

FOREWORD

This standard sets forth a standard test method to simulate shearing action on a fastener to determine its shear withstanding capabilities.

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THE INITIAL RELEASE OF THIS DOCUMENT SUPERSEDES MIL-STD-1312-4.
DESIGNATION FOR THIS TEST METHOD REMAINS MIL-STD-1312-4.

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Documents

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1. SCOPE

1.1 **Applicability.** This test method outlines a standard procedure for determining the room temperature strength properties of mechanically fastened sheet metal lap joints statically loaded to produce shear on the fastener. The significant strength properties include the ultimate strength and the yield strength of the joint.

1.1.1 This test method applies to sheet metal lap joints fastened with rivets, bolts, screws, or comparable fastening devices.

2. REFERENCED DOCUMENTS

2.1 **Government documents**

2.1.1 **Specifications, standards and handbooks.** Unless otherwise specified, the following specifications, standards and handbooks of the issue listed in the current Department of Defense Index of Specifications and Standards (DoDISS) and the supplement thereto (if applicable), form a part of this standard to the extent specified herein.

HANDBOOKS

Federal Aviation Administration

MMPDS Metallic Materials Properties Development and Standardization

(Copies of specifications, standards, handbooks, drawings and publications required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.2 **Other publications.** The following document(s) forms a part of this specification to the extent specified herein, The issues of the documents which are indicated as DOD adopted shall be the issue in the current DoDISS and the supplement thereto, if applicable.

ASTM International

ASTM E4 Force Verification of Testing Machines
ASTM E8/E8M Tension Testing of Metallic Materials
ASTM E83 Verification and Classification of Extensometer Systems

Copies can be obtained from ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA, 19428-2959 USA www.astm.org

Aerospace Industries Association

NAS618 Fastener, Recommended Shank, Hole and Head to Shank Fillet Radius, Limits for

Copies can be obtained from the Aerospace Industries Association, 1000 Wilson Blvd., Suite 1700, Arlington, VA 22209 www.aia-aerospace.org

NCSL International

NCSL Z540.1 Laboratories, Calibration, and Measuring And Test Equipment

Copies can be obtained from NCSL International, 2995 Wilderness Place, Suite 107, Boulder, CO 80301.
www.ncsli.org

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3. DEFINITIONS

- 3.1 Joint ultimate shear strength. The ultimate strength of a joint is the highest load developed by the joint coincident with or prior to the failure of the fastener, parent sheet material, or a combination of both.
- 3.2 Joint yield shear strength. Yield strength of a joint is the load corresponding to a specified value of permanent set across the joint. Unless otherwise specified, the yield shall be determined from the load deflection curve by the Secondary Modulus Method as illustrated in Figure 1 using an offset of .04x"ØD" or as defined in MMPDS, Chapter 9.

4. GENERAL REQUIREMENTS

4.1 Test apparatus

- 4.1.1 Testing machine. The testing machine shall be capable of applying a tensile load at a controllable rate. The calibration system for the machine shall conform to NCSL Z540.1. Its accuracy shall be verified every 12 months by a method complying with ASTM E4. The yield loads, ultimate loads and structural failure loads of the fasteners tested shall be within the loading range of the testing machine as defined in ASTM E4.

- 4.1.2 Deflection measuring device. The measuring device used shall be an averaging, differential-transformer extensometer or equivalent, preferably of the separable type. It shall be used in conjunction with an autographic recorder and it shall have an accuracy of .5 percent of the indicated joint deflection at yield strength and be calibrated per ASTM E83. It shall be capable of direct attachment or mounting to the joint specimen. Load and deflection ranges shall be used that give the initial part of the load-extension curve a slope between 45 and 60 degrees.

- 4.1.3 Test fixtures. The test fixtures holding the joint specimen shall have self-aligning jaws (pin or grip type) capable of transmitting a load along a faying surface of the specimen within .005 inches of the centerline of the fasteners.

4.2 Test specimens

4.2.1 Configuration

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