ASME B18.29.2M-2005

# Helical Coil Screw Thread Inserts: Free Running and Screw Locking (Metric Series)

AN AMERICAN NATIONAL STANDARD



The American Society of Mechanical Engineers

--`,,```,,,,````-`-`,,`,,`,`,,`---

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS

Not for Resale

ASME B18.29.2M-2005

# Helical Coil Screw Thread Inserts: Free Running and Screw Locking (Metric Series)

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

Three Park Avenue • New York, NY 10016

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS

Not for Resale

Date of Issuance: February 6, 2006

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 Standard. Interpretations are published on the ASME website under the Committee Pages at http://www.asme.org/codes/ 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 © 2006 by
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
All rights reserved
Printed in U.S.A.

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS

Not for Resale

# CONTENTS


Foreword ..... iv
Committee Roster ..... v
Correspondence With the B18 Committee ..... vi

**1 General** ..... 1
**2 Comparison With ISO Standards** ..... 1
**3 References** ..... 1
**4 Terminology** ..... 1
**5 Dimensions** ..... 1
**6 Description** ..... 1
**7 Class of Fit** ..... 2
**8 Types of Inserts** ..... 2
**9 STI-Tapped Hole** ..... 2
**10 Helical Coil Insert** ..... 5
**11 Inspection and Quality Assurance** ..... 5

**Figures**
1 Tapping Depths ..... 2
2 Insert Configuration ..... 6
3 Torque Test Spacer ..... 13

**Tables**
1 STI-Threaded Hole Data ..... 3
2 Chemical Composition ..... 5
3 Insert Length Data ..... 7
4 Insert Dimensions ..... 9
5 Self-Locking Torque ..... 12
6 Torque Test Spacer Dimensions ..... 13

**Nonmandatory Appendices**
A Insert Length Selection ..... 15
B Screw Thread Insert Taps ..... 16
C Installation ..... 17




--`,,```,,,,````-`-`,,`,,`,`,,`---

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS

Not for Resale

# FOREWORD

The helical coil screw thread insert was invented in the 1930s and found acceptance in aircraft manufactured and serviced by the Allied air forces during World War II. Since that time, applications for helical coil inserts have come into broad usage in aerospace, automotive, and industrial original equipment design, production salvage (repair), and in service repair. Although this usage did include metric spark plug sizes, the regular metric series was delineated in Europe in the 1950s and came into production in the Customary units–using countries in the 1960s.

Subcommittee 29, Threaded Inserts, met initially in May 1989 after authorization by the ASME B18 Committee to proceed with the development of standards covering screw thread inserts. This ASME Standard for the metric series of helical coil screw thread inserts follows ASME B18.29.1-1993, Helical Coil Screw Thread Inserts — Free Running and Screw Locking (Inch Series).

ASME B18.29.2M-2005 was approved as an American National Standard on May 26, 2005.



Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

# 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*
**R. D. Strong,** *Vice Chair*
**S. W. Vass,** *Vice Chair*
**R. L. Crane,** *Secretary*

## STANDARDS COMMITTEE PERSONNEL

**J. Altman,** Rotor Clip Co.
**J. H. Slass,** *Alternate,* Rotor Clip Co.
**J. B. Belford,** Lawson Products, Inc.
**V. Cartina,** Aztech Locknut
**D. A. Clever,** Deere and Co.
**A. P. Cockman,** Ford Motor Co.
**T. Collier,** Cam-Tech Industries, Inc.
**R. L. Crane,** The American Society of Mechanical Engineers
**A. C. DiCola,** Wrought Washer Co.
**B. A. Dusina,** Federal Screw Works
**D. S. George,** Ford Motor Co.
**J. S. Foote,** Trade Association Management, Inc.
**J. Greenslade,** Greenslade and Co.
**J. J. Grey,** Fastener Consulting Services, Inc.
**B. Hasiuk,** Defense Industrial Supply Center Philadelphia
**A. Herskovitz,** Consultant
**J. Hubbard,** Rockford Fastener, Inc.
**M. Keller,** *Corresponding Member,* Paracad Technology Co.
**J. F. Koehl,** Spirol International Corp.
**W. H. Kopke,** ITW Shakeproof Assembly Components
**J. G. Langenstein,** *Member Emeritus,* Consultant
**M. Levinson,** *Alternate,* ITW Shakeproof Assembly Components
**L. L. Lord,** *Corresponding Member,* Consultant
**W. J. Lutkus,** Emhart Industrial Heli-Coil
**A. D. McCrindle,** Canadian Fasteners Institute
**M. D. Prasad,** General Motors Corp.
**J. A. Roley,** *Corresponding Member,* Caterpillar, Inc.
**W. L. Sakowski,** Account Managers LLC
**S. Savoji,** ITW Medalist
**W. Schevey,** BGM Fastener Co., Inc.
**W. R. Stevens,** Ramco
**R. D. Strong,** General Motors Corp.
**S. W. Vass,** Nova Machine Products
**C. B. Wackrow,** MNP Corp.
**R. G. Weber,** Fairfield University
**W. K. Wilcox,** Consultant
**C. J. Wilson,** Industrial Fasteners Institute
**R. B. Wright,** Wright Tool Co.
**J. G. Zeratsky,** National Rivet and Manufacturing Co.

## SUBCOMMITTEE 29 — THREADED INSERTS

**W. J. Lutkus,** *Chair,* Emhart Industrial Heli-Coil
**R. L. Crane,** *Secretary,* The American Society of Mechanical Engineers
**R. C. Caponi,** Spirol International Corp.
**R. L. Davis,** Kato Fastening Systems, Inc.
**W. Giannakakos,** Emhart Industrial Heli-Coil
**A. Herskovitz,** Consultant
**M. W. Holubecki,** Electric Boat Corp.
**J. Jennings,** Naval Surface Warfare Center
**M. Keller,** Paracad Technology Co.
**H. Lo,** Defense Industrial Supply Center Philadelphia
**L. L. Lord,** *Corresponding Member,* Consultant
**A. Qaqish,** Kato Fastening Systems, Inc.
**R. D. Strong,** General Motors Corp.
**C. J. Wilson,** Industrial Fasteners Institute



Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

# 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.

**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 Standards Committee.

The request for 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, which 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 ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

# HELICAL COIL SCREW THREAD INSERTS: FREE RUNNING AND SCREW LOCKING (METRIC SERIES)

## 1 GENERAL

### 1.1 Scope

This Standard delineates the dimensional, mechanical, and performance data for the metric series helical coil screw thread insert and threaded hole into which it is installed. Appendices that describe insert selection, STI (screw thread insert) taps, insert installation, and removal tooling are also included.

The inclusion of dimensional data in this Standard is not intended to imply that all products described are stock sizes.

## 2 COMPARISON WITH ISO STANDARDS

At this time, no ISO Standard for metric helical coil screw threads exists. Further, no work within ISO is expected for some time.

## 3 REFERENCES

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

ASME B1.3M, Screw Thread Gaging Systems for Dimensional Acceptability — Inch and Metric Screw Threads (UN, UNR, UNJ, M, and MJ)

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

ASME B1.16M, Gages and Gaging for Metric M Profile Screw Threads

ASME B1.21M, Metric Screw Threads — MJ Profile

ASME B18.12, Glossary of Terms for Mechanical Fasteners

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

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

ASME B46.1, Surface Texture (Surface Roughness, Waviness, and Lay)

ASME B47.1, Gage Blanks

ASME B94.9, Taps — Cut and Ground Threads

ASME Y14.5M, Dimensioning and Tolerancing

ASME Y14.36M, Surface Texture Symbols

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

ASTM B 209M, Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate

ASTM E 290, Standard Test Method for Bend Testing of Material for Ductility

ASTM A 370, Standard Test Methods and Definitions for Mechanical Testing

ASTM F 568M, Carbon and Alloy Steel Externally Threaded Metric Fasteners

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

SAE AMS 4120, Aluminum Alloy, Rolled or Cold Finished Bars, Rods, and Wire

SAE AS5272, Lubricant, Solid Dry Film, Heat Cured, Corrosion Inhibiting

SAE J417, Hardness Tests and Hardness Number Conversions

Publisher: Society of Automotive Engineers (SAE), 400 Commonwealth Drive, Warrendale, PA 15096-0001

## 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 plating or coating is specified, the finished product dimensions shall be as agreed upon by the supplier and purchaser.

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

## 6 DESCRIPTION

Helical coil inserts are screw thread bushings coiled from wire of diamond-shape cross-section. Inserts are screwed into STI-tapped holes to form nominal size internal threads. Inserts are installed by torquing through a diametral tang. This tang is notched for removal after installation. In the free state, they are larger in diameter than the tapped hole into which they are

--`,,```,,,,````-`-`,,`,,`,`,,`---



Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

installed. In the assembly operation, the torque applied to the tang reduces the diameter of the leading coil and permits it to enter the tapped thread. The remaining coils are reduced in diameter as they, in turn, are screwed into the tapped hole. When the torque or rotation is stopped, the coils expand with a spring-like action anchoring the insert in place against the tapped hole.

## 7 CLASS OF FIT

### 7.1 Tolerance Classes 4H5H and 5H

Since helical coil inserts are flexible, the class of fit of the final assembly is a function of the size of the tapped hole. Helical coil STI taps are available for both Tolerance Class 4H5H– (or Class 4H6H–) and Class 5H–tapped holes. Tolerance Class 5H–tapped holes provide maximum production tolerances but result in lower locking torques when screw-locking inserts are used. The higher and more consistent torques given in Table 5 are met by the screw-locking inserts when assembled and tested in Tolerance Class 4H5H– (or Class 4H6H–) tapped holes in accordance with para. 9.

### 7.2 Compatibility

Assembled helical coil inserts will mate properly with items that have M Profile external threads in accordance with ASME B1.13M. Also, due to the radius on the crest of the insert at the minor diameter, the assembled insert will mate with MJ Profile externally threaded parts with controlled radius root threads per ASME B1.21M.

## 8 TYPES OF INSERTS

### 8.1 Free-Running

The free-running insert provides a smooth, hard, and free-running thread.

### 8.2 Screw-Locking

The screw-locking insert provides a resilient locking thread produced by a series of chords on one or more of the insert coils.

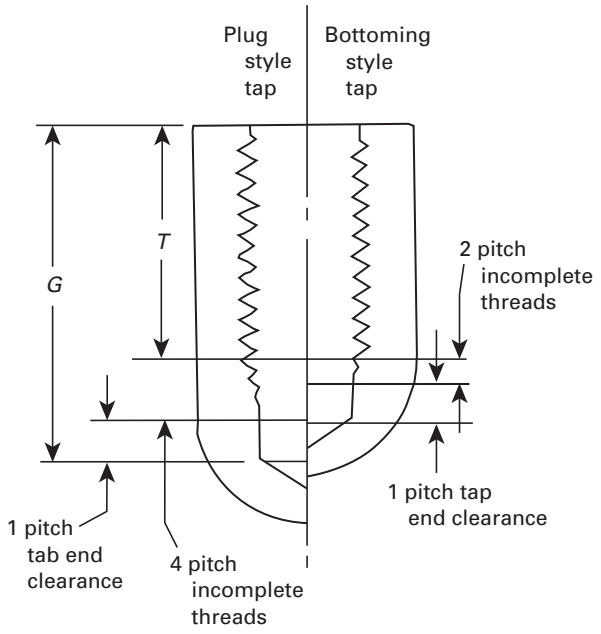
## 9 STI-TAPPED HOLE

The tapped hole into which the insert is installed shall be in accordance with ASME B1.13M, except that diameters are larger to accommodate the wire cross-section of the insert (see Fig. 1). Dimensions of the STI-tapped hole are shown in Table 1 and are calculated per General Note (c) to Table 1.

### 9.1 Screw Thread Designation

**9.1.1 Designation for Tapped Hole.** The drawing note for the STI-threaded hole per Table 1 to accept the helical coil insert shall be in accordance with the following example:

EXAMPLE: M8 × 1.25-5H STI; 23.5 *T* per ASME B18.29.2M.




GENERAL NOTE: See Table 1 and accompanying notes.

**Fig. 1 Tapping Depths**

**9.1.2 Designation for a Helical Coil Insert**

*(a)* Helical coil inserts shall be designated by the following data, in the sequence shown:

*(1)* product name
*(2)* designation of the standard
*(3)* nominal diameter and thread pitch
*(4)* nominal length
*(5)* insert type (free-running or screw-locking)

EXAMPLES:

Helical Coil insert, ASME B18.29.2M, M8 × 1.25 × 12.0 free-running.

Helical Coil insert, ASME B18.29.2M, M5 × 0.8 × 7.5 screw-locking.

*(b)* The recommended B18 part number (PIN) code system for helical coil inserts is included in ASME B18.24. This system may be used by any user needing a definitive part-numbering system.

**9.1.3 Designation for STI-Threaded Hole Including Installed Helical Coil Insert.** The drawing note for the STI-threaded hole per Table 1 having a helical coil insert installed shall be in accordance with this example.

EXAMPLE:

M8 × 1.25 STI 23.5 deep;

Helical Coil insert, ASME B18.29.2M, M8 × 1.25 × 12.0, free-running

### 9.2 Gages and Gaging

Acceptance of the threaded hole is determined by gaging with STI GO, NOT GO (HI), and plain cylindrical gages designed and applied in accordance with System 21 of ASME B1.3M and with ASME B1.16M.



--`,,```,,,,````-`-`,,`,,`,`,,`---

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS

Not for Resale

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS

## Table 1 STI-Threaded Hole Data

| Nominal Thread Size | Minimum Drilling Depth for Each Insert Length, *G* | | | | | | | | | | Countersink Diameter, *M* (120 deg ± 5 deg Included Angle) | | Minor Diameter | | Pitch Diameter | | | | Min. Major Diam. | Minimum Tapping Depth, *T* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Plug Taps | | | | | Bottoming Taps | | | | | | | | | | 4H | 5H | 6H | All | Insert Length | | | | |
| | 1*D* | 1.5*D* | 2*D* | 2.5*D* | 3*D* | 1*D* | 1.5*D* | 2*D* | 2.5*D* | 3*D* | Min. | Max. | Min. | Max. | Min. | Max. | Max. | Max. | Classes | 1*D* | 1.5*D* | 2*D* | 2.5*D* | 3*D* |
| M2 × 0.4 | 5.40 | 6.40 | 7.40 | 8.40 | 9.40 | 3.60 | 4.60 | 5.60 | 6.60 | 7.60 | 2.30 | 2.70 | 2.087 | 2.199 | 2.260 | 2.295 | 2.310 | 2.329 | 2.520 | 2.40 | 3.40 | 4.40 | 5.40 | 6.40 |
| M2.5 × 0.45 | 6.45 | 7.70 | 8.95 | 10.20 | 11.45 | 4.30 | 5.55 | 6.80 | 8.05 | 9.30 | 2.90 | 3.40 | 2.597 | 2.722 | 2.792 | 2.832 | 2.847 | 2.867 | 3.084 | 2.95 | 4.20 | 5.45 | 6.70 | 7.95 |
| M3 × 0.5 | 7.50 | 9.00 | 10.50 | 12.00 | 13.50 | 5.00 | 5.00 | 8.00 | 9.50 | 11.00 | 3.40 | 4.00 | 3.108 | 3.248 | 3.326 | 3.367 | 3.384 | 3.404 | 3.650 | 3.50 | 5.00 | 6.50 | 8.00 | 9.50 |
| M3.5 × 0.6 | 8.86 | 10.60 | 12.35 | 14.10 | 15.85 | 5.90 | 7.65 | 9.40 | 11.15 | 12.90 | 4.10 | 4.70 | 3.630 | 3.790 | 3.890 | 3.940 | 3.959 | 3.981 | 4.280 | 4.10 | 5.85 | 7.60 | 9.35 | 11.10 |
| M4 × 0.7 | 10.20 | 12.20 | 14.20 | 16.20 | 18.20 | 6.80 | 8.80 | 10.80 | 12.80 | 14.80 | 4.70 | 5.30 | 4.162 | 4.332 | 4.455 | 4.508 | 4.529 | 4.522 | 4.910 | 4.70 | 6.70 | 8.70 | 10.70 | 12.70 |
| M5 × 0.8 | 12.30 | 14.80 | 17.30 | 19.80 | 22.30 | 8.20 | 10.70 | 13.20 | 15.70 | 18.20 | 5.80 | 6.40 | 5.174 | 5.374 | 5.520 | 5.577 | 5.597 | 5.622 | 6.040 | 5.80 | 8.30 | 10.80 | 13.30 | 15.80 |
| M6 × 1 | 15.00 | 18.00 | 21.00 | 24.00 | 27.00 | 10.00 | 13.00 | 16.00 | 19.00 | 22.00 | 7.10 | 7.70 | 6.217 | 6.407 | 6.650 | 6.719 | 6.742 | 6.774 | 7.300 | 7.00 | 10.00 | 13.00 | 16.00 | 19.00 |
| M7 × 1 | 16.50 | 20.00 | 23.50 | 27.00 | 30.50 | 11.00 | 14.50 | 18.00 | 21.50 | 25.00 | 8.10 | 8.70 | 7.217 | 7.407 | 7.650 | 7.719 | 7.742 | 7.774 | 8.300 | 8.00 | 11.50 | 15.00 | 18.50 | 22.00 |
| M8 × 1 | 18.00 | 22.00 | 26.00 | 30.00 | 34.00 | 12.00 | 16.00 | 28.00 | 20.00 | 24.00 | 0.10 | 9.70 | 8.217 | 8.407 | 8.650 | 8.719 | 8.742 | 8.774 | 9.300 | 9.00 | 13.00 | 17.00 | 21.00 | 25.00 |
| M8 × 1.25 | 19.50 | 23.60 | 27.50 | 31.50 | 35.50 | 13.00 | 17.00 | 29.00 | 21.00 | 25.00 | 9.50 | 10.10 | 8.271 | 8.483 | 8.812 | 8.886 | 8.911 | 8.946 | 9.624 | 9.26 | 13.25 | 17.26 | 21.25 | 25.25 |
| M10 × 1 | 16.00 | 21.00 | 26.00 | 31.00 | 36.00 | 14.00 | 19.00 | 34.00 | 24.00 | 29.00 | 11.10 | 11.70 | 10.217 | 10.407 | 10.650 | 10.719 | 10.742 | 10.774 | 11.300 | 11.00 | 16.00 | 21.00 | 26.00 | 31.00 |
| M10 × 1.25 | 17.50 | 22.60 | 27.50 | 32.50 | 37.50 | 15.00 | 20.00 | 35.00 | 25.00 | 30.00 | 11.50 | 12.10 | 10.271 | 10.483 | 10.812 | 10.886 | 10.911 | 10.946 | 11.624 | 11.26 | 16.25 | 21.26 | 26.25 | 31.25 |
| M10 × 1.5 | 19.00 | 24.00 | 29.00 | 34.00 | 39.00 | 16.00 | 21.00 | 38.00 | 26.00 | 31.00 | 11.80 | 12.40 | 10.324 | 10.580 | 10.974 | 11.061 | 11.089 | 11.129 | 11.948 | 11.50 | 16.50 | 21.50 | 26.50 | 31.50 |
| M12 × 1.25 | 19.50 | 25.50 | 31.50 | 37.50 | 43.50 | 17.00 | 23.00 | 29.00 | 35.00 | 41.00 | 13.50 | 14.10 | 12.271 | 12.483 | 12.812 | 12.896 | 12.926 | 12.966 | 13.624 | 13.25 | 19.25 | 25.25 | 31.25 | 37.25 |
| M12 × 1.5 | 21.00 | 27.00 | 33.00 | 39.00 | 45.00 | 18.00 | 24.00 | 30.00 | 36.00 | 42.00 | 13.00 | 14.40 | 12.324 | 12.560 | 12.974 | 13.067 | 13.099 | 13.139 | 13.948 | 13.50 | 19.50 | 25.50 | 31.50 | 37.60 |
| M12 × 1.75 | 22.50 | 28.50 | 34.50 | 40.50 | 48.50 | 19.00 | 25.00 | 31.00 | 37.00 | 43.00 | 14.20 | 14.80 | 12.379 | 12.644 | 13.137 | 13.236 | 13.271 | 13.311 | 14.274 | 13.75 | 19.75 | 25.75 | 31.75 | 37.75 |
| M14 × 1.5 | 23.00 | 30.00 | 37.00 | 44.00 | 51.00 | 20.00 | 27.00 | 34.00 | 41.00 | 48.00 | 15.80 | 16.40 | 14.324 | 14.560 | 14.974 | 15.067 | 15.099 | 15.139 | 15.940 | 15.50 | 22.50 | 29.50 | 38.50 | 43.50 |
| M14 × 2 | 26.00 | 33.00 | 40.00 | 47.00 | 54.00 | 22.00 | 29.00 | 36.00 | 43.00 | 50.00 | 16.50 | 17.10 | 14.433 | 14.733 | 15.299 | 15.406 | 15.444 | 15.486 | 16.958 | 16.00 | 23.00 | 30.00 | 37.00 | 44.00 |
| M16 × 1.5 | 25.00 | 33.00 | 41.00 | 49.00 | 57.00 | 22.00 | 30.00 | 38.00 | 46.00 | 50.00 | 17.80 | 18.40 | 16.324 | 16.560 | 16.974 | 17.067 | 17.099 | 17.139 | 17.948 | 17.50 | 25.50 | 33.50 | 41.50 | 49.50 |
| M16 × 2 | 28.00 | 36.00 | 44.00 | 52.00 | 60.00 | 24.00 | 32.00 | 40.00 | 48.00 | 56.00 | 18.50 | 19.10 | 16.433 | 16.733 | 17.299 | 17.406 | 17.444 | 17.486 | 18.598 | 18.00 | 26.00 | 34.00 | 42.00 | 50.00 |
| M18 × 1.5 | 27.00 | 36.00 | 45.00 | 54.00 | 63.00 | 24.00 | 33.00 | 42.00 | 51.00 | 60.00 | 19.80 | 20.40 | 18.324 | 18.560 | 18.974 | 19.067 | 19.099 | 19.139 | 19.948 | 19.50 | 28.50 | 37.50 | 46.50 | 55.50 |
| M18 × 2 | 30.00 | 39.00 | 48.00 | 57.00 | 66.00 | 26.00 | 35.00 | 44.00 | 53.00 | 62.00 | 20.50 | 21.10 | 18.433 | 18.733 | 19.299 | 19.406 | 19.444 | 19.486 | 20.598 | 20.00 | 29.00 | 38.00 | 47.00 | 56.00 |
| M18 × 2.5 | 33.00 | 42.00 | 51.00 | 60.00 | 69.00 | 28.00 | 37.00 | 46.00 | 55.00 | 64.00 | 21.20 | 21.80 | 18.541 | 18.896 | 19.624 | 19.738 | 19.778 | 19.822 | 21.248 | 20.50 | 29.50 | 38.50 | 47.50 | 56.50 |
| M20 × 1.5 | 29.00 | 39.00 | 49.00 | 59.00 | 69.00 | 26.00 | 36.00 | 46.00 | 56.00 | 66.00 | 21.80 | 22.40 | 20.324 | 20.560 | 20.974 | 21.067 | 21.099 | 21.139 | 21.940 | 21.50 | 31.50 | 41.50 | 51.50 | 61.50 |
| M20 × 2 | 32.00 | 42.00 | 52.00 | 62.00 | 72.00 | 28.00 | 38.00 | 48.00 | 58.00 | 68.00 | 22.50 | 23.10 | 20.433 | 20.733 | 21.299 | 21.406 | 21.444 | 21.486 | 22.598 | 22.00 | 32.00 | 42.00 | 52.00 | 62.00 |
| M20 × 2.5 | 35.00 | 45.00 | 55.00 | 65.00 | 75.00 | 30.00 | 40.00 | 50.00 | 60.00 | 70.00 | 23.20 | 23.80 | 20.541 | 20.896 | 21.624 | 21.738 | 21.778 | 21.822 | 23.248 | 22.50 | 32.50 | 42.50 | 52.50 | 62.50 |
| M22 × 1.5 | 31.00 | 42.00 | 53.00 | 64.00 | 75.00 | 28.00 | 39.00 | 50.00 | 61.00 | 72.00 | 23.80 | 24.40 | 22.324 | 22.560 | 22.974 | 23.067 | 23.099 | 23.139 | 23.948 | 23.50 | 34.50 | 45.50 | 56.50 | 67.50 |
| M22 × 2 | 34.00 | 45.00 | 56.00 | 67.00 | 78.00 | 30.00 | 41.00 | 52.00 | 63.00 | 74.00 | 24.50 | 25.10 | 22.433 | 22.733 | 23.299 | 23.406 | 23.444 | 23.486 | 24.598 | 24.00 | 35.00 | 46.00 | 57.00 | 68.00 |
| M22 × 2.5 | 37.00 | 48.00 | 59.00 | 70.00 | 81.00 | 32.00 | 43.00 | 54.00 | 65.00 | 76.00 | 25.20 | 25.80 | 22.541 | 22.896 | 23.624 | 23.738 | 23.778 | 23.822 | 25.248 | 24.50 | 35.50 | 46.50 | 57.50 | 68.50 |
| M24 × 2 | 38.00 | 48.00 | 60.00 | 72.00 | 84.00 | 32.00 | 44.00 | 56.00 | 68.00 | 80.00 | 26.50 | 27.10 | 24.433 | 24.733 | 25.299 | 25.414 | 15.454 | 25.498 | 26.598 | 26.00 | 38.00 | 50.00 | 62.00 | 74.00 |
| M24 × 3 | 42.00 | 54.00 | 66.00 | 78.00 | 90.00 | 36.00 | 48.00 | 60.00 | 72.00 | 84.00 | 27.90 | 28.50 | 24.649 | 25.049 | 25.948 | 26.093 | 26.135 | 26.188 | 27.897 | 27.00 | 39.00 | 51.00 | 63.00 | 75.00 |
| M27 × 2 | 39.00 | 52.50 | 66.00 | 79.50 | 93.00 | 35.00 | 48.50 | 62.00 | 75.50 | 89.00 | 29.50 | 30.10 | 27.433 | 27.733 | 28.299 | 28.414 | 28.454 | 28.498 | 29.598 | 29.00 | 42.50 | 58.00 | 69.50 | 83.00 |
| M27 × 3 | 45.00 | 68.50 | 72.00 | 85.50 | 99.00 | 39.00 | 52.50 | 66.00 | 79.50 | 93.00 | 30.90 | 31.50 | 27.649 | 28.049 | 28.948 | 29.093 | 29.135 | 29.188 | 30.897 | 30.00 | 43.50 | 57.00 | 70.50 | 84.00 |
| M30 × 2 | 42.00 | 67.00 | 72.00 | 87.00 | 102.00 | 38.00 | 53.00 | 68.00 | 83.00 | 98.00 | 32.50 | 33.10 | 30.433 | 30.733 | 31.299 | 31.414 | 31.454 | 31.489 | 32.598 | 32.00 | 47.00 | 62.00 | 77.00 | 92.00 |
| M30 × 3 | 48.00 | 63.00 | 78.00 | 93.00 | 108.00 | 42.00 | 57.00 | 72.00 | 87.00 | 102.00 | 33.90 | 34.50 | 30.649 | 31.049 | 31.948 | 32.093 | 32.136 | 32.188 | 33.897 | 33.00 | 48.00 | 63.00 | 78.00 | 93.00 |



Not for Resale

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS



## Table 1 STI-Threaded Hole Data (Cont'd)

| Nominal Thread Size | Minimum Drilling Depth for Each Insert Length, *G* | | | | | | | | | | Countersink Diameter, *M* (120 deg ± 5 deg Included Angle) | | Minor Diameter | | Pitch Diameter | | | | Min. Major Diam. | Minimum Tapping Depth, *T* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Plug Taps | | | | | Bottoming Taps | | | | | | | | | | | | | | Insert Length | | | | |
| | 1*D* | 1.5*D* | 2*D* | 2.5*D* | 3*D* | 1*D* | 1.5*D* | 2*D* | 2.5*D* | 3*D* | Min. | Max. | Min. | Max. | Min. | 4H Max. | 5H Max. | 6H Max. | All Classes | 1*D* | 1.5*D* | 2*D* | 2.5*D* | 3*D* |
| M30 × 3.5 | 51.00 | 66.00 | 81.00 | 96.00 | 111.00 | 44.00 | 59.00 | 74.00 | 89.00 | 104.00 | 34.60 | 35.20 | 30.767 | 31.207 | 32.273 | 32.428 | 32.472 | 32.628 | 34.546 | 33.50 | 48.50 | 63.50 | 78.50 | 93.50 |
| M33 × 2 | 45.00 | 61.60 | 78.00 | 94.50 | 111.00 | 41.00 | 57.50 | 74.00 | 90.50 | 107.00 | 35.50 | 36.10 | 33.433 | 33.733 | 34.299 | 34.414 | 34.454 | 34.498 | 35.598 | 35.00 | 51.50 | 68.00 | 84.50 | 101.00 |
| M33 × 3 | 51.00 | 67.60 | 84.00 | 104.50 | 117.00 | 45.00 | 61.50 | 78.00 | 94.50 | 111.00 | 36.90 | 37.50 | 33.649 | 34.049 | 34.948 | 35.093 | 35.135 | 36.188 | 36.897 | 36.00 | 52.50 | 69.00 | 85.50 | 102.00 |
| M36 × 2 | 48.00 | 66.00 | 84.00 | 102.00 | 120.00 | 44.00 | 62.00 | 80.00 | 98.00 | 116.00 | 38.50 | 39.10 | 36.433 | 36.733 | 37.299 | 37.414 | 37.464 | 37.498 | 38.598 | 38.00 | 58.00 | 74.00 | 92.00 | 110.00 |
| M36 × 3 | 54.00 | 72.00 | 90.00 | 108.00 | 126.00 | 48.00 | 66.00 | 84.00 | 102.00 | 120.00 | 39.90 | 40.50 | 36.649 | 37.049 | 37.948 | 38.093 | 38.135 | 38.188 | 39.897 | 39.00 | 57.00 | 75.00 | 93.00 | 111.00 |
| M36 × 4 | 60.00 | 78.00 | 96.00 | 114.00 | 132.00 | 52.00 | 70.00 | 88.00 | 106.00 | 124.00 | 41.30 | 41.90 | 36.866 | 37.341 | 28.598 | 38.763 | 38.809 | 38.873 | 41.196 | 40.00 | 58.00 | 76.00 | 94.00 | 112.00 |
| M39 × 2 | 51.00 | 70.50 | 90.00 | 109.50 | 129.00 | 47.00 | 66.50 | 88.00 | 105.50 | 125.00 | 41.50 | 42.10 | 39.433 | 39.733 | 40.299 | 40.414 | 40.454 | 40.498 | 41.598 | 41.00 | 60.50 | 80.00 | 99.50 | 119.00 |
| M39 × 3 | 57.00 | 76.50 | 96.00 | 115.50 | 135.00 | 51.00 | 70.50 | 90.00 | 109.50 | 129.00 | 42.90 | 43.50 | 39.649 | 40.049 | 40.948 | 41.093 | 41.136 | 41.188 | 42.897 | 42.00 | 61.50 | 81.00 | 100.50 | 120.00 |

NOTES:

(1) The minimum drilling depths allow for
- *(a)* countersinking the drilled hole to prevent a feather edge at the start of the tapped hole.
- *(b)* 0.75 to 1.5 pitch of insert set-down to allow for maximum production tolerance.
- *(c)* Dimensions are shown for both plug and bottoming taps. Plug taps 8 mm and smaller have a male center, and the drilled hole depth dimensions allow for this length (one-half of the diameter of the bolt). Calculation of dimension *G* is as follows:

For plug taps 8 mm and smaller

*G* = insert nominal length + 0.5 x bolt nominal diameter + 4 pitch (tap chamfer) + 1 pitch (tap end clearance) + 1 pitch (allowance for countersink and maximum insert set-down).

For plug taps larger than 8 mm

*G* = insert nominal length + 4 pitch (tap chamfer) + 1 pitch (tap end clearance) + 1 pitch (allowance for countersink and maximum insert set-down).

For bottoming taps

*G* = insert nominal length + 2 pitch (tap chamfer) + 1 pitch (tap end clearance) + 1 pitch (allowance for countersink and maximum insert set-down).

(2) The minimum tapping depth (dimension *T*) is the minimum for countersink holes with insert set-down of 1.5 pitch maximum (see Fig. 1). The calculation for dimension *T* is

*T* = insert nominal length + 1 pitch

(3) Thread diameters are calculated as follows:

*Pitch diam., min.* = pitch diam., min., of nominal thread + 2 x H max.
*Pitch diam., max.* = pitch diam., max., of nominal thread + 2 x H min.

where H min. and H max. are from Table 1.

*Major diam., min.* = pitch diam., min. + 0.649519 pitch
*Minor diam., min.* = pitch diam., min. − 0.433013 pitch
*Minor diam., max.* = minor diam., min. + tolerance

where tolerance is selected from the appropriate table in ASME B1.13M with basic major diameter equal to the minimum major diameter of the STI thread.



Not for Resale

**Table 2 Chemical Composition**

| Element | Analysis, % | Check Analysis | |
|---|---|---|---|
| | | Under, Min. | Over, Max. |
| Carbon | 0.15 max. | ... | 0.01 |
| Manganese | 2.00 max. | ... | 0.04 |
| Silicon | 1.00 max. | ... | 0.05 |
| Phosphorous | 0.045 max. | ... | 0.01 |
| Sulphur | 0.035 max. | ... | 0.005 |
| Chromium | 17.00 to 20.00 | 0.20 | 0.20 |
| Nickel | 8.00 to 10.50 | 0.15 | 0.15 |
| Molybdenum | 0.75 max. | ... | 0.05 |
| Copper | 0.75 max. | ... | 0.05 |
| Iron | Remainder | ... | ... |

## 10 HELICAL COIL INSERT

### 10.1 Material

Chemical composition of the inserts is austenitic corrosion-resistant (stainless) steel within the limits of Table 2.

### 10.2 Properties

**10.2.1 Tensile Strength.** Wire, before coiling into inserts, shall have tensile strength not lower than 1035 MPa, determined in accordance with ASTM A 370.

**10.2.2 Bending.** Wire shall withstand, without cracking, bending in accordance with ASTM E 290 at room temperature through an angle of 180 deg around a diameter equal to twice the cross-sectional dimension of the wire in the plane of the bend.

**10.2.3 Workmanship.** The formed wire shall be of uniform quality and temper; it shall be smooth, clean, and free from kinks, waviness, splits, cracks, laps, seams, scale, segregation, and other defects that may impair the serviceability of the insert.

### 10.3 Coatings

**10.3.1 Dry Film Lubricant Coating.** At the option of the user, dry film lubricant coating can be applied to helical coil inserts. The coating shall meet the requirements of paras. 10.3.1.1 and 10.3.1.2. The color of dry film–lubricated inserts is dark gray to black.

**10.3.1.1 Material.** The lubricant shall meet the requirements of Aerospace Standard SAE AS5272, Type I, Lubricant, Solid Film Heat Cured, and Corrosion Inhibiting.

**10.3.1.2 Thickness.** The coating shall be uniformly deposited on the insert with the minimum thickness being complete coverage. The maximum thickness shall be the avoidance of bridging between coils. Slight fill-in between closely wound coils, which immediately separates as the coils are axially pulled apart by hand, shall not be considered bridging.

### 10.4 Configuration and Dimensions

Insert configurations shall be in accordance with Fig. 2, and dimensions shall be in accordance with Tables 3 and 4.

**10.4.1 Nominal Length.** Each nominal insert size is standardized in five lengths, which are multiples of the insert's nominal diameter. These are 1, 1.5, 2, 2.5, and 3 times nominal diameter.

Each nominal length is the minimum through-hole length (material thickness), without countersink, into which that insert can be installed. The nominal insert length is a reference value and cannot be measured.

**10.4.2 Assembled Length.** Actual assembled length of the insert equals nominal length minus 0.5 pitch to minus 0.75 pitch, with insert installed in a basic STI-threaded hole. It cannot be measured in the insert's free state.

## 11 INSPECTION AND QUALITY ASSURANCE

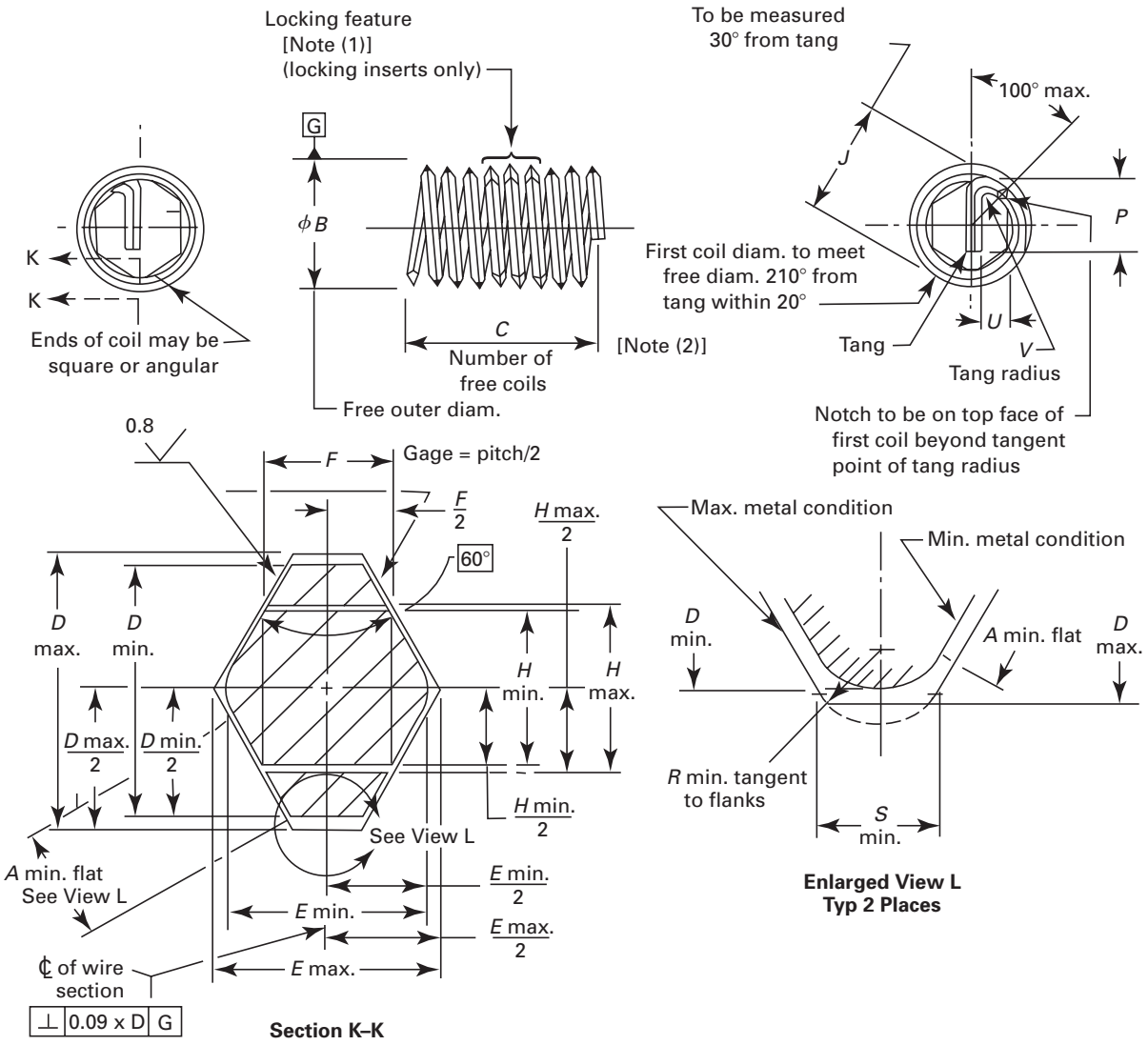
Unless otherwise specified by the purchaser, the inspection of inserts shall be in accordance with ASME B18.18.1M, with inspection level 3 for the 15-cycle torque test described in para. 11.2.3.

### 11.1 Inspection (Nondestructive)

**11.1.1 Examination of the Product.** Inserts shall be visually examined for conformance with drawings and workmanship requirements in accordance with ASME B18.18.1M.



Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale




GENERAL NOTES:

(a) Assembled length of insert to be measured from notch.

(b) Dimensions apply before supplementary coating (see Tables 3 and 4).

(c) Surface texture; symbols per ASME Y14.35, requirements per ASME B46.1.

(d) Dimensions and tolerancing; ASME Y14.5M.

NOTES:

(1) Number of locking coils, spacing of locking coils, number of locking deformations, shape and orientation optional locking feature for 1, 1.5, and 2 diam. length inserts symmetrically positioned about the center of insert, and for 2.5 and 3 diam. length inserts at 1 diam. from tang end of insert.

(2) Number of free coils to be counted from notch.

**Fig. 2 Insert Configuration**



Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

## Table 3 Insert Length Data

| Norminal Thread Size | 1 × Diam. | | | | 1 ½ × Diam. | | | | 2 × Diam. | | | | 2 ½ × Diam. | | | | 3 × Diam. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Nom- | Assembled | | C | Nom- | Assembled | | C | Nom- | Assembled | | C | Nom- | Assembled | | C | Nom- | Assembled | | C |
| | inal | Max. | Min. | (Ref.) | inal | Max. | Min. | (Ref.) | inal | Max. | Min. | (Ref.) | inal | Max. | Min. | (Ref.) | inal | Max. | Min. | (Ref.) |
| M2 × 0.4 | 2.00 | 1.80 | 1.70 | 3.250 | 3.00 | 2.80 | 2.70 | 5.500 | 4.00 | 3.80 | 3.70 | 7.750 | 5.00 | 4.80 | 4.70 | 10.125 | 6.00 | 5.80 | 5.70 | 12.375 |
| M2.5 × 0.45 | 2.50 | 2.28 | 2.16 | 3.575 | 3.80 | 3.52 | 3.41 | 5.750 | 5.00 | 4.78 | 4.66 | 8.125 | 6.30 | 6.02 | 5.91 | 10.500 | 7.50 | 7.28 | 7.16 | 12.750 |
| M3 × 0.5 | 3.00 | 2.75 | 2.62 | 3.750 | 4.50 | 4.25 | 4.12 | 6.375 | 6.00 | 5.75 | 5.62 | 8.875 | 7.50 | 7.25 | 7.12 | 11.375 | 9.00 | 8.75 | 8.62 | 13.875 |
| M3.5 × 0.6 | 3.50 | 3.20 | 3.05 | 3.750 | 5.30 | 5.00 | 4.80 | 6.375 | 7.00 | 6.70 | 6.55 | 8.750 | 8.80 | 8.50 | 8.30 | 11.375 | 10.50 | 10.20 | 10.05 | 13.750 |
| M4 × 0.7 | 4.00 | 3.65 | 3.47 | 3.625 | 6.00 | 5.65 | 5.47 | 6.125 | 8.00 | 7.65 | 7.47 | 8.625 | 10.00 | 9.65 | 9.47 | 11.125 | 12.00 | 11.65 | 11.47 | 13.625 |
| M5 × 0.8 | 5.00 | 4.60 | 4.40 | 4.125 | 7.50 | 7.10 | 6.90 | 6.875 | 10.00 | 9.60 | 9.40 | 9.625 | 12.50 | 12.10 | 11.90 | 12.375 | 15.00 | 14.60 | 14.40 | 15.125 |
| M6 × 1 | 6.00 | 5.50 | 5.25 | 4.000 | 9.00 | 8.50 | 8.25 | 6.750 | 12.00 | 11.50 | 11.25 | 9.500 | 15.00 | 14.50 | 14.25 | 12.125 | 18.00 | 17.50 | 17.25 | 14.875 |
| M7 × 1 | 7.00 | 6.50 | 6.25 | 4.875 | 10.50 | 10.00 | 9.75 | 8.000 | 14.00 | 13.50 | 13.25 | 11.125 | 17.50 | 17.00 | 16.75 | 14.125 | 21.00 | 20.50 | 20.25 | 17.250 |
| M8 × 1 | 8.00 | 7.50 | 7.25 | 5.875 | 12.00 | 11.50 | 11.25 | 9.375 | 16.00 | 15.50 | 15.25 | 13.000 | 20.00 | 19.50 | 19.25 | 16.500 | 24.00 | 23.50 | 23.25 | 20.125 |
| M8 × 1.25 | 8.00 | 7.38 | 7.06 | 4.500 | 12.00 | 11.38 | 11.06 | 7.375 | 16.00 | 15.38 | 15.06 | 10.250 | 20.00 | 19.38 | 19.06 | 13.250 | 24.00 | 23.38 | 23.06 | 16.125 |
| M10 × 1 | 10.00 | 9.50 | 9.25 | 7.625 | 15.00 | 14.50 | 14.25 | 12.000 | 20.00 | 19.50 | 19.25 | 16.500 | 25.00 | 24.50 | 24.25 | 21.000 | 30.00 | 29.50 | 29.25 | 25.500 |
| M10 × 1.25 | 10.00 | 9.38 | 9.06 | 5.875 | 15.00 | 14.38 | 14.06 | 9.500 | 20.00 | 19.38 | 19.06 | 13.125 | 25.00 | 24.38 | 24.06 | 16.750 | 30.00 | 29.38 | 29.06 | 20.375 |
| M10 × 1.5 | 10.00 | 9.25 | 8.87 | 4.875 | 15.00 | 14.25 | 13.87 | 8.000 | 20.00 | 19.25 | 18.87 | 11.125 | 25.00 | 24.25 | 23.87 | 14.250 | 30.00 | 29.25 | 28.87 | 17.375 |
| M12 × 1.25 | 12.00 | 11.38 | 11.06 | 7.250 | 18.00 | 17.38 | 17.06 | 11.625 | 24.00 | 23.38 | 23.06 | 15.875 | 30.00 | 29.38 | 29.06 | 20.250 | 36.00 | 35.38 | 35.06 | 24.500 |
| M12 × 1.5 | 12.00 | 11.25 | 10.87 | 6.000 | 18.00 | 17.25 | 16.87 | 9.625 | 24.00 | 23.25 | 22.87 | 13.375 | 30.00 | 29.25 | 28.87 | 17.000 | 36.00 | 35.25 | 34.87 | 20.750 |
| M12 × 1.75 | 12.00 | 11.12 | 10.68 | 5.000 | 18.00 | 17.12 | 16.68 | 8.250 | 24.00 | 23.12 | 22.68 | 11.500 | 30.00 | 29.12 | 28.68 | 14.625 | 36.00 | 35.12 | 34.68 | 17.875 |
| M14 × 1.5 | 14.00 | 13.25 | 12.87 | 7.125 | 21.00 | 20.25 | 19.87 | 11.375 | 28.00 | 27.25 | 26.87 | 15.625 | 35.00 | 4.25 | 33.87 | 20.000 | 42.00 | 41.25 | 40.87 | 24.250 |
| M14 × 2 | 14.00 | 13.00 | 12.50 | 5.125 | 21.00 | 20.00 | 19.50 | 8.500 | 28.00 | 27.00 | 26.50 | 11.750 | 35.00 | 34.00 | 33.50 | 15.000 | 42.00 | 41.00 | 40.50 | 18.375 |
| M16 × 1.5 | 16.00 | 15.25 | 14.87 | 8.250 | 24.00 | 23.25 | 22.87 | 13.125 | 32.00 | 31.25 | 30.87 | 18.000 | 40.00 | 39.25 | 38.87 | 22.750 | 48.00 | 47.25 | 46.87 | 27.625 |
| M16 × 2 | 16.00 | 15.00 | 14.50 | 6.125 | 24.00 | 23.00 | 22.50 | 9.750 | 32.00 | 31.00 | 30.50 | 13.500 | 40.00 | 39.00 | 38.50 | 17.250 | 48.00 | 47.00 | 46.50 | 21.000 |
| M18 × 1.5 | 18.00 | 17.25 | 16.87 | 9.500 | 27.00 | 26.25 | 25.87 | 15.000 | 36.00 | 35.25 | 34.87 | 20.375 | 45.00 | 44.25 | 43.87 | 25.875 | 54.00 | 53.25 | 52.87 | 31.375 |
| M18 × 2 | 18.00 | 17.00 | 16.50 | 7.000 | 27.00 | 26.00 | 25.50 | 11.125 | 36.00 | 35.00 | 34.50 | 15.375 | 45.00 | 44.00 | 43.50 | 19.500 | 54.00 | 53.00 | 52.50 | 23.625 |
| M18 × 2.5 | 18.00 | 16.75 | 16.12 | 5.375 | 27.00 | 25.75 | 25.12 | 8.875 | 36.00 | 34.75 | 34.12 | 12.250 | 45.00 | 43.75 | 43.12 | 15.625 | 54.00 | 52.75 | 52.12 | 19.000 |
| M20 × 1.5 | 20.00 | 19.25 | 18.87 | 10.750 | 30.00 | 29.25 | 28.87 | 16.875 | 40.00 | 39.25 | 38.87 | 22.875 | 50.00 | 49.25 | 48.87 | 28.875 | 60.00 | 59.25 | 58.87 | 35.000 |
| M20 × 2 | 20.00 | 19.00 | 18.50 | 7.875 | 30.00 | 29.00 | 28.50 | 12.500 | 40.00 | 39.00 | 38.50 | 17.250 | 50.00 | 49.00 | 48.50 | 21.875 | 60.00 | 59.00 | 58.50 | 26.500 |
| M20 × 2.5 | 20.00 | 18.75 | 18.12 | 6.125 | 30.00 | 28.75 | 28.12 | 9.875 | 40.00 | 38.75 | 38.12 | 13.625 | 50.00 | 48.75 | 48.12 | 17.375 | 60.00 | 58.75 | 58.12 | 21.125 |
| M22 × 1.5 | 22.00 | 21.25 | 20.87 | 11.875 | 33.00 | 32.25 | 31.87 | 18.500 | 44.00 | 43.25 | 42.87 | 25.125 | 55.00 | 54.25 | 53.87 | 31.625 | 66.00 | 65.25 | 64.87 | 38.250 |
| M22 × 2 | 22.00 | 21.00 | 20.50 | 8.750 | 33.00 | 32.00 | 31.50 | 13.750 | 44.00 | 43.00 | 42.50 | 18.875 | 55.00 | 54.00 | 53.50 | 23.875 | 66.00 | 65.00 | 64.50 | 29.000 |
| M22 × 2.5 | 22.00 | 20.75 | 20.12 | 6.750 | 33.00 | 31.75 | 31.12 | 10.875 | 44.00 | 42.75 | 42.12 | 14.875 | 55.00 | 53.75 | 53.12 | 19.000 | 66.00 | 64.75 | 64.12 | 23.125 |
| M24 × 2 | 24.00 | 23.00 | 22.50 | 9.500 | 36.00 | 35.00 | 34.50 | 15.000 | 48.00 | 47.00 | 16.50 | 20.375 | 60.00 | 59.00 | 58.50 | 25.875 | 72.00 | 71.00 | 70.50 | 31.250 |
| M24 × 3 | 24.00 | 22.50 | 21.75 | 6.125 | 36.00 | 34.50 | 33.75 | 10.000 | 48.00 | 46.50 | 45.75 | 13.750 | 60.00 | 58.50 | 57.75 | 17.500 | 72.00 | 70.50 | 69.75 | 21.375 |



Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

**Table 3 Insert Length Data (Cont'd)**

| Norminal Thread Size | 1 × Diam. | | | | 1 ½ × Diam. | | | | 2 × Diam. | | | | 2 ½ × Diam. | | | | 3 × Diam. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Nominal | Assembled | | *C* (Ref.) | Nominal | Assembled | | *C* (Ref.) | Nominal | Assembled | | *C* (Ref.) | Nominal | Assembled | | *C* (Ref.) | Nominal | Assembled | | *C* (Ref.) |
| | | Max. | Min. | | | Max. | Min. | | | Max. | Min. | | | Max. | Min. | | | Max. | Min. | |
| M27 × 2 | 27.00 | 26.00 | 25.50 | 10.875 | 40.50 | 39.50 | 39.00 | 17.000 | 54.00 | 53.00 | 52.50 | 23.250 | 67.50 | 66.50 | 66.00 | 29.375 | 81.00 | 80.00 | 79.50 | 35.500 |
| M27 × 3 | 27.00 | 25.50 | 24.75 | 7.000 | 40.50 | 39.00 | 38.25 | 11.250 | 54.00 | 52.50 | 51.75 | 15.500 | 67.50 | 66.50 | 65.25 | 19.750 | 81.00 | 79.50 | 78.75 | 24.000 |
| M30 × 2 | 30.00 | 29.00 | 28.50 | 12.250 | 45.00 | 44.00 | 43.50 | 19.125 | 60.00 | 59.00 | 58.50 | 25.875 | 75.00 | 74.00 | 73.50 | 32.750 | 90.00 | 89.00 | 88.50 | 39.500 |
| M30 × 3 | 30.00 | 28.50 | 27.75 | 7.875 | 45.00 | 43.50 | 42.75 | 12.500 | 60.00 | 58.50 | 57.75 | 17.125 | 75.00 | 73.50 | 72.75 | 21.875 | 90.00 | 88.50 | 87.75 | 26.500 |
| M30 × 3.5 | 30.00 | 28.25 | 27.37 | 6.750 | 45.00 | 43.25 | 42.37 | 10.750 | 60.00 | 58.25 | 57.37 | 14.875 | 75.00 | 73.25 | 72.37 | 18.875 | 90.00 | 88.25 | 87.37 | 23.000 |
| M33 × 2 | 33.00 | 32.00 | 31.50 | 13.625 | 49.50 | 48.50 | 48.00 | 21.125 | 66.00 | 65.00 | 64.50 | 28.625 | 82.50 | 81.50 | 81.00 | 35.000 | 99.00 | 98.00 | 97.50 | 43.500 |
| M33 × 3 | 33.00 | 32.50 | 30.75 | 8.750 | 49.50 | 48.00 | 47.25 | 13.875 | 66.00 | 64.50 | 63.75 | 19.000 | 82.50 | 81.00 | 80.25 | 24.125 | 99.00 | 97.50 | 96.75 | 29.250 |
| M36 × 2 | 36.00 | 35.00 | 34.50 | 15.000 | 54.00 | 53.00 | 52.50 | 23.250 | 72.00 | 71.00 | 70.50 | 31.375 | 90.00 | 89.00 | 88.50 | 39.500 | 108.00 | 107.00 | 106.50 | 47.750 |
| M36 × 3 | 36.00 | 34.50 | 33.75 | 9.750 | 54.00 | 52.50 | 51.75 | 15.250 | 72.00 | 70.50 | 69.75 | 20.875 | 90.00 | 88.50 | 87.75 | 26.500 | 108.00 | 106.50 | 105.75 | 32.000 |
| M36 × 4 | 36.00 | 34.00 | 33.00 | 7.125 | 54.00 | 52.00 | 51.00 | 11.375 | 72.00 | 70.00 | 69.00 | 15.625 | 90.00 | 88.00 | 87.00 | 19.875 | 108.00 | 106.00 | 105.00 | 24.250 |
| M39 × 2 | 39.00 | 38.00 | 37.50 | 16.375 | 58.50 | 57.50 | 57.00 | 25.250 | 78.00 | 77.00 | 76.50 | 34.125 | 97.50 | 96.50 | 96.00 | 43.000 | 117.00 | 116.00 | 115.50 | 51.875 |
| M39 × 3 | 39.00 | 37.50 | 36.75 | 10.750 | 58.50 | 57.00 | 56.25 | 15.750 | 78.00 | 76.50 | 75.75 | 22.750 | 97.50 | 96.00 | 95.25 | 28.875 | 117.00 | 115.50 | 114.75 | 34.875 |



Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

## Table 4 Insert Dimensions

| Nominal Thread Size | *A*, Min. | *B* | | *D* | | *E* | | Gage, *F* | *H* | | *J* | | *P* | | *R*, Min. | *S*, Min. | *U* | | *V*, Max. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Min. | Max. | Min. | Max. | Min. | Max. | | Min. | Max. | Min. | Max. | Min. | Max. | | | Min. | Max. | |
| M2 × 0.4 | 0.074 | 2.50 | 2.70 | 0.389 | 0.433 | 0.274 | 0.350 | 0.200 | 0.2495 | 0.2600 | 2.50 | 2.70 | 1.30 | 1.90 | 0.072 | 0.125 | 0.66 | 0.37 | 0.22 |
| M2.5 × 0.45 | 0.082 | 3.20 | 3.70 | 0.437 | 0.487 | 0.318 | 0.394 | 0.225 | 0.2820 | 0.2920 | 3.05 | 3.65 | 1.60 | 2.25 | 0.081 | 0.141 | 1.22 | 0.81 | 0.30 |
| M3 × 0.5 | 0.105 | 3.80 | 4.35 | 0.482 | 0.541 | 0.352 | 0.438 | 0.250 | 0.3145 | 0.3250 | 3.60 | 4.30 | 1.95 | 2.80 | 0.090 | 0.156 | 1.33 | 0.56 | 0.30 |
| M3.5 × 0.6 | 1.160 | 4.40 | 4.95 | 0.586 | 0.650 | 0.449 | 0.525 | 0.300 | 0.3795 | 0.3900 | 4.25 | 4.90 | 2.20 | 3.00 | 0.108 | 0.158 | 1.47 | 0.92 | 0.30 |
| M4 × 0.7 | 0.163 | 5.05 | 5.60 | 0.683 | 0.758 | 0.510 | 0.612 | 0.350 | 0.4445 | 0.4550 | 4.90 | 5.55 | 2.50 | 3.55 | 0.126 | 0.219 | 1.67 | 1.02 | 0.45 |
| M5 × 0.8 | 0.209 | 6.25 | 6.80 | 0.775 | 0.866 | 0.598 | 0.700 | 0.400 | 0.5085 | 0.5200 | 6.10 | 6.75 | 3.15 | 4.55 | 0.144 | 0.250 | 2.09 | 1.41 | 0.60 |
| M6 × 1 | 0.267 | 7.40 | 7.95 | 0.975 | 1.083 | 0.748 | 0.875 | 0.500 | 0.6370 | 0.6500 | 7.25 | 7.90 | 3.70 | 4.85 | 0.180 | 0.312 | 2.55 | 1.65 | 0.60 |
| M7 × 1 | 0.267 | 8.65 | 9.20 | 0.975 | 1.083 | 0.748 | 0.875 | 0.500 | 0.6370 | 0.6500 | 8.40 | 9.15 | 4.30 | 5.50 | 0.180 | 0.312 | 3.10 | 2.09 | 0.75 |
| M8 × 1 | 0.267 | 9.70 | 10.25 | 0.975 | 1.083 | 0.748 | 0.875 | 0.500 | 0.6370 | 0.6500 | 9.20 | 9.65 | 4.75 | 6.50 | 0.180 | 0.312 | 3.58 | 2.27 | 0.75 |
| M8 × 1.25 | 0.415 | 9.80 | 10.35 | 1.251 | 1.353 | 0.967 | 1.094 | 0.625 | 0.7990 | 0.8120 | 9.50 | 9.90 | 4.75 | 6.50 | 0.226 | 0.391 | 3.60 | 2.02 | 0.75 |
| M10 × 1 | 0.267 | 11.95 | 12.50 | 0.975 | 1.083 | 0.748 | 0.875 | 0.500 | 0.6370 | 0.6500 | 11.10 | 11.55 | 5.50 | 8.00 | 0.180 | 0.312 | 4.90 | 2.95 | 0.75 |
| M10 × 1.25 | 0.415 | 12.10 | 12.65 | 1.251 | 1.353 | 0.967 | 1.094 | 0.625 | 0.7990 | 0.8120 | 11.50 | 11.95 | 5.50 | 8.00 | 0.226 | 0.391 | 4.77 | 2.56 | 0.75 |
| M10 × 1.5 | 0.511 | 11.95 | 12.50 | 1.522 | 1.624 | 1.160 | 1.312 | 0.750 | 0.9615 | 0.9740 | 11.80 | 12.25 | 5.50 | 8.00 | 0.271 | 0.469 | 4.54 | 2.56 | 0.75 |
| M12 × 1.25 | 0.415 | 14.30 | 15.00 | 1.251 | 1.353 | 0.967 | 1.094 | 0.625 | 0.7990 | 0.8120 | 13.50 | 14.00 | 6.70 | 9.75 | 0.226 | 0.391 | 5.84 | 3.77 | 1.00 |
| M12 × 1.5 | 0.511 | 14.25 | 14.95 | 1.522 | 1.624 | 1.160 | 1.312 | 0.750 | 0.9615 | 0.9740 | 13.80 | 14.30 | 6.70 | 9.75 | 0.271 | 0.469 | 5.58 | 3.50 | 1.20 |
| M12 × 1.75 | 0.654 | 14.30 | 15.00 | 1.792 | 1.894 | 1.379 | 1.531 | 0.875 | 1.1240 | 1.1370 | 14.10 | 14.60 | 6.70 | 9.75 | 0.316 | 0.547 | 5.36 | 3.23 | 1.40 |
| M14 × 1.5 | 0.511 | 16.55 | 17.25 | 1.522 | 1.624 | 1.160 | 1.312 | 0.750 | 0.9615 | 0.9740 | 15.80 | 16.30 | 7.20 | 11.25 | 0.271 | 0.469 | 6.76 | 4.34 | 1.15 |
| M14 × 2 | 0.799 | 16.65 | 17.35 | 2.063 | 2.165 | 1.598 | 1.750 | 1.000 | 1.2865 | 1.2990 | 16.40 | 16.90 | 7.20 | 11.25 | 0.361 | 0.625 | 6.26 | 3.79 | 1.40 |
| M16 × 1.5 | 0.511 | 18.90 | 19.60 | 1.522 | 1.624 | 1.160 | 1.312 | 0.750 | 0.9615 | 0.9740 | 17.80 | 18.30 | 8.30 | 12.75 | 0.271 | 0.469 | 7.78 | 5.32 | 1.45 |
| M16 × 2 | 0.799 | 18.90 | 19.60 | 2.063 | 2.165 | 1.598 | 1.750 | 1.000 | 1.2865 | 1.2990 | 18.40 | 18.90 | 8.30 | 12.75 | 0.361 | 0.625 | 7.30 | 4.76 | 2.70 |
| M18 × 1.5 | 0.511 | 21.05 | 21.75 | 1.522 | 1.624 | 1.160 | 1.312 | 0.750 | 0.9615 | 0.9740 | 19.80 | 20.35 | 9.30 | 14.00 | 0.271 | 0.469 | 8.83 | 6.26 | 1.75 |
| M18 × 2 | 0.799 | 21.15 | 21.85 | 2.063 | 2.165 | 1.598 | 1.750 | 1.000 | 1.2865 | 1.2990 | 20.40 | 20.95 | 9.30 | 14.00 | 0.361 | 0.625 | 8.30 | 5.74 | 2.70 |
| M18 × 2.5 | 1.017 | 21.30 | 22.00 | 2.604 | 2.706 | 1.998 | 2.188 | 1.250 | 1.6110 | 1.6240 | 20.90 | 21.45 | 9.30 | 14.00 | 0.451 | 0.781 | 7.79 | 5.20 | 2.85 |
| M20 × 1.5 | 0.511 | 23.15 | 24.00 | 1.522 | 1.624 | 1.160 | 1.312 | 0.750 | 0.9615 | 0.9740 | 21.80 | 22.50 | 10.40 | 14.50 | 0.271 | 0.469 | 9.77 | 7.19 | 2.85 |
| M20 × 2 | 0.799 | 23.20 | 24.05 | 2.063 | 2.165 | 1.598 | 1.750 | 1.000 | 1.2865 | 1.2990 | 22.40 | 23.10 | 10.40 | 14.50 | 0.361 | 0.625 | 9.40 | 6.65 | 2.85 |
| M20 × 2.5 | 1.017 | 23.55 | 24.40 | 2.604 | 2.706 | 1.998 | 2.188 | 1.250 | 1.6110 | 1.6240 | 22.90 | 23.60 | 10.40 | 14.50 | 0.451 | 0.781 | 8.89 | 6.11 | 2.85 |

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS



Not for Resale

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS

**Table 4 Insert Dimensions (Cont'd)**

| Nominal Thread Size | *A*, Min. | *B* | | *D* | | *E* | | Gage, *F* | *H* | | *J* | | *P* | | *R*, Min. | *S*, Min. | *U* | | *V*, Max. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Min. | Max. | Min. | Max. | Min. | Max. | | Min. | Max. | Min. | Max. | Min. | Max. | | | Min. | Max. | |
| M20 × 1.5 | 0.511 | 23.15 | 24.00 | 1.522 | 1.624 | 1.160 | 1.312 | 0.750 | 0.9615 | 0.9740 | 24.10 | 24.80 | 11.40 | 16.00 | 0.271 | 0.469 | 11.10 | 8.01 | 2.85 |
| M22 × 2 | 0.799 | 25.60 | 26.50 | 2.063 | 2.165 | 1.598 | 1.750 | 1.000 | 1.2865 | 1.2990 | 24.40 | 25.10 | 11.40 | 16.00 | 0.361 | 0.625 | 10.45 | 7.61 | 2.85 |
| M22 × 2.5 | 1.017 | 25.90 | 26.90 | 2.604 | 2.706 | 1.998 | 2.188 | 1.250 | 1.6110 | 1.6240 | 24.90 | 25.60 | 11.40 | 16.00 | 0.451 | 0.781 | 9.94 | 7.07 | 2.85 |
| M24 × 2 | 0.799 | 28.10 | 29.10 | 2.063 | 2.165 | 1.598 | 1.750 | 1.000 | 1.2865 | 1.2990 | 26.40 | 27.10 | 12.50 | 16.50 | 0.361 | 0.625 | 11.48 | 8.60 | 2.85 |
| M24 × 3 | 1.234 | 28.00 | 29.00 | 3.146 | 3.248 | 2.396 | 2.625 | 1.500 | 1.9360 | 1.9485 | 27.50 | 28.20 | 12.50 | 16.50 | 0.541 | 0.938 | 10.45 | 7.51 | 2.85 |
| M27 × 2 | 0.799 | 31.30 | 32.30 | 2.063 | 2.165 | 1.598 | 1.750 | 1.000 | 1.2865 | 1.2990 | 29.40 | 30.10 | 14.00 | 17.50 | 0.361 | 0.625 | 13.14 | 9.93 | 2.85 |
| M27 × 3 | 1.234 | 31.40 | 32.40 | 3.146 | 3.248 | 2.396 | 2.625 | 1.500 | 1.9360 | 1.9485 | 30.50 | 31.20 | 14.00 | 17.50 | 0.541 | 0.938 | 12.13 | 8.85 | 2.85 |
| M30 × 2 | 0.799 | 34.50 | 35.70 | 2.063 | 2.165 | 1.598 | 1.750 | 1.000 | 1.2865 | 1.2990 | 32.50 | 33.20 | 15.00 | 19.00 | 0.361 | 0.625 | 14.81 | 11.26 | 2.85 |
| M30 × 3 | 1.234 | 34.90 | 36.10 | 3.146 | 3.248 | 2.396 | 2.625 | 1.500 | 1.9360 | 1.9485 | 33.50 | 34.20 | 15.00 | 19.00 | 0.541 | 0.938 | 13.65 | 10.32 | 2.85 |
| M30 × 3.5 | 1.451 | 34.90 | 36.10 | 3.687 | 3.789 | 2.833 | 3.062 | 1.750 | 2.2605 | 2.2750 | 34.10 | 34.60 | 15.00 | 19.00 | 0.631 | 1.094 | 13.13 | 9.65 | 2.85 |
| M33 × 2 | 0.799 | 37.80 | 39.20 | 2.063 | 2.165 | 1.598 | 1.750 | 1.000 | 1.2865 | 1.2990 | 35.80 | 36.50 | 17.00 | 21.00 | 0.361 | 0.625 | 16.35 | 12.74 | 2.85 |
| M33 × 3 | 1.234 | 38.10 | 39.50 | 3.146 | 3.248 | 2.396 | 2.625 | 1.500 | 1.9360 | 1.9485 | 36.50 | 37.20 | 17.00 | 21.00 | 0.541 | 0.938 | 15.19 | 11.78 | 2.85 |
| M36 × 2 | 0.799 | 41.00 | 42.40 | 2.063 | 2.165 | 1.598 | 1.750 | 1.000 | 1.2865 | 1.2990 | 39.00 | 39.70 | 18.50 | 22.50 | 0.361 | 0.625 | 17.77 | 14.29 | 2.85 |
| M36 × 3 | 1.234 | 41.30 | 42.70 | 3.146 | 3.248 | 2.396 | 2.625 | 1.500 | 1.9360 | 1.9485 | 39.50 | 40.20 | 18.50 | 22.50 | 0.541 | 0.938 | 16.73 | 13.23 | 2.85 |
| M36 × 4 | 1.688 | 41.50 | 42.90 | 4.228 | 4.330 | 3.271 | 3.500 | 2.000 | 2.5855 | 2.5980 | 40.60 | 41.10 | 18.50 | 22.50 | 0.722 | 1.250 | 15.57 | 12.12 | 2.85 |
| M39 × 2 | 0.799 | 44.30 | 45.70 | 2.063 | 2.165 | 1.598 | 1.750 | 1.000 | 1.2865 | 1.2990 | 42.30 | 43.00 | 20.00 | 24.00 | 0.361 | 0.625 | 19.28 | 15.77 | 2.85 |
| M39 × 3 | 1.234 | 44.40 | 45.80 | 3.146 | 3.248 | 2.396 | 2.625 | 1.500 | 1.9360 | 1.9485 | 42.50 | 43.20 | 20.00 | 24.00 | 0.541 | 0.938 | 18.28 | 14.68 | 2.85 |



Not for Resale

**11.1.2 Threads.** The inserts, when assembled in STI-threaded holes conforming to Table 1, shall form threads conforming to ASME B1.13M Tolerance Class 4H5H or 5H except for the locking feature of screw-locking inserts. The assembled insert, both types, shall accept and function with parts having external MJ threads per ASME B1.21M.

NOTE: The accuracy of the finished thread when the insert is installed depends on the accuracy of the tapped hole. If the finished tapped hole gages satisfactorily, the installed insert will be within the thread tolerance when the insert meets the requirements of the Standard. It is, therefore, not necessary to gage the installed insert. After the insert is installed, the GO thread plug gage may not enter freely because the insert may not have been fully seated in the tapped hole. However, the insert should become seated after a bolt or screw is installed and tightened.

**11.1.3 Tang Removal Notch.** The tang removal notch shall be located as shown in Fig. 2 and of such depth that the part may be installed without failure of the tang and that the tang may be removed, after assembly, without affecting the function of the installed insert.

### 11.2 Self-Locking Torque (Destructive)

The screw-locking insert, when assembled in threaded holes conforming to Table 1 and tested in accordance with the following paragraphs, shall provide a frictional lock to retain the bolt threads within the torque limits specified in Table 5.

**11.2.1 Torque Test Bolts.** Assembled screw-locking inserts shall be torque tested with bolts in accordance with ASME B1.13M or ASME B1.21M, cadmium plated, or having other coating with a similar coefficient of friction and hardness of 36 HRC to 44 HRC. The bolts selected for this test shall be of sufficient length so the thread runout does not enter the insert and that a minimum of one full thread extends past the end of the insert when the bolt is fully seated. Acceptability of bolt threads shall be determined based on System 22 of ASME B1.3M.

NOTE: Until a replacement for cadmium plating on the torque test bolts (as specified in para. 11.2.1) is found, and test data completed, an alternate coating/lubricant can be used to perform the torque test (values may be different from those obtained using cadmium-plated screws) based on agreement between the customer and insert supplier.

**11.2.2 Torque Test Block and Spacer.** The insert to be tested shall be installed in a Tolerance Class 4H5H– or 4H6H–threaded hole conforming to Table 1 in a test block made from 2024-T4 (SAE AMS4120 or ASTM B 209M) aluminum alloy. After installation, the tang shall be removed. The surface of the test block from which the insert is assembled shall be marked "TOP" and shall be marked to indicate the radial location where the assembled insert begins. A steel spacer meeting the requirements of Fig. 3 and Table 6 shall be used for developing the bolt load.

**11.2.3 Torque Test Method.** The torque test shall consist of a 15-cycle, room temperature test. A new bolt or screw and new tapped hole shall be used for each complete 15-cycle test. For each of the 15 cycles, bolts shall be assembled and seated to the assembly torque specified in Table 5. Bolts shall be completely disengaged from the locking coils of the insert at the end of each cycle. The test shall be run at less than 40 rpm to yield a dependable measure of torque and avoid heating of the bolt.

**11.2.4 Maximum Locking Torque.** Maximum locking torque shall be the highest torque value encountered on any installation or removal cycle and shall not exceed the values specified in Table 5. Maximum locking torque readings shall be taken on the first and seventh installation cycles before the assembly torque is applied and on the 15th removal cycle.

**11.2.5 Minimum Breakaway Torque.** Minimum breakaway torque shall be the torque required to overcome static friction when 100% of the locking feature is engaged and the bolt or screw is not seated (no axial load). It shall be recorded at the start of the 15th removal cycle. The torque value for any cycle shall be not less than the applicable value shown in Table 5.

**11.2.6 Acceptance.** The inserts shall be considered to have failed if, at the completion of any of the tests and inspection, any of the following conditions exist:

*(a)* any break or crack in the insert

*(b)* installation or removal torque exceeds the maximum locking torque value in Table 5

*(c)* breakaway torque less than the values in Table 5

*(d)* movement of the insert beyond ±90 deg relative to the TOP surface when installing or removing the test bolt

*(e)* seizure or galling of the insert or test bolt

*(f)* tang not broken off, which interferes with the test bolt at installation

*(g)* tang breaks off during insert installation



Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

**Table 5 Self-Locking Torque**

| Nominal Thread Size | Maximum Locking Torque Installation or Removal, N·m | Minimum Breakaway Torque, N·m | Nominal Thread Size | Maximum Locking Torque Installation or Removal, N·m | Minimum Breakaway Torque, N·m |
|---|---|---|---|---|---|
| M2 × 0.4 | 0.12 | 0.03 | | | |
| | | | M18 × 1.5 | 42 | 5.5 |
| M2.5 × 0.45 | 0.22 | 0.06 | M18 × 2 | 42 | 5.5 |
| | | | M18 × 2.5 | 42 | 5.5 |
| M3 × 0.5 | 0.44 | 0.1 | | | |
| M3.5 × 0.6 | 0.68 | 0.12 | M20 × 1.5 | 54 | 7 |
| M4 × 0.7 | 0.9 | 0.16 | M20 × 2 | 54 | 7 |
| | | | M20 × 2.5 | 54 | 7 |
| M5 × 0.8 | 1.6 | 0.3 | | | |
| M6 × 1 | 3 | 0.4 | M22 × 1.5 | 70 | 9 |
| M7 × 1 | 4.4 | 0.6 | M22 × 2 | 70 | 9 |
| | | | M22 × 2.5 | 70 | 9 |
| M8 × 1 | 6 | 0.8 | | | |
| M8 × 1.25 | 6 | 0.8 | M24 × 2 | 80 | 11 |
| M10 × 1 | 10 | 1.4 | M24 × 3 | 80 | 11 |
| M10 × 1.25 | 10 | 1.4 | | | |
| M10 × 1.5 | 10 | 1.4 | M27 × 2 | 95 | 12 |
| | | | M27 × 3 | 95 | 12 |
| M12 × 1.25 | 15 | 2.2 | | | |
| M12 × 1.5 | 15 | 2.2 | M30 × 2 | 110 | 14 |
| M12 × 1.75 | 15 | 2.2 | M30 × 3 | 110 | 14 |
| | | | M30 × 3.5 | 110 | 14 |
| M14 × 1.5 | 23 | 3 | | | |
| M14 × 2 | 23 | 3 | M33 × 2 | 125 | 16 |
| | | | M33 × 3 | 125 | 16 |
| M16 × 1.5 | 32 | 4.2 | | | |
| M16 × 2 | 32 | 4.2 | M36 × 2 | 140 | 18 |
| | | | M36 × 3 | 140 | 18 |
| | | | M36 × 4 | 140 | 18 |
| | | | M39 × 2 | 150 | 20 |
| | | | M39 × 3 | 150 | 20 |



Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

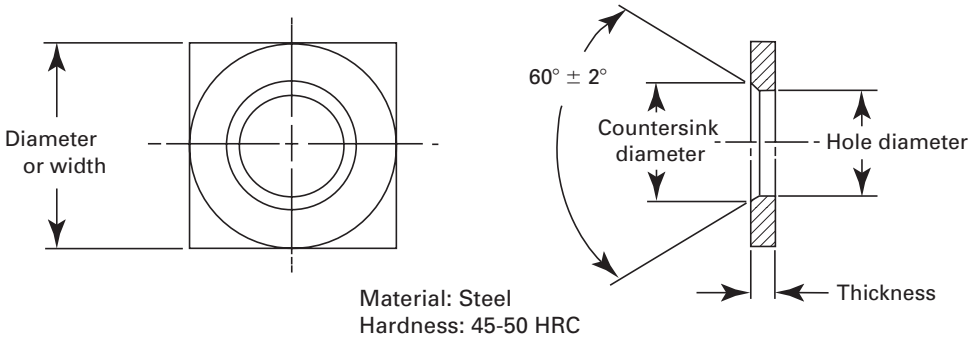



**Fig. 3 Torque Test Spacer**

**Table 6 Torque Test Spacer Dimensions**

| Nominal Insert Size | Minimum Diameter or Width | Hole Diameter | | Countersink Diameter | | Minimum Thickness |
|---|---|---|---|---|---|---|
| | | Max. | Min. | Max. | Min. | |
| 2 | **7.0** | **2.3** | **2.1** | **2.7** | **2.5** | **1.5** |
| 2.5 | 8.0 | 2.8 | 2.6 | 3.3 | 3.1 | 1.5 |
| 3 | 9.0 | 3.5 | 3.3 | 3.8 | 3.6 | 2.0 |
| 3.5 | 10.0 | 4.0 | 3.8 | 4.3 | 4.1 | 2.0 |
| 4 | 11.0 | 4.5 | 4.3 | 4.9 | 4.7 | 3.0 |
| 5 | 12.0 | 5.5 | 5.3 | 5.9 | 5.7 | 3.0 |
| 6 | 14.0 | 6.5 | 6.3 | 7.0 | 6.8 | 3.5 |
| 7 | 17.0 | 7.6 | 7.3 | 8.4 | 8.2 | 3.5 |
| 8 | 19.0 | 8.6 | 8.3 | 9.5 | 9.2 | 4.0 |
| 10 | 23.0 | 10.7 | 10.4 | 11.5 | 11.2 | 4.0 |
| 12 | 27.0 | 12.7 | 12.4 | 14.5 | 14.2 | 4.5 |
| 14 | 31.0 | 14.8 | 14.4 | 16.5 | 16.2 | 4.5 |
| 16 | 35.0 | 16.8 | 16.4 | 18.5 | 18.2 | 4.5 |
| 18 | 39.0 | 18.8 | 18.4 | 20.7 | 20.4 | 4.5 |
| 20 | 43.0 | 20.8 | 20.4 | 22.7 | 22.4 | 5.0 |
| 22 | 47.0 | 22.8 | 22.4 | 24.7 | 24.4 | 5.0 |
| 24 | 51.0 | 24.8 | 24.4 | 26.7 | 26.4 | 5.0 |
| 27 | 56.0 | 28.3 | 27.9 | 29.8 | 29.4 | 5.0 |
| 30 | 62.0 | 31.3 | 30.9 | 33.8 | 33.4 | 6.0 |
| 33 | 67.0 | 34.3 | 33.9 | 36.8 | 36.4 | 6.0 |
| 36 | 72.0 | 37.3 | 36.9 | 39.8 | 39.4 | 6.0 |
| 39 | 77.0 | 40.3 | 39.9 | 42.8 | 42.4 | 6.0 |



Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS

Not for Resale

--`,,```,,,,````-`-`,,`,,`,`,,`---

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS

Not for Resale

# NONMANDATORY APPENDIX A
# INSERT LENGTH SELECTION

## A-1 ENGAGED LENGTH OF BOLT

Normally, the engaged length of bolt in an insert is determined by strength considerations.

## A-2 MATERIAL STRENGTHS

The standard engineering practice of balancing the tensile strength of the bolt material against the shear strength of the parent or boss material also applies to helical coil inserts. Tables A-1 and A-2 will aid in developing the full load value of the bolt rather than stripping the parent or tapped material.

In using this table, the following factors must be considered:

*(a)* The parent material shear strengths are for room temperature. Elevated temperatures call for significant shear value reductions; compensation should be made when required. Shear values are appropriate because the parent material is subject to shearing stress at the major diameter of the tapped threads.

*(b)* When parent material shear strength falls between two tabulated values, use the lower of the two.

*(c)* Bolt thread length, overall length, insert length, and full tapped thread depth must be adequate to ensure full-thread engagement when assembled to comply with its design function.

**Table A-1 Insert Length Selection**

| Parent Material Shear Strength, MPa | Bolt Property Class | | | | | | |
|---|---|---|---|---|---|---|---|
| | 4.6 | 4.8 | 5.8 | 8.8 | 9.8 | 10.9 | 12.9 |
| | Insert Length in Terms of Diameters | | | | | | |
| 70 | 3 | 3 | 3 | ... | ... | ... | ... |
| 100 | 2 | 2 | 2 | 3 | ... | ... | ... |
| 150 | 1.5 | 1.5 | 1.5 | 2 | 2.5 | 2.5 | 3 |
| 200 | 1.5 | 1.5 | 1.5 | 2 | 2 | 2 | 2 |
| 250 | 1 | 1 | 1 | 1.5 | 1.5 | 1.5 | 1.5 |
| 300 | 1 | 1 | 1 | 1.5 | 1.5 | 1.5 | 1.5 |
| 350 | 1 | 1 | 1 | 1 | 1 | 1.5 | 1.5 |

**Table A-2 Hardness Number Conversion**

| Bolt Property Class | Max. Rockwell Hardness | Max. Tensile Strength, MPa |
|---|---|---|
| 4.6 | 95 HRB | 705 |
| 4.8 | 95 HRB | 705 |
| 5.8 | 95 HRB | 705 |
| 8.8 | 34 HRC | 1055 |
| 9.8 | 36 HRC | 1115 |
| 10.9 | 39 HRC | 1215 |
| 12.9 | 44 HRC | 1435 |

GENERAL NOTE: Bolt strength upon which insert length recommendations are based is developed by taking the maximum hardness per ASTM F568M Carbon and Alloy Steel Externally Threaded Metric Fasteners and the equivalent tensile strength from SAE J417 Hardness Tests and Hardness Number Conversions.



Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

# NONMANDATORY APPENDIX B
# SCREW THREAD INSERT TAPS

## B-1 SCOPE

This Appendix covers design and dimensions for taps for producing Metric Series STI–threaded holes required for the installation of helical coil screw thread inserts. Threaded hole dimensions are shown in Table 1 of this Standard.

## B-2 NOMENCLATURE

Helical coil screw thread insert taps are identified by the designation STI.

## B-3 DESIGNS AND DIMENSIONS

### B-3.1 Types of Taps

Various types and styles of STI taps are available. General dimensions and tolerances are in accordance with ASME B94.9.

### B-3.2 Tap Thread Limits

Ground thread taps are recommended for screw thread inserts. Tap thread limits are in accordance with ASME B94.9. Basic pitch diameter used for determining values is the "Pitch Diameter, min." from Table 1.

## B-4 MARKING

Taps are marked in accordance with ASME B94.9.

EXAMPLE: M6 × 1 STI HS G H2.

Other information may be added at the discretion of the manufacturer.



Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

# NONMANDATORY APPENDIX C
# INSTALLATION

## C-1 INSERT INSTALLATION

Helical coil inserts are greater in diameter than the STI-tapped holes into which they are installed. The installation process applies torque to the tang to reduce the diameter of the leading coil and permit it to enter the tapped hole. The remaining coils are reduced in diameter as they, in turn, are screwed into the tapped hole. When the torque or rotation is stopped, the insert coil expands with a spring-like action to anchor the insert permanently in place against the threads of the tapped hole.

Finer pitch inserts are proportionally larger (before installation) than coarse pitch inserts and thus have to be "prewound" to a smaller diameter for installation. Large, coarse pitch inserts need only a threaded mandrel tool for installation.

## C-2 STRIP FEED

Helical coil inserts are normally furnished in bulk containers. However, they are also normally available in feeding belts known as strip feed.

Strip feed consists of a belt or strip of pliable plastic such as polyethylene through which holes have been punched, and into which the helical coil inserts are positioned, the ends of the inserts protruding from each side of the strip. The strip is coiled on a reel or spool.

The purpose for, and advantage of strip feed is to ease handling of the insert and to increase installation rates.

Inserting tools are available for handling strip feed, wherein the strip passes through a slot in the prewinder thus locating each insert for engagement with the mandrel. After each insert has been driven through the tool and installed into the work, the strip indexes the next insert into position.

Helical coil inserts are normally available in strip feed in sizes up through 8 mm nominal diameter.

## C-3 INSERTING TOOLS

### C-3.1 Manual Inserting Tools

Various types of manual inserting tools are available. Examples are shown in Table C-1. These manual inserting tools will install helical coil inserts up to 3 diameters long for thread sizes up through 22 mm. Tools for sizes 24 mm and larger will install inserts up to 2 diameters long.

### C-3.2 Power Inserting Tools — Air Driven

For installing large quantities of helical coil inserts, power inserting tools are available. A typical tool is comprised of three basic assemblies: a reversible air motor, an adapter, and a front-end assembly. The air motor provides the driving torque. The adapter couples the motor to the front-end assembly. The front-end assembly holds the insert and, in operation, reduces the diameter of the insert (prewinds), then drives it into its tapped hole. A foot-activated air valve may be used as an alternative to the hand-activated lever.

Two sizes of adapters are available: one for the smaller range of thread sizes and one for the larger sizes. These tools will install 1, 1.5, and 2 diameter length inserts. Front-end assemblies are also available for longer length inserts or larger sizes.

Examples of air-driven power inserting tools are shown in Table C-2.

## C-4 TANG BREAK-OFF TOOLS

If the bolt is to engage the full length of the insert, the driving tang must be removed to eliminate interference with the end of the assembled bolt.

Tang break-off tools are of several types.

### C-4.1 Spring-Actuated Manual Tang Break-Off Tool

Spring-actuated tang break-off tools are available for use with inserts through 12 mm nominal diameter. Their operation is automatic, having a spring-loaded, easily triggered punch that strikes a sharp, uniform blow against the tang of the installed insert.

Examples are shown in Table C-3.

### C-4.2 Pneumatic Tang Break-Off Tool

Pneumatic tang break-off tools provide rapid tang removal for quantities of installed inserts in sizes up to M12. Supplied 0.414 MPa to 0.551 MPa air, the tool is hand-held. The punch is inserted into the installed insert in contact with the tang. A push button actuates the punch to deliver a sharp, uniform blow, which breaks off the tang. Examples are shown in Table C-4.

### C-4.3 Rod-Type Tang Break-Off Tool

Rod-type tools are available for use with inserts through 12 mm nominal diameter. They are actuated by the tap of a hammer. Examples are given in Table C-5.



Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

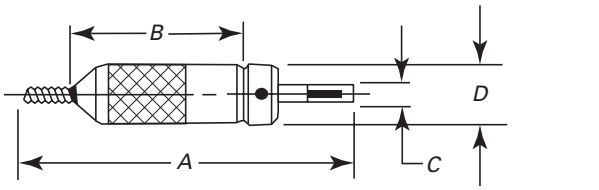
### C-4.4 Long-Nose Pliers

For insert nominal sizes larger than 12 mm, use long-nose pliers, bending the tang up and down to snap it off at the notch.

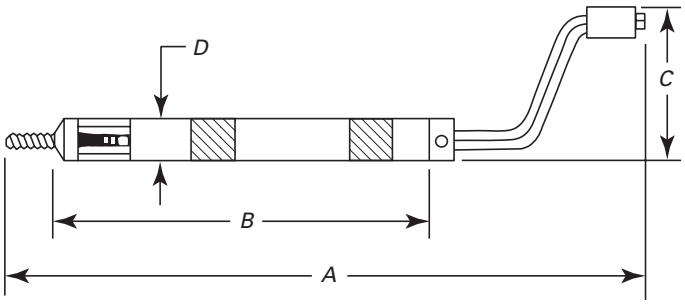
## C-5 EXTRACTING TOOLS

Examples of tools to remove helical coil inserts are shown in Table C-6. These operate by applying the tool to the insert, striking the head of the tool a light blow, and turning counterclockwise while maintaining steady downward pressure.

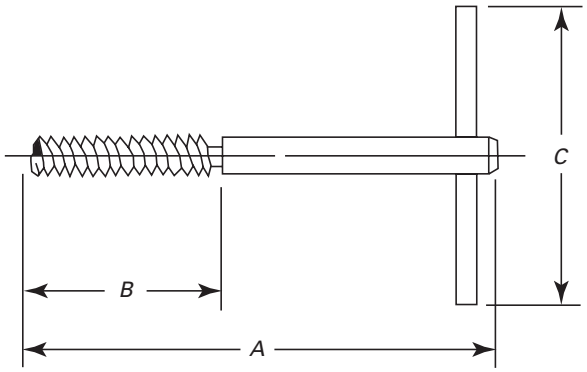
**Table C-1 Manual Inserting Tools**




Type I




Type II




Type III

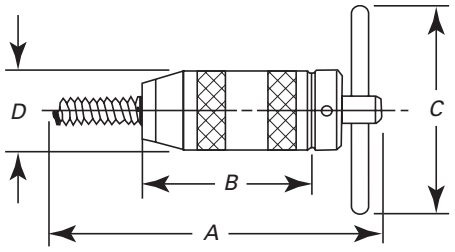
| Size | A | B | C | D |
|---|---|---|---|---|
| M2 × 0.4 | 66.7 | 19.1 | 4.8 | 11.1 |
| M2.5 × 0.45 | 189.7 | 117.5 | 57.9 | 9.5 |
| M3 × 0.5 | 189.7 | 117.5 | 57.9 | 9.5 |
| M3.5 × 0.6 | 189.7 | 117.5 | 57.9 | 9.5 |
| M4 × 0.7 | 189.7 | 117.5 | 57.9 | 9.5 |
| M5 × 0.8 | 189.7 | 117.5 | 57.9 | 11.9 |
| M6 × 1 | 202.4 | 117.5 | 64.3 | 13.1 |
| M7 × 1 | 202.4 | 128.0 | 94.5 | 17.9 |
| M8 × 1 | 202.4 | 127.0 | 94.5 | 17.9 |
| M8 × 1.25 | 202.4 | 127.0 | 94.5 | 17.9 |
| M10 × 1 | 215.1 | 133.3 | 94.5 | 19.8 |
| M10 × 1.25 | 215.1 | 133.3 | 94.5 | 19.8 |
| M10 × 1.5 | 215.1 | 133.3 | 94.5 | 19.8 |
| M12 × 1.25 | 224.6 | 139.7 | 94.5 | 22.2 |
| M12 × 1.5 | 224.6 | 139.7 | 94.5 | 22.2 |
| M12 × 1.75 | 224.6 | 139.7 | 94.5 | 22.2 |
| M18 × 2.5 | 123.8 | 60.3 | 101.6 | |
| M22 × 2.5 | 123.8 | 74.6 | 114.3 | |
| M24 × 3 | 123.8 | 57.2 | 114.3 | |
| M27 × 3 | 171.5 | 57.2 | 152.4 | |
| M30 × 3.5 | 171.5 | 69.8 | 152.4 | |
| M36 × 4 | 171.5 | 84.1 | 152.4 | |

--`,,```,,,,````-`-`,,`,,`,`,,`---



Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

**Table C-1 Manual Inserting Tools (Cont'd)**




Type IV

| Size | A | B | C | D |
|---|---|---|---|---|
| M14 × 1.5 | 146.0 | 76.2 | 101.6 | 22.2 |
| M14 × 2 | 146.0 | 76.2 | 101.6 | 22.2 |
| M16 × 1.5 | 149.2 | 76.2 | 101.6 | 25.4 |
| M16 × 2 | 149.2 | 76.2 | 101.6 | 25.4 |
| M18 × 1.5 | 155.6 | 76.2 | 101.6 | 28.6 |
| M18 × 2 | 155.6 | 76.2 | 101.6 | 28.6 |
| M20 × 1.5 | 160.3 | 76.2 | 101.6 | 28.6 |
| M20 × 2 | 160.3 | 76.2 | 101.6 | 28.6 |
| M20 × 2.5 | 160.3 | 76.2 | 101.6 | 28.6 |
| M22 × 1.5 | 171.4 | 76.2 | 114.3 | 33.3 |
| M22 × 2 | 171.4 | 76.2 | 114.3 | 33.3 |
| M24 × 2 | 152.4 | 76.2 | 114.3 | 33.3 |
| M27 × 2 | 177.8 | 95.2 | 152.4 | 38.1 |
| M30 × 2 | 184.2 | 95.2 | 152.4 | 46.0 |
| M30 × 3 | 184.2 | 95.2 | 152.4 | 46.0 |
| M33 × 2 | 192.1 | 95.2 | 152.4 | 46.0 |
| M33 × 3 | 192.1 | 95.2 | 152.4 | 46.0 |
| M36 × 2 | 200.0 | 95.2 | 152.4 | 46.0 |
| M36 × 3 | 200.0 | 95.2 | 152.4 | 46.0 |
| M39 × 2 | 206.4 | 95.2 | 152.4 | 50.8 |
| M39 × 3 | 206.4 | 95.2 | 152.4 | 50.8 |

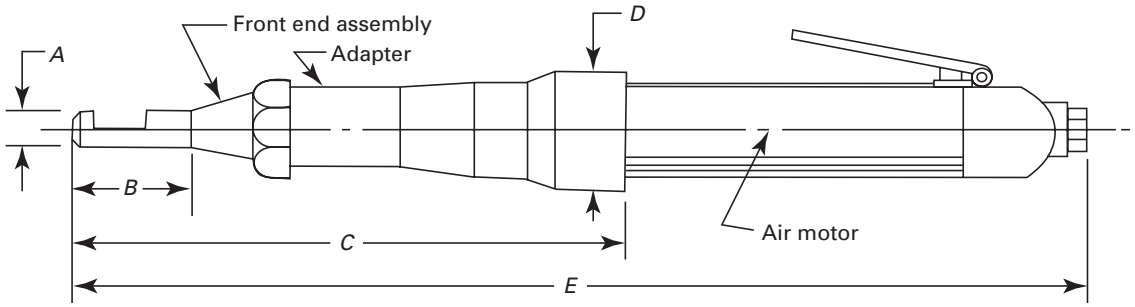



**Table C-2 Air Power Inserting Tools**

| | For Bulk Inserts | | For Strip Feed Inserts | | | | |
|---|---|---|---|---|---|---|---|
| Size | A | B | A | B | C | D | E |
| M2.5 × 0.45 | 6.4 | 14.6 | 9.5 | 23.8 | 112.7 | 31.8 | 249.2 |
| M3 × 0.5 | 7.1 | 14.6 | 9.5 | 23.8 | 112.7 | 31.8 | 249.2 |
| M3.5 × 0.6 | 7.9 | 14.6 | 12.7 | 23.8 | 112.7 | 31.8 | 249.2 |
| M4 × 0.7 | 8.7 | 14.6 | 12.7 | 23.8 | 112.7 | 31.8 | 249.2 |
| M5 × 0.8 | 9.5 | 23.3 | 12.7 | 23.8 | 112.7 | 31.8 | 249.2 |
| M6 × 1 | 10.7 | 23.3 | 15.9 | 34.9 | 112.7 | 31.8 | 249.2 |
| M7 × 1 | 14.3 | 30.5 | 17.5 | 30.5 | 146.0 | 31.8 | 282.6 |
| M8 × 1 | 14.3 | 33.0 | 19.2 | 33.0 | 146.0 | 31.8 | 282.6 |
| M8 × 1.25 | 14.3 | 33.0 | 19.2 | 33.0 | 146.0 | 31.8 | 282.6 |
| M10 × 1 | 19.0 | 34.1 | . . . | . . . | 162.7 | 31.8 | 299.2 |
| M10 × 1.25 | 19.0 | 34.1 | . . . | . . . | 162.7 | 31.8 | 299.2 |
| M10 × 1.5 | 19.0 | 34.1 | . . . | . . . | 162.7 | 31.8 | 299.2 |
| M12 × 1.25 | 20.6 | 44.0 | . . . | . . . | 169.9 | 31.8 | 306.4 |
| M12 × 1.5 | 20.6 | 44.0 | . . . | . . . | 169.9 | 31.8 | 306.4 |
| M12 × 1.75 | 20.6 | 44.0 | . . . | . . . | 169.9 | 31.8 | 306.4 |



Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

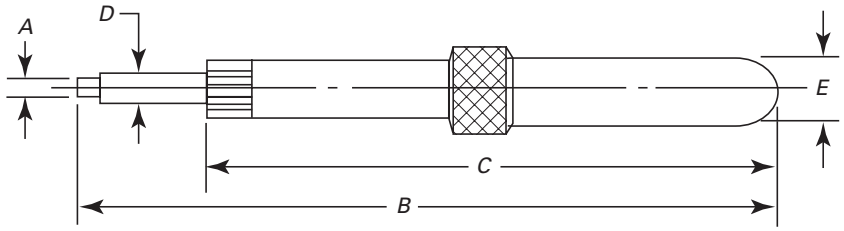



**Table C-3 Spring-Actuated Tang Break-Off Tool**

| Size | A | B | C | D | E |
|---|---|---|---|---|---|
| M2 × 0.4 | 1.32 | 133.4 | 127.0 | . . . | 12.7 |
| M2.5 × 0.45 | 1.47 | 138.1 | 127.0 | . . . | 12.7 |
| M3 × 0.5 | 1.93 | 139.7 | 127.0 | . . . | 12.7 |
| M3.5 × 0.6 | 1.93 | 139.7 | 127.0 | . . . | 12.7 |
| M4 × 0.7 | 2.84 | 142.9 | 127.0 | . . . | 12.7 |
| M5 × 0.8 | 3.17 | 146.0 | 127.0 | . . . | 12.7 |
| M6 × 1 | 3.91 | 147.6 | 127.0 | . . . | 12.7 |
| M7 × 1 | 3.00 | 147.6 | 124.6 | 5.08 | 15.9 |
| M8 × 1 | 3.04 | 147.6 | 124.6 | 5.66 | 15.9 |
| M8 × 1.25 | 3.04 | 147.6 | 124.6 | 6.42 | 15.9 |
| M10 × 1 | 5.81 | 183.4 | 154.8 | 7.67 | 19.05 |
| M10 × 1.25 | 5.81 | 183.4 | 154.8 | 7.67 | 19.05 |
| M10 × 1.5 | 5.81 | 183.4 | 154.8 | 7.67 | 19.05 |
| M12 × 1.25 | 5.81 | 186.5 | 154.8 | 9.09 | 19.05 |
| M12 × 1.5 | 5.81 | 186.5 | 154.8 | 9.09 | 19.05 |
| M12 × 1.75 | 5.81 | 186.5 | 154.8 | 9.09 | 19.05 |

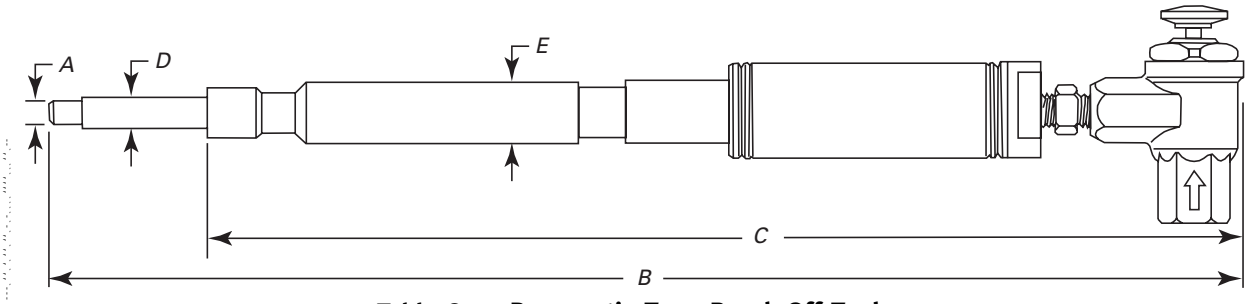



**Table C-4 Penumatic Tang Break-Off Tools**

| Size | A | B | C | D | E |
|---|---|---|---|---|---|
| M2 × 0.4 | 1.32 | . . . | . . . | . . . | 15.88 |
| M2.5 × 0.45 | 1.47 | . . . | . . . | . . . | 15.88 |
| M3 × 0.5 | 1.93 | 228.60 | 215.90 | . . . | 15.88 |
| M3.5 × 0.6 | 1.93 | 228.60 | 215.90 | . . . | 15.88 |
| M4 × 0.7 | 2.84 | 230.99 | 215.90 | . . . | 15.88 |
| M5 × 0.8 | 3.17 | 234.16 | 215.16 | . . . | 15.88 |
| M6 × 1 | 3.91 | 235.74 | 215.14 | . . . | 15.88 |
| M7 × 1 | 3.00 | 242.89 | 219.89 | 5.08 | 15.88 |
| M8 × 1 | 3.04 | 246.06 | 223.06 | 5.66 | 15.88 |
| M8 × 1.25 | 3.04 | 246.06 | 223.06 | 6.42 | 15.88 |
| M10 × 1 | 5.81 | 269.08 | 240.48 | 7.67 | 19.05 |
| M10 × 1.25 | 5.81 | 269.08 | 240.48 | 7.67 | 19.05 |
| M10 × 1.5 | 5.81 | 269.08 | 240.48 | 7.67 | 19.05 |
| M12 × 1.25 | 5.81 | 271.46 | 239.76 | 9.09 | 19.05 |
| M12 × 1.5 | 5.81 | 271.46 | 239.76 | 9.09 | 19.05 |
| M12 × 1.75 | 5.81 | 271.46 | 239.76 | 9.09 | 19.05 |



Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS Not for Resale

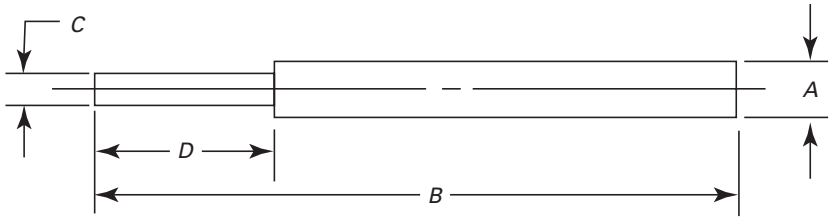



**Table C-5 Rod-Type Tang Break-Off Tool**

| Size | A | B | C | D |
|---|---|---|---|---|
| M2.5 × 0.45 | 6.4 | 102 | 1.47 | 10 |
| M3 × 0.5 | 6.4 | 102 | 1.93 | 13 |
| M3.5 × 0.6 | 6.4 | 102 | 2.26 | 16 |
| M4 × 0.7 | 6.4 | 102 | 2.84 | 17 |
| M5 × 0.8 | 6.4 | 102 | 3.18 | 19 |
| M6 × 1 | 6.4 | 102 | 4.47 | 26 |
| M7 × 1 | 6.4 | 102 | 5.08 | 26 |
| M8 × 1 | 6.4 | 102 | 5.84 | 29 |
| M8 × 1.25 | 6.4 | 102 | 5.84 | 29 |
| M10 × 1 | 7.1 | 102 | None | None |
| M10 × 1.25 | 7.1 | 102 | None | None |
| M10 × 1.5 | 7.1 | 102 | None | None |
| M12 × 1.25 | 8.7 | 102 | None | None |
| M12 × 1.5 | 8.7 | 102 | None | None |
| M12 × 1.75 | 8.7 | 102 | None | None |

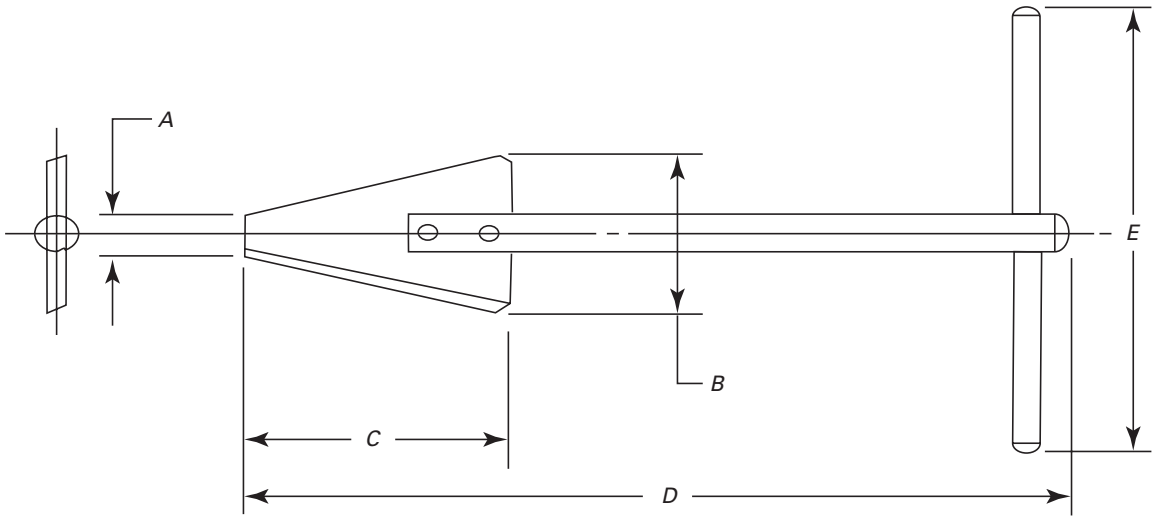



**Table C-6 Extracting Tool**

| Nominal Thread Size Range, mm | A | B | C | D | E |
|---|---|---|---|---|---|
| 2 | 1.27 | 9.52 | 15.87 | 108 | 76 |
| 2.5–4.5 | 1.98 | 9.52 | 15.87 | 108 | 76 |
| 5–10 | 3.68 | 9.52 | 14.28 | 108 | 76 |
| 11–24 | 9.14 | 25.40 | 41.27 | 129 | 102 |
| 27–39 | 24.63 | 38.10 | 33.33 | 156 | 102 |



Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

# ASME B18.29.2M-2005

ISBN 0-7918-2973-1






M18805

--`,,```,,,,````-`-`,,`,,`,`,,`---

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS

Not for Resale