Cancelled specifications are available from SAE.

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1. SCOPE:

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

1.1 MAM 2616 is the metric equivalent of this AMS.

1.2 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 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 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 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 National Institute of Standards and Technology (NIST).

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 is required for drying parts subject to corrosion.

3.2 Test Media:

Water, hydraulic fluids, or suitable petroleum-base test fluids 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 machining, forming, straightening, welding, brazing, anodizing, 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 and magnesium may be applied either before or after pressure testing.

3.3.4 Impregnation: Impregnation of castings shall not be permitted except as 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 in order to 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 Procedures:

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, pressure of 200 psi ± 10 shall be applied to the fluid and maintained for sufficient time to establish the rate of leakage.

3.4.1 Duration: Parts shall be held under the specified pressure for not less than three minutes to permit complete visual inspection while at the specified pressure.

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

3.4.3 Cleaning: Parts which have been tested with water or hydraulic fluid 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 250 °F ± 25 for sufficient time to ensure complete moisture removal.

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

3.5 Acceptance Standards:

3.5.1 Leakage: Parts shall not leak under pressure. The effect of any slight leakage of parts shall be considered by cognizant personnel and the parts accepted, repaired and retested, or rejected.

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 leakage limits specified are acceptable.

3.5.3 Rubber Hose: Rubber or synthetic rubber hose without reinforcing braid may distort up to 15% enlargement of 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.

3.5.5 Metal Tubing: Tubes shall not have a permanent set of more than 1.0% increase in diameter at any place along the entire length.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Reports:

The pressure test vendor shall furnish with each shipment a report stating that the parts have been tested in accordance with requirements of this specification and that they conform to the technical requirements. This report shall include the purchase order number, AMS 2616E, part number, and quantity.

5. PREPARATION FOR DELIVERY:

5.1 Preservation:

Parts, which are subject to corrosion, shall be suitably preserved prior to shipment.