SAE Aerospace
An SAE International Group

AEROSPACE MATERIAL SPECIFICATION

AMS 7240F

Issued	MAR 1940
Revised	OCT 1979
Noncurrent	JAN 1992
Reaf. Noncur.	JUN 2006
Cancelled	JUL 2007

Superseded by AS7240

Washers, Spring Lock
Carbon Steel

RATIONALE

AMS 7240E has been designated Cancelled and Superseded because equivalent technical requirements are provided by AS7240. AS7240 was developed to transfer jurisdiction of this specification from the materials commodity in AMS Committee E to the parts commodity in SAE Committee E-25.

CANCELLATION NOTICE

This specification has been declared “CANCELLED” by the Aerospace Materials Division, SAE, as of July, 2007 and has been superseded by AS7240. The requirements of the latest issue of AS7240 shall be fulfilled whenever reference is made to the cancelled AMS 7240E. By this action, this document will remain listed in the Numerical Section of the Index of Aerospace Material Specifications, noting that it has been superseded by AS7240.

Cancelled specifications are available from SAE.

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AEROSPACE MATERIAL SPECIFICATION

SAE AMS 7240E

Issued MAR 1940
Revised OCT 1979
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Superseding AMS 7240D

Washers, Spring Lock
Carbon Steel

NONCURRENT NOTICE

This specification has been declared “NONCURRENT” by the Aerospace Materials Division, SAE, as of January 1992. It is recommended, therefore, that this specification not be specified for new designs.

“NONCURRENT” refers to those materials which have previously been widely used and which may be required on some existing designs in the future. The Aerospace Materials Division, however, does not recommend these as standard materials for future use in new designs. Each of these “NONCURRENT” specifications is available from SAE.

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1. SCOPE:

1.1 Type:

This specification covers plain helical lock washers fabricated from heat treated carbon steel.

1.2 Application:

Primarily for use with threaded fasteners; not recommended for use at temperatures higher than 450°F (230°C).

2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications:

Available from Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Materials Specifications:

AMS 2259 Chemical Check Analysis Limits, Wrought Low-Alloy and Carbon Steels
AMS 2350 Standards and Test Methods
AMS 2400 Plating, Cadmium

2.2 ASTM Publications:

Available from American Society of Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM E18 Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials
ASTM E350 Chemical Analysis of Carbon Steel, Low-Alloy Steel, Silicon Electrical Steel, Ingot Iron, and Wrought Iron

2.3 Government Publications:

Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Federal Standards:

Federal Test Method Standard No. 151 - Metals; Test Methods

2.3.2 Military Standards:

MIL-STD-414 Sampling Procedures and Tables for Inspection by Variables for Percent Defective
MIL-STD-794 Parts and Equipment, Procedures for Packaging and Packing of

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

Shall conform to the following percentages by weight, determined by wet chemical methods in accordance with ASTM E350, by spectrographic methods in accordance with Federal Test Method Standard No. 151, Method 112, or by other analytical methods approved by purchaser:

	min	max
Carbon	0.55	0.88
Manganese	0.60	0.90
Silicon	0.15	0.35
Phosphorus	--	0.040
Sulfur	--	0.050
Nickel	--	0.25
Chromium	--	0.10
Molybdenum	--	0.08
Copper	--	0.35

3.1.1 Check Analysis: Composition variations shall meet the applicable requirements of AMS 2259.

3.2 Condition:

Hardened, tempered, and plated.

3.3 Fabrication:

3.3.1 Helix: Washers shall be coiled so that the free height is approximately twice the thickness of the washer section. Gap and relationship of the severed ends shall be such as to prevent the washers tangling.

3.3.2 Finish: Washers shall be plated in accordance with AMS 2400.

3.4 Properties:

Washers shall conform to the following requirements:

3.4.1 Hardness: Shall be 45 - 53 HRC, determined in accordance with ASTM E18, after removing the plating and any decarburization.

3.4.2 Temper: After the first compression to flat, the free height of a washer shall be not less than 0.66 times the original free height. Subsequent compressions to flat shall not further reduce this free height by more than 0.005 in. (0.13 mm) but the free height after ten compressions to flat shall be not less than 0.66 times the original free height.

3.4.3 Toughness: A portion of washer shall be firmly gripped in vise jaws having sharp edges. Ends of washer shall be free and an axis passing through the slot shall be parallel to top of vise. An equal portion of washer shall be gripped in wrench jaws. Edges of wrench jaws shall be sharp and in a plane parallel to top of vise. Free portion of washer, between the grip of vise and wrench, shall be approximately 25% of washer diameter. Movement of wrench in the direction that increases the free height of the washer shall twist the lock washer through 90 deg without evidence of fracture. When a washer fractures because of twist, the structure at the point of fracture shall show a fine grain; the washers shall deliver, at the instant of fracture, a tough, springy, reactive shear.

3.5 Quality:

The flat faces and the inner and outer periphery of the washers shall be smooth and free from knurling, serrations, die marks, and deep scratches; however, slight feed marks are permissible. The ends at the gap shall not have cutting edges at the contact surfaces. Washers shall have rounded edges and shall be free from internal and external imperfections detrimental to their performance.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The vendor of washers shall supply all samples and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.4. Purchaser reserves the right to perform such confirmatory testing as he deems necessary to ensure that the washers conform to the requirements of this specification.

4.2 Classification of Tests:

Tests to determine conformance to all technical requirements of this specification are classified as acceptance tests and shall be performed on each lot.