

FOREWORD

This standard sets forth a standard test method to determine the interaction life cycle capabilities of any configuration of installed fastener when subjected to combined tension and shear loads.

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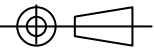
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THE INITIAL RELEASE OF THIS DOCUMENT SUPERSEDES MIL-STD-1312-2.
DESIGNATION FOR THIS TEST METHOD REMAINS MIL-STD-1312-2.

THIRD ANGLE PROJECTION		CUSTODIAN	REVISION
		NATIONAL AEROSPACE STANDARDS COMMITTEE	1
PROCUREMENT SPECIFICATION	NONE	TITLE FASTENER TEST METHODS METHOD 2 INTERACTION	CLASSIFICATION STANDARD PRACTICE
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1. SCOPE

- 1.1 Applicability. The interaction test for a complete fastener system is a method for determining the properties of the fastener system under combined tension and shear loading for any configuration of installed fastener system.

2. REFERENCED DOCUMENTS

- 2.1 Government documents. Not applicable.
- 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 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. www.astm.org

3. DEFINITIONS

Not applicable.

4. GENERAL REQUIREMENTS

4.1 Test apparatus

- 4.1.1 Test fixtures. The fixtures for performing the interaction test on 1/2 inch and smaller fasteners are shown on Figures 1 through 5. This fixture shall be adapted by transition studs to any standard type testing machine capable of applying a tensile load smoothly at a controlled rate. Test bushings (Figure 4) shall be modified to suit the configuration of the fastener to be tested. Fixtures for larger fasteners shall be proportionately larger, similar in shape and design, and equivalent in dimensional control.

- 4.1.2 Instrumentation. The fixture shown on Figure 1 provides a means of attaching an extensometer with 7 inch gage length. The extensometer shall be an averaging, differential-transformer extensometer, or equivalent. It shall conform to ASTM E83, class B-1.

4.2 Test specimens

- 4.2.1 General. This test evaluates a complete assembly. Tests resulting in failure of any component of the assembly shall be considered a complete test of that fastener. When testing either an internally or externally threaded fastener, the mating part shall be of sufficient strength to ensure failure in the test specimen. The grip length shall be at least four times the nominal diameter.

5. DETAIL REQUIREMENTS

5.1 Test procedures

- 5.1.1 Installation. The fastener shall be installed in the fixture with standard production tools, using the manufacturer's recommended installation procedures.

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- 5.2 Loading rate. Tension loads shall be applied slowly and evenly. Unless otherwise specified, the rate of loading shall be in accordance with Table I.

TABLE I – LOAD RATES

Nominal size (in)	Load rate $\pm 10\%$ (lb/Min)	Nominal size (in)	Load rate $\pm 10\%$ (lb/Min)	Nominal size (in)	Load rate $\pm 10\%$ (lb/Min)
.125	1,240	.375	11,000	.875	60,000
.156	1,920	.438	15,000	1.000	78,000
.164	2,100	.500	19,600	1.125	100,000
.190	2,800	.563	24,800	1.250	122,000
.250	5,000	.625	30,600	1.375	148,000
.313	7,700	.750	44,000	1.500	176,000

6. NOTES

- 6.1 Test report. The test report shall include the following data:

- Fastener type and part number, including lot identification, fastener diameter, and description of material(s).
- Testing machine used with most recent date of certification and calibration, and method used for calibration.
- Interaction angle of test.
- Individual readings for ultimate strength achieved for each group or specimen.
- Computation of average ultimate strength for each specimen.
- Extensometers and gage length.
- Installation procedure.
- Type of failure.
- Cause and duration of any interruption during test.
- Results of all inspections.

6.1.1 Yield point data (optional)

- 6.1.1.1 Autographic curves. Autographic curves for each specimen shall be included with the test data when yield point information is required. Each curve shall show the graphic determination for yield point for each specimen, and shall be completely identified as to specimen, test number, and date of test.

- 6.1.1.2 Yield data. Yield data shall be presented on the data tabulation sheet for each specimen.

- 6.1.1.3 Yield strength. Yield strength shall be determined as specified in the procurement document.

6.1.2 Interaction diagram

- 6.1.2.1 An interaction diagram may be plotted, using applied load laid out to scale on the angle of the test. The tension load in pounds is the ordinate and the shear load in pounds is the abscissa. Units of the ordinate and abscissa must be equal in value and scale. (Pure tension is on the fastener at 0° interaction angle and pure shear load is on the fastener at 90° interaction angle.) A sample diagram is included as Figure 6.

- 6.1.2.2 A smooth curve may be drawn between plotted points and intermediate loads picked off this curve. A curve should be drawn for the average load of all tests, the low load recorded for all tests, and when desired, the yield load curve may be drawn.

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