ASME B18.21.2M-1999
(Revision of ASME B18.21.2M-1994)

REAFFIRMED 2014

FOR CURRENT COMMITTEE PERSONNEL
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LOCK WASHERS (METRIC SERIES)

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

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(Revision of ASME B18.21.2M-1994)

Date of Issuance: January 31, 2000

This Standard will be revised when the Society approves the issuance of a new edition. There will be no addenda or written interpretations of the requirements of this Standard issued to this edition.

The American Society of Mechanical Engineers
Three Park Avenue, New York, NY 10016-5990

FOREWORD

American National Standards Committee B27 for the standardization of plain and lock washers was organized in March 1926 as Sectional Committee B27 under the aegis of the American Standards Association (later the United States of America Standards Institute and, as of October 6, 1969, the American National Standards Institute, Inc.), with the Society of Automotive Engineers and the American Society of Mechanical Engineers as joint sponsors. Since 1950, this Committee has been designated responsibility for standardization of washers and machine rings.

In May of 1928, the B27 Committee established two subcommittees to carry on development work: Subcommittee 1[1] on plain washers and Subcommittee 2[1] on lock washers. A tentative standard for helical spring lock washers circulated for industry comment in November 1931 failed to achieve acceptance and Committee activity became dormant for some years.

In 1940, the B27 Committee was reorganized and Subcommittee 2 proceeded to draft a proposal covering three series of helical spring lock washers, designated light, medium, and heavy. In 1943, this proposal was amended to include the extra-heavy series washers and, following approval by the B27 Committee and sponsor organizations, was accepted as an American Standard under the designation ASA B27.1-1944.

During the ensuing years, minor refinements to the hardness requirements and methods of test were considered, and in December 1948, the B27 Committee accepted, in principle, expansion of the standard to cover helical spring lock washers made from materials other than carbon steel and inclusion of specifications for tooth lock washers, and both helical spring and tooth lock washer machine screw assemblies. A draft proposal incorporating requirements applicable to corrosion resistant steel, phosphor bronze, silicon bronze, aluminum-zinc alloy, and K-monel helical spring lock washers and the other new products was completed by Subcommittee 2 in September 1949. Subsequent to approval by the B27 Committee and sponsors, this proposal was forwarded to the American Standards Association and declared an American Standard on May 22, 1950.

During the years 1951 through 1958, Subcommittee 2 held five meetings, at which it was agreed to extend the light and heavy series helical spring lock washers to include sizes $1\frac{5}{8}$ in. through 3 in., establish tolerances on the nominal thickness of helical spring lock washers, and recognize hardened screw and lock washer assemblies. A format draft dated June 1957 was approved by the letter ballot of the B27 Committee and the sponsor organizations and submitted to the American Standards Association for designation as an American Standard. This was granted on November 3, 1958.

Throughout the period from 1959 through 1961, a number of changes were recommended by the Helical Washer Institute, which had undertaken a program to refine the helical spring lock washers to meet more exacting demands of consumer industries. Also, at a meeting held on November 28, 1961, the B27 Committee recognized the desirablity of publishing the screw and washer assemblies as a separate document under the jurisdiction of the B18 Committee, but subject to joint approval by the B27 Committee and affected subcommittees thereof. Subsequently, a draft proposal deleting the coverage on screw and washer assemblies

[1] As of April 1, 1966, Subcommittee 1 was redesignated Subcommittee 2 on plain washers, and Subcommittee 2 was redesignated Subcommittee 1 on lock washers.

and incorporating revisions to the helical spring lock washers was prepared. The latter included changing designation of medium series to regular series and extra-heavy series to extra-duty series, and the addition of the hi-collar series for use with socket head cap screws. Following acceptance by the subcommittee, the proposal was letter balloted to the B27 Committee on November 18, 1963, then approved by the sponsors and the American Standards Association and officially granted recognition as an American Standard on September 20, 1965.

Continued studies conducted by the Helical Washer Institute resulted in this group submitting further recommendations for changes to the standard at a meeting of American National Standards Committee B27 in October 1969. Subcommittee 1 then undertook preparation of a proposal dated May 1970, incorporating changes to helical spring lock washers. These consisted of deleting coverage for the light series and Type 420 corrosion resistant steels, adding control on section corner radius, adjusting inside diameters, and relegating the heavy series to "Not Recommended for New Applications" status. Other minor corrections to dimensional data and extensive editorial refinements were also included. This draft was approved by letter ballot of Standards Committee B27, conducted on August 11, 1970. Subsequent to the inclusion of additional editorial refinements, the proposal was found acceptable by the sponsor organizations and submitted to the American National Standards Institute for designation as an American National Standard. After approval of this revision by American National Standards Committee B27, the washer activity was transferred to American National Standards Committee B18. Subcommittee 1 of B27 was redesignated as Subcommittee 21 of Standards Committee B18.

At the December 1986 American National Standards B18 main meeting, a request was made to have Subcommittee 21 draft an American National Standard for metric lock washers. On May 26, 1987, the first draft of the requested standard was completed. This draft was based on the inch series standard, which was being reviewed and revised at the time by Subcommittee 21. Dimensional data and types of lock washers to be included in the tables were gathered from industry standards. Both standards were then updated as required during the May and December 1987 subcommittee meetings. At the December 1987 meeting, a motion to ballot the standard was made, and by the December 1988 meeting, all ballot comments were reviewed and editorial changes were made. At the May 1989 meeting, the completed draft dated May 6, 1989 was submitted for publication.

On December 9, 1992, a proposal to revise this Standard was made. This Standard has not been used with the dimensions in Table 2 or with the product listed in Table 3. This revision changes the dimensions in Table 2 to reflect active part dimensions and replaces Table 3, Metric Socket Head Helical Spring Lock Washers, with a new Table 3 for Metric Heavy Helical Spring Lock Washers. In addition, the trapezoid dimensions were replaced with the formula used in prior standards; several materials and hardness values were added; paragraphs covering lot size, inspection and quality assurance requirements, and inspection characteristics were added, and editorial changes were made. The proposal was sent out for balloting, and at the December 7, 1993 meeting, comments were reviewed and acted upon as needed.

On December 4, 1995, a proposal to clarify items in this Standard was made. For helical spring lock washers, the changes included, adding clearance to the washer inside diameter needing heavier coatings such as mechanically galvanizing, moving decarb measuring requirement into proper location, and correcting illustrations above tables. For the tooth lock washer, the changes include clarifying the wording in the measurement of the tooth projection from side to side, and removing the need for twist testing. In addition, the Standard was revised to conform with the standard formatting for B18 documents.

This Standard was approved as an American National Standard on November 3, 1999.

ASME STANDARDS COMMITTEE B18
Standardization of Bolts, Nuts, Rivets, Screws, Washers, and Similar Fasteners

(The following is the roster of the Committee at the time of approval of this Standard.)

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CORRESPONDENCE WITH THE B18 COMMITTEE

General. ASME Standards are developed and maintained with the intent to represent the consensus of concerned interests. As such, users of this Standard may interact with the Committee by requesting interpretations, proposing revisions, and attending committee meetings. Correspondence should be addressed to:

Secretary, B18 Main Committee
The American Society of Mechanical Engineers
Three Park Avenue
New York, NY 10016-5990

Proposing Revisions. Revisions are made periodically to the Standard to incorporate changes that appear necessary or desirable, as demonstrated by the experience gained from the application of the Standard. Approved revisions will be published periodically.

The Committee welcomes proposals for revisions to this Standard. Such proposals should be as specific as possible, citing the paragraph number(s), the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent documentation.

Interpretations. Upon request, the B18 Committee will render an interpretation of any requirement of the Standard. Interpretations can only be rendered in response to a written request sent to the Secretary of the B18 Main Committee.

The request for interpretation should be clear and unambiguous. It is further recommended that the inquirer submit his request in the following format:

Subject:	Cite the applicable paragraph number(s) and the topic of the inquiry.
Edition:	Cite the applicable edition of the Standard for which the interpretation is being requested.
Question:	Phrase the question as a request for an interpretation of a specific requirement suitable for genral understanding and use, not as a request for an approval of a proprietary design or situation. The inquirer may also include plans or drawings which are necessary to explain the question; however, they should not contain proprietary names or information.

Requests that are not in this format will be rewritten in this format by the Committee prior to being answered, which may inadvertently change the intent of the original request.

ASME procedures provide for reconsideration of any interpretation when or if additional information that might affect an interpretation is available. Further, persons aggrieved by an interpretation may appeal to the cognizant ASME Committee or Subcommittee. ASME does not “approve”, “certify”, “rate”, or “endorse” any item, construction, proprietary device, or activity.

Attending Committee Meetings. The B18 Committee regularly holds meetings, which are open to the public. Persons wishing to attend any meeting should contact the Secretary of the B18 Main Committee.

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LOCK WASHERS (METRIC SERIES)

1 INTRODUCTORY NOTES

1.1 Scope

1.1.1 This Standard covers the dimensions, physical properties, and methods of testing for helical spring and tooth lock washers.

1.1.2 The inclusion of dimensional data in this Standard is not intended to imply that all products described are stock production items. Consumers should consult with suppliers concerning the availability of products.

NOTE: The word *lock* appearing in the names of products in this Standard is a generic term historically associated with their identification and is not intended to imply an indefinite permanency of fixity in attachments where the fasteners are used.

1.2 Comparison with ISO

This Standard has no ISO counterpart.

1.3 Types

1.3.1 Helical Spring Lock Washers. This Standard covers helical spring lock washers of the following sections: regular and heavy.

1.3.2 Tooth Lock Washers. This Standard covers tooth lock washers of the following type: internal tooth, external tooth, internal-external tooth, of two constructions, designated Type A and Type B.

1.4 Dimensions

All dimensions in this Standard are given in millimeters (mm), and apply before any coating, unless otherwise specified.

1.5 Responsibility for Modifications

The washer manufacturers shall not be held responsible for malfunctions of product determined to be due to plating or other modifications when such plating or modification is not accomplished under the manufacturers' control or direction.

1.6 Terminology

For definitions of terms relating to washers or features thereof used in this Standard, refer to ASME B18.12, Glossary of Terms for Mechanical Fasteners.

1.7 Referenced Standards

Unless otherwise specified at the time the order is placed, the latest referenced standards shall be used.

ASME B18.12, Glossary of Terms for Mechanical Fasteners

ASME B18.18.1M, Inspection and Quality Assurance for General Purpose Fasteners

ASME B18.18.2M, Inspection and Quality Assurance for High-Volume Machine Assembly Fasteners

ASME B18.18.3M, Inspection and Quality Assurance for Special Purpose Fasteners

ASME B18.18.4M, Inspection and Quality Assurance for Fasteners for Highly Specialized Engineered Applications

ASME B18.24.3, Part Identifying Number (PIN) Code System Standard for B18 Nonthreaded Products

Publisher: The American Society of Mechanical Engineers (ASME), Order Department: 22 Law Drive, Box 2900, Fairfield, NJ 07007-2900

ASTM B 99, Standard Specification for Copper-Silicon Alloy Wire for General Applications

ASTM B 159, Standard Specifications for Phosphor Bronze Wire

ASTM B 211, Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod and Wire

ASTM B 591, Standard Specifications for Copper-Zinc-Tin Alloys Plate, Sheet, Strip, and Rolled Bar

ASTM E 140, Standard Hardness Conversion Tables for Metals (Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Rockwell Superficial Hardness, Knoop Hardness, and Scleroscope Hardness)

Publisher: The American Society for Testing and Materials (ASTM), 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959