

WASHERS, SPRING LOCK, CORROSION RESISTANT STEEL
18Cr - 9Ni

UNS S30200

1. SCOPE:

- 1.1 Type: This specification covers plain helical lock washers fabricated from corrosion-resistant steel.
- 1.2 Application: Primarily for use with corrosion-resistant steel threaded fasteners; not recommended for use at temperatures higher than 700°F (370°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 shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

- 2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

- AMS 2248 - Chemical Check Analysis Limits, Wrought Corrosion and Heat Resistant Steels and Alloys, Maraging and Other Highly-Alloyed Steels, and Iron Alloys
- AMS 2350 - Standards and Test Methods
- AMS 2371 - Quality Assurance Sampling of Corrosion and Heat Resistant Steels and Alloys, Wrought Products Except Forgings and Forging Stock

- 2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

- ASTM E18 - Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials
- ASTM E353 - Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys

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2.3 U.S. Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 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 E353 or by spectrochemical or other analytical methods approved by purchaser:

	min	max
Carbon	--	0.15
Manganese	--	2.00
Silicon	--	1.00
Phosphorus	--	0.040
Sulfur	--	0.030
Chromium	17.00	19.00
Nickel	8.00	10.00
Molybdenum	--	0.75
Copper	--	0.75

3.1.1 Check Analysis: Composition variations shall meet the requirements of AMS 2248.

3.2 Condition: Cold worked.

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.

3.4 Properties: Washers shall conform to the following requirements:

3.4.1 Hardness: Shall be 35 - 43 HRC, or equivalent, determined in accordance with ASTM E18.

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. (0.12 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 imperfections detrimental to usage of the washers.
4. QUALITY ASSURANCE PROVISIONS:
- 4.1 Responsibility for Inspection: The vendor of washers shall supply all samples for vendor's tests 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 sample and to perform any confirmatory testing deemed 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 heat or lot as applicable.
- 4.3 Sampling: Shall be in accordance with the following; a lot shall be all washers of the same part number, fabricated from the same heat of steel, and presented for vendor's inspection at one time:
- 4.3.1 Composition: One sample from each heat.
- 4.3.2 Other Requirements: In accordance with MIL-STD-414 to an AQL of 3.5%.
- 4.4 Reports: The vendor of washers shall furnish with each shipment a report showing the results of test for chemical composition of each heat and stating that the washers conform to the technical requirements of this specification. This report shall include the purchase order number, AMS 7241A, lot number, contractor or other direct supplier of material, part number, nominal size, and quantity.

4.5 Resampling and Retesting: If any specimen used in the above tests fails to meet the specified requirements, disposition of the washers may be based on the results of testing three additional specimens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the washers represented and no additional testing shall be permitted. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Identification and Packaging:

5.1.1 Washers of each different part number shall be packaged in separate containers.

5.1.2 Each container shall be marked with not less than the following information:

WASHERS, SPRING LOCK, CORROSION RESISTANT STEEL

AMS 7241A

PART NUMBER _____

LOT NUMBER _____

PURCHASE ORDER NUMBER _____

QUANTITY _____

MANUFACTURER'S IDENTIFICATION _____

5.1.3 Containers of washers shall be prepared for shipment in accordance with commercial practice and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of the washers to ensure carrier acceptance and safe delivery. Packaging shall conform to carrier rules and regulations applicable to the mode of transportation.

5.1.4 For direct U.S. Military procurement, packaging shall be in accordance with MIL-STD-794, Level A or Level C, as specified in the request for procurement. Commercial packaging as in 5.1.1 and 5.1.3 will be acceptable if it meets the requirements of Level C.

6. ACKNOWLEDGMENT: A vendor shall mention this specification and its revision letter in all quotations and when acknowledging purchase orders.

7. REJECTIONS: Washers not conforming to this specification or to modifications authorized by purchaser will be subject to rejection.

8. NOTES:

8.1 Marginal Indicia: The phi (ϕ) symbol is used to indicate technical changes from the previous issue of this specification.