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MILITARY STANDARD

FASTENER TEST METHODS

METHOD 13,

DOUBLE SHEAR TEST



FSC 53GP

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DEPARTMENT OF DEFENSE
WASHINGTON, DC 20301

Fastener Test Methods, Method 13, Double Shear Test

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FOREWORD

This standard sets forth a standard test method to define the procedure and apparatus for testing fasteners in double shear in a half-hole shear fixture.

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1. SCOPE

1.1 Applicability. This test method covers the procedure and apparatus for testing fasteners in double shear in a half-hole shear fixture.

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.

STANDARDS

MILITARY

MIL-STD-45662 Calibration System Requirements

(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.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E 4 Load Verification of Testing Machines

(Applications for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

3. DEFINITIONS

Not applicable.

4. GENERAL REQUIREMENTS

4.1 Test apparatus.

4.1.1 Testing machine. The testing machine shall be capable of applying a compressive load at a controllable rate. The calibrating system for the machine shall conform to MIL-STD-45662. Its accuracy shall be verified every 6 months by a method complying with

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ASTM E 4, using a calibration device which has been calibrated by the National Bureau of Standards not more than 2 years prior to its use. The loads of the fasteners tested shall be within the range of the testing machine as defined in ASTM E 4.

4.1.2 Test fixture. Test fixtures shall be in accordance with figure 1.

4.1.3 Unless otherwise specified, the minimum grip length of the test specimen shall be 3D.

5. DETAIL REQUIREMENTS

5.1 Test procedures. The ultimate double shear strength shall be obtained as follows:

5.1.1 The fastener is placed in the receiving half-holes of the fixture base with neither threads nor fillet in bearing.

5.1.2 The blade (guillotine) portion is placed in position on the specimen and the preload applied.

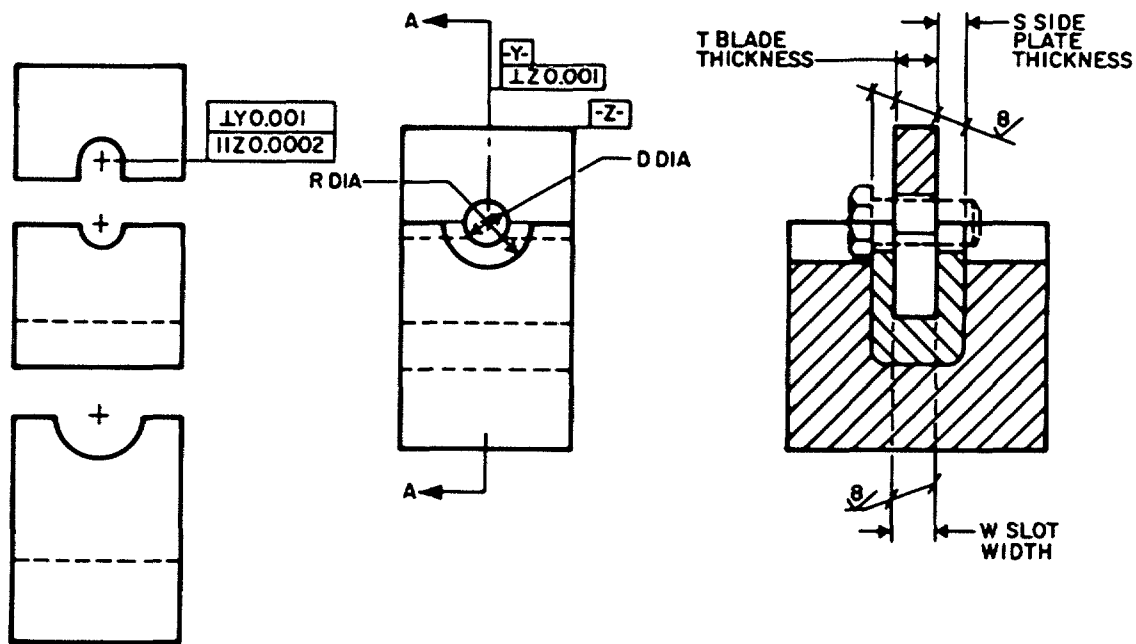
5.1.3 The test load is then applied at a uniform rate as specified in table I. Load rates for larger or smaller size fasteners shall be calculated to give an initial stress rate of 50,000 pounds per minute per square inch of nominal double shear area. A tolerance of ± 10 percent shall apply on the load rate. Nominal double shear area is twice the nominal shank area for load rate calculation only. The test may be discontinued and the specimen removed without a complete shear failure after the ultimate load has been reached.

TABLE I. Double shear load rates.

Nominal diameter	Load rate lb./min.	Nominal diameter	Load rate lb./min.
0.125	2,480	0.563	49,600
0.156	3,840	0.625	61,200
0.164	4,200	0.750	88,000
0.188	5,600	0.875	120,000
0.250	10,000	1.000	156,000
0.313	15,400	1.125	200,000
0.375	22,000	1.250	244,000
0.438	30,000	1.375	296,000
0.500	39,200	1.500	352,000

The testing laboratory, at their option, may use a constant strain rate which will produce the specified load rate (± 10 Percent) in the elastic range. That is, the strain rate shall be equal to the initial stress rate of 50,000 pounds per minute per square inch divided by the elastic modulus in shear.

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Nominal fastener size	D		S ₁ +0.0010 -0.0000	T +0.0000 -0.0010	W +0.0010 -0.0000	R
	Max.	Min.				
0.125	0.1260	0.1253	0.063	0.1250	0.1260	0.156
0.156	0.1573	0.1566	0.078	0.1563	0.1573	0.188
0.164	0.1650	0.1643	0.083	0.1562	0.1572	0.188
0.188	0.1885	0.1878	0.094	0.1875	0.1885	0.219
0.190	0.1910	0.1903	0.094	0.1900	0.1910	0.219
0.250	0.2510	0.2503	0.125	0.2500	0.2510	0.281
0.313	0.3135	0.3128	0.156	0.3125	0.3135	0.344
0.375	0.3760	0.3753	0.188	0.3750	0.3760	0.406
0.438	0.4385	0.4378	0.219	0.4375	0.4385	0.468
0.500	0.5010	0.5003	0.250	0.5000	0.5010	0.531
0.563	0.5635	0.5628	0.281	0.5625	0.5635	0.594
0.625	0.6260	0.6253	0.312	0.6250	0.6260	0.656
0.750	0.7510	0.7503	0.375	0.7500	0.7510	0.781
0.875	0.8760	0.8753	0.437	0.8750	0.8760	0.906
1.000	1.0010	1.0003	0.500	1.0000	1.0010	1.031
1.125	1.1260	1.1253	0.562	1.1250	1.1260	1.156
1.250	1.2510	1.2503	0.625	1.2500	1.2510	1.281
1.375	1.3760	1.3753	0.687	1.3750	1.3760	1.406
1.500	1.5010	1.5003	0.750	1.5000	1.5010	1.531

- NOTES:**
1. Break shear edges, 0.005 minimum. Fixture shall be reworked when wear results in chamfer or radius of 0.010.
 2. For fixture sizes other than those listed, the geometric proportions specified herein shall be maintained.

FIGURE 1. Double shear fixture.

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6. NOTES

6.1 Test report. Unless otherwise prescribed in the product specification, for the material being tested, the test report shall contain the following data:

- a. Fastener description.
- b. Part number.
- c. Material.
- d. Manufacturer.
- e. Measured diameter of each specimen.
- f. Individual ultimate load.

Custodians:

Army - AR
Navy - AS
Air Force - 11

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