

INCH-POUND

MIL-DTL-21338B

28 July 2014

SUPERSEDING

MIL-W-21338A

15 January 1970

DETAIL SPECIFICATION

WASHER, KEY RETAINING,
BALL AND ROLLER BEARINGS

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the procurement requirements for retaining key washers for use in assemblies with ball and roller bearings (see 6.1).

1.2 Classification. The washers shall be of the following types and classes, as specified (see 6.2):

Types:

Type I – Regular series

Class 1 – Carbon steel

Class 2 – Corrosion resisting steel

Type II – Light series

Class 1 – Alloy steel

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications and standards form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

Comments, suggestions, or questions on this document should be addressed to Defense Supply Center Philadelphia (DSCP), ATTN: DSCP-NASA, 700 Robbins Avenue, Philadelphia, PA 19111-5096 or e-mail to dscpg&ispeccomments@dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <https://assist.dla.mil>.

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DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-130 MS19069	Identification Marking of U.S. Military Property Washer, Key Retaining, Ball and Roller Bearing, Light Series
MS19070	Washer, Key Retaining, Ball and Roller Bearing, Regular Series

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-DTL-16232	Phosphate Coating, Heavy, Manganese or Zinc Base
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(Copies of these documents are available online at <http://quicksearch.dla.mil/> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS

ASME-B46.1	Surface Texture(Surface Roughness, Waviness, and Lay)
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(Copies of this document are available from www.asme.org American Society of Mechanical Engineers, Three Park Avenue, M/S 10E, New York, NY 10016-5990.)

AMERICAN SOCIETY FOR QUALITY (ASQ)

ASQ Z1.4	Sampling Procedures and Tables for Inspection by Attributes.
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(Copies of this document are available from www.asq.org American Society for Quality Control, 600 North Plankinton Avenue, Milwaukee, WI 53203.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM B633	Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel
ASTM E18	Standard Test Methods for Rockwell Hardness of Metallic Materials
ASTM E1282	Standard Guide for Specifying the Chemical Compositions and Selecting Sampling Practices and Quantitative

(Copies of these documents are available from www.astm.org or the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

SAE AIR4127 SAE AMS2700	Steel: Chemical Composition and Hardenability Passivation of Corrosion Resistant Steels
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(Copies of these documents are available from www.sae.org or the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096-0001.)

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2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Materials. Materials used in the manufacture of washers shall be homogeneous in structure, free from laminations, inclusion of nonmetallic impurities, and such other defects as would render the material unsuitable for its intended purpose and shall be in accordance with 3.1.1, 3.1.2, or 3.1.3, as applicable.

3.1.1 Carbon steel. Type I, Class 1 washers shall be made from carbon steel conforming to SAE AIR4127 Steel Numbers 1005 to 1035, inclusive.

3.1.2 Corrosion-resisting steel. Type I, Class 2 washers shall be fabricated from corrosion-resisting steel conforming to SAE AIR4127 Steel Numbers 302, 303, or 304.

3.1.3 Alloy steel. Type II, Class 1 washers shall be made from an alloy steel conforming to SAE AIR4127 Steel Number 8735.

3.2 Surface roughness. Surface roughness of Types I and II washers shall not be greater than a minimum roughness height rating of 250. Surface roughness shall be interpreted in accordance with the provisions of ASME B46.1.

3.3 Tolerances. Tolerances for Type I and II washers shall be plus or minus 0.010 inch for linear dimensions and plus or minus 2 degrees for angular dimensions.

3.4 Design, sizes, and dimensions. Unless otherwise specified in the contract or order, washers shall conform to the designs, sizes, dimensions, and other requirements specified herein and on MS19069 and MS19070.

3.5 Tangs. The tangs shall be equally spaced, uniform and symmetrical with respect to size, shape, and angle.

3.6 Bending. Washers shall be capable of being bent without fracture, as specified in test method 4.4.1.

3.7 Protective coating and treatment. Unless otherwise specified in the contract or order (see 6.2), washers shall be plated, coated, or treated in accordance with 3.7.1, 3.7.2, or 3.7.3.

3.7.1 Zinc plating. Zinc plating shall be in accordance with ASTM B633, Class 5, Type II.

3.7.2 Phosphate coating. Phosphate coating shall be in accordance with MIL-DTL-16232, Type Z, Class 2.

3.7.3 Passivation. Corrosion-resisting steel shall be passivated in accordance with SAE AMS2700, Method 1, Type II.

3.7.3.1 Other methods of passivation may be substituted in lieu of 3.7.3 only upon prior approval of the procuring activity.

3.8 Hardness.

3.8.1 Carbon steel. The hardness of carbon steel washers in the annealed condition shall be Rockwell B50 minimum to Rockwell B81 maximum.

3.8.2 Corrosion-resisting steel. Corrosion-resisting steel washers shall be in the annealed condition and at a hardness of 70 Rockwell B minimum to 90 Rockwell B maximum.

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3.8.3 Alloy steel. The hardness of alloy steel washers in the normalized condition shall be Rockwell B92 minimum.

3.9 Identification marking. Each washer shall be permanently and legibly marked with the manufacturer's name or trademark and part number in accordance with the provisions of MIL-STD-130.

3.10 Workmanship. Workmanship shall be in accordance with high grade commercial practice governing this type of item. Washers shall be free from burrs, sharp edges, cracks, or any other defects which will adversely affect their serviceability.

4. VERIFICATION

4.1 Conformance inspection. Conformance inspection shall consist of all the examinations and tests specified herein.

4.2 Inspection lot. A lot shall consist of all the washers of the same type, class, and size submitted for conformance inspection at one time.

4.3 Sampling.

4.3.1 Sampling for conformance tests. Unless otherwise specified, sampling for Composition, Hardness and Bending tests shall be in accordance with Inspection Level S-2 of ASQ Z1.4.

4.3.2 Sampling for examination of the end item. Unless otherwise specified, sampling for visual and dimensional examinations (see 4.3.3) shall be in accordance with Inspection Level II of ASQ Z1.4.

4.3.3 Visual and dimensional examination. Sample washers selected in accordance with 4.3.2 shall be visually and dimensionally examined in accordance with 3.2 through 3.5, 3.7, 3.9, and 3.10, and the contract or order.

4.4 Test methods.

4.4.1 Bending. Sample washers selected in accordance with 4.3.1 shall be capable of being bent back 180° (degrees) flat, either way of grain, over a radius equal to 1/2 the stock thickness, without fracture.

4.4.2 Composition and hardness. Sample washers selected in accordance with 4.3.2 shall be tested for composition and hardness for conformance with 3.1 and 3.8 respectively. The test procedures for composition and hardness shall be outlined in ASTM E1282 and ASTM E18 respectively, or the manufacturer's certificate on composition and hardness will be acceptable.

4.5 Rejected lot. A rejected lot may be resubmitted for Government acceptance in accordance with the provisions of ASQ Z1.4.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

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6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. Retaining key washers covered by this specification are intended for use with slotted retaining nuts in securing and locking ball and roller bearings in position on shafts against shaft shoulders. This specification covers the requirements for MS19069 to MS19070.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number and date of this specification.
- b. Type, class, and size of washer required (see 1.2 and 3.4).
- c. Applicable MS part number (see 3.4).
- d. Protective finish required (see 3.7).
- e. Packaging requirements (see 5.1).

6.3 Subject term (key word) listing.

Cadmium plating
Passivation
Phosphate coating

6.4 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Custodian:

Army - AT
Navy - OS
Air Force - 11
DLA - IS

Preparing Activity:

DLA - IS

(Project 5310-2014-004)

Review Activity:

Army - AR, AV, GL, MI
Navy - AS, SH, YD
Air Force - 84, 99

NOTE: The activities listed above were interested in this document as of the date of document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <https://assist.dla.mil>.