

FED. SUPPLY CLASS

53GP

FOREWORD:

This standard sets forth standard test procedures for determining the capability of externally threaded fasteners to withstand the various stress load conditions encountered when used in military weapons systems.

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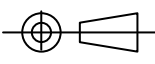
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THE INITIAL RELEASE OF THIS DOCUMENT SUPERSEDES DOD-STD-1312-105.
DESIGNATION FOR THIS TEST METHOD REMAINS DOD-STD-1312-105.

THIRD ANGLE PROJECTION		CUSTODIAN NATIONAL AEROSPACE STANDARDS COMMITTEE	REVISION 1
PROCUREMENT SPECIFICATION NONE		TITLE FASTENER TEST METHODS METRIC METHOD 105 STRESS DURABILITY	CLASSIFICATION STANDARD PRACTICE NAM1312-105



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1. SCOPE

- 1.1. Applicability. This method establishes a standard procedure for testing the stress durability of externally threaded fasteners. This procedure applies to all types of externally threaded fasteners which may be subject to any type of embrittlement and is not limited by configuration or size.

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.

SPECIFICATIONS

Federal

GGG-W-686 — Wrench, Torque
GGG-W-2843 — Wrench, Micrometer, Torque

Military

MIL-T-5544 — Thread Compound, Antiseize, Graphite-Petrolatum

Copies can be obtained from the Department of Defense Single Stock Point (DODSSP). <http://dodssp.daps.dla.mil>

- 2.2. Industry publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted shall be those listed in the issue of the DoDISS specified in the solicitation. Unless otherwise specified, the issues of the documents not listed in the DoDISS shall be the issue of the nongovernment documents which are current on the date of the solicitation.

ASTM International

ASTM E1417 — Standard Practice for Liquid Penetrant Testing
ASTM E1444 — Standard Practice for Magnetic Particle Testing

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

SAE International

AMS2518 — Thread Compound, Anti-Seize, Graphite-Petrolatum

Copies can be obtained from SAE International, 400 Commonwealth Dr., Warrendale, PA 15096-0001. www.sae.org

ASME

ASME B107.300 — Torque Instruments

Copies can be obtained from ASME, Three Park Ave., New York, NY 10016-5990. www.asme.org

3. DEFINITIONS

Not applicable.

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Documents

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4. GENERAL REQUIREMENTS

4.1. Test apparatus

- 4.1.1. Torque method of loading. Torque wrenches calibrated for accuracy within the limits specified in GGG-W-686 GGG-W-2843 and ASME B107.300 will be required, as well as the necessary adaptors to fit the configuration of the fastener under test. Also required are steel blocks as shown on Figure 1, heat treated to a minimum hardness of 45 HRC, or steel spacers as shown on Figure 2, heat treated to a minimum hardness of 45 HRC, and an internally threaded member (Figures 3 and 4) with sufficient strength to develop full tensile strength of the fastener being tested.
- 4.1.2. Elongation method of loading. Equipment in accordance with 4.1.1 shall be used, except that any suitable wrenching device may be used and a precision measuring instrument is required to measure elongation of the test fastener according to acceptable methods.
- 4.1.3. External loading method. Suitable equipment and fixtures such as those used in tensile testing of fasteners shall be used to develop and maintain the required test load on the fastener.
- 4.1.4. Load cell method of loading. A precision calibrated load cell of sufficient strength to develop full tensile strength of the fastener under test shall be used, and be of proper dimensions to accommodate the fastener. Strain gages shall be fastened by standard approved methods of the load cell as indicated on Figure 5. Hardened steel washers or plates as shown on Figure 5 of sufficient strength to develop full tensile strength of fastener shall be required. In addition, an accurate strain indicator is required which, at the option of the tester, may be coupled with a multi-channel switch and balance unit. Also required are a suitable wrenching device for the test fastener and an internally threaded member as specified in 4.1.1.
- 4.2. Test specimen sample size. The number of specimens to be tested from each lot shall be as specified in the acquisition document or product specification. The test specimen shall not be altered other than as specified in 5.2.

5. DETAIL REQUIREMENTS

- 5.1. Test methods. Unless otherwise specified, stress durability tests shall be conducted in accordance with one of the following methods listed below. Selection of method shall be an option of the manufacturer. In the event of controversy, the external loading method shall be used as the referee method.
- 5.1.1. Torque method. Test fastener shall be assembled in the test units, utilizing not more than three spacers in accordance with Figure 4. The threads of the fastener, the bearing surface of the fastener head, and the bearing surface of the nut shall be lubricated with a lubricant conforming to MIL-T-5544 AMS2518. A minimum of two full threads of the test specimen shall extend above the face of the nut or tapped block toward the head of the bolt. The tapped test block or the untapped block nearest to the nuts shall be held in a vise. The specimen shall be tightened with a torque wrench to a torque equivalent to the induced load. Unless otherwise specified, the induced load shall be 75-80 percent of the minimum ultimate tensile strength specified in the product specification. The specimen assembly shall remain in a torqued condition at room temperature for a period of time specified by the procurement document.
- 5.1.1.1. The torque value may be determined from the following equation or torque tension curves developed from tests utilizing hardened steel threaded members:

$$T = K\phi DL$$

Where: T = Torque in Newton-meter
K = 0,1 (coefficient of friction)
 ϕD = Nominal diameter of specimen (mm)
L = Induced load (kN)

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