ASME B18.2.4.5M-2008
[Revision of ANSI B18.2.4.5M-1979 (R2003)]

Metric Hex Jam Nuts

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

ASME
SETTING THE STANDARD

Copyright © 2009 by the American Society of Mechanical Engineers.
No reproduction may be made of this material without written consent of ASME.

ASME B18.2.4.5M-2008

[Revision of ANSI B18.2.4.5M-1979 (R2003)]

Metric Hex Jam Nuts

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

ASME SETTING THE STANDARD

Copyright © 2009 by the American Society of Mechanical Engineers.
No reproduction may be made of this material without written consent of ASME.

Date of Issuance: March 31, 2009

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

ASME issues written replies to inquiries concerning interpretations of technical aspects of this document. Periodically, certain actions of the ASME B18 Committee may be published as Cases. Cases and interpretations are published on the ASME Web site under the Committee Pages at http://cstools.asme.org as they are issued.

ASME is the registered trademark of The American Society of Mechanical Engineers.

This code or standard was developed under procedures accredited as meeting the criteria for American National Standards. The Standards Committee that approved the code or standard was balanced to assure that individuals from competent and concerned interests have had an opportunity to participate. The proposed code or standard was made available for public review and comment that provides an opportunity for additional public input from industry, academia, regulatory agencies, and the public-at-large.

ASME does not "approve," "rate," or "endorse" any item, construction, proprietary device, or activity.

ASME does not take any position with respect to the validity of any patent rights asserted in connection with any items mentioned in this document, and does not undertake to insure anyone utilizing a standard against liability for infringement of any applicable letters patent, nor assume any such liability. Users of a code or standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

Participation by federal agency representative(s) or person(s) affiliated with industry is not to be interpreted as government or industry endorsement of this code or standard.

ASME accepts responsibility for only those interpretations of this document issued in accordance with the established ASME procedures and policies, which precludes the issuance of interpretations by individuals.

No part of this document may be reproduced in any form,
in an electronic retrieval system or otherwise,
without the prior written permission of the publisher.

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

Copyright © 2009 by
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
All rights reserved
Printed in U.S.A.

Copyright © 2009 by the American Society of Mechanical Engineers.
No reproduction may be made of this material without written consent of ASME.

CONTENTS

Copyright © 2009 by the American Society of Mechanical Engineers.
No reproduction may be made of this material without written consent of ASME.

FOREWORD

The B18 Standards Committee for the standardization of bolts, screws, nuts, rivets, and similar fasteners was organized in March 1922, as the B18 Sectional Committee under the aegis of the American Engineering Standards Committee (later the American Standards Association, then 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. B18 Subcommitee 2 was subsequently established and charged with the responsibility for technical content of standards covering wrench head bolts and nuts.

At its meeting on December 4, 1974, the B18 Committee authorized preparation of a series of standards for metric fasteners. B18 Subcommittee 2 was assigned responsibility for developing standards for metric hex bolts, screws, and nuts.

At a meeting on September 22, 1976, B18 Subcommittee 2 organized the contents of a standard covering six different styles of hex nuts. Actual drafting was postponed until ISO/TC2 could reach final decisions relating to basic dimensions and characteristics of hex bolts, screws, and nuts. At ISO/TC2 meetings held in April 1977, final actions were taken. The B18 Committee affirmed the TC2 decisions at a meeting on June 29, 1977 and drafting of this Standard was started.

In February 1978, the B18 Committee established a cooperative program with the Department of Defense to draft American National Standards for metric fasteners in such a way that they could be used directly by the Government for procurement purposes. The Department of Defense requested that each of the six nut products be covered in separate standards and B18 Subcommittee 2 accepted this approach at its meeting on June 27, 1978.

The previous Edition of this Standard was approved by ballot of the B18 Committee on July 2, 1979 and was subsequently approved by the secretariats and submitted to the American National Standards Institute for designation as an American National Standard. This was granted on December 6, 1979.

ASME B18.2.4.5M-2008 was balloted and approved by the B18 Standards Committee and B18 Subcommittee 2 on August 4, 2008. The proposal was submitted to the American National Standards Institute and designated as an American National Standard on November 11, 2008.

Copyright © 2009 by the American Society of Mechanical Engineers.
No reproduction may be made of this material without written consent of ASME.

ASME B18 COMMITTEE
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.)

STANDARDS COMMITTEE OFFICERS

D. A. Clever, *Chair*
D. S. George, *Vice Chair*
R. D. Strong, *Vice Chair*
R. L. Crane, *Secretary*

STANDARDS COMMITTEE PERSONNEL

V. Cartina, Continental-Aero
D. A. Clever, Deere & Co.
A. P. Cockman, Ford Motor Co.
B. D. Burnside, *Alternate,* Ford Motor Co.
R. L. Crane, The American Society of Mechanical Engineers
J. S. Foote, *Contributing Member,* Trade Association Management, Inc.
D. S. George, ND Industries
J. Greenslade, Industrial Fasteners Institute
J. J. Grey, *Contributing Member,* Fastener Consulting Services, Inc.
B. Hasiuk, *Contributing Member,* Defense Supply Center Philadelphia
A. Herskovitz, Consultant
J. Jennings, *Contributing Member,* Naval Surface Warfare Center
J. F. Koehl, *Contributing Member,* Spirol International Corp.
W. H. Kopke, Consultant
W. J. Lutkus, Emhart Teknologies
D. McCrindle, Canadian Fasteners Institute
M. D. Prasad, *Contributing Member,* Global M&F Solutions, Inc.
S. Savoji, ITW Medalist
W. R. Schevey, *Contributing Member,* BGM Fastener Co., Inc.
W. R. Stevens, Ramco
R. D. Strong, General Motors Corp.
S. W. Vass, Consultant
C. B. Wackrow, *Contributing Member,* MNP Corp.
W. K. Wilcox, Consultant
C. B. Williamson, Fastenal Co.
C. J. Wilson, Consultant
R. B. Wright, *Contributing Member,* Wright Tool
J. G. Zeratsky, National Rivet and Manufacturing Co.

SUBCOMMITTEE 2 — EXTERNALLY DRIVEN FASTENERS (B18)

J. Greenslade, *Chair,* Industrial Fasteners Institute
C. B. Williamson, *Vice Chair,* Fastenal Co.
R. L. Crane, *Secretary,* The American Society of Mechanical Engineers
V. Cartina, Continental-Aero
L. Claus, ATF, Inc.
D. A. Clever, Deere & Co.
A. P. Cockman, Ford Motor Co.
C. A. Dugal, TSP
B. A. Dusina, Federal Screw Works
M. A. Elmi, Catepillar, Inc.
J. S. Foote, Trade Association Management, Inc.
D. S. George, ND Industries
A. Herskovitz, Consultant
M. W. Holubecki, Electric Boat Corp.
J. Hubbard, Leland-Powell Fasteners, Inc.
J. Jennings, *Contributing Member,* Naval Surface Warfare Center
W. H. King, Porteous Fastener Co.
J. F. McCarrick, Defense Supply Center Philadelphia
D. McCrindle, Canadian Fasteners Institute
R. B. Meade, Atrona Material Testing Laboratories, Inc.
S. Savoji, ITW Medalist
R. M. Serabin, Freundlich Supply Co.
D. F. Sharp, GMS Structural Engineers
G. M. Simpson, Semblex Corp.
Q. M. Smith, Oregon DOT
W. R. Stevens, Ramco
R. D. Strong, GM Vehicle Engineering Center
R. L. Tennis, Consultant
S. W. Vass, Consultant
C. B. Wackrow, MNP Corp.
W. K. Wilcox, Consultant
C. J. Wilson, Consultant

Copyright © 2009 by the American Society of Mechanical Engineers.
No reproduction may be made of this material without written consent of ASME.

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 Standards 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.

Proposing a Case. Cases may be issued for the purpose of providing alternative rules when justified, to permit early implementation of an approved revision when the need is urgent, or to provide rules not covered by existing provisions. Cases are effective immediately upon ASME approval and shall be posted on the ASME Committee Web page.

Requests for Cases shall provide a Statement of Need and Background Information. The request should identify the standard, the paragraph, figure or table number(s), and be written as a Question and Reply in the same format as existing Cases. Requests for Cases should also indicate the applicable edition(s) of the standard to which the proposed Case applies.

Interpretations. Upon request, the B18 Standards 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 Standards Committee.

The request for an interpretation should be clear and unambiguous. It is further recommended that the inquirer submit his/her 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 general understanding and use, not as a request for an approval of a proprietary design or situation. The inquirer may also include any plans or drawings that are necessary to explain the question; however, they should not contain proprietary names or information.

Requests that are not in this format may be rewritten in the appropriate 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 Standards Committee regularly holds meetings, which are open to the public. Persons wishing to attend any meeting should contact the Secretary of the B18 Standards Committee.

Copyright © 2009 by the American Society of Mechanical Engineers.
No reproduction may be made of this material without written consent of ASME.

METRIC HEX JAM NUTS

1 SCOPE

(a) This Standard covers the complete general and dimensional data for metric hex jam nuts recognized as American National Standard.

(b) The inclusion of dimensional data in this Standard is not intended to imply that all of the nut sizes in conjunction with the various options described herein are stock items. Consumers should consult with suppliers concerning lists of stock production hex jam nuts.

2 COMPARISON WITH ISO STANDARDS

(a) Hex jam nuts, as covered in this Standard, have been coordinated to the extent possible with ISO 4035. The dimensional differences between this Standard and ISO 4035 are very few and relatively minor, except those of the M10 size. None affect the functional interchangeability of nuts manufactured to the requirements of either.

(b) At its meeting in Varna, May 1977, ISO/TC2 studied several technical reports analyzing design considerations influencing determination of the best series of width across flats for hex bolts, screws, and nuts. A primary technical objective was to achieve a logical ratio between underhead (nut) bearing surface area (which determines the magnitude of the compressive stress on the bolted members) and the tensile stress area of the screw thread (which governs the clamping force that can be developed by tightening the fastener).

M10 nuts with 15 mm width across flats are currently being produced and used in the U.S. and many other countries of the world. This size, however, is not an ISO standard (see Table 1).

NOTE: When M10 nuts are ordered, nuts with 16 mm width across flats shall be furnished, unless 15 mm width across flats is specified.

(c) Letter symbols designating dimensional characteristics are in accordance with those used in ISO standards, except where capitals have been used instead of lowercase letters in ISO standards.

3 REFERENCED STANDARDS

Unless otherwise specified, the referenced Standard shall be the most recent issue at the time of order placement. The following is a list of publications referenced in this Standard.

ASME B1.3M, Screw Thread Gaging Systems for Dimensional Acceptability

ASME B1.13M, Metric Screw Threads — M Profile

ASME B18.12, Glossary of Terms for Mechanical Fasteners

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

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

ASME B18.24, Part Identifying Number (PIN) Code System Standard for B18 Fastener Products

ASME Y14.5M, Dimensioning and Tolerancing

Publisher: The American Society Of Mechanical Engineers (ASME), Three Park Avenue, New York, NY 10016-5990; Order Department: 22 Law Drive, Box 2300, Fairfield, NJ 07007-2300 (www.asme.org)

ASTM A 563M, Carbon and Alloy Steel Nuts [Metric]

ASTM F 467M, Nonferrous Nuts for General Use [Metric]

ASTM F 812/F 812M, Surface Discontinuities of Nuts, Inch and Metric Series

ASTM F 836M, Stainless Steel Metric Nuts

ASTM F 1941M, Electrodeposited Coatings on Threaded Fasteners (Metric)

Publisher: American Society for Testing and Materials (ASTM International), 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 (www.astm.org)

ISO 4035, Hexagon Thin Nuts Chamfered, Product Grades A & B

Publisher: International Organization for Standardization (ISO), 1 rue de Varembé, Case Postale 56, CH-1211, Genève 20, Switzerland/Suisse (www.iso.org)

4 TERMINOLOGY

For definitions of terms relating to fasteners or component features thereof used in this Standard, refer to ASME B18.12.

5 DIMENSIONS

(a) Unless otherwise stated, all dimensions in this Standard are in millimeters and apply before any coating. When a plating or coating is specified, the finished product dimensions shall be agreed upon between the supplier and purchaser.

(b) Symbols specifying geometric characteristics are in accordance with ASME Y14.5M.

Copyright © 2009 by the American Society of Mechanical Engineers.
No reproduction may be made of this material without written consent of ASME.