AEROSPACE RECOMMENDED PRACTICE

ARP4457™	REV. A

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Superseding ARP4457

Torsion Strength Testing of Hydraulic Tube Joints

RATIONALE

This technical report is being stabilized because it covers technology, products, or processes which are mature and not likely to change in the foreseeable future.

STABILIZED NOTICE

This document has been declared “STABILIZED” by SAE G-3, Aerospace Couplings, Fittings, Hose, Tubing Assemblies Committee and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

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1. SCOPE:

This Aerospace Recommended Practice (ARP) establishes uniform requirements and procedures to determine the torsional strength of permanent hydraulic tube joints. It also establishes testing equipment and apparatus for torsion testing.

2. REFERENCES:

2.1 Military Publication:

Available from Standardization Documents Order Desk, Bldg. 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-H-5606 Hydraulic Fluid, Petroleum Base, Aircraft, Missile, and Ordnance

3. TECHNICAL REQUIREMENTS:

3.1 Test Conditions:

Testing shall be conducted at ambient room temperature (70 °F ± 20 °F) conditions.

3.2 Test Apparatus:

A typical test setup is shown in Figure 1. The test apparatus shall support the tube with minimal friction to insure maximum torque transmission to the fixed end and to prevent bending forces from being applied to the specimen.

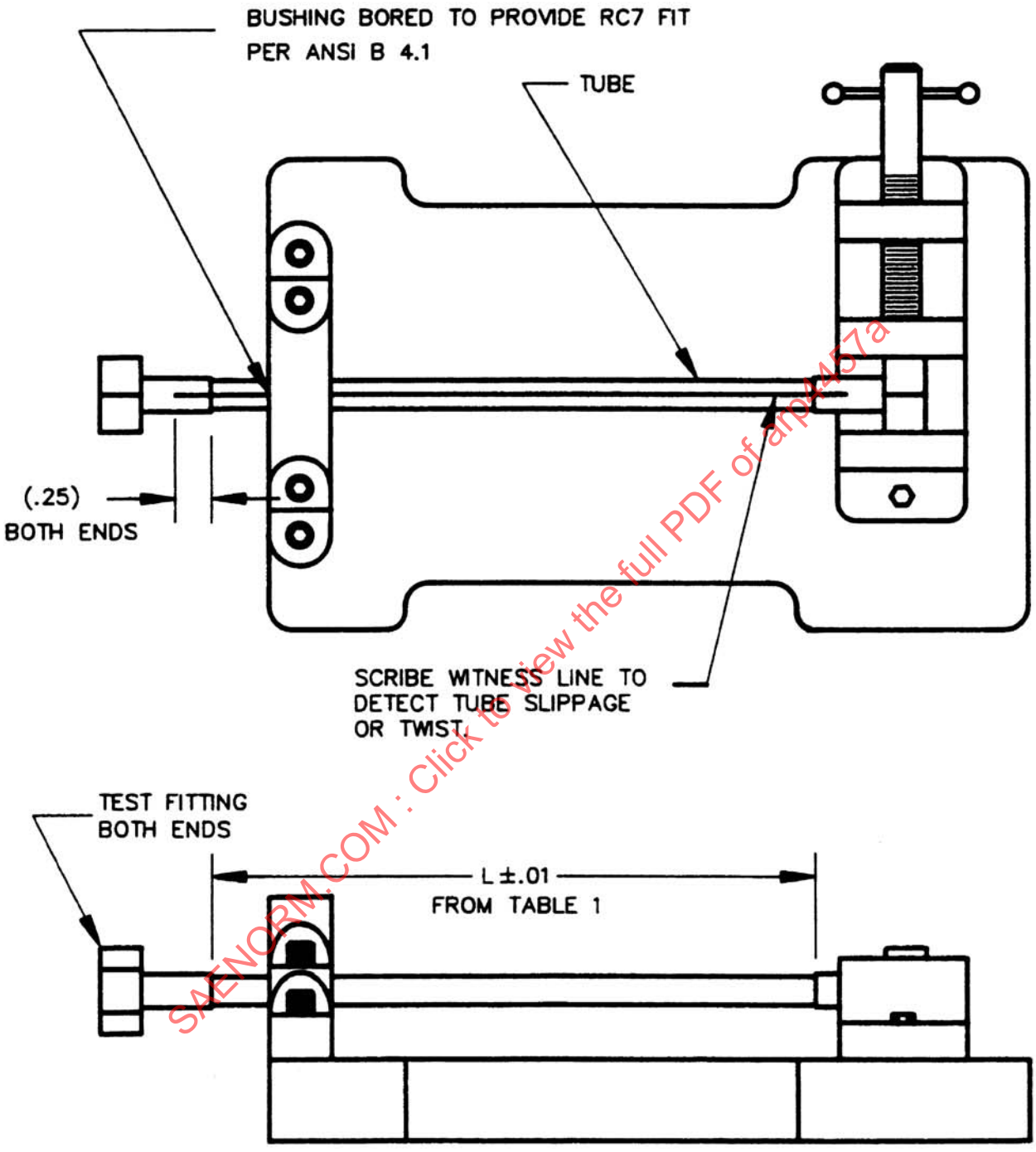

FIGURE 1 - Test Apparatus

3.3 Test Specimens:

3.3.1 Fittings: The fittings used shall have wrench pads or flats to facilitate the application of torque to the assembly. Test fittings shall be examined for workmanship and conformance to design specifications.

3.3.2 Tubing: Specimen tube length shall be the length of free tube after assembly specified in Table 1, using the minimum tube insertion (if applicable).

3.3.3 Specimen Assembly: One fitting shall be installed on each end of the prepared tube, following assembly procedures specified by the manufacturer.

3.3.4 Hydraulic Proof Test: Before torsion testing, the assembly shall be proof pressure tested for 5 min at two times its rated pressure using Mil-H-5606 hydraulic fluid.

4. TEST PROCEDURE:

The torsion test shall be conducted as described in the following paragraphs.

4.1 Scribe a line along the length of the assembly to be tested, crossing the tube/fitting interface at either end. This line is to be used to detect slippage or twisting of the assembly.

4.2 Clamp the test assembly into the test stand as shown in Figure 1.

4.3 Using a dial-indicator type wrench with a telltale, slowly apply a torsional load to the free end of the assembly. Continue loading until tube slippage or twisting of at least 5° occurs between the flats of the input fitting and those of the reaction fitting. Record the displacement angle, the corresponding torque value, and the nature of the displacement (twist or slip). This data shall be compiled into document AIR YYY.

4.4 Subject the assembly to hydraulic proof test per 3.3.4 if the tubing twists without slipping of tube. If the tube slips in the fitting, terminate the test.