

AMERICAN NATIONAL STANDARD

# Metric Series Hexagon Keys and Bits

---

ANSI B18.3.2M - 1979

For Socket Screw Products

**REAFFIRMED 1990**

FOR CURRENT COMMITTEE PERSONNEL  
PLEASE SEE ASME MANUAL AS-11

**SECRETARIAT**

SOCIETY OF AUTOMOTIVE ENGINEERS  
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

---

**REAFFIRMED 1998**

FOR CURRENT COMMITTEE PERSONNEL  
PLEASE SEE ASME MANUAL AS-11

*PUBLISHED BY*

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

United Engineering Center

345 East 47th Street

New York, N. Y. 10017

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.

Date of Issuance: August 31, 1979

Copyright © 1979 by  
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS  
All Rights Reserved  
Printed in U.S.A.

## FOREWORD

The American National Standards Committee B18 for the standardization of bolts, screws, nuts, rivets and similar fasteners was organized in March 1922, as Sectional Committee B18 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.

Subcommittee No. 9 was established in April of 1929 to undertake development and oversee maintenance of standards covering Socket Head Cap Screws and Set Screws. In line with a general realignment of the subcommittee structure on April 1, 1966, Subcommittee 9 was redesignated Subcommittee 3. Over the intervening years this activity has produced several versions of American National Standards covering inch series socket cap, shoulder and set screws bearing the B18.3 designation.

At the December 4, 1974 meeting of American National Standards Committee B18, Subcommittee 3 was assigned the task of preparing standards for metric series socket screw products paralleling that contained in the latest ANSI B18.3 document. The subcommittee was also instructed to continue coordination with the International Standards Organization, ISO Technical Committee 2 and Working Group 3 under that activity, and to the extent possible keep the proposals for metric standards under development in conformance with agreements reached therein.

Subsequent meetings of Subcommittee 3 held in February, 1975 and January, 1976 resulted in general agreement on the following basic principles to be considered in developing the metric version of the standard: (1) To assure consumers continuity of performance integrity consistent with inch socket screw products, the metric standards should maintain the same quality levels as their inch counterparts; (2) to facilitate and expedite the processing, acceptance and adoption of the metric versions, proposals for the various product categories should be prepared as separate and complete product standards; (3) to promote understanding and assimilation during the transition to metric the dimensional symbols, designations, terminology and basic formats of the metric standards should be kept similar to that used in the ANSI B18.3 document.

At the November 10, 1976 meeting of Subcommittee 3, it was agreed the socket screw industry document covering metric hexagon keys should be circulated for subcommittee consideration as a proposed standard. It was noted that this document included the 0.7, 0.9 and 1.3 mm key sizes which were soft conversions of the 0.028, 0.035 and 0.050 inch keys, respectively, required for wrenching the 1.6, 2 and 2.5 mm set screws already called for in ISO standards and that although there were differences in the tolerance structure and strength capabilities, the keys contained therein would satisfy the dimensional and mechanical requirements of the existing ISO standard covering keys for sizes 2.5 mm and larger. Subcommittee acceptance of the content ensued and the document, modified to more closely suit the ANSI format, was approved by letter ballot to American National Standards Committee B18. Following its approval by the sponsor organizations, the proposal was duly submitted to the American National Standards Institute and was granted recognition as an American National Standard on May 17, 1979.

**AMERICAN NATIONAL STANDARDS COMMITTEE B18**  
**Standardization of Bolts, Nuts, Rivets, Screws, Washers and Similar Fasteners**

**OFFICERS**

**R. P. Trowbridge, Chairman**  
**J. B. Levy, Vice-Chairman**  
**H. G. Muenchinger, Vice-Chairman**  
**R. McGinnis, Secretary**

**COMMITTEE PERSONNEL**

**AMERICAN CHAIN ASSOCIATION**

*L. E. Hampel, Moline Malleable Iron Company, St. Charles, Illinois*

**AMERICAN HARDWARE MANUFACTURERS ASSOCIATION**

*Donald Wanek, Wrought Washer Manufacturing Company, Milwaukee, Wisconsin*

**AMERICAN INSTITUTE OF INDUSTRIAL ENGINEERS**

*R. T. Kelly, Hitchcock Publishing Company, Wheaton, Illinois*

**AMERICAN SOCIETY OF AGRICULTURAL ENGINEERS**

*E. R. Friesth, Deere & Company, Moline, Illinois*

*J. H. Zich, Alternate, Ford Motor Company, Troy, Michigan*

**AMERICAN SOCIETY OF MECHANICAL ENGINEERS, THE**

*A. R. Machell, Jr., Xerox Corporation, Rochester, New York*

*F. P. Tisch, Desert Hot Springs, California*

*R. P. Trowbridge, General Motors Technical Center, Warren, Michigan*

*C. R. Adams, Alternate, Newport News Shipbuilding & Dry Dock Company, Newport News, Virginia*

*K. E. McCullough, Alternate, SPS Technologies, Jenkintown, Pennsylvania*

**ANTI-FRICTION BEARING MANUFACTURERS ASSOCIATION**

*W. J. Derner, FMC Corporation, Indianapolis, Indiana*

**ENGINE MANUFACTURERS ASSOCIATION**

*K. F. Naylor, Cummins Engine Company, Columbus, Indiana*

**FARM & INDUSTRIAL EQUIPMENT INSTITUTE**

*E. R. Friesth, Deere & Company, Moline, Illinois*

**HAND TOOLS INSTITUTE**

*C. B. Ingersoll, J. H. Williams Company, Buffalo, New York*

**INDUSTRIAL FASTENERS INSTITUTE**

*R. B. Belford, Industrial Fasteners Institute, Cleveland, Ohio*

*A. R. Breed, The Lamson & Sessions Company, Cleveland, Ohio*

*E. J. Heldmann, Holo-Krome Company, West Hartford, Connecticut*

*D. A. Garrison, Russell, Burdsall & Ward, Inc., Rock Falls, Illinois*

*R. W. Groover, Bethlehem Steel Company, Lebanon, Pennsylvania*

*Jack Shugart, Rockford Products Corporation, Rockford, Illinois*

*D. P. Wagner, Illinois Tool Works, Inc., Elgin, Illinois*

*D. D. Wheeler, Armco Steel Corporation, Kansas City, Missouri*

*N. W. Bellas, Alternate, Illinois Tool Works, Inc., Elgin, Illinois*

*R. M. Harris, Alternate, Bethlehem Steel Corporation, Lebanon, Pennsylvania*

*F. R. Ling, Alternate, Russell, Burdsall & Ward, Inc., Mentor, Ohio*

*A. J. Parker, Alternate, The Lamson & Sessions Company, Cleveland, Ohio*

#### METAL CUTTING TOOL INSTITUTE

*Dino Emanuelli*, Greenfield Tap & Die, Greenfield, Massachusetts

#### NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION

*J. B. Levy*, General Electric Company, Schenectady, New York

*F. F. Weingruber*, Westinghouse Electric Corporation, Pittsburgh, Pennsylvania

*F. K. Kitzantides*, National Electrical Manufacturers Association, Washington, D.C.

#### NATIONAL ELEVATOR INDUSTRY, INC.

*R. J. Cummings*, Otis Elevator Company, Mahwah, New Jersey

#### SOCIETY OF AUTOMOTIVE ENGINEERS

*H. W. Ellison*, General Motors Corporation, Warren, Michigan

*S. E. Mallen*, Ford Motor Company, Dearborn, Michigan

*R. S. Piotrowski*, Mack Trucks, Inc., Allentown, Pennsylvania

*C. F. Schaening*, General Motors Engineering Standard Section, Warren, Michigan

*R. R. Sjoberg*, International Harvester Company, Hinsdale, Illinois

*D. W. Vial*, Chrysler Corporation, Detroit, Michigan

#### SOCKET SCREW PRODUCTS BUREAU

*E. R. Carter, Jr.*, The Allen Manufacturing Company, Hartford, Connecticut

*Ernest Heldmann*, Holo-Krome Company, West Hartford, Connecticut

*Jack Trilling*, Great Lakes Screw, Chicago, Illinois

#### TELEPHONE GROUP

*R. A. Agnew*, Western Electric Company, Chicago, Illinois

*R. H. Van Horn*, Bell Laboratory, Columbus, Ohio

*H. Haefeli, Alternate*, Bell Laboratory, Columbus, Ohio

#### TUBULAR & MACHINE INSTITUTE

*J. G. Zeratsky*, National Rivet & Manufacturing Company, Waupun, Wisconsin

#### U.S. DEPARTMENT OF THE AIR FORCE

To be appointed

#### U.S. DEPARTMENT OF THE ARMY

*M. E. Taylor*, U.S. Army Armament R & D Command, Dover, New Jersey

*Allen Herskovitz, Alternate*, U.S. Army Armament R & D Command, Dover, New Jersey

#### U.S. DEPARTMENT OF DEFENSE

*Eli Schwartz*, Defense Industrial Supply Center, Philadelphia, Pennsylvania

*Lewis Pieninck*, Defense Industrial Supply Center, Philadelphia, Pennsylvania

#### U.S. DEPARTMENT OF THE NAVY

*J. S. Ruff*, Department of the Navy, Washington, D.C.

*M. S. Orysh, Alternate*, Department of the Navy, Philadelphia, Pennsylvania

#### U.S. MACHINE CAP WOOD & TAPPING SCREW BUREAUS

*S. C. Adamek*, Pheoll Manufacturing Company, Chicago, Illinois

*R. M. Byrne*, U.S. Screw Service Bureaus, New York, New York

*T. J. Ferry*, E. W. Ferry Screw Products Company, Inc., Cleveland, Ohio

*Casey Gordon*, Parker-Kalon, Campbellsville, Kentucky

*Herman Muenchinger*, Continental Screw Company, New Bedford, Massachusetts

*K. D. Ringland*, Parker-Kalon Fastener Division, USM Corporation, Campbellsville, Kentucky

*R. H. Seymour*, Reed & Prince Manufacturing Company, Worcester, Massachusetts

*Louis Zanin*, Elco Industries, Inc., Rockford, Illinois

*Paul Foytho, Alternate*, Harvey Hubbel, Inc., Bridgeport, Connecticut

#### INDIVIDUAL COMPANIES

*J. J. Naesset*, Clark Equipment Company, Battle Creek, Michigan

*R. W. Bertoia*, The Ohio Nut & Washer Company, Mingo Junction, Ohio

*E. D. Cowlin*, Canton, Ohio

*J. E. Eaton, Jr.*, IBM Corporation, Boulder, Colorado

*Jules Freedman*, G. K. Garrett Company, Philadelphia, Pennsylvania

*D. M. McCarthy*, Ford Motor Company, Dearborn, Michigan

*J. F. Tornow*, Microdot Inc., Troy, Michigan

#### INDIVIDUAL MEMBERS

*C. O. Franklin*, Valley Bolt Company, Marion, Iowa  
*F. E. Graves*, Fairfield, Connecticut

#### PERSONNEL OF SUBCOMMITTEE NO. 3 SOCKET HEAD CAP AND SET SCREWS

*Jack Trilling*, *Chairman*, Great Lakes Screw, Chicago, Illinois  
*John Akins*, Safety Socket Screw Corporation, Chicago, Illinois  
*J. J. Naasset*, Clark Equipment Company, Battle Creek, Michigan  
*R. B. Belford*, Industrial Fasteners Institute, Cleveland, Ohio  
*Henry Bobrowski*, Kerr-Lakeside, Inc., Cleveland, Ohio  
*R. M. Byrne*, Socket Screw Products Bureau, New York, New York  
*Russ Carter*, Allen Manufacturing Company, Hartford, Connecticut  
*E. J. Heldmann*, Holo-Krome Screw Corporation, Hartford, Connecticut  
*D. T. Lipari*, Bell Telephone Laboratory, Columbus, Ohio  
*A. R. Machell, Jr.*, Xerox Corporation, Rochester, New York  
*James Marek*, Stanadyne, Inc., Garrett, Indiana  
*K. E. McCullough*, SPS Technologies, Jenkintown, Pennsylvania  
*Lewis Pieninck*, Defense Supply Agency, Philadelphia, Pennsylvania  
*C. F. Schaening*, General Motors Technical Center, Warren, Michigan  
*M. E. Taylor*, U.S. Army Armament R & D Command, Dover, New Jersey  
*F. F. Weingruber*, Westinghouse Electric Corporation, Pittsburgh, Pennsylvania  
*Larry Harkins*, *Alternate*, Defense Supply Agency, Philadelphia, Pennsylvania  
*Allen Herskovitz*, *Alternate*, U.S. Army Armament R&D Command, Dover, New Jersey

## CONTENTS

|                                                              |   |
|--------------------------------------------------------------|---|
| 1. General . . . . .                                         | 1 |
| 2. Dimensional Characteristics . . . . .                     | 3 |
| 3. Material, Processing, and Mechanical Properties . . . . . | 3 |

## TABLES

|                                                            |   |
|------------------------------------------------------------|---|
| 1. Dimensions for Metric Hexagon Keys and Bits . . . . .   | 2 |
| 2. Torsional Moments for Torsional Strength Test . . . . . | 3 |
| 3. Sample Size for Mechanical Testing . . . . .            | 4 |



## AMERICAN NATIONAL STANDARD

## METRIC SERIES HEXAGON KEYS AND BITS

**1 GENERAL****1.1 Scope**

1.1.1 This standard contains the complete dimensional, mechanical and performance requirements for Metric Series Hexagon Keys and Bits of nominal sizes from 0.7 mm to 36 mm recognized as "American National Standard." They are primarily intended to be used for tightening and loosening metric series hexagon socket screw products but may also be suitable for use on other products having metric hexagon socket wrenching provisions.

1.1.2 The inclusion of dimensional data in this standard is not intended to imply that all the products described are stock production sizes. Consumers are requested to consult with manufacturers concerning lists of stock production sizes.

**1.2 Interchangeability with ISO Keys**

1.2.1 Dimensions. Keys in 2.5 mm and larger nominal sizes produced to this standard will conform dimensionally to International Standard, Assembly Tools for Screws, Bolts and Nuts—Hexagon Socket Screw Keys—Metric Series, ISO 2936-1973. At present, ISO 2936 does not cover nominal key sizes smaller than 2.5 mm.

1.2.2 Strength. The strength capability of keys made to the ISO 2936 standard is such that the keys are not considered suitable for driving high strength screws, such as property class 12.9 hexagon socket cap screws and property class 45H hexagon socket set screws.

**1.3 Large Keys and Bits**

For nominal socket sizes above 24 mm it is recommended that bits be used in conjunction with standard hexagon wrenches or power drives. When the application makes the use of keys necessary the keys should conform to the dimensions specified herein. Bits are

available in nominal sizes 24 mm and smaller but the lengths have not been standardized.

**1.4 Dimensions**

All dimensions in this standard are given in millimeters (mm) unless otherwise stated. For plated hexagon keys or bits all dimensions are before plating.

**1.5 Options**

Options, where specified, shall be at the discretion of the manufacturer unless otherwise agreed upon by manufacturer and purchaser.

**1.6 Responsibility for Modification**

The manufacturer shall not be held responsible for malfunctions of product determined to be due to plating or other modification when such plating or modification is not accomplished under his control or direction.

**1.7 Marking**

Hexagon keys in nominal sizes 2 mm to 10 mm, inclusive, shall be permanently and legibly marked with the nominal size and manufacturer's identification. On nominal sizes larger than 10 mm markings shall be optional.

**1.8 Designation**

Hexagon keys and bits shall be designated by the following data in the sequence shown:

Specification (ANSI document) number, followed by a dash; nominal key (or bit) size; Product name; series (for keys); and protective coating, if required.

*Examples:*

B18.3.2 6 mm Hexagon Key, Short Series

B18.3.2 8 mm Hexagon Key, Long Series, Nickel Plated

B18.3.2 32 mm Hexagon Bit



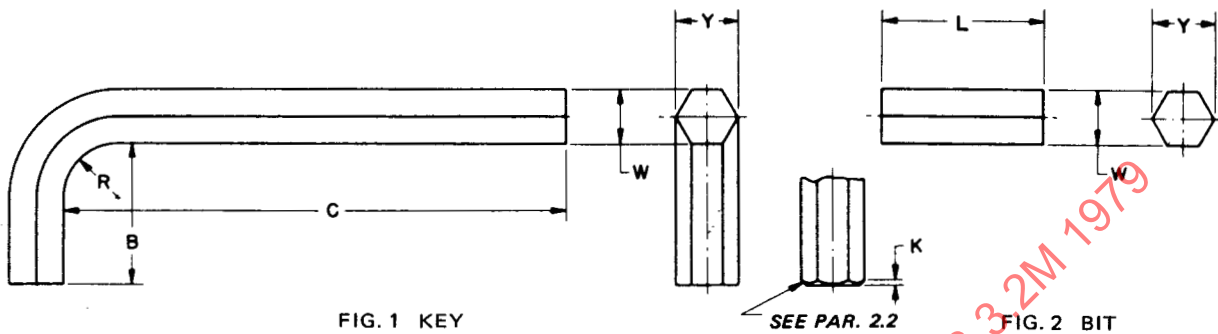


FIG. 1 KEY

FIG. 2 BIT

Table 1 Dimensions of Metric Hexagon Keys and Bits

| Nominal<br>Key or Bit<br>and<br>Socket<br>Size | W                                |        | Y                                  |        | B                         |     | C                  |     |             |     | R                    | L                   | K                 |
|------------------------------------------------|----------------------------------|--------|------------------------------------|--------|---------------------------|-----|--------------------|-----|-------------|-----|----------------------|---------------------|-------------------|
|                                                | Hexagon<br>Width Across<br>Flats |        | Hexagon<br>Width Across<br>Corners |        | Length<br>of<br>Short Arm |     | Length of Long Arm |     |             |     | Radius<br>of<br>Bend | Length<br>of<br>Bit | Chamfer<br>Length |
|                                                |                                  |        |                                    |        |                           |     | Short Series       |     | Long Series |     |                      |                     |                   |
|                                                | Max                              | Min    | Max                                | Min    | Max                       | Min | Max                | Min | Max         | Min | Min                  | ± 1.5               | Max               |
| 0.7                                            | 0.711                            | 0.698  | 0.798                              | 0.762  | 8                         | 3   | 34                 | 28  | 69          | 63  | 1.5                  | —                   | 0.08              |
| 0.9                                            | 0.899                            | 0.876  | 0.998                              | 0.960  | 11                        | 6   | 34                 | 28  | 71          | 65  | 1.5                  | —                   | 0.10              |
| 1.3                                            | 1.270                            | 1.244  | 1.422                              | 1.372  | 16                        | 11  | 44                 | 39  | 75          | 69  | 1.5                  | —                   | 0.14              |
| 1.5                                            | 1.500                            | 1.470  | 1.690                              | 1.640  | 14                        | 13  | 45                 | 43  | 78          | 76  | 1.5                  | —                   | 0.14              |
| 2                                              | 2.000                            | 1.970  | 2.250                              | 2.200  | 16                        | 15  | 50                 | 48  | 83          | 81  | 2.0                  | —                   | 0.14              |
| 2.5                                            | 2.500                            | 2.470  | 2.820                              | 2.770  | 18                        | 17  | 56                 | 53  | 90          | 87  | 2.5                  | —                   | 0.14              |
| 3                                              | 3.000                            | 2.960  | 3.399                              | 3.340  | 20                        | 18  | 63                 | 60  | 100         | 97  | 3.0                  | —                   | 0.18              |
| 4                                              | 4.000                            | 3.960  | 4.532                              | 4.470  | 25                        | 23  | 70                 | 66  | 106         | 102 | 4.0                  | —                   | 0.24              |
| 5                                              | 5.000                            | 4.960  | 5.690                              | 5.630  | 28                        | 26  | 80                 | 76  | 118         | 114 | 5.0                  | —                   | 0.30              |
| 6                                              | 6.000                            | 5.950  | 6.828                              | 6.760  | 32                        | 30  | 90                 | 86  | 140         | 136 | 6.0                  | —                   | 0.36              |
| 8                                              | 8.000                            | 7.950  | 9.136                              | 9.030  | 36                        | 34  | 100                | 95  | 160         | 155 | 8.0                  | —                   | 0.49              |
| 10                                             | 10.000                           | 9.950  | 11.470                             | 11.340 | 40                        | 38  | 112                | 106 | 170         | 164 | 10.0                 | —                   | 0.62              |
| 12                                             | 12.000                           | 11.950 | 13.764                             | 13.590 | 45                        | 43  | 125                | 119 | 212         | 206 | 12.0                 | —                   | 0.76              |
| 14                                             | 14.000                           | 13.930 | 16.058                             | 15.880 | 56                        | 53  | 140                | 133 | 236         | 229 | 14.0                 | —                   | 0.85              |
| 17                                             | 17.000                           | 16.930 | 19.499                             | 19.300 | 63                        | 60  | 160                | 152 | 250         | 242 | 17.0                 | —                   | 1.04              |
| 19                                             | 19.000                           | 18.930 | 21.793                             | 21.580 | 70                        | 67  | 180                | 171 | 280         | 271 | 19.0                 | —                   | 1.16              |
| 22                                             | 22.000                           | 21.930 | 25.234                             | 25.000 | 80                        | 76  | 200                | 190 | 335         | 325 | 22.0                 | —                   | 1.36              |
| 24                                             | 24.000                           | 23.930 | 27.525                             | 27.240 | 90                        | 86  | 224                | 213 | 375         | 364 | 24.0                 | —                   | 1.49              |
| 27                                             | 27.000                           | 26.870 | 30.969                             | 30.710 | 100                       | 95  | 250                | 238 | —           | —   | 27.0                 | 100.0               | 1.68              |
| 32                                             | 32.000                           | 31.840 | 36.704                             | 36.430 | 125                       | 119 | 315                | 300 | —           | —   | 32.0                 | 100.0               | 1.99              |
| 36                                             | 36.000                           | 35.840 | 41.292                             | 40.900 | 140                       | 133 | 355                | 338 | —           | —   | 36.0                 | 100.0               | 2.25              |

For additional requirements refer to applicable paragraphs in the text on Pages 1, 3 and 4.