

ASME B18.6.3-2013

(Revision of ASME B18.6.3-2010)

Machine Screws, Tapping Screws, and Metallic Drive Screws (Inch Series)

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FOREWORD

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 3¹ was subsequently established and charged with the responsibility for technical content of standards covering slotted and recessed head screws.

An American Standard setting forth slotted head proportions was approved and published in April 1930. Over the years following the issuance of this document, the need for standards more comprehensive than head configurations became apparent. At a meeting held on April 14, 1942, Subcommittee 3¹ was reorganized and enlarged, and the following operating scope was established:

The scope of Subcommittee 3¹ shall consist of the development and promulgation of American Standards embracing screw products variously known as machine screws, wood screws, tapping screws, slotted head cap screws, slotted headless set screws, and machine screw nuts. The standards shall comprise complete product standards covering all dimensions and tolerances required for the specification and production of the products. Details shall include boundary dimensions, such as nut width and thickness; screw head dimensions; slot and recess dimensions; body dimensions; thread classification or thread detail, as required; thread length; point design; chamfers; underhead fillets; and supporting general specifications covering the quality, finish, and the acceptable tolerances and limits as well as any information that may be necessary to ensure satisfactory application of the products.

Several meetings of the Subcommittee over the ensuing 3 years resulted in the development and acceptance of a proposed revision containing complete product standards coverage for slotted and recessed head machine, tapping and wood screws; slotted and hexagon head cap screws; and slotted headless set screws. Following approval by the B18 Committee and sponsor organizations, this proposal was forwarded to the American Standards Association and declared an American Standard, ASA B18.6, on April 12, 1947.

Recognizing the need for further refinements, Subcommittee 3¹ at a meeting held on February 1, 1951, established three standing working subgroups: one to develop details pertinent to tapping screw threads; a second to review, revise, and develop head dimensions and tolerances; and a third to correlate and edit the technical information emanating from the other two groups. Also at this meeting, numerous suggested changes were reviewed and assigned to the respective subgroups for further development. Additional meetings of the Subcommittee were held on October 9, 1952; October 29, 1953; and April 1 and 2, 1954. Between each of these meetings the subgroups held numerous working sessions and carried on technical development in cooperation with the technical committees of the U.S. Machine Screw and Tapping Screw Service Bureaus.

At the April 1954 meeting, Subcommittee 3¹, contemplating a partial revision of the ASA B18.6 document, recommended the publication of standards for wood screws, cap and set screws, machine screws, and tapping and drive screws in four separate documents, each of which would consist of a complete product specification. This approach was confirmed by the B18 Committee with the further stipulation that the coverage for hexagon head cap screws, square head set screws, and machine screw nuts from the ASA B18.2 standard be transferred to the documents covering cap and set screws and machine screws, respectively. It was understood that jurisdiction over the square head set screws and hexagon head cap screws would remain with Subcommittee 2 and that Subcommittee 3¹ would retain responsibility for machine screw nuts. Following this

¹ As of April 1, 1966, Subcommittee 3 was redesignated Subcommittee 6.



confirmation and additional direction, the preparation of proposals for the new documents was undertaken.

The proposed standard covering slotted and recessed head machine screws and machine screw nuts was approved by Subcommittee 3¹ at a meeting held on December 6, 1955. After being circulated to industry for comment, it was revised and subsequently approved by letter ballot of the B18 Committee in March of 1958. The proposal was, however, redrafted to incorporate additional revisions and refinements adopted by Subcommittee 3¹ at meetings held on October 30, 1958 and September 17, 1959. The revised proposal was recirculated to the B18 Committee and was approved by the sponsor organizations and the American Standards Association and formally designated an American Standard, ASA B18.6.3, on February 12, 1962.

Following issuance of the 1962 document, Subcommittee 3¹ and the working subgroups continued to develop revisions and refinements reflecting changes in industry practices and technical improvements. Work over the intervening years culminated in the Subcommittee 6 acceptance of a draft dated November 1969, incorporating revisions in the following areas: inclusion of Type IA cross recess data; addition of the No. 0000, No. 000, and No. 00 sizes to most slotted head styles; extensions of size coverage for 100 deg flat countersunk heads and binding heads in smaller sizes, and for pan heads in larger sizes; redimensioning of flat and oval countersunk heads; revision of thread lengths; inclusion of appendices for wobble gaging of recessed heads and wrench sizes for square and hex products; and a complete revamping of the format.

This revision was approved as an American National Standard on May 22, 2003.

In late 2008 the ASME B18.6 Subcommittee undertook a revision of B18.6.3. The first major decision was to combine B18.6.3 and B18.6.4 into one standard for all types of screws, machine and tapping. This was decided since over 50% of both standards were identical, and they both contained essentially the same head and recess data.

The Type VI recess design, having six internal lobes, was introduced into this Standard because of its wide use. The Type II recess was removed from the Standard because there is no documented use of this design today. A grade of hardened steel machine screw was added to the standard along with references to stainless steel and nonferrous materials. The thread Type TRS, for thread rolling screws, was added in the tapping screw section. The Type A thread type was moved back into the body of the standard from the Appendix because it is still in high use in several industries. The Type ABR thread, a Type AB with a radius point, was also introduced. Machine screw nuts were moved to ASME B18.2.2. ASME B18.6.3-2010 was approved as an American National Standard on September 8, 2010.

The 2010 revision was extensive, and users reported numerous minor errors. This revision corrects the reported errors and updates the quality requirements to reflect the publication of ASME B18.18. This revision was approved as an American National Standard on February 5, 2013.

Suggestions for improvement of this Standard are welcome. They should be sent to Secretary, B18 Committee, The American Society of Mechanical Engineers, Two Park Avenue, New York, NY 10016-5990.



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.)

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Secretary, B18 Standards Committee
The American Society of Mechanical Engineers
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<http://go.asme.org/Inquiry>

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.

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

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

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

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

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

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

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



ASME B18.6.3-2013

SUMMARY OF CHANGES

Following approval by the ASME B18 Committee and ASME, and after public review, ASME B18.6.3-2013 was approved by the American National Standards Institute on February 5, 2013.

ASME B18.6.3-2013 includes editorial changes, revisions, and corrections identified by a margin note, (13).

<i>Page</i>	<i>Location</i>	<i>Change</i>
1	1.7	Revised
	1.8	Revised
2	2.1.2	Revised
3	3.1	Title revised
4	3.8.1	Revised
	3.8.2	Revised
	3.11	Examples 1 and 2 revised
6	4.3.1	In last sentence, reference to Table 47 revised to Table 46
7	4.8.1	Revised
	4.10	Revised
8	4.12	Subparagraph (a) and Example 1 revised
9	5.5.1	Revised
	5.7	Subparagraph (a) and Example 1 revised
21, 22	Table 8	Last column head revised
33	Table 16	Column titled "Head Size" deleted
36	Table 19	Last column head revised
40	Table 22	Last column head revised
44, 45	Table 25	Last column head revised
52	Table 30	(1) Type VI illustration added (2) Last column head revised
54, 55	Table 32	New Note (5) added
56	Table 33	(1) Last column head revised (2) New Note (4) added
57	Table 34	New Note (4) added
59	Table 36	Last four columns revised
62	Table 38	Note (2) added
63, 64	Table 39	Note (2) added



<i>Page</i>	<i>Location</i>	<i>Change</i>
71	Table 45	Last column head revised
80	Table III-1	Illustration for Gage Head, Type III added
85	Mandatory Appendix IV	Table IV-3 deleted

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MACHINE SCREWS, TAPPING SCREWS, AND METALLIC DRIVE SCREWS (INCH SERIES)

1 INTRODUCTORY NOTES

1.1 Scope

This Standard is intended to cover the complete general and dimensional data for the various types of slotted and recessed head machine screws, tapping screws, and metallic drive screws recognized as American National Standard. Also included are appendices that provide specifications and instructions for the protrusion gaging of flat countersunk head screws; across-corners gaging of hex head screws; penetration gaging and wobble gaging of recessed head screws; approximate hole size for tapping screws; wrench openings for hex and square products; thread dimensions for the No. 0000, No. 000, and No. 00 sizes; means for determining effective grip lengths on screws; documentation for screw types and head types relegated to not-recommended or limited-usage status; and formulas on which dimensional data are based. It shall be understood, however, that where questions arise concerning acceptance of product, the dimensions in the tables shall govern over recalculation by formula.

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

1.2 Dimensions

All dimensions in this Standard are given in inches, unless stated otherwise.

1.3 Options

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

1.4 Responsibility for Modification

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

1.5 Terminology

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

1.6 Comparison With ISO

This Standard has no ISO counterpart.

1.7 Referenced Standards

(13)

Unless otherwise specified, the standards referenced shall be the latest at the time of order placement.

ASME B1.1, Unified Inch Screw Threads (UN and UNR Thread Form)

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

ASME B18.2.9, Straightness Gage and Gaging for Bolts and Screws

ASME B18.12, Glossary of Terms for Mechanical Fasteners

ASME B18.18, Quality Assurance for Fasteners

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

Publisher: The American Society of Mechanical Engineers (ASME), Two Park Avenue, New York, NY 10016-5990; Order Department: 22 Law Drive, P.O. Box 2900, Fairfield, NJ 07007-2900 (www.asme.org)

ASTM F1941, Specification for Electrodeposited Coatings on Threaded Fasteners [Unified Inch Screw Threads (UN/UNR)]

Publisher: American Society for Testing and Materials (ASTM International), 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA, 19428-2959 (www.astm.org)

SAE J423, Methods of Measuring Case Depth

Publisher: SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001 (www.sae.org)

1.8 Inspection and Quality Assurance

(13)

Unless otherwise specified, acceptability to this Standard shall be determined in accordance with ASME B18.18, Category 2 for manufacturers, plus all applicable material and/or mechanical tests indicated in this Standard.



2 GENERAL DATA FOR MACHINE SCREW AND TAPPING SCREW HEADS

2.1 Heads

2.1.1 Head Height. All dimensions pertaining to head height specified in the dimensional tables shall be measured parallel to the axis of the screw, and those relating to the top of the head shall represent a metal-to-metal measurement. In other words, any truncation of rounded head contours due to the slot or recess shall not be considered part of the head height.

Total or overall head heights shall be measured from the top of the head to the plane of the bearing surface for flat bearing surface type heads, to the plane of the undercut for undercut countersunk heads, and to the junction of the conical bearing surface with the basic screw diameter for countersunk heads.

Head side heights shall be measured from the theoretical intersection of the top surface of the head with the head diameter to the plane of the bearing surface for flat bearing surface type heads, to the plane of the undercut for undercut countersunk heads, and to the junction of the conical bearing surface with the basic screw diameter for countersunk heads.

On countersunk heads, the junction of the conical bearing surface with the basic screw diameter may not necessarily be the same as the actual junction of the head with the shank and the head height delineating the conical bearing surface is a reference dimension.

- (13) **2.1.2 Bearing Surface.** The bearing surface of flat bearing surface type screw heads shall be perpendicular to the axis of the screw shanks within 2 deg.

2.1.3 Gaging of Recesses

2.1.3.1 Penetration Gaging. The penetration gaging depth of the recess in recessed head screws shall be the primary inspection criteria. It is measured, parallel to the axis of screw, from the intersection of the maximum diameter of the recess with the head surface to the point at which penetration gage bottoms in the recess.

Recess gaging values are included in the respective dimensional tables. The gaging method and specifications for gages are contained in Mandatory Appendix III for Types I, IA, and III; and Mandatory Appendix VII for Type VI recesses.

2.1.3.2 Wobble Gaging. Recess wobble gages, gaging procedures, and permissible limits for recess Types I, IA, and III are given in Mandatory Appendix IV.

2.1.4 Slot

2.1.4.1 Slot Depth. The depth of the slot in slotted head screws shall be measured, parallel to the axis of screw, from the top of the head to the intersection of the bottom of the slot with the head surface or bearing surface.

2.1.4.2 Slot Width. The width of the slot shall be measured perpendicular to the axis of the screw, from the theoretical intersection of the bottom and one side of the slot, to the theoretical intersection of the bottom and the other side of the slot.

Unless specified by the purchaser, the slot width may be slightly tapered from the bottom to the top, or straight, at the option of the manufacturer.

2.1.5 Feature Positional Tolerances. The positional relationship of the heads and driving provisions of screws with respect to the shanks of screws (formerly defined as "eccentricity") shall be as follows:

(a) *True Position of Head.* The axis of the head shall be located at true position relative to the axis of the screw shank within a tolerance zone having a diameter equivalent to 6% of the specified maximum head diameter, or maximum width-across-flats of hex and hex washer heads, regardless of feature size.

(b) *True Position of Recess.* The recess in cross recessed head screws shall be located at true position relative to the axis of the screw shank within a tolerance zone having a diameter equivalent to 12% of the basic screw diameter or 0.030 in., whichever is greater, regardless of feature size.

(c) *True Position of Slot.* The slot in slotted head screws shall be located at true position relative to the axis of the screw shank within a tolerance zone having a diameter equivalent to 12% of the basic screw diameter or 0.020 in., whichever is greater.

2.1.6 Underhead Fillets. The radius of the fillet under countersunk head screws shall be no greater than 40% of the basic screw diameter. The radius of the fillet under truss heads and No. 6-sized pan heads shall be no greater than 25% of the basic screw diameter. The radius of the fillet under all other head styles shall be no greater than 15% of the basic screw diameter. Screws shall have a definite underhead fillet large enough to ensure that full fastener strength is achieved.

2.2 Screw Head Types

The head types covered by this Standard include those commonly recognized as being applicable to machine screws and tapping screws and are enumerated and described in paras. 2.2.1 through 2.2.12.

2.2.1 Flat Countersunk Head. The flat countersunk head has a flat top surface and a conical bearing surface with a head angle for one style of approximately 82 deg and for another style of approximately 100 deg. Dimensions are given in Tables 1 through 4. Dimensions of close tolerance 100-deg flat countersunk heads are given in Tables 5 and 6.

2.2.2 Oval Countersunk Head. The oval countersunk head has a rounded top surface and a conical bearing surface with a head angle of approximately 82 deg. Dimensions are given in Tables 7 and 8.



2.2.3 Undercut Flat and Oval Countersunk Heads.

For short lengths, 82-deg flat and oval countersunk head screws have heads undercut to 70% of normal side height to afford greater length of thread on the screws. Dimensions are given in Tables 9 through 12.

2.2.4 Flat and Oval Countersunk Trim Heads. Flat and oval countersunk trim heads are similar to the 82-deg flat and oval countersunk heads except that the size of head for a given size screw is one or two sizes smaller than the regular flat and oval countersunk head size, and oval countersunk trim heads have a controlled radius where the curved top surface meets the conical bearing surface. Trim heads are furnished only in cross recessed head types. Dimensions are given in Tables 13 through 16.

2.2.5 Pan Head. The slotted pan head has a flat top surface rounded into cylindrical sides and a flat bearing surface. The recessed pan head has a rounded top surface blending into cylindrical sides and a flat bearing surface. Dimensions are given in Tables 17 through 20.

2.2.6 Fillister Head. The fillister head has a rounded top surface, cylindrical sides, and a flat bearing surface. Dimensions are given in Tables 21 and 22. Dimensions of drilled fillister head machine screws are given in Table 23.

2.2.7 Truss Head. The truss head has a low rounded top surface with a flat bearing surface, the diameter of which for a given screw size is larger than the diameter of the corresponding pan head. Dimensions are given in Tables 24 through 26.

2.2.8 Binding Head. The binding head has a rounded top surface and slightly tapered sides. The bearing surface is flat and, where specified by the purchaser, slotted heads shall have an annular undercut adjacent to the shank. Binding heads are applicable only to machine screws. Dimensions are given in Tables 27 and 28.

2.2.9 Hex Head. The hex head has a flat or indented top surface, six flat sides, and a flat bearing surface. Dimensions for regular and large heads are given in Tables 29 through 31.

2.2.10 Hex Washer Head. The hex washer head has an indented top surface and six flat sides formed integrally with a flat washer that projects beyond the sides and provides a flat bearing surface. Dimensions are given in Tables 32 through 34.

2.2.11 Round Head. The round head has a semielliptical top surface and a flat bearing surface. In recognition of the superior slot-driving characteristics of pan head screws over round head screws, and the overlap in the dimensions of cross recessed pan heads and round heads, it is recommended that pan head screws be used in new designs and, wherever possible, substituted in

existing designs. Dimensions of round head screws are given in Tables 35 through 37.

2.2.12 Round Washer Head. The round washer head has a semielliptical top surface formed integrally with a flat washer that projects beyond the crown of the head and provides a flat bearing surface. Dimensions are given in Tables 38 and 39.

3 GENERAL DATA FOR MACHINE SCREWS

3.1 Machine Screw Threads

(13)

3.1.1 Uncoated Threads. Unless otherwise specified, threads for sizes No. 0 through $\frac{3}{4}$ in. shall conform to the requirements of Class 2A according to ASME B1.1. Threads for sizes No. 0000, No. 000, and No. 00 shall conform to the requirements in Mandatory Appendix V.

3.1.2 Coated or Plated Threads. Unless otherwise specified, coated or plated threads shall be accepted based on the high limits of Class 3A (GO) and the low limits of Class 2A (NO GO).

3.1.3 Thread Acceptance. Thread acceptance shall be determined using System 21 in ASME B1.3.

3.2 Machine Screw Length of Thread

Machine screws shall have thread lengths conforming to the following (on screws threaded full length, the distance to the first full-form thread shall be measured, parallel to the axis of screw, from the bearing surface of the head to the face of a nonchamfered or noncounter-bored special 3A GO thread ring gage assembled by hand as far as the thread will permit):

(a) *Sizes No. 5 and Smaller.* Screws of nominal lengths equal to three diameters and shorter shall have full-form threads extending to within one pitch (thread) of the bearing surface of the head, or closer, if practicable. Nominal lengths greater than three diameters, up to and including $1\frac{1}{8}$ in., shall have full-form threads extending to within two pitches (threads) of the bearing surface of the head, or closer, if practicable. Screws of longer nominal lengths shall, unless otherwise specified, have a minimum length of full-form thread of 1 in.

(b) *Sizes No. 6 and Larger.* Screws of nominal lengths equal to three diameters and shorter shall have full-form threads extending to within one pitch (thread) of the bearing surface of the head, or closer, if practicable. Nominal lengths greater than three diameters, up to and including 2 in., shall have full-form threads extending to within two pitches (threads) of the bearing surface of the head, or closer, if practicable. Screws of longer nominal lengths shall have a minimum length of full-form thread of 1.50 in. unless otherwise specified.

3.3 Machine Screw Length Measurement

The nominal length of screw, L , shall be measured, parallel to the axis of screw, from the extreme point



to the plane of the bearing surface for screws having perpendicular bearing surface type heads, and to the theoretical intersection of the top surface of head with the head diameter for screws having countersunk type heads. For all oval heads, the overall length, L_o , shall be measured, parallel to the axis of the screw, from the extreme point to the top of the head, where

$$L_o \text{ (overall length)} = L \text{ (nominal length)} + C \text{ (head crown height)}$$

3.4 Machine Screw Tolerance on Length

The length tolerance shall apply to L_o for all oval heads and to L for all other head styles. The tolerance on the length of machine screws shall conform to the following for the respective screw types:

Nominal Screw Length	Tolerance on Length for Nominal Screw Size		
	0000 Through 00	0 Through 12	$\frac{1}{4}$ Through $\frac{3}{4}$
Up to $\frac{1}{2}$ in., inclusive	-0.01	-0.02	-0.03
Over $\frac{1}{2}$ in. to 1 in., inclusive	-0.02	-0.03	-0.03
Over 1 in. to 2 in., inclusive	...	-0.06	-0.06
Over 2 in.	...	-0.09	-0.09

NOTE: Machine screws can be made to any length, but they are generally produced in fractional length increments of $\frac{1}{16}$ in. for screws up to $\frac{5}{8}$ in. long, $\frac{1}{8}$ in. for screws over $\frac{5}{8}$ in. through $1\frac{1}{2}$ in. long, and $\frac{1}{4}$ in. for screws over $1\frac{1}{2}$ in. long.

3.5 Machine Screw Diameter of Body

The diameter of body on machine screws having other than trim heads shall not be less than the Class 2A thread minimum pitch diameter nor greater than the basic major diameter of the thread.

NOTE: Trim head screws not threaded to the head shall have a shoulder of 0.062 in. min. length under the head with diameter limits as specified in the dimensional tables.

3.6 Machine Screw Points

Unless otherwise specified, machine screws shall have plain sheared ends. When chamfered points are specified by the purchaser, the point diameter shall be slightly under the minimum minor diameter and the chamfer length shall be one to two thread pitches in length.

3.7 Machine Screw Straightness

Straightness shall be determined using the gaging practices in B18.2.9. For lengths 12 in. and shorter, the tolerance shall be 0.006 in. per inch, and for lengths 24 in. and shorter but greater than 12 in., the tolerance shall be 0.008 in. per inch. For information of a typical gage design and an inspection procedure, consult ASME B18.2.9.

3.8 Machine Screw Material

3.8.1 Carbon Steel — Unhardened. Unless otherwise specified, machine screws shall be non-heat-treated low carbon steel, such as 1006 through 1022, with a hardness of Rockwell B69–100. (13)

3.8.2 Carbon Steel — Hardened. When hardened machine screws are specified, they shall be made from low or medium carbon steel, such as 1018 through 1038, with or without boron, through-hardened to Rockwell C25–38. (13)

3.8.3 Stainless Steel. When specified, stainless steel screws shall comply with the chemical requirements of ASTM F837.

3.8.4 Nonferrous. When specified, nonferrous screws shall comply with the chemical requirements of ASTM F468.

3.9 Machine Screw Finish

Unless otherwise specified, screws shall be supplied with a natural (as processed) finish, unplated or uncoated. When plating is specified, it shall conform to the requirements of ASTM F1941. When other coatings are specified, the requirements shall be agreed upon by the supplier and the purchaser.

3.10 Machine Screw Workmanship

Screws shall not contain an excess of surface imperfections that may affect their serviceability, such as burrs, seams, laps, loose scale, and other irregularities.

3.11 Machine Screw Designation

(13)

(a) Machine screws shall be designated by the following data, preferably in the sequence shown:

- (1) product name, including head type and driving provision and designation of the standard
- (2) nominal size (number, fraction, or decimal equivalent)
- (3) threads per inch
- (4) nominal length (fraction or decimal equivalent)
- (5) header point, if desired
- (6) material
- (7) protective coating, if required

EXAMPLES:

- (1) Slotted pan head machine screws, ASME B18.6.3, $\frac{1}{4}$ – 20 × $1\frac{1}{4}$, hardened carbon steel, zinc plated per ASTM F1941 Fe/Zn 3A.
- (2) Type IA cross recessed fillister head machine screw, ASME B18.6.3, 6 – 32 × $\frac{3}{4}$, UNS C46200 brass per ASTM F468.
- (3) Hexagon washer head machine screw, ASME B18.6.3, 0.375 – 16 × 1.50, unhardened carbon steel.
- (4) Type I cross recessed flat countersunk head machine screw, ASME B18.6.3, 0.190 – 24 × 1.50, unhardened carbon steel, phosphate/oil per ASTM E1137 Grade 0D.

(b) For a recommended part identifying number (PIN) system for machine screws, see ASME B18.24.



4 GENERAL DATA FOR TAPPING SCREWS

4.1 Tapping Screw Types and Application

Screws covered by this Standard and the appendices include tapping screws of the thread-forming, thread-cutting, and thread-rolling varieties, and metallic drive screws. The type designations, descriptions, and applications are detailed in paras. 4.1.1 through 4.1.3.

4.1.1 Thread-Forming Tapping Screws. Thread-forming tapping screws are generally for application in materials where large internal stresses are permissible, or desirable, to increase resistance to loosening. They shall be of the types described in paras. 4.1.1.1 through 4.1.1.5.

4.1.1.1 Types AB and ABR. Type AB tapping screws shall have spaced threads, with the same pitches as Type B, and a gimlet point. They are primarily intended for use in thin metal, resin-impregnated plywood, and asbestos compositions. Type AB screws, because they offer wider versatility of application, are recommended over Type A screws. If a nonsharp point is specifically required, designate the screws as "ABR." Dimensions for Types AB and ABR are given in Table 40.

4.1.1.2 Type B. Type B tapping screws shall have spaced threads and a blunt point with incomplete entering threads. They are intended for use in materials such as thin metal, nonferrous castings, plastics, resin-impregnated plywood, and asbestos compositions. Dimensions are given in Table 41.

4.1.1.3 Type BP. Type BP tapping screws shall have spaced threads the same as Type B but shall have a conical point extending beyond the incomplete entering threads. They are intended for piercing fabrics or for use in assemblies where holes may be misaligned. Dimensions are given in Table 41.

4.1.1.4 Type A. Type A tapping screws shall have coarse-spaced threads and a gimlet point. They are primarily intended for use in thin metal, resin-impregnated plywood, and asbestos compositions. Dimensions are given for reference purposes in Table 42.

4.1.1.5 Type C. Type C tapping screws shall have threads of machine screw diameter-pitch combinations approximating Unified Form with a blunt point and tapered incomplete entering threads. Type C tapping screws are not subject to thread gaging but shall meet all dimensional requirements specified herein. They are intended for application where the use of a machine screw pitch thread is preferable to the use of the spaced-thread types of thread-forming screws, or where chips from machine screw pitch thread-cutting screws are objectionable.

In view of the declining use of Type C screws, which in general require high driving torques, in favor of more efficient designs of thread-rolling tapping screws, they

are not recommended for new design. Accordingly, the dimensions are documented in Mandatory Appendix VI.

4.1.2 Thread-Cutting Tapping Screws. Thread-cutting tapping screws are generally for application in materials where disruptive internal stresses are undesirable or where excessive driving torques are encountered with thread-forming screws. They shall be of the types described in paras. 4.1.2.1 and 4.1.2.2.

4.1.2.1 Types BF and BT (25). Types BF and BT tapping screws shall have spaced threads with a blunt point and tapered entering threads, as on Type B, with one or more cutting edges and chip cavities. The tapered threads of the Type BF screw may be complete or incomplete at the manufacturer's option; all other types shall have incomplete tapered threads. These screws are intended for use in plastics, asbestos, and other similar compositions. Dimensions are given in Table 43.

4.1.2.2 Types D (1), F, G, and T (23). Types D, F, G, and T tapping screws shall have threads of machine screw diameter-pitch combinations approximating Unified Form with a blunt point and tapered entering threads having one or more cutting edges and chip cavities. The tapered threads of the Type F screw may be complete or incomplete at the manufacturer's option; all other types shall have incomplete tapered threads. Types D, F, G, and T tapping screws are not subject to thread gaging but shall meet the dimensions specified in Table 44. These screws are intended for use in materials such as aluminum, zinc, and lead die castings; steel sheets and shapes; cast iron; brass; plastics; etc.

4.1.3 Thread-Rolling Tapping Screws — Type TRS. Thread-rolling tapping screws shall have threads of machine screw diameter-pitch combinations approximating Unified Form with a blunt point, tapered entering threads, and some type of out-of-round-portion feature in the body and/or the tapered entering threads for displacing material in the application to form a mating internal thread without generating any chips.

Thread-rolling tapping screws are generally for application in materials where the installer wishes to have a thread engagement longer than one screw diameter; he or she does not wish to create chips during installation; and/or he or she wishes to maximize the difference between the amount of torque it takes to drive the screw up to its seating position and the torque required to fail the application either by screw breaking or thread stripping. Thread-rolling screws are installed in untapped holes larger than the comparable thread-cutting screws because thread-rolling screws uniformly displace the mating material instead of cutting it to create the internal thread. Dimensions are given in Table 45.



4.2 Threads and Points

The threads and points applicable to screws covered by this Standard are generally described under subsection 4.1. Types B, BP, BF, BT, C, D, F, G, T, and TRS tapping screws shall have tapered entering threads from a diameter slightly less than the thread minor diameter. Point taper length is the length from the pointed end to the first fully formed thread at the major diameter as determined by the distance that the point enters into a cylindrical NO GO major diameter ring gage. For other details and dimensions, refer to the tables covering the respective screw types.

4.3 Tapping Screw Length of Thread

Tapping screws shall have thread lengths conforming to the specifications detailed in paras. 4.3.1 through 4.3.3.

- (13) **4.3.1 Types A, AB, B, BF, BP, and BT.** For screws of nominal lengths equal to or shorter than the nominal screw lengths, L , listed in Table 46, the full-form threads shall extend close to the head such that the minor diameter limits of the specified thread are maintained to within Y distance from the underside of the head, or closer if practicable. See Fig. 1. Screws of nominal lengths, L , longer than those tabulated in Table 46 shall have a minimum length of full-form thread as shown in the " L_T Min." column of Table 46, unless otherwise specified by the purchaser.

4.3.2 Types C, D, G, T, and TRS. For screws of nominal lengths within the ranges listed under the "Fully Threaded" column of Table 47, full-form threads shall extend to within the respective Y max. unthreaded length limits from the underside of the head, or closer if practicable. Unthreaded length Y represents the distance, measured parallel to the axis of the screw, from the underside of the head to the face of a non-chamfered or non-counterbored thread ring set to Class 3A GO limits, assembled by hand as far as the thread will permit. See Fig. 2. Screws of nominal lengths longer than those tabulated under the "Partially Threaded" column of Table 47 shall have a minimum length of full-form thread as shown in the " L_T Min." column, unless otherwise specified by the purchaser.

4.3.3 Type F. For screws of nominal lengths within the ranges listed under the "Fully Threaded" column of Table 47, the full-form threads shall extend close to the head such that the major diameter limits of the specified thread are maintained to within the respective Y max. unthreaded length limits from the underside of the head, or closer if practicable. See Fig. 3. Screws of nominal lengths longer than those tabulated under the "Partially Threaded" column of Table 47 shall have a minimum length of full-form thread as shown in the " L_T Min." column, unless otherwise specified by the purchaser.

4.4 Tapping Screw Diameter of Body

4.4.1 Types A, AB, B, BP, BF, and BT tapping screw body diameters shall not be less than the minimum minor diameter nor greater than the maximum major diameter of the thread, except for trim head screws.

Trim head screws not threaded to head shall have a shoulder of 0.062 in. minimum length under the head with diameter limits as specified in the dimensional tables. At the manufacturer's option, the specified shoulder diameter may extend the entire length from the head to the thread.

4.4.2 Types C, D, F, G, T, and TRS tapping screw body diameters shall not be less than the Class 2A thread minimum pitch diameter nor greater than the maximum major diameter of the thread.

Trim head screws not threaded to head shall have a shoulder of 0.062 in. minimum length under the head with diameter limits as specified in the dimensional tables. At the manufacturer's option, the specified shoulder diameter may extend the entire length from the head to the thread.

4.5 Tapping Screw Length

4.5.1 Measurement. The nominal length of the screw, L , shall be measured, parallel to the axis of the screw, from the extreme point to the plane of the bearing surface for screws having perpendicular bearing surface type heads, and to the theoretical intersection of the top surface of the head with the head diameter for screws having countersunk type heads. For all oval heads, the overall length, L_o , shall be measured, parallel to the axis of the screw, from the extreme point to the top of the head, where

$$L_o \text{ (overall length)} = L \text{ (nominal length)} + C \text{ (head crown height)}$$

4.6 Tapping Screw Tolerance on Length

The length tolerance shall apply to L_o for all oval heads and to L for all other head styles. The tolerance on the length of tapping screws shall conform to the specifications detailed in paras. 4.6.1 and 4.6.2 for the respective screw types.

4.6.1 Types A, AB, and BP. The tolerance on length shall be as tabulated below.

Nominal Screw Length	Tolerance on Length
Up to 1 in., inclusive	± 0.03
Over 1 in.	± 0.05

4.6.2 Types B, BF, BT, C, D, F, G, T, and TRS. The tolerance on length shall be as tabulated below.

Nominal Screw Length	Tolerance on Length
Up to $\frac{3}{4}$ in., inclusive	-0.03
Over $\frac{3}{4}$ in. to $1\frac{1}{2}$ in., inclusive	-0.05
Over $1\frac{1}{2}$ in.	-0.06



NOTE: Tapping screws can be made to any length, but they are generally produced in fractional length increments of $\frac{1}{16}$ in. for screws up to $\frac{1}{2}$ in. long, $\frac{1}{8}$ in. for screws over $\frac{1}{2}$ in. through $1\frac{1}{2}$ in. long, $\frac{1}{4}$ in. for screws over $1\frac{1}{2}$ in. through 3 in. long, and $\frac{1}{2}$ in. for screws over 3 in. long.

4.7 Tapping Screw Straightness

Straightness shall be determined using the gaging practices in ASME B18.2.9. For lengths 12 in. and shorter, the tolerance shall be 0.006 in. per inch, and for lengths 24 in. and shorter but greater than 12 in., the tolerance shall be 0.008 in. per inch. For information on a typical gage design and an inspection procedure, consult ASME B18.2.9.

4.8 Tapping Screw Materials

- (13) **4.8.1 Steel.** Tapping screws are fabricated from low carbon steel, case hardened to meet the performance requirements set forth in these specifications. At the option of the manufacturer, the steel shall be killed or capped but not rimmed.

Screw Size	Carbon by % Wt.	Manganese by % Wt.
No. 4 and smaller	0.11–0.27	0.57–1.71
No. 5 and larger	0.13–0.27	0.64–1.71

NOTE: All material requirements come directly from SAE J933.

4.8.1.1 Core Hardness. Screws shall have a core hardness of Rockwell C28–38. Hardness shall not exceed the maximum shown and preferably should be no higher than Rockwell C36 to ensure against failure in assembly and service.

4.8.1.2 Case Hardness. Screws shall have a minimum case hardness of Rockwell C45.

4.8.1.3 Total Case Depth. Screws shall have a total case depth conforming to the following table, when tested as specified in SAE J423. At the maximum case depth, the hardness must not exceed Rockwell C42.

Nominal Size	Total Case Depth, in.	
	Min.	Max.
No. 2 through No. 6	0.002	0.007
No. 8 and No. 10	0.004	0.009
$\frac{1}{4}$ and larger	0.005	0.011

4.8.2 Other Materials. When specified, tapping screws may be made from other materials. The material and properties shall be agreed to by the supplier and the purchaser.

4.9 Tapping Screw Finish

Unless otherwise specified, screws shall be supplied with a natural (as processed) finish, unplated or uncoated. When plating is specified, it shall conform to the requirements of ASTM F1941. When other coatings are specified, the requirements, such as recess fill, thread acceptability, etc., shall be agreed upon by the supplier and the purchaser.

For Type TRS screws, all electroplated finishes must have an additional lubrication such as a wax top coating.

4.10 Tapping Screw Workmanship

(13)

Screws shall not contain surface imperfections that measurably affect their performance, such as burrs, seams, laps, loose scale, and other irregularities.

4.11 Performance Tests

The acceptability of carbon steel tapping screws shall be determined by subjecting the screws to the applicable tests specified in paras. 4.11.1 through 4.11.5.

4.11.1 Drive Test. All tapping screws except Types BF and BT shall be driven into standard test plates as specified in Table 48.

Tapping screws shall be driven into test plates, forming or cutting a mating thread until the tapered threads of the point are completely through the test plate. The screw points and tapered threads shall not exhibit any deformation.

The test-hole sizes specified in Table 48 were predicted originally on the testing of plain finish (uncoated or unplated) screws. Subsequent experience has shown these hole sizes to be satisfactory for the testing of screws having most types of commercial finishes. However, some finishes, heavy coatings in particular, alter the performance characteristics of the screws. Where screws with such finishes fail the test, they shall be stripped of plating, baked, lubricated with machine oil, and retested in the plain finish condition. If screws so tested pass the test, it will be determined that they are acceptable, and the problem arising from the finish shall be subject to resolution between the manufacturer and the purchaser. In cases where screws are plated subsequent to delivery to the purchaser, or where plating of screws is otherwise under the control of the purchaser, the screw manufacturer shall not be held responsible for failures due to plating.

4.11.2 Type TRS Drive Torque Test. When performing the drive test using Type TRS screws, the maximum torque to drive the tapered threads completely through the test plate shall be recorded and shall not exceed the values shown in Table 49 regardless of their finish or coating. Speed of driving the screws shall not exceed 500 rotations per minute (rpm). In the event of dispute, the speed of 30 rpm shall be used for referee purposes.

4.11.3 Torsional Strength Test. Screws shall be securely clamped by suitable means such that the clamped portion of threads are not damaged and that at least two full threads project above the clamping device, and that at least two full threads exclusive of point, flutes, or end slot are held within the clamping device. (A blind hole may be used in place of a threaded clamping device, provided the hole depth is such as to



ensure that breakage will occur beyond the point or the full length of the flutes or end slot.) By means of a suitably calibrated torque-measuring device, torque shall be applied to the screw until failure occurs. The torque required to twist the screw into two pieces shall be no less than the minimum value given in Table 50 for the type and size of screw being tested. A typical fixture for conducting torsional strength tests on tapping screws is depicted in Fig. 4.

4.11.4 Ductility Test. The sample screw shall be inserted into a hole in a hardened 10-deg wedge block or other suitable device. The hole shall be 0.020 in. to 0.040 in. larger than the nominal screw diameter. An axial compressive load shall be applied against the top of the screw head and continued until the plane of the underhead bearing surface is permanently bent with respect to a plane perpendicular to the axis of the screw. This may be accomplished utilizing a hammer and applying a single or repeated blows, as necessary, to achieve a permanent bend. Head separation shall be cause for rejection.

4.11.5 Hydrogen Embrittlement Test. Electroplated screws shall be installed into a steel test plate as specified in Table 48 with the head of the screw seated against a standard steel flat washer or stack of washers to keep the head angle of countersunk heads and the thread runoff from engaging the top surface of the test plate. For longer screws having an unthreaded shank portion, steel spacers, of a length that will ensure that full-form thread engagement is maintained within the test-plate thickness, shall be used between the screw head and the test plate.

Drive five screws to failure (i.e., screw breakage into two or more parts) and average the failure values. Tighten sample screws to 80% of the average failure torque. The screws shall be allowed to remain in this tightened state for a period of 24 hr. The original embrittlement test torque shall then be reapplied, and there shall be no evidence of screw failure.

(13) 4.12 Tapping Screw Designation

(a) Tapping screws shall be designated by the following data in the sequence shown:

- (1) product name, including head type, driving provision, and designation of standard
- (2) nominal size (number, fraction, or decimal equivalent)
- (3) threads per inch
- (4) nominal length (fraction or decimal equivalent)
- (5) point type
- (6) material
- (7) protective finish, if required

EXAMPLES:

- (1) Slotted pan head tapping screw, ASME B18.6.3, $\frac{1}{4}$ – 14 $\times$ 1 $\frac{1}{4}$, Type AB, steel plated zinc per ASTM F1941 Fe/Zn 3A.

- (2) Type 1 cross recessed pan head tapping screw, ASME B18.6.3, 6 – 32 $\times$ $\frac{3}{4}$, Type F, corrosion-resistant steel per UNS S30200, passivated per ASTM A380.

(b) Until ASME B18.24 is revised, the part identifying numbers will be listed under ASME B18.6.4 rather than ASME B18.6.3.

4.13 Tapping Screw Assembly Considerations

The finish (plating or coating) on tapping screws and the material composition and hardness of the mating component are factors that affect assembly torques in individual applications. Although the recommended hole sizes shown in Nonmandatory Appendix D were originally based on the use of plain unfinished carbon steel screws, experience has since proven that the specified holes are also suitable for screws having most types of commercial finishes. However, it should be noted that, due to various finishes providing different degrees of lubricity, some adjustment of installation torques may be necessary to suit individual applications. Also, where exceptionally heavy finishes are involved or screws are to be assembled into materials of higher hardness, some deviation from the specified hole sizes may be required to provide optimum assembly. The necessity and extent of such deviations can best be determined by experiment in the particular assembly environment.

5 GENERAL DATA FOR METALLIC DRIVE SCREWS

Metallic drive screws are designated Type U. They shall have multiple start threads of a large helix angle with a pilot point. These screws are intended for making permanent fastenings in metals and plastics, when forced into the work under pressure. Dimensions are given in Table 51.

5.1 Drive Screw Threads

Type U metallic drive screws shall have multiple start threads, as specified for the respective screw size, with a helix angle of 45 deg to 65 deg.

5.2 Drive Screw Length of Thread

Type U metallic drive screws shall have fully formed threads extending from the base of pilot to the head except that threads at the starting end and under the head may be incomplete for a length equal to one-half of the maximum screw diameter, due to the natural flow of material in the thread-forming operation.

5.3 Drive Screw Points

Type U metallic drive screws shall have a pilot point. The blunt end of the pilot may be slightly angular, as depicted in the illustration in Table 51, due to the natural flow of material in the cutoff process.



5.4 Drive Screw Tolerance on Length

The tolerance on length of Type U metallic drive screws shall be as tabulated below.

Nominal Screw Length	Tolerance on Length
Up to $\frac{3}{8}$ in., inclusive	± 0.02
Over $\frac{3}{8}$ in.	± 0.03

5.5 Drive Screw Material

- (13) **5.5.1 Steel.** Unless otherwise specified, Type U metallic drive screws shall be made of low carbon or low carbon boron steel case hardened as required in paras. 4.8.1, 4.8.1.1, 4.8.1.2, and 4.8.1.3.

5.5.2 Other Materials. When specified, drive screws shall be made from other materials; the materials and properties shall be agreed to by the supplier and purchaser.

5.6 Test Requirements

Type U metallic drive screws shall be driven into steel test plates having a hardness of Rockwell B70 to B85 and having the thickness of Type C in Table 48 and hole sizes as specified in Table 51. The screws shall produce mating threads in the test plates without breaking or shearing of the screw threads.

(13) 5.7 Drive Screw Designation

(a) Type U metallic drive screws shall be designated by the following data in the sequence shown:

- (1) round head metallic drive screw ASME B18.6.3
- (2) nominal diameter (number, fraction, or decimal equivalent)
- (3) length (fraction or decimal equivalent)
- (4) material
- (5) protective finish including standard number

EXAMPLES:

- (1) Round head metallic drive, ASME B18.6.3, $10 \times \frac{5}{16}$, screw, steel.
- (2) Round head metallic drive screw, ASME B18.6.3, $\frac{5}{16} \times 0.50$, steel, zinc plated per ASTM F1941, Fe/Zn 3A.

(b) Until ASME B18.24 is revised, the part identifying numbers will be listed under ASME B18.6.4 rather than ASME B18.6.3.

Fig. 1 Types A, AB, B, BF, BP, and BT

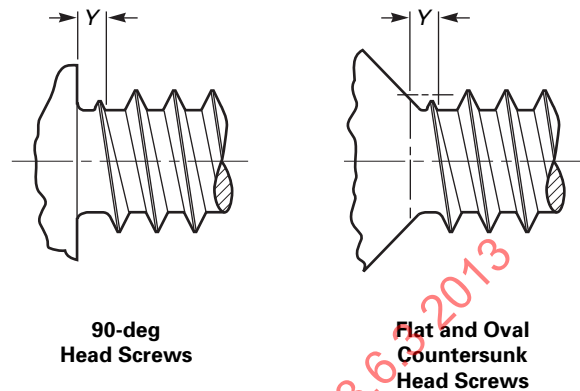


Fig. 2 Types C, D, G, T, and TRS

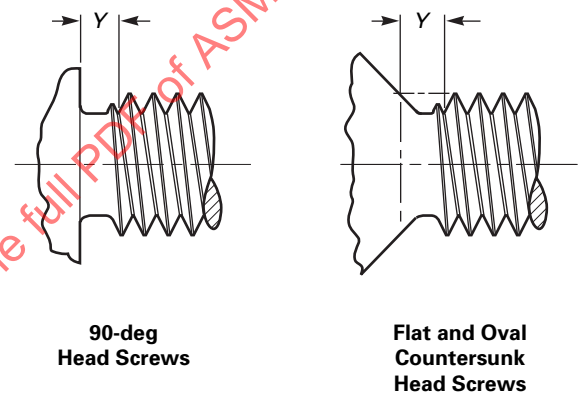


Fig. 3 Type F

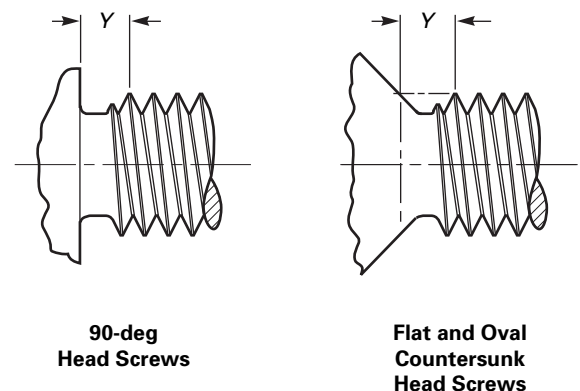
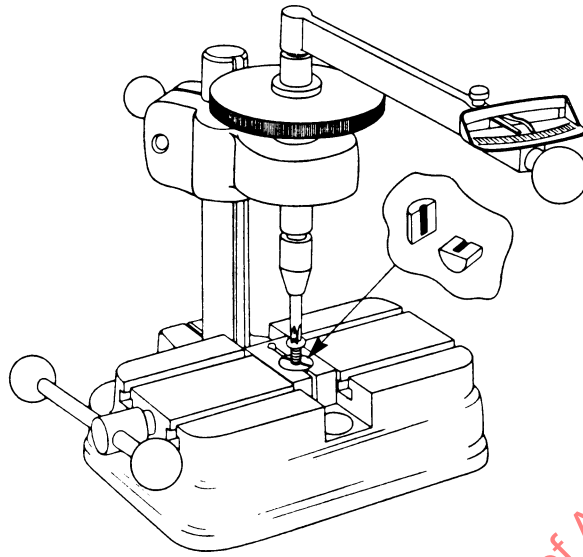
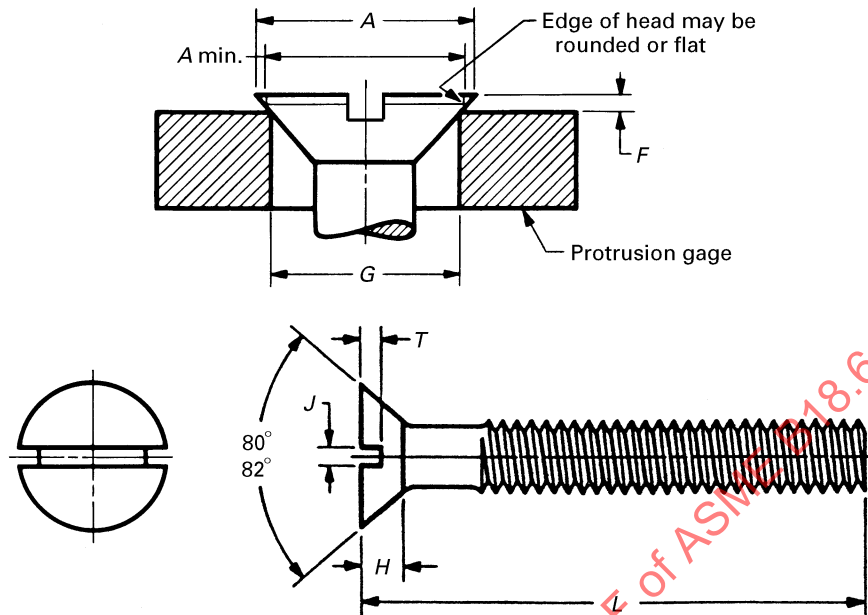


Fig. 4 Typical Torsional Strength Test Fixture



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Table 1 Dimensions of Slotted Flat Countersunk Head Screws

Nominal Size or Basic Screw Diameter [Notes (1), (2), (3)]	Machine Screw Length, L [Note (4)]	These Lengths or Shorter Are Undercut [Note (4)]		Head Diameter, A		Head Height, H, Ref. [Note (5)]	Slot Width, J		Slot Depth, T		Protrusion Above Gaging Diameter, F [Note (6)]		Gaging Diameter, G [Note (6)]
		Type A & AB Tapping Screws	Other Types of Tapping Screws	Max.	Min.		Max.	Min.	Max.	Min.	Max.	Min.	
0000 0.0210	...	...	...	0.040	0.035	0.011	0.008	0.004	0.007	0.003	[Note (7)]	[Note (7)]	[Note (7)]
000 0.0340	...	...	...	0.060	0.055	0.016	0.011	0.007	0.009	0.005	[Note (7)]	[Note (7)]	[Note (7)]
00 0.0470	...	...	...	0.087	0.080	0.028	0.017	0.010	0.014	0.009	[Note (7)]	[Note (7)]	[Note (7)]
0 0.0600	1/8	3/16	1/8	0.112	0.096	0.035	0.023	0.016	0.015	0.010	0.026	0.016	0.078
1 0.0730	1/8	3/16	5/32	0.137	0.120	0.043	0.026	0.019	0.019	0.012	0.028	0.016	0.101
2 0.0860	1/8	3/16	3/16	0.162	0.144	0.051	0.031	0.023	0.023	0.015	0.029	0.017	0.124
3 0.0990	1/8	7/32	7/32	0.187	0.167	0.059	0.035	0.027	0.027	0.017	0.031	0.018	0.148
4 0.1120	3/16	1/4	1/4	0.212	0.191	0.067	0.039	0.031	0.030	0.020	0.032	0.019	0.172
5 0.1250	3/16	1/4	1/4	0.237	0.215	0.075	0.043	0.035	0.034	0.022	0.034	0.020	0.196
6 0.1380	3/16	5/16	5/16	0.262	0.238	0.083	0.048	0.039	0.038	0.024	0.036	0.021	0.220
7 0.1510	...	3/8	3/8	0.287	0.262	0.091	0.048	0.039	0.041	0.027	0.037	0.022	0.243
8 0.1640	1/4	7/16	7/16	0.312	0.285	0.100	0.054	0.045	0.045	0.029	0.039	0.023	0.267
10 0.1900	5/16	1/2	1/2	0.362	0.333	0.116	0.060	0.050	0.053	0.034	0.042	0.025	0.313
12 0.2160	3/8	9/16	9/16	0.412	0.380	0.132	0.067	0.056	0.060	0.039	0.045	0.027	0.362
14 0.2420	...	5/8	...	0.462	0.427	0.148	0.075	0.064	0.068	0.044	0.049	0.029	0.410
1/4 0.2500	7/16	5/8	5/8	0.477	0.442	0.153	0.075	0.064	0.070	0.046	0.050	0.029	0.424
16 0.2680	...	3/4	...	0.512	0.475	0.164	0.075	0.064	0.075	0.049	0.052	0.031	0.457
18 0.2940	...	13/16	...	0.561	0.522	0.180	0.084	0.072	0.083	0.054	0.055	0.033	0.505
5/16 0.3125	1/2	13/16	5/8	0.597	0.556	0.191	0.084	0.072	0.088	0.058	0.057	0.034	0.539
20 0.3200	...	13/16	...	0.611	0.569	0.196	0.084	0.072	0.090	0.059	0.058	0.035	0.553
24 0.3720	...	1	...	0.711	0.664	0.228	0.094	0.081	0.105	0.069	0.065	0.039	0.648
3/8 0.3750	9/16	...	5/8	0.717	0.670	0.230	0.094	0.081	0.106	0.070	0.065	0.039	0.653
7/16 0.4375	5/8	...	3/4	0.760	0.715	0.223	0.094	0.081	0.103	0.066	0.073	0.044	0.690
1/2 0.5000	3/4	...	3/4	0.815	0.765	0.223	0.106	0.091	0.103	0.065	0.081	0.049	0.739
9/16 0.5625	...	...	...	0.932	0.878	0.260	0.118	0.102	0.120	0.077	0.089	0.053	0.851
5/8 0.6250	...	...	...	1.050	0.990	0.298	0.133	0.116	0.137	0.088	0.097	0.058	0.962
3/4 0.7500	...	...	...	1.285	1.215	0.372	0.149	0.131	0.171	0.111	0.112	0.067	1.186

Table 1 Dimensions of Slotted Flat Countersunk Head Screws (Cont'd)

GENERAL NOTES:

- (a) For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.
- (b) Applicable to screw types as indicated below. See referenced tables for thread and point dimensions.
 - (1) Type A thread forming, except short lengths, see Table 42.
 - (2) Type AB thread forming, see Table 40.
 - (3) Type B and BP thread forming, see Table 41 and Types BF and BT thread cutting, see Table 43.
 - (4) Type C thread forming, see Mandatory Appendix VI; Types D, F, G, and T thread cutting, see Table 44; and Type TRS thread-rolling, see Table 45.
- (c) For recess dimensions, refer to Table 2.
- (d) For slot inspection, see para. 2.1.4.

NOTES:

- (1) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
- (2) Sizes 0000, 000, 00, $\frac{9}{16}$, $\frac{5}{8}$, and $\frac{3}{4}$ are for machine screws only.
- (3) Sizes 7, 14, 16, 18, 20, and 24 are for tapping screws only.
- (4) Screws of these lengths and shorter shall have undercut heads as shown in Table 9. For tapping screws, use Type AB undercut head screws in place of Type A screws for these lengths and shorter.
- (5) Tabulated values determined from formula for maximum H in Nonmandatory Appendix C.
- (6) No tolerance for gaging diameter is given. If the gaging diameter of the gage used differs from tabulated value, the protrusion will be affected accordingly, and the proper protrusion values must be recalculated using the formulas shown in Mandatory Appendix I.
- (7) Not practical to gage.



Table 2 Recess Dimensions for Flat Countersunk Head Screws

Nominal Screw Size or Basic Screw Diameter [Notes (1), (2), (3)]	Type I			Type IA			Type III			Type VI		
	Recess Penetration Gaging			Recess Penetration Gaging			Recess Penetration Gaging			Recess Penetration Gaging		
	Depth, P			Depth, P			Depth, P			Depth, P		
	Max.	Min.		Max.	Min.		Max.	Min.		Max.	Min.	
Recess Dia., M, Ref.	Driver Size	Recess Dia., M, Ref.	Driver Size	Recess Dia., M, Ref.	Driver Size	Recess Dia., M, Ref.	Driver Size	Recess Dia., M, Ref.	Driver Size	Recess Dia., M, Ref.	Driver Size	Recess Dia., M, Ref.
0 0.060	0 0.062	0 0.036	0.020	0 0.062	0 0.037	0.021	...	...	...	...	...	...
1 0.073	0 0.070	0 0.044	0.028	0 0.070	0 0.045	0.029	...	...	...	...	T5	0.017
2 0.086	0.096	1 0.056	0.040	0.096	1 0.053	0.037	0.050	0 0.033	0.028	0.058	T6	0.022
3 0.099	0.100	1 0.061	0.045	0.100	1 0.058	0.042	0.070	0 0.038	0.028	0.069	T8	0.025
4 0.112	0.122	1 0.082	0.066	0.122	1 0.079	0.063	0.070	0 0.038	0.028	0.094	T8	0.033
5 0.125	0.148	2 0.075	0.052	0.148	2 0.071	0.053	0.091	15 0.055	0.040	0.094	T10	0.045
6 0.138	0.168	2 0.095	0.072	0.168	2 0.091	0.073	0.091	1S 0.055	0.040	0.111	T10	0.045
7 0.151	0.176	2 0.103	0.080	0.176	2 0.099	0.081	0.091	1R 0.065	0.050	0.111	T15	0.045
8 0.164	0.182	2 0.110	0.087	0.182	2 0.107	0.089	0.112	2S 0.063	0.048	0.132	T15	0.051
10 0.190	0.198	2 0.125	0.102	0.198	2 0.122	0.104	0.112	2R 0.075	0.060	0.132	T20	0.065
12 0.216	0.262	3 0.139	0.116	0.262	3 0.136	0.118	0.133	3R 0.095	0.080	0.155	T25	0.070
14 0.242	0.276	3 0.154	0.131	0.276	3 0.151	0.133	0.133	3R 0.095	0.080	0.178	T27	0.080
										0.200		0.065
										0.226		0.040
										0.232		0.026
										0.242		0.031
										0.252		0.036
										0.262		0.040

This type of recess has a center opening having six equally spaced lobes, straight sidewalls, a conical bottom, and top edges slightly rounded.

This type of recess has a square center opening, slightly tapered side walls, and a conical bottom, with top edges relieved or rounded.

This type of recess has a large center opening, wide straight wings, and blunt bottom, with all edges relieved or rounded.

This type of recess has a large center opening, tapered wings, and blunt bottom, with all edges relieved or rounded.



Table 2 Recess Dimensions for Flat Countersunk Head Screws (Cont'd)

Nominal Screw Size or Basic Screw Diameter [Notes (1), (2), (3)]	Type I			Type IA			Type III			Type VI		
	Recess			Recess			Recess			Recess		
	Penetration Gaging			Penetration Gaging			Penetration Gaging			Penetration Gaging		
	Depth, <i>P</i>	Max.	Min.	Depth, <i>P</i>	Max.	Min.	Depth, <i>P</i>	Max.	Min.	Depth, <i>P</i>	Max.	Min.
Recess Dia., <i>M</i> , Ref.	Driver Size	Recess Dia., <i>M</i> , Ref.		Driver Size	Recess Dia., <i>M</i> , Ref.		Driver Size	Recess Dia., <i>M</i> , Ref.		Driver Size	Recess Dia., <i>M</i> , Ref.	
		Max.	Min.		Max.	Min.		Max.	Min.		Max.	Min.
1/4 0.250	3	0.276	0.131	3	0.151	0.133	3R	0.095	0.080	0.200	0.090	0.075
16 0.268	3	0.296	0.151	3	0.171	0.153	3R	0.095	0.080	0.221	0.070	0.055
18 0.294	4	0.358	0.174	4	0.193	0.175	4R	0.100	0.085	0.221	0.090	0.075
5/16 0.313	4	0.358	0.174	4	0.193	0.175	4R	0.100	0.085	0.266	0.105	0.087
20 0.320	4	0.372	0.188	4	0.206	0.188	4R	0.100	0.085	0.266	0.115	0.095
24 0.372	4	0.386	0.203	4	0.222	0.204	4R	0.100	0.085	0.266	0.125	0.105
3/8 0.375	4	0.386	0.203	4	0.222	0.204	4R	0.100	0.085	0.266	0.135	0.115
7/16 0.438	4	0.402	0.219	4	0.238	0.220	...	...	...	0.352	0.125	0.105
1/2 0.500	4	0.418	0.234	4	0.253	0.235	...	...	...	0.352	0.135	0.120
9/16 0.563	4	0.443	0.258	4	0.276	0.258	...	...	...	0.446	0.160	0.140
5/8 0.625	5	0.565	0.283	5	0.307	0.286	...	...	...	0.446	0.160	0.140
3/4 0.750	5	0.628	0.347	5	0.372	0.351	...	...	...	0.529	0.230	0.205

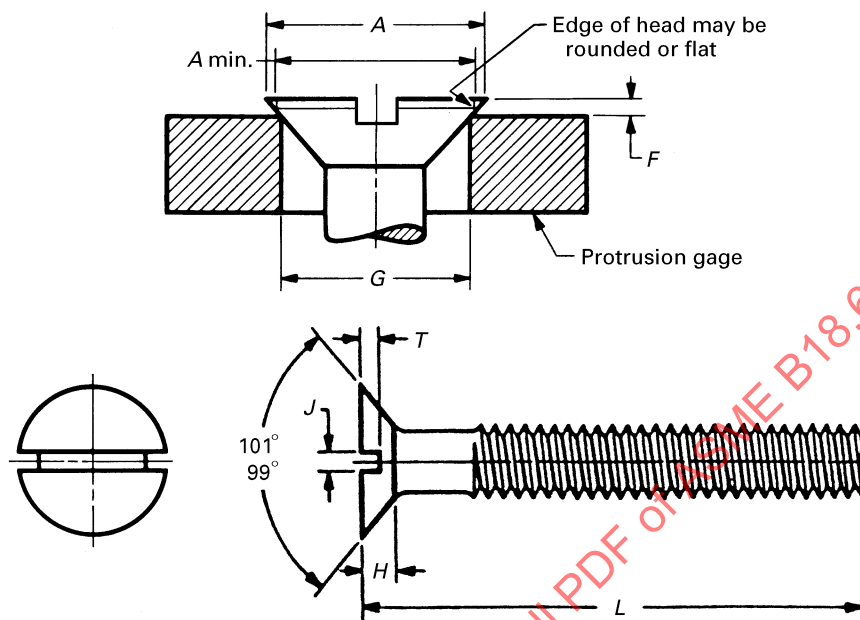
GENERAL NOTES:

- (a) For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.
 (b) For head dimensions, refer to Table 1.
 (c) For recess inspection, see para. 2.1.3.

NOTES:

- (1) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
 (2) Sizes $\frac{9}{16}$, $\frac{5}{8}$, and $\frac{3}{4}$ are for machine screws only.
 (3) Sizes 7, 14, 16, 20, and 24 are for tapping screws only.
 (4) "R" in the recess size tabulation means regular depth recess, and "S" means short depth recess.
 (5) Square recesses incorporate a slight taper on the sides of the recess. This taper can result in loss of penetration gaging depth on finished fasteners due to the build up of plating in the recesses. The recess penetration dimensions specified here are for finished (plated) product. Manufacturers should be advised that they should not use all this tolerance in the heading process, or an out of tolerance condition could exist after plating.



Table 3 Dimensions of Slotted 100-deg Flat Countersunk Head Screws (Machine Screws Only)

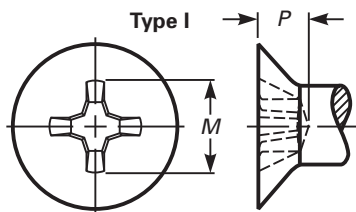
Nominal Size or Basic Screw Diameter [Note (1)]	Head Diameter, A		Head Height, H [Note (2)]	Slot Width, J		Slot Depth, T		Protrusion Above Gaging Diameter, F [Note (3)]		Gaging Diameter, G [Note (3)]
	Max.	Min.	Ref.	Max.	Min.	Max.	Min.	Max.	Min.	
0000 0.0210	0.040	0.035	0.009	0.008	0.005	0.008	0.004	[Note (4)]	[Note (4)]	[Note (4)]
000 0.0340	0.060	0.055	0.014	0.012	0.008	0.011	0.007	[Note (4)]	[Note (4)]	[Note (4)]
00 0.0470	0.087	0.080	0.020	0.017	0.010	0.013	0.008	[Note (4)]	[Note (4)]	[Note (4)]
0 0.0600	0.112	0.095	0.026	0.023	0.016	0.013	0.008	0.020	0.012	0.074
1 0.0730	0.137	0.118	0.031	0.026	0.019	0.016	0.010	0.021	0.013	0.098
2 0.0860	0.162	0.142	0.037	0.031	0.023	0.019	0.012	0.022	0.014	0.121
3 0.0990	0.187	0.165	0.043	0.035	0.027	0.022	0.014	0.024	0.015	0.144
4 0.1120	0.212	0.188	0.049	0.039	0.031	0.024	0.017	0.025	0.016	0.167
6 0.1380	0.262	0.235	0.060	0.048	0.039	0.030	0.022	0.028	0.017	0.214
8 0.1640	0.312	0.282	0.072	0.054	0.045	0.036	0.027	0.031	0.019	0.261
10 0.1900	0.362	0.329	0.083	0.060	0.050	0.042	0.031	0.034	0.021	0.307
1/4 0.2500	0.477	0.437	0.110	0.075	0.064	0.055	0.042	0.040	0.025	0.415
5/16 0.3125	0.597	0.550	0.138	0.084	0.072	0.069	0.053	0.047	0.030	0.526
3/8 0.3750	0.717	0.662	0.165	0.094	0.081	0.083	0.065	0.053	0.034	0.638

GENERAL NOTES:

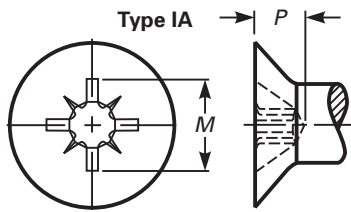
- (a) For additional requirements, refer to sections 2 and 3.
 (b) For recess dimensions, refer to Table 4.
 (c) For slot inspection, see para. 2.1.4.

NOTES:

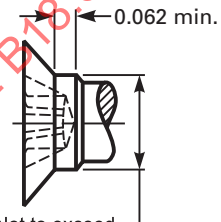
- (1) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
 (2) Tabulated values determined from formula for maximum H in Nonmandatory Appendix C.
 (3) No tolerance for gaging diameter is given. If the gaging diameter of the gage used differs from tabulated value, the protrusion will be affected accordingly, and the proper protrusion values must be recalculated using the formulas shown in Mandatory Appendix I.
 (4) Not practical to gage.

Table 4 Recess Dimensions for 100-deg Flat Countersunk Head Screws (Machine Screws Only)

This type of recess has a large center opening, tapered wings, and blunt bottom, with all edges relieved or rounded.



This type of recess has a large center opening, wide straight wings, and blunt bottom, with all edges relieved or rounded.



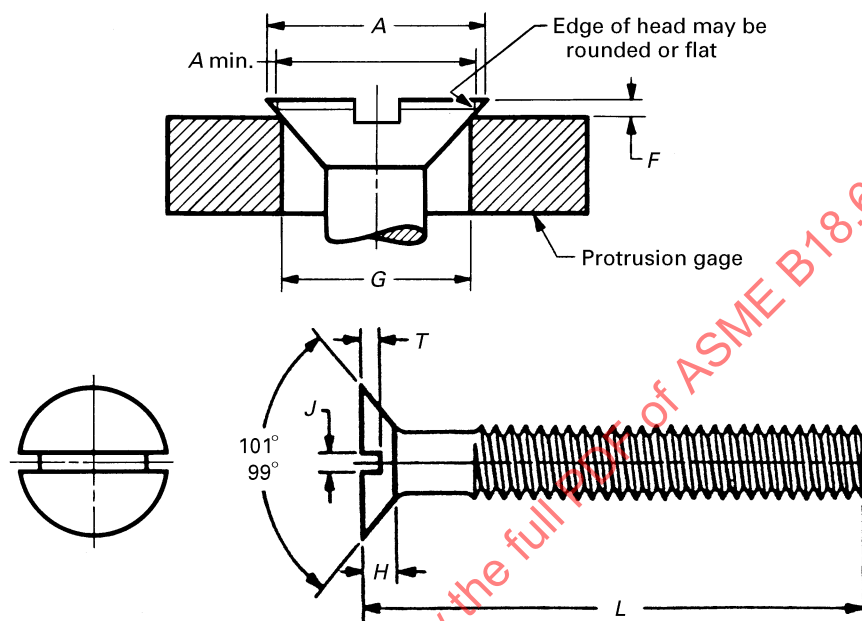
Optional Shoulder for Long Recessed Head Screws With Reduced Body

Nominal Size or Basic Screw Diameter [Note (1)]	Type I				Type IA			
	Recess Dia., <i>M</i> , Ref.	Driver Size	Recess Penetration Gaging Depth, <i>P</i>		Recess Dia., <i>M</i> , Ref.	Driver Size	Recess Penetration Gaging Depth, <i>P</i>	
			Max.	Min.			Max.	Min.
0 0.0600	0.054	0	0.028	0.012	0.054	0	0.029	0.013
1 0.0730	0.062	0	0.036	0.020	0.062	0	0.037	0.021
2 0.0860	0.088	1	0.049	0.033	0.088	1	0.046	0.030
3 0.0990	0.096	1	0.056	0.040	0.096	1	0.053	0.037
4 0.1120	0.110	1	0.071	0.055	0.110	1	0.068	0.052
6 0.1380	0.148	2	0.075	0.052	0.148	2	0.071	0.053
8 0.1640	0.162	2	0.090	0.067	0.162	2	0.086	0.068
10 0.1900	0.178	2	0.105	0.082	0.178	2	0.101	0.083
1/4 0.2500	0.240	3	0.118	0.095	0.240	3	0.114	0.096
5/16 0.3125	0.310	4	0.148	0.126	0.310	4	0.145	0.127
3/8 0.3750	0.336	4	0.173	0.151	0.336	4	0.170	0.152

NOTE:

(1) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.

Table 5 Dimensions of Slotted Close Tolerance 100-deg Flat Countersunk Head Screws (Machine Screws Only)



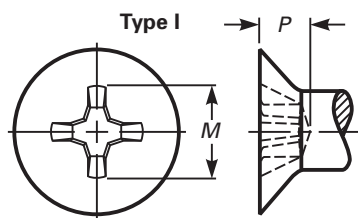
Nominal Size or Basic Screw Diameter [Note (1)]	Head Diameter, <i>A</i>		Head Height, <i>H</i> [Note (2)]	Slot Width, <i>J</i>		Slot Depth, <i>T</i>		Protrusion Above Gaging Diameter, <i>F</i> [Note (3)]		Gaging Diameter, <i>G</i> [Note (3)]	
	Max.	Min.	Ref.	Max.	Min.	Max.	Min.	Max.	Min.		
4	0.1120	0.212	0.188	0.049	0.039	0.031	0.024	0.017	0.025	0.019	0.167
6	0.1380	0.262	0.235	0.060	0.048	0.039	0.030	0.022	0.028	0.021	0.214
8	0.1640	0.312	0.282	0.072	0.054	0.045	0.036	0.027	0.031	0.023	0.261
10	0.1900	0.362	0.329	0.083	0.060	0.050	0.042	0.031	0.034	0.026	0.307
1/4	0.2500	0.477	0.437	0.110	0.075	0.064	0.055	0.042	0.040	0.031	0.415
5/16	0.3125	0.597	0.550	0.138	0.084	0.072	0.069	0.053	0.047	0.037	0.526
3/8	0.3750	0.717	0.662	0.165	0.094	0.081	0.083	0.065	0.053	0.042	0.638
7/16	0.4375	0.837	0.774	0.193	0.094	0.081	0.097	0.076	0.060	0.047	0.750
1/2	0.5000	0.957	0.887	0.221	0.106	0.091	0.111	0.088	0.066	0.053	0.862
9/16	0.5625	1.077	1.000	0.249	0.118	0.102	0.125	0.099	0.073	0.058	0.974
5/8	0.6250	1.197	1.112	0.276	0.133	0.116	0.139	0.111	0.080	0.063	1.086

GENERAL NOTE: For additional requirements, refer to sections 2 and 3.

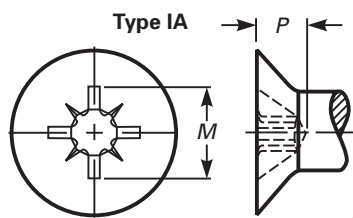
NOTES:

- (1) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
- (2) Tabulated values determined from formula for maximum H in Nonmandatory Appendix C.
- (3) No tolerance for gaging diameter is given. If the gaging diameter of the gage used differs from tabulated value, the protrusion will be affected accordingly, and the proper protrusion values must be recalculated using the formulas shown in Mandatory Appendix I.

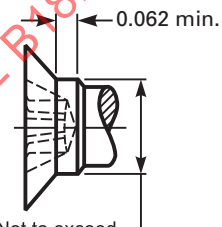
Table 6 Recess Dimensions for Close Tolerance 100-deg Flat Countersunk Head Screws (Machine Screws Only)



This type of recess has a large center opening, tapered wings, and blunt bottom, with all edges relieved or rounded.



This type of recess has a large center opening, wide straight wings, and blunt bottom, with all edges relieved or rounded.



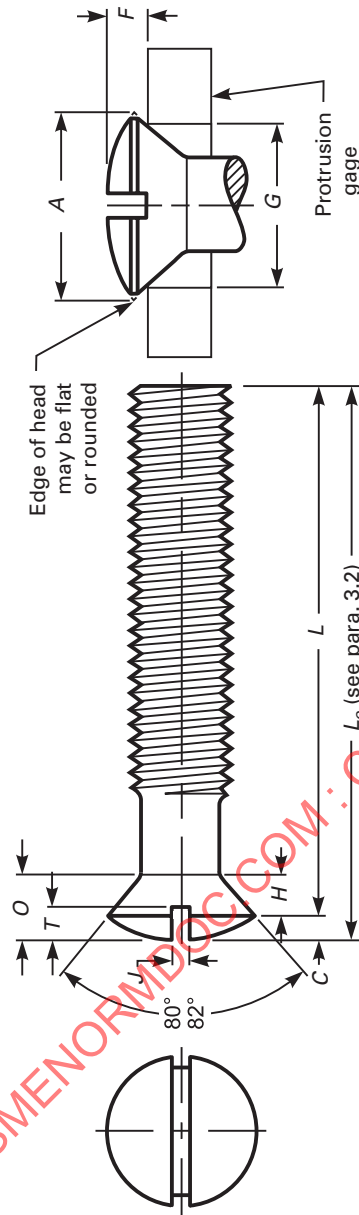
Optional Shoulder for Long Recessed Head Screws With Reduced Body

Nominal Size or Basic Screw Diameter [Note (1)]	Type I				Type IA			
	Recess Dia., <i>M</i> , Ref.	Driver Size	Recess Penetration Gaging Depth, <i>P</i>		Recess Dia., <i>M</i> , Ref.	Driver Size	Recess Penetration Gaging Depth, <i>P</i>	
			Max.	Min.			Max.	Min.
4 0.1120	0.110	1	0.071	0.055	0.110	1	0.068	0.052
6 0.1380	0.148	2	0.075	0.052	0.148	2	0.071	0.053
8 0.1640	0.162	2	0.090	0.067	0.162	2	0.086	0.068
10 0.1900	0.178	2	0.105	0.082	0.178	2	0.101	0.083
$\frac{1}{4}$ 0.2500	0.240	3	0.118	0.095	0.240	3	0.114	0.096
$\frac{5}{16}$ 0.3125	0.310	4	0.148	0.126	0.310	4	0.145	0.127
$\frac{3}{8}$ 0.3750	0.336	4	0.173	0.151	0.336	4	0.170	0.152
$\frac{7}{16}$ 0.4375	0.360	4	0.198	0.176	0.360	4	0.194	0.176
$\frac{1}{2}$ 0.5000	0.386	4	0.226	0.204	0.386	4	0.222	0.204
$\frac{9}{16}$ 0.5625	0.418	4	0.256	0.234	0.418	4	0.253	0.235
$\frac{5}{8}$ 0.6250	0.504	5	0.248	0.222	0.488	5	0.228	0.207

NOTE:

(1) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.

Table 7 Dimensions of Slotted Oval Countersunk Head Screws

These Lengths or
Shorter Are
Undercut

Nominal Size or Basic Screw Diameter [Notes (1), (2), (3)]	These Lengths or Shorter Are Undercut [Note (4)]				ASME B18.6.3										Gaging Diameter, <i>G</i> [Note (7)]
	Machine Screw Length, <i>L</i> [Note (4)]	Type of Tapping Screws A & AB	Other Types of Tapping Screws	Head Diameter, <i>A</i>		Head Side Height, <i>H</i> , Ref. [Note (5)]	Head Crown Height, <i>C</i> , Ref. [Note (6)]	Total Head Height, <i>O</i> , Ref. [Note (6)]	Slot Width, <i>J</i>		Slot Depth, <i>T</i>		Protrusion Above Gaging Diameter, <i>F</i>		
				Max.	Min.				Max.	Min.	Max.	Min.	Max.	Min.	
00 0.0470	...	...	...	0.087	0.080	0.028	0.014	0.042	0.017	0.010	0.023	0.016	[Note (8)]	[Note (8)]	[Note (8)]
0 0.0600	1/8	3/16	1/8	0.112	0.096	0.035	0.021	0.056	0.023	0.016	0.030	0.025	0.047	0.031	0.078
1 0.0730	1/8	3/16	5/32	0.137	0.120	0.043	0.025	0.068	0.036	0.019	0.038	0.031	0.053	0.035	0.101
2 0.0860	1/8	3/16	3/16	0.162	0.144	0.051	0.029	0.080	0.031	0.023	0.045	0.037	0.058	0.039	0.124
3 0.0990	1/8	7/32	7/32	0.187	0.167	0.059	0.033	0.092	0.035	0.027	0.052	0.043	0.064	0.044	0.148
4 0.1120	3/16	1/4	1/4	0.212	0.191	0.067	0.037	0.104	0.039	0.031	0.059	0.049	0.069	0.048	0.172
5 0.1250	3/16	1/4	1/4	0.237	0.215	0.075	0.041	0.116	0.043	0.035	0.067	0.055	0.075	0.053	0.196
6 0.1380	3/16	5/16	5/16	0.262	0.238	0.083	0.045	0.128	0.048	0.039	0.074	0.060	0.080	0.057	0.220
7 0.1510	...	3/8	3/8	0.287	0.262	0.091	0.049	0.140	0.048	0.039	0.081	0.066	0.085	0.062	0.243
8 0.1640	1/4	7/16	7/16	0.312	0.285	0.100	0.052	0.152	0.054	0.045	0.088	0.072	0.091	0.066	0.267
10 0.1900	5/16	1/2	1/2	0.362	0.333	0.116	0.060	0.176	0.060	0.050	0.103	0.084	0.102	0.075	0.313
12 0.2160	3/8	9/16	9/16	0.412	0.380	0.132	0.068	0.200	0.067	0.056	0.117	0.096	0.113	0.084	0.362
14 0.2420	...	5/8	...	0.462	0.427	0.148	0.076	0.224	0.075	0.064	0.132	0.108	0.125	0.093	0.410
1/4 0.2500	7/16	5/8	5/8	0.477	0.442	0.153	0.079	0.232	0.075	0.064	0.136	0.112	0.129	0.095	0.424
16 0.2680	...	3/4	...	0.512	0.475	0.164	0.084	0.248	0.075	0.064	0.146	0.120	0.136	0.102	0.457



Table 7 Dimensions of Slotted Oval Countersunk Head Screws (Cont'd)

Nominal Size or Basic Screw Diameter [Notes (1), (2), (3)]	Machine Screw Length, <i>L</i> [Note (4)]	These Lengths or Shorter Are Undercut [Note (4)]				Head Side Height, <i>H</i> , Ref. [Note (5)]	Head Crown Height, <i>C</i> , Ref. [Note (5)]	Total Head Height, <i>O</i> , Ref. [Note (6)]	Slot Width, <i>J</i>		Slot Depth, <i>T</i>		Protrusion Above Gaging Diameter, <i>F</i> [Note (7)]		Gaging Diameter, <i>G</i> [Note (7)]	
		Type A & AB Tapping Screws	Other Types of Tapping Screws	Head Diameter, <i>A</i>					Max.	Min.	Max.	Min.	Max.	Min.		
				Max.	Min.											
18	0.2940	...	13/16	...	0.561	0.522	0.180	0.092	0.272	0.084	0.072	0.160	0.132	0.147	0.111	0.505
5/16	0.3125	1/2	13/16	5/8	0.597	0.556	0.191	0.099	0.290	0.084	0.072	0.171	0.141	0.155	0.117	0.539
20	0.3200	...	13/16	...	0.611	0.569	0.196	0.100	0.296	0.084	0.072	0.175	0.144	0.158	0.120	0.553
24	0.3720	...	1	...	0.711	0.664	0.228	0.116	0.344	0.094	0.081	0.204	0.168	0.181	0.138	0.648
3/8	0.3750	9/16	...	5/8	0.717	0.670	0.230	0.117	0.347	0.094	0.081	0.206	0.170	0.182	0.139	0.653
7/16	0.4375	5/8	...	3/4	0.760	0.715	0.223	0.122	0.345	0.094	0.081	0.210	0.174	0.195	0.150	0.690
1/2	0.5000	3/4	...	3/4	0.815	0.765	0.223	0.131	0.354	0.106	0.091	0.216	0.176	0.212	0.163	0.739
9/16	0.5625	...	...	...	0.932	0.878	0.260	0.150	0.410	0.118	0.102	0.250	0.207	0.239	0.184	0.851
5/8	0.6250	...	...	...	1.050	0.990	0.298	0.169	0.467	0.133	0.116	0.285	0.235	0.266	0.206	0.962
3/4	0.7500	...	...	...	1.285	1.215	0.372	0.206	0.578	0.149	0.131	0.353	0.293	0.318	0.240	1.186

GENERAL NOTES:

(a) For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.

(b) Applicable to screw types as indicated below. See referenced tables for thread and point dimensions.

(1) Type A thread forming, except short lengths, see Table 42.

(2) Type AB thread forming, see Table 40.

(3) Type B and BP thread forming, see Table 41 and Types BF and BT thread cutting, see Table 43.

(4) Type C thread forming, see Mandatory Appendix Vi; Types D, F, G, and T thread cutting, see Table 44; and Type TRS thread-rolling, see Table 45.

(c) For recess dimensions, refer to Table 8.

(d) For slot inspection, see para. 2.1.4.

NOTES:

(1) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.

(2) Sizes 00, 1/16, 5/8, and 3/4 are for machine screws only.

(3) Sizes 7, 14, 18, 20, and 24 are for tapping screws only.

(4) Screws of these lengths and shorter shall have undercut heads as shown in Table 11. For tapping screws, use Type AB undercut head screws in place of Type A screws for these lengths and shorter.

(5) Tabulated values determined from formula for maximum *H* in Nonmandatory Appendix C.(6) Tabulated values determined from formula for maximum *O* in Nonmandatory Appendix C.

(7) No tolerance for gaging diameter is given. If the gaging diameter of the gage used differs from tabulated value, the protrusion will be affected accordingly, and the proper protrusion values must be recalculated using the formulas shown in Mandatory Appendix I.

(8) Not practical to gage.



Table 8 Recess Dimensions of Oval Countersunk Head Screws

Nominal Size or Basic Screw Diameter [Notes (1), (2), (3)]	Type I				Type IA				Type III				Type VI			
	Recess Dia., M, Ref.		Driver Size		Recess Dia., M, Ref.		Driver Size		Recess Dia., M, Ref.		Driver Size		Recess Dia., M, Ref.		Driver Size	
	Max.		Min.		Max.		Min.		Max.		Min.		Max.		Min.	
0 0.0600	0.068	0.038	0.020	0.042	0.068	0.042	0.024	0.042	0.070	0.043	0.027	0.043	0.070	0.043	0.027	0.043
1 0.0730	0.070	0.041	0.023	0.043	0.070	0.043	0.027	0.043	0.070	0.043	0.027	0.043	0.070	0.043	0.027	0.043
2 0.0860	0.106	0.062	0.045	0.062	0.106	0.062	0.046	0.062	0.106	0.062	0.046	0.062	0.106	0.062	0.046	0.062
3 0.0990	0.118	0.074	0.057	0.074	0.118	0.074	0.058	0.074	0.118	0.074	0.058	0.074	0.118	0.074	0.058	0.074
4 0.1120	0.130	0.087	0.070	0.086	0.130	0.086	0.070	0.086	0.130	0.086	0.070	0.086	0.130	0.086	0.070	0.086
5 0.1250	0.152	0.074	0.050	0.074	0.152	0.074	0.056	0.074	0.152	0.074	0.056	0.074	0.152	0.074	0.056	0.074
6 0.1380	0.172	0.094	0.069	0.093	0.172	0.093	0.075	0.093	0.172	0.093	0.075	0.093	0.172	0.093	0.075	0.093
7 0.1510	0.176	0.100	0.075	0.099	0.176	0.099	0.081	0.099	0.176	0.099	0.081	0.099	0.176	0.099	0.081	0.099
8 0.1640	0.186	0.108	0.084	0.108	0.186	0.108	0.090	0.108	0.186	0.108	0.090	0.108	0.186	0.108	0.090	0.108
10 0.1900	0.202	0.126	0.102	0.125	0.202	0.125	0.107	0.125	0.202	0.125	0.107	0.125	0.202	0.125	0.107	0.125
12 0.2160	0.264	0.135	0.111	0.135	0.264	0.135	0.117	0.135	0.264	0.135	0.117	0.135	0.264	0.135	0.117	0.135
14 0.2420	0.282	0.156	0.131	0.153	0.282	0.153	0.135	0.153	0.282	0.153	0.135	0.153	0.282	0.153	0.135	0.153
1/4 0.2500	0.284	0.156	0.131	0.155	0.284	0.155	0.137	0.155	0.284	0.155	0.137	0.155	0.284	0.155	0.137	0.155
16 0.2680	0.326	0.197	0.172	0.197	0.326	0.197	0.179	0.197	0.326	0.197	0.179	0.197	0.326	0.197	0.179	0.197
18 0.2940	0.374	0.206	0.182	0.205	0.374	0.205	0.187	0.205	0.374	0.205	0.187	0.205	0.374	0.205	0.187	0.205
5/16 0.3125	0.384	0.218	0.194	0.215	0.384	0.215	0.197	0.215	0.384	0.215	0.197	0.215	0.384	0.215	0.197	0.215
20 0.3200	0.394	0.225	0.201	0.225	0.394	0.225	0.207	0.225	0.394	0.225	0.207	0.225	0.394	0.225	0.207	0.225
24 0.3720	0.430	0.262	0.238	0.261	0.430	0.261	0.243	0.261	0.430	0.261	0.243	0.261	0.430	0.261	0.243	0.261
3/8 0.3750	0.404	0.237	0.213	0.235	0.404	0.235	0.217	0.235	0.404	0.235	0.217	0.235	0.404	0.235	0.217	0.235
7/16 0.4375	0.416	0.249	0.225	0.247	0.416	0.247	0.229	0.247	0.416	0.247	0.229	0.247	0.416	0.247	0.229	0.247

(13)



Table 8 Recess Dimensions of Oval Countersunk Head Screws (Cont'd)

Nominal Size or Basic Screw Diameter [Notes (1), (2), (3)]	Type I				Type IA				Type III				Type VI			
	Recess Dia., M, Ref.		Driver Size		Recess Dia., M, Ref.		Driver Size		Recess, AF, Ref.		Driver Size (4)		Recess Dia., M, Ref.		Driver Size	
	Recess Penetration Gaging Depth, P		Recess Penetration Gaging Depth, P		Recess Penetration Gaging Depth, P		Recess Penetration Gaging Depth, P [Note (5)]		Recess Penetration Gaging Depth, P		Recess Penetration Gaging Depth, P		Recess Penetration Gaging Depth, P		Recess Penetration Gaging Depth, P	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
$\frac{1}{2}$ 0.5000	0.430	0.263	0.239	0.262	0.430	0.244	...	...	...	...	...	...	0.352	T50	0.169	0.150
$\frac{9}{16}$ 0.5625	0.462	0.296	0.272	0.285	0.450	0.267	...	...	...	...	...	...	0.446	T55	0.190	0.165
$\frac{5}{8}$ 0.6250	0.580	0.323	0.291	0.300	0.562	0.279	...	...	...	...	...	...	0.446	T55	0.190	0.165
$\frac{3}{4}$ 0.7500	0.642	0.388	0.357	0.362	0.624	0.341	...	...	...	...	...	...	0.529	T60	0.230	0.210

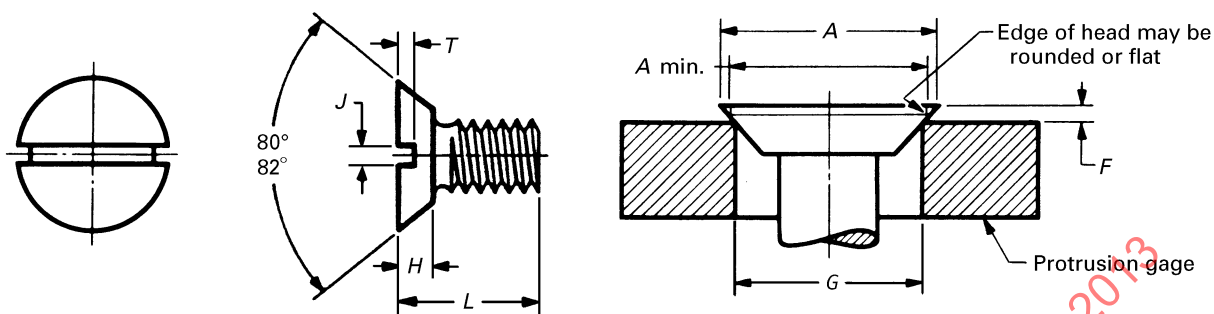
GENERAL NOTES:

- (a) For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.
 (b) For head dimensions, refer to Table 7.
 (c) For recess inspection, see para. 2.1.3.

NOTES:

- (1) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
 (2) Sizes $\frac{9}{16}$, $\frac{5}{8}$, and $\frac{3}{4}$ are for machine screws only.
 (3) Sizes 7, 14, 16, 18, 20, and 24 are for tapping screws only.
 (4) "R" in the recess size tabulation means regular depth recess, and "S" means short depth recess.
 (5) Square recesses incorporate a slight taper on the sides of the recess. This taper can result in loss of penetration gaging depth on finished fasteners due to the build up of plating in the recesses. The recess penetration dimensions specified here are for finished (plated) product. Manufacturers should be advised that they should not use all this tolerance in the heading process, or an out-of-tolerance condition could exist after plating.



Table 9 Dimensions of Slotted Undercut 82-deg Flat Countersunk Head Screws

Nominal Size or Basic Screw Diameter [Notes (1) and (2)]		Machine Screw Length, <i>L</i> [Note (3)]	These Lengths or Shorter Are Undercut, <i>L</i> [Note (3)]		Head Diameter, <i>A</i>		Head Height, <i>H</i>		Slot Width, <i>J</i>		Slot Depth, <i>T</i>		Protrusion Above Gaging Diameter, <i>F</i> [Note (4)]		Gaging Diameter, <i>G</i> [Note (4)]
			Type A & AB Tapping Screws	Other Types of Tapping Screws									Max.	Min.	
			Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.			
0	0.0600	1/8	3/16	1/8	0.112	0.096	0.025	0.018	0.023	0.016	0.011	0.007	[Note (5)]	[Note (5)]	[Note (5)]
1	0.0730	1/8	3/16	5/32	0.137	0.120	0.031	0.023	0.026	0.019	0.014	0.009	[Note (5)]	[Note (5)]	[Note (5)]
2	0.0860	1/8	3/16	3/16	0.162	0.144	0.036	0.028	0.031	0.023	0.016	0.011	0.029	0.017	0.124
3	0.0990	1/8	7/32	7/32	0.187	0.167	0.042	0.033	0.035	0.027	0.019	0.012	0.031	0.018	0.148
4	0.1120	3/16	1/4	1/4	0.212	0.191	0.047	0.038	0.039	0.031	0.022	0.014	0.032	0.019	0.172
5	0.1250	3/16	1/4	1/4	0.237	0.215	0.053	0.043	0.043	0.035	0.024	0.016	0.034	0.020	0.196
6	0.1380	3/16	5/16	5/16	0.262	0.238	0.059	0.048	0.048	0.039	0.027	0.017	0.036	0.021	0.220
7	0.1510	...	3/8	3/8	0.287	0.262	0.064	0.053	0.048	0.039	0.030	0.019	0.037	0.022	0.243
8	0.1640	1/4	7/16	7/16	0.312	0.285	0.070	0.058	0.054	0.045	0.032	0.021	0.039	0.023	0.267
10	0.1900	5/16	1/2	1/2	0.362	0.333	0.081	0.068	0.060	0.050	0.037	0.024	0.042	0.025	0.313
12	0.2160	3/8	9/16	9/16	0.412	0.380	0.092	0.078	0.067	0.056	0.043	0.028	0.045	0.027	0.362
14	0.2420	...	5/8	...	0.462	0.427	0.103	0.089	0.075	0.064	0.047	0.032	0.049	0.029	0.410
1/4	0.2500	7/16	5/8	5/8	0.477	0.442	0.107	0.092	0.075	0.064	0.050	0.032	0.050	0.029	0.424
16	0.2680	...	11/16	...	0.512	0.475	0.114	0.099	0.075	0.064	0.053	0.035	0.052	0.031	0.457
18	0.2940	...	3/4	...	0.581	0.522	0.126	0.109	0.084	0.072	0.058	0.039	0.055	0.033	0.505
5/16	0.3125	1/2	13/16	5/8	0.597	0.556	0.134	0.116	0.084	0.072	0.062	0.041	0.057	0.034	0.539
20	0.3200	...	13/16	...	0.611	0.569	0.137	0.119	0.084	0.072	0.063	0.042	0.058	0.035	0.553
24	0.3720	...	7/8	...	0.711	0.664	0.159	0.139	0.094	0.081	0.074	0.049	0.065	0.039	0.648
3/8	0.3750	9/16	5/8	5/8	0.717	0.670	0.161	0.140	0.094	0.081	0.075	0.049	0.065	0.039	0.653
7/16	0.4375	5/8	3/4	3/4	0.760	0.715	0.156	0.133	0.094	0.081	0.072	0.045	0.073	0.044	0.690
1/2	0.5000	3/4	3/4	3/4	0.815	0.765	0.156	0.130	0.106	0.091	0.072	0.046	0.081	0.049	0.739

GENERAL NOTES:

- (a) For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.
 (b) Applicable to screw types as indicated below. See referenced tables for thread and point dimensions and minimum practical screw lengths.

(1) Type AB thread forming, see Table 40.

(2) Type B and BP thread forming, see Table 41; and Types BF and BT thread cutting, see Table 43.

(3) Type C thread forming, see Mandatory Appendix VI; Types D, F, G, and T thread cutting, see Table 44; and Type TRS thread-rolling, see Table 45.

(c) For recess dimensions, refer to Table 10.

(d) For slot inspection, see para. 2.1.4.

NOTES:

(1) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.

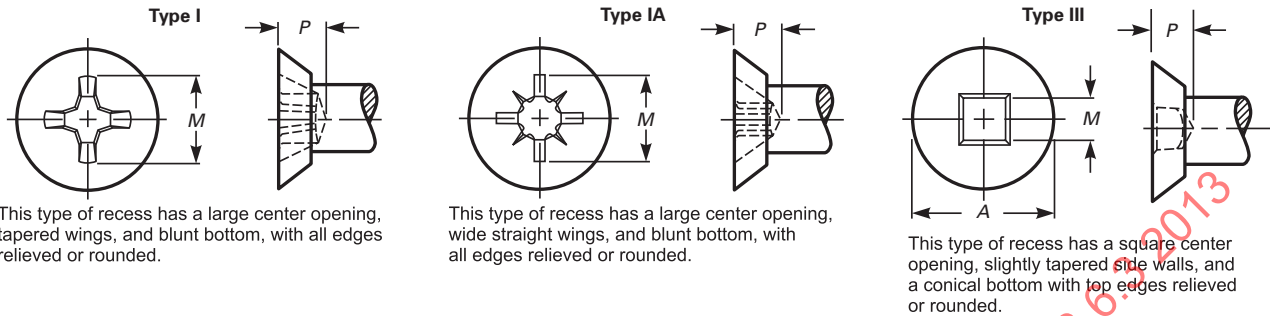
(2) Size 7 is for tapping screws only.

(3) Screws of these lengths and shorter are undercut. Screws of longer lengths shall have head heights as shown in Table 1.

(4) No tolerance for gaging diameter is given. If the gaging diameter of the gage used differs from tabulated value, the protrusion will be affected accordingly, and the proper protrusion values must be recalculated using the formulas shown in Mandatory Appendix I.

(5) Not practical to gage.



Table 10 Recess Dimensions for Undercut 82-deg Flat Countersunk Head Screws

Nominal Size or Basic Screw Diameter [Notes (1), (2)]	Type I				Type IA				Type III			
	Recess Dia., M, Ref.	Driver Size	Recess Penetration Gaging Depth, P		Recess Dia., M, Ref.	Driver Size	Recess Penetration Gaging Depth, P		Recess Across Flats, M, Ref.	Driver Size (3)	Recess Penetration Gaging Depth, P [Note (4)]	
			Max.	Min.			Max.	Min.			Max.	Min.
0 0.0600	0.062	0	0.036	0.020	0.062	0	0.037	0.021	...	...	...	...
1 0.0730	0.070	0	0.044	0.028	0.070	0	0.045	0.029	...	...	...	...
2 0.0860	0.088	1	0.049	0.033	0.088	1	0.046	0.030	...	...	...	...
3 0.0990	0.096	1	0.056	0.040	0.096	1	0.053	0.037	0.050	00	0.033	0.028
4 0.1120	0.110	1	0.071	0.055	0.110	1	0.068	0.052	0.050	00	0.033	0.028
5 0.1250	0.122	1	0.082	0.066	0.122	1	0.079	0.063	0.070	0	0.038	0.028
6 0.1380	0.140	2	0.067	0.044	0.140	2	0.063	0.045	0.091	1SS	0.027	0.017
7 0.1510	0.148	2	0.075	0.052	0.148	2	0.071	0.053	0.091	1SS	0.027	0.017
8 0.1640	0.168	2	0.095	0.072	0.168	2	0.091	0.073	0.112	2SS	0.037	0.027
10 0.1900	0.182	2	0.110	0.087	0.182	2	0.107	0.089	0.112	2SS	0.037	0.027
12 0.2160	0.226	3	0.104	0.081	0.226	3	0.100	0.082	0.133	3SS	0.073	0.063
14 0.2420	0.224	3	0.119	0.096	0.242	3	0.115	0.097	0.133	3S	0.080	0.065
1/4 0.2500	0.224	3	0.119	0.096	0.242	3	0.115	0.097	0.133	3S	0.080	0.065
16 0.2680	0.262	3	0.139	0.116	0.262	3	0.136	0.118	0.133	3R	0.095	0.080
18 0.2940	0.310	4	0.139	0.126	0.310	4	0.145	0.127	0.191	4R	0.100	0.085
5/16 0.3125	0.310	4	0.148	0.126	0.310	4	0.145	0.127	0.191	4R	0.100	0.085
20 0.3200	0.329	4	0.166	0.144	0.328	4	0.163	0.145	0.191	4R	0.100	0.085
24 0.3720	0.358	4	0.196	0.174	0.358	4	0.193	0.175	0.191	4R	0.100	0.085
3/8 0.3750	0.358	4	0.196	0.174	0.358	4	0.193	0.175	0.191	4R	0.100	0.085
7/16 0.4375	0.386	4	0.225	0.203	0.386	4	0.222	0.204	...	...	...	...
1/2 0.5000	0.402	4	0.241	0.219	0.402	4	0.238	0.220	...	...	...	...

GENERAL NOTES:

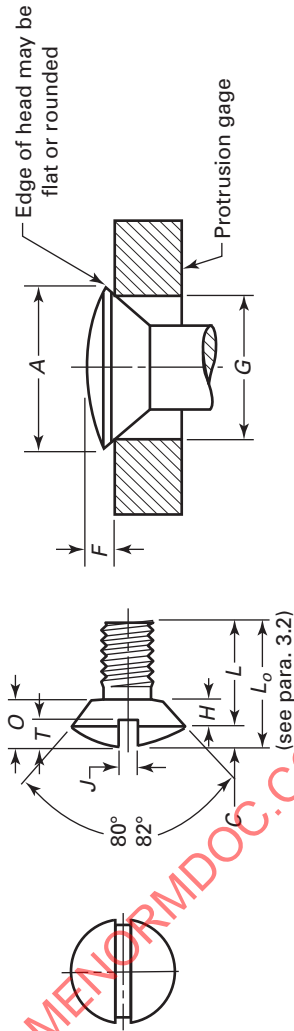
- (a) For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.
 (b) For head dimensions, refer to Table 9.
 (c) For recess inspection, see para. 2.1.3.

NOTES:

- (1) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
 (2) Size 7 is for tapping screws only.
 (3) "R" in the recess size tabulation means regular depth recess, and "S" means short depth recess.
 (4) Square recesses incorporate a slight taper on the sides of the recess. This taper can result in loss of penetration gaging depth on finished fasteners due to the build up of plating in the recesses. The recess penetration dimensions specified here are for finished (plated) product. Manufacturers should be advised that they should not use all this tolerance in the heading process, or an out-of-tolerance condition could exist after plating.



Table 11 Dimensions of Slotted Undercut Oval Countersunk Head Screws



These Lengths or
Shorter Are
Undercut, L
[Note (3)]

Nominal Size or Basic Screw Diameter [Notes (1), (2)]	Machine Screw Length, L [Note (3)]	Type A & AB Tapping Screws	Other Types of Tapping Screws	Head Diameter, A		Head Side Height, H, Ref. [Note (4)]		Head Crown Height, C, Ref. [Note (4)]		Total Head Height, O		Slot Width, J		Slot Depth, T		Protrusion Above Gaging Diameter, F [Note (5)]		Gaging Diameter, G [Note (5)]
				Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	
0 0.0600	1/8	3/16	1/8	0.112	0.096	0.025	0.021	0.021	0.021	0.046	0.033	0.023	0.016	0.028	0.022	0.047	0.031	0.078
1 0.0730	1/8	3/16	5/32	0.137	0.120	0.031	0.025	0.025	0.025	0.056	0.042	0.026	0.019	0.034	0.027	0.053	0.035	0.101
2 0.0860	1/8	3/16	3/16	0.162	0.144	0.036	0.029	0.029	0.029	0.065	0.050	0.031	0.023	0.040	0.033	0.058	0.039	0.124
3 0.0990	1/8	7/32	7/32	0.187	0.167	0.042	0.033	0.033	0.033	0.075	0.059	0.035	0.027	0.047	0.038	0.064	0.044	0.148
4 0.1120	3/16	1/4	1/4	0.212	0.191	0.047	0.037	0.037	0.037	0.084	0.067	0.039	0.031	0.053	0.043	0.069	0.048	0.172
5 0.1250	3/16	1/4	1/4	0.237	0.215	0.053	0.041	0.041	0.041	0.094	0.076	0.043	0.035	0.059	0.048	0.075	0.053	0.196
6 0.1380	3/16	5/16	5/16	0.262	0.238	0.059	0.045	0.045	0.045	0.104	0.084	0.048	0.039	0.065	0.053	0.080	0.057	0.220
7 0.1510	...	3/8	3/8	0.287	0.262	0.064	0.049	0.049	0.049	0.113	0.093	0.048	0.039	0.071	0.059	0.085	0.062	0.243
8 0.1640	1/4	7/16	7/16	0.312	0.285	0.070	0.052	0.052	0.052	0.123	0.101	0.054	0.045	0.078	0.064	0.091	0.066	0.267
10 0.1900	5/16	1/2	1/2	0.362	0.333	0.081	0.060	0.060	0.060	0.142	0.118	0.060	0.050	0.090	0.074	0.102	0.075	0.313
12 0.2160	3/8	9/16	9/16	0.412	0.380	0.092	0.068	0.068	0.068	0.161	0.135	0.067	0.056	0.103	0.085	0.113	0.084	0.362
14 0.2420	...	5/8	...	0.462	0.427	0.104	0.076	0.076	0.076	0.180	0.153	0.075	0.064	0.115	0.096	0.125	0.093	0.410
1/4 0.2500	7/16	5/8	5/8	0.477	0.442	0.107	0.079	0.079	0.079	0.186	0.158	0.075	0.064	0.119	0.098	0.129	0.095	0.424
16 0.2680	...	3/4	...	0.512	0.475	0.115	0.084	0.084	0.084	0.199	0.170	0.075	0.064	0.127	0.106	0.136	0.102	0.457
18 0.2940	...	13/16	...	0.561	0.522	0.126	0.092	0.092	0.092	0.218	0.187	0.084	0.072	0.140	0.116	0.147	0.111	0.505
5/16 0.3125	1/2	13/16	5/8	0.597	0.556	0.134	0.099	0.099	0.099	0.232	0.198	0.084	0.072	0.149	0.124	0.155	0.117	0.539
20 0.3200	...	13/16	...	0.611	0.569	0.137	0.100	0.100	0.100	0.237	0.204	0.084	0.072	0.152	0.127	0.158	0.120	0.553
24 0.3720	...	1	...	0.711	0.664	0.160	0.116	0.116	0.116	0.275	0.238	0.094	0.081	0.177	0.148	0.181	0.138	0.648
3/8 0.3750	9/16	...	5/8	0.717	0.670	0.161	0.117	0.117	0.117	0.278	0.239	0.094	0.081	0.179	0.149	0.182	0.139	0.653
7/16 0.4375	5/8	...	3/4	0.760	0.715	0.156	0.122	0.122	0.122	0.279	0.239	0.094	0.081	0.184	0.154	0.195	0.150	0.690
1/2 0.5000	3/4	...	3/4	0.815	0.765	0.156	0.131	0.131	0.131	0.288	0.244	0.106	0.091	0.204	0.169	0.212	0.163	0.739



Table 11 Dimensions of Slotted Undercut Oval Countersunk Head Screws (Cont'd)

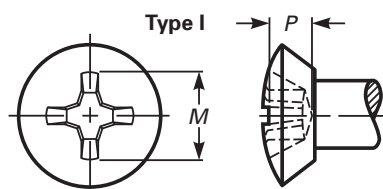
GENERAL NOTES:

- (a) For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.
- (b) Applicable to screw types as indicated below. See referenced tables for thread and point dimensions and minimum practical screw lengths.
 - (1) Type AB thread forming, see Table 40.
 - (2) Type B and BP thread forming, see Table 41, and Types BF and BT thread cutting, see Table 43.
 - (3) Type C thread forming, see Mandatory Appendix VI; Types D, F, G, and T thread cutting, see Table 44; and Type TRS thread-rolling, see Table 45.
- (c) For recess dimensions, refer to Table 12.
- (d) For slot inspection, see para. 2.1.4.

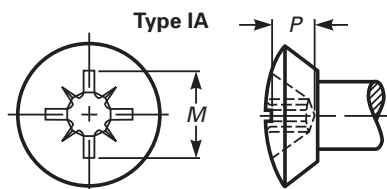
NOTES:

- (1) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
- (2) Size 7 is for tapping screws only.
- (3) Screws of these lengths and shorter are undercut. Screws of longer lengths shall have head heights as shown in Table 7.
- (4) Tabulated values determined from formula for maximum H in Nonmandatory Appendix C.
- (5) No tolerance for gaging diameter is given. If the gaging diameter of the gage used differs from tabulated value, the protrusion will be affected accordingly, and the proper protrusion values must be recalculated using the formulas shown in Mandatory Appendix I.

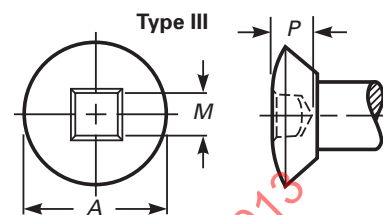


Table 12 Recess Dimensions for Undercut Oval 82-deg Countersunk Head Screws

This type of recess has a large center opening, tapered wings, and blunt bottom, with all edges relieved or rounded.



This type of recess has a large center opening, wide straight wings, and blunt bottom, with all edges relieved or rounded.



This type of recess has a square center opening, slightly tapered side walls, and a conical bottom with top edges relieved or rounded.

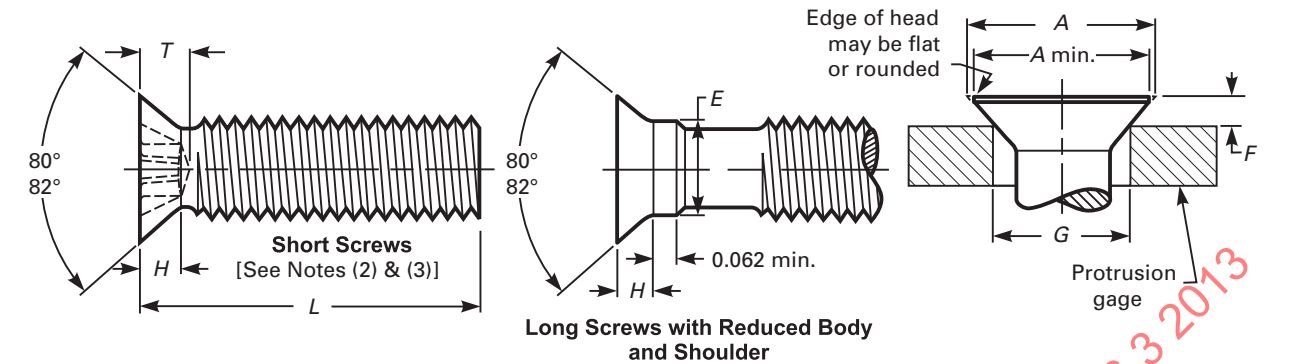
Nominal Size or Basic Screw Diameter [Notes (1), (2)]	Type I				Type IA				Type III			
	Recess Dia., M, Ref.	Driver Size	Recess Penetration Gaging Depth, P		Recess Dia., M, Ref.	Driver Size	Recess Penetration Gaging Depth, P		Recess Across Flats, M, Ref.	Driver Size [Note (3)]	Recess Penetration Gaging Depth, P [Note (4)]	
			Max.	Min.			Max.	Min.			Max.	Min.
0 0.0600	0.068	0	0.038	0.020	0.068	0	0.040	0.024	...	...	...	...
1 0.0730	0.070	0	0.041	0.023	0.070	0	0.043	0.027	...	...	...	...
2 0.0860	0.106	1	0.062	0.045	0.106	1	0.062	0.046	0.050	00	0.033	0.028
3 0.0990	0.118	1	0.074	0.057	0.118	1	0.074	0.058	0.070	0	0.038	0.028
4 0.1120	0.130	1	0.087	0.070	0.130	1	0.086	0.070	0.070	0	0.038	0.028
5 0.1250	0.152	2	0.074	0.050	0.152	2	0.074	0.056	0.091	1R	0.065	0.050
6 0.1380	0.172	2	0.094	0.069	0.172	2	0.093	0.075	0.091	1R	0.065	0.050
7 0.1510	0.176	2	0.100	0.075	0.176	2	0.099	0.081	0.091	1R	0.065	0.050
8 0.1640	0.186	2	0.108	0.084	0.186	2	0.108	0.090	0.112	2R	0.075	0.060
10 0.1900	0.202	2	0.126	0.102	0.202	2	0.125	0.107	0.112	2R	0.075	0.060
12 0.2160	0.264	3	0.135	0.111	0.264	3	0.135	0.117	0.133	3R	0.095	0.080
14 0.2420	0.282	3	0.156	0.131	0.282	3	0.153	0.135	0.133	3R	0.095	0.080
1/4 0.2500	0.284	3	0.156	0.131	0.284	3	0.155	0.137	0.133	3R	0.095	0.080
16 0.2680	0.300	3	0.173	0.149	0.300	3	0.172	0.154	0.133	3R	0.095	0.080
18 0.2940	0.358	4	0.189	0.165	0.358	4	0.188	0.170	0.191	4R	0.100	0.085
5/16 0.3125	0.374	4	0.206	0.182	0.374	4	0.205	0.187	0.191	4R	0.100	0.085
20 0.3200	0.384	4	0.218	0.194	0.384	4	0.215	0.197	0.191	4R	0.100	0.085
24 0.3720	0.394	4	0.225	0.201	0.394	4	0.225	0.207	0.191	4R	0.100	0.085
3/8 0.3750	0.394	4	0.225	0.201	0.394	4	0.225	0.207	0.191	4R	0.100	0.085
7/16 0.4375	0.404	4	0.237	0.213	0.404	4	0.235	0.217	...	...	...	...
1/2 0.5000	0.416	4	0.249	0.225	0.416	4	0.247	0.229	...	...	...	...

GENERAL NOTES:

- (a) For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.
 (b) For head dimensions, refer to Table 11.
 (c) For recess inspection, see para. 2.1.3.

NOTES:

- (1) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
 (2) Size 7 is for tapping screws only.
 (3) "R" in the recess size tabulation means regular depth recess.
 (4) Square recesses incorporate a slight taper on the sides of the recess. This taper can result in loss of penetration gaging depth on finished fasteners due to the build up of plating in the recesses. The recess penetration dimensions specified here are for finished (plated) product. Manufacturers should be advised that they should not use all this tolerance in the heading process, or an out-of-tolerance condition could exist after plating.

Table 13 Dimensions of Flat Countersunk Trim Head Screws

Nominal Size or Basic Screw Diameter [Notes (1)–(4)]	Head Size	Shoulder Diameter, E		Shoulder Diameter, E, Type A, Tapping Screws [Note (5)]		Shoulder Diameter, E; Other Types of Tapping Screws [Note (5)]		Head Diameter, A		Head Height, H, Ref. [Note (6)]	Protrusion Above Gaging Diameter, F [Note (7)]		Gaging Diameter, G [Note (7)]
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.		Max.	Min.	
4 0.1120	3	0.112	0.106	0.105	0.106	0.187	0.167	0.052	0.031	0.018	0.148		
5 0.1250	4	0.125	0.119	0.118	0.119	0.212	0.191	0.060	0.032	0.019	0.172		
6 0.1380	4	0.138	0.131	0.131	0.131	0.212	0.191	0.052	0.032	0.019	0.172		
6 0.1380	5	0.138	0.131	0.131	0.131	0.237	0.215	0.068	0.034	0.020	0.196		
8 0.1640	5	0.164	0.157	0.157	0.157	0.237	0.215	0.052	0.034	0.020	0.196		
8 0.1640	6	0.164	0.157	0.157	0.157	0.262	0.238	0.069	0.036	0.021	0.220		
10 0.1900	8	0.190	0.181	0.183	0.181	0.312	0.285	0.085	0.039	0.023	0.267		
12 0.2160	8	0.216	0.207	0.209	0.207	0.312	0.285	0.069	0.039	0.023	0.267		
12 0.2160	10	0.216	0.207	0.209	0.207	0.362	0.333	0.101	0.042	0.025	0.313		
14 0.2420	10	...	...	0.235	...	0.362	0.333	0.080	0.042	0.025	0.313		
14 0.2420	12	...	...	0.235	...	0.412	0.380	0.112	0.045	0.027	0.362		
1/4 0.2500	10	0.250	0.240	...	0.240	0.362	0.333	0.080	0.042	0.025	0.313		
1/4 0.2500	12	0.250	0.240	...	0.240	0.412	0.380	0.112	0.045	0.027	0.362		
5/16 0.3125	12	0.312	0.302	...	0.302	0.412	0.380	0.075	0.045	0.027	0.362		
5/16 0.3125	1/4	0.312	0.302	...	0.302	0.477	0.442	0.116	0.050	0.029	0.424		
3/8 0.3750	5/16	0.375	0.364	...	0.364	0.597	0.556	0.155	0.057	0.034	0.539		

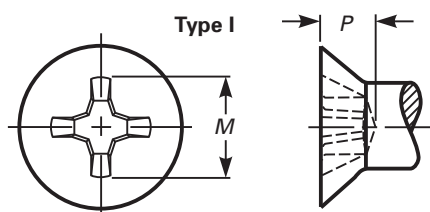
GENERAL NOTES:

- For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.
- Applicable to screw types as indicated below. See referenced tables for thread and point dimensions.
 - Type A thread forming, except short lengths, see Table 42.
 - Type AB thread forming, see Table 40.
 - Type B and BP thread forming, see Table 41; and Types BF and BT thread cutting, see Table 43.
 - Type C thread forming, see Mandatory Appendix VI; Types D, F, G, and T thread cutting, see Table 44; and Type TRS thread-rolling, see Table 45.
- For recess dimensions, refer to Table 14.
- For slot inspection, see para. 2.1.4.

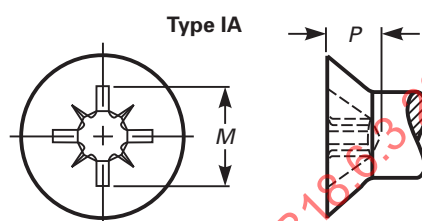
NOTES:

- Where specifying nominal size in the decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
- Short machine screws include nominal lengths up to and including 1 1/8 in. for sizes No. 5 and smaller, and 2 in. for sizes No. 6 and larger.
- Short tapping screws are those threaded full length. Refer to para. 4.3 for applicable screw lengths.
- Size 14 is for tapping screws only.
- Maximum diameter shall not exceed minimum plus 0.011 in. for Type A tapping screws, and basic screw diameter for all other tapping screw types.
- Tabulated values determined from formula for maximum H in Nonmandatory Appendix C.
- No tolerance for gaging diameter is given. If the gaging diameter of the gage used differs from tabulated value, the protrusion will be affected accordingly, and the proper protrusion values must be recalculated using the formulas shown in Mandatory Appendix I.



Table 14 Recess Dimensions for Flat Countersunk Trim Head Screws

This type of recess has a large center opening, tapered wings, and blunt bottom, with all edges relieved or rounded.



This type of recess has a large center opening, wide straight wings, and blunt bottom, with all edges relieved or rounded.

Nominal Size or Basic Screw Diameter [Notes (1)–(4)]	Head Size	Type I				Type IA			
		Recess Dia., <i>M</i> , Ref.	Driver Size	Recess Penetration Gaging Depth, <i>P</i>		Recess Dia., <i>M</i> , Ref.	Driver Size	Recess Penetration Gaging Depth, <i>P</i>	
				Max.	Min.			Max.	Min.
4 0.1120	3	0.100	1	0.061	0.045	0.100	1	0.058	0.042
5 0.1250	4	0.122	1	0.082	0.066	0.122	1	0.079	0.063
6 0.1380	4	0.122	1	0.082	0.066	0.122	1	0.079	0.063
6 0.1380	5	0.148	2	0.075	0.052	0.148	2	0.071	0.053
8 0.1640	5	0.158	2	0.085	0.062	0.158	2	0.081	0.063
8 0.1640	6	0.176	2	0.103	0.080	0.176	2	0.099	0.081
10 0.1900	8	0.182	2	0.110	0.087	0.182	2	0.107	0.089
12 0.2160	8	0.192	2	0.120	0.097	0.192	2	0.117	0.099
12 0.2160	10	0.198	2	0.125	0.102	0.198	2	0.122	0.104
14 0.2420	10	0.198	2	0.125	0.102	0.198	2	0.122	0.104
14 0.2420	12	0.262	3	0.139	0.116	0.262	3	0.136	0.118
1/4 0.2500	10	0.198	2	0.125	0.102	0.198	2	0.122	0.104
1/4 0.2500	12	0.262	3	0.139	0.116	0.262	3	0.136	0.118
5/16 0.3125	12	0.262	3	0.139	0.116	0.262	3	0.136	0.118
5/16 0.3125	1/4	0.276	3	0.154	0.131	0.276	3	0.151	0.133
3/8 0.3750	5/16	0.358	4	0.196	0.174	0.358	4	0.193	0.175

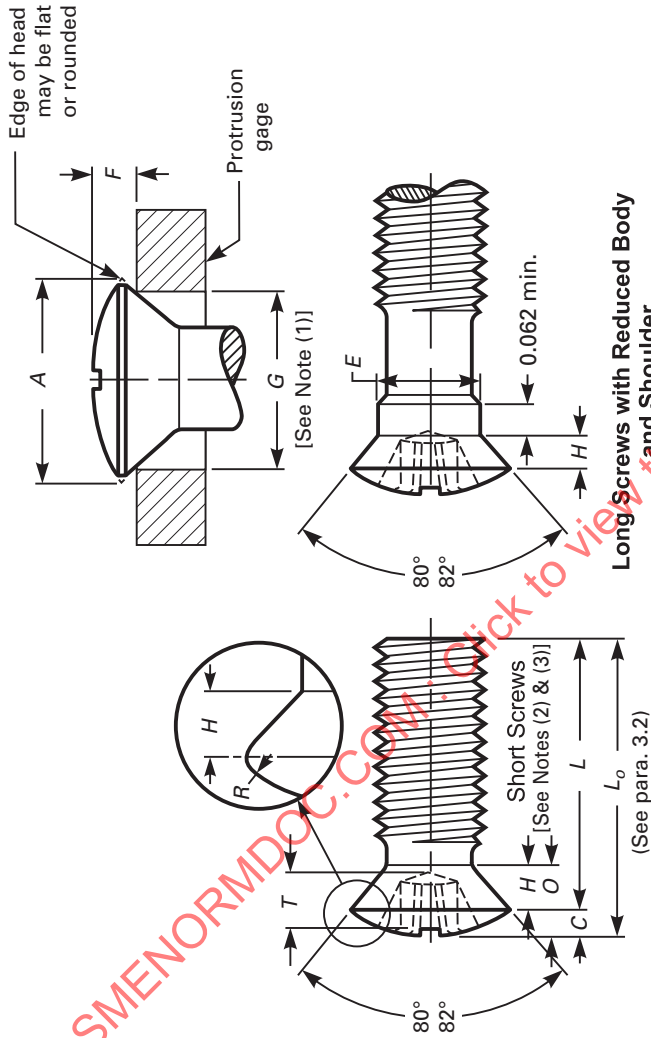
GENERAL NOTES:

- For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.
- For head dimensions, refer to Table 13.
- For recess inspection, see para. 2.1.3

NOTES:

- Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted
- Short machine screws include nominal lengths up to and including 1 1/8 in. for sizes No. 5 and smaller, and 2 in. for sizes No. 6 and larger.
- Short tapping screws are those threaded full length. Refer to para. 4.3 for applicable screw lengths.
- Size 14 is for tapping screws only.

Table 15 Dimensions of Oval 82-deg Countersunk Trim Head Screws



Nominal Size or Basic Screw Diameter [Notes (4), (5)]	Machine Screw Shoulder Diameter, <i>E</i>		Shoulder Diameter, <i>E</i> , Type A Tapping Screws [Note (6)]		Shoulder Diameter, <i>E</i> , Other Types of Tapping Screws [Note (6)]		Head Diameter, <i>A</i>		Head Side Height, <i>H</i> , Ref. [Note (1)]		Head Crown Height, <i>C</i> , Ref. [Note (7)]		Total Head Height, <i>O</i> , Ref. [Note (7)]		Protrusion Above Gaging Diameter, <i>F</i>		Gaging Diameter, <i>G</i> [Note (8)]
	Head Size	Max.	Min.	Min.	Min.	Max.	Min.	Max.	[Note (1)]	C, Ref. [Note (7)]	O, Ref. [Note (7)]	Max.	Min.				
For Short Screws [Notes (2), (3)]																	
4	0.112	...	...	...	...	0.187	0.167	0.057	0.033	0.086	0.014	0.064	0.044	0.148			
5	0.125	...	...	...	...	0.212	0.191	0.066	0.037	0.099	0.017	0.069	0.048	0.172			
6	0.138	...	...	...	...	0.212	0.191	0.058	0.037	0.091	0.017	0.069	0.048	0.172			
6	0.138	...	...	...	...	0.237	0.215	0.075	0.041	0.112	0.019	0.075	0.053	0.196			
8	0.164	...	...	...	...	0.237	0.215	0.060	0.041	0.096	0.019	0.075	0.053	0.196			
8	0.164	...	...	...	...	0.262	0.238	0.076	0.045	0.117	0.021	0.080	0.057	0.220			
10	0.190	...	...	...	...	0.312	0.285	0.094	0.076	0.141	0.025	0.091	0.066	0.267			
12	0.216	...	...	...	...	0.312	0.285	0.078	0.076	0.125	0.025	0.091	0.066	0.267			
12	0.216	...	...	...	...	0.362	0.333	0.111	0.060	0.166	0.029	0.102	0.075	0.313			

Table 15 Dimensions of Oval 82-deg Countersunk Trim Head Screws (Cont'd)

Nominal Size or Basic Screw Diameter [Notes (4), (5)]	Machine Screw Shoulder Diameter, E		Shoulder Diameter, E, Type A Tapping Screws [Note (6)]		Shoulder Diameter, E, Other Types of Tapping Screws [Note (6)]		Head Diameter, A		Head Side Height, H, Ref. [Note (1)]		Head Crown Height, C, Ref. [Note (7)]		Total Head Height, O, Ref. [Note (7)]		Protrusion Above Gaging Diameter, F [Note (8)]		Gaging Diameter, G [Note (8)]
	Head Size	Max.	Min.	Min.	Min.	Max.	Min.	Max.	[Note (1)]	C, Ref.	O, Ref.	R, Ref.	Max.	Min.			
For Short Screws [Notes (2), (3)] (Cont'd)																	
14 0.242	10	...	...	...	...	0.362	0.333	0.091	0.060	0.146	0.029	0.102	0.075	0.313			
14 0.242	12	...	...	...	...	0.412	0.380	0.124	0.068	0.187	0.033	0.113	0.084	0.362			
1/4 0.250	10	...	...	...	...	0.362	0.333	0.091	0.060	0.146	0.029	0.102	0.075	0.313			
1/4 0.250	12	...	...	...	...	0.412	0.380	0.124	0.068	0.187	0.033	0.113	0.084	0.362			
5/16 0.3125	12	...	...	...	...	0.412	0.380	0.087	0.068	0.150	0.033	0.113	0.084	0.362			
5/16 0.3125	5/16	...	...	...	...	0.477	0.442	0.130	0.079	0.202	0.038	0.129	0.095	0.424			
3/8 0.375	3/8	...	...	...	...	0.597	0.556	0.173	0.099	0.265	0.048	0.155	0.117	0.539			
For Long Screws With Shoulder																	
4 0.112	3	0.112	0.106	0.105	0.106	0.187	0.167	0.057	0.033	0.086	0.014	0.064	0.044	0.148			
5 0.125	4	0.125	0.119	0.118	0.119	0.212	0.191	0.066	0.037	0.099	0.017	0.069	0.048	0.172			
6 0.138	4	0.138	0.131	0.131	0.131	0.212	0.191	0.058	0.037	0.091	0.017	0.069	0.048	0.172			
6 0.138	5	0.138	0.131	0.131	0.131	0.237	0.215	0.075	0.041	0.112	0.019	0.075	0.053	0.196			
8 0.164	5	0.164	0.157	0.157	0.157	0.237	0.215	0.060	0.041	0.096	0.019	0.075	0.053	0.196			
8 0.164	6	0.164	0.157	0.157	0.157	0.262	0.238	0.076	0.045	0.117	0.021	0.080	0.057	0.220			
10 0.190	8	0.190	0.181	0.183	0.181	0.312	0.285	0.094	0.076	0.141	0.025	0.091	0.066	0.267			
12 0.216	8	0.216	0.207	0.209	0.207	0.312	0.285	0.078	0.076	0.125	0.025	0.091	0.066	0.267			
12 0.216	10	0.216	0.207	0.209	0.207	0.362	0.333	0.111	0.060	0.166	0.029	0.102	0.075	0.313			
14 0.242	10	...	...	0.235	...	0.362	0.333	0.091	0.060	0.146	0.029	0.102	0.075	0.313			
14 0.242	12	...	...	0.235	...	0.412	0.380	0.124	0.068	0.187	0.033	0.113	0.084	0.362			
1/4 0.250	10	0.250	0.240	...	0.240	0.362	0.333	0.091	0.060	0.146	0.029	0.102	0.075	0.313			
1/4 0.250	12	0.250	0.240	...	0.240	0.412	0.380	0.124	0.068	0.187	0.033	0.113	0.084	0.362			
5/16 0.3125	12	0.312	0.302	...	0.302	0.412	0.380	0.087	0.068	0.150	0.033	0.113	0.084	0.362			
5/16 0.3125	5/16	0.312	0.302	...	0.302	0.477	0.442	0.130	0.079	0.202	0.038	0.129	0.095	0.424			
3/8 0.375	3/8	0.375	0.364	...	0.364	0.597	0.556	0.173	0.099	0.265	0.048	0.155	0.117	0.539			



Table 15 Dimensions of Oval 82-deg Countersunk Trim Head Screws (Cont'd)**GENERAL NOTES:**

- (a) For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.
- (b) Applicable to screw types as indicated below. See referenced tables for thread and point dimensions and minimum practical screw lengths.
 - (1) Type A thread forming, except short lengths, see Table 42.
 - (2) Type AB thread forming, see Table 40.
 - (3) Type B and BP thread forming, see Table 41; and Types BF and BT thread cutting, see Table 43.
 - (4) Type C thread forming, see Mandatory Appendix VI; Types D, F, G, and T thread cutting, see Table 44; and Type TRS thread-rolling, see Table 45.
- (c) For recess dimensions, refer to Table 16.
- (d) For slot inspection, see para. 2.1.4.

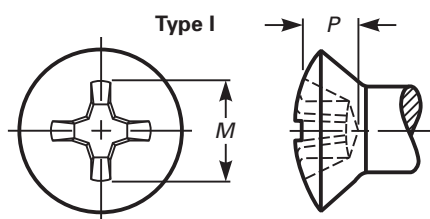
NOTES:

- (1) Tabulating values determined from formula for maximum H in Nonmandatory Appendix C.
- (2) Short machine screws include nominal lengths up to and including $1\frac{1}{8}$ in. for sizes No. 5 and smaller, and 2 in. for sizes No. 6 and larger.
- (3) Short tapping screws are those threaded full length. Refer to para. 4.3 for applicable screw lengths.
- (4) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
- (5) Size 14 is for tapping screws only.
- (6) Maximum diameter shall not exceed minimum plus 0.011 in. for Type A tapping screws, and basic screw diameter for all other tapping screw types.
- (7) Tabulating values determined from formula for maximum O in Nonmandatory Appendix C.
- (8) No tolerance for gaging diameter is given. If the gaging diameter of the gage used differs from tabulated value, the protrusion will be affected accordingly, and the proper protrusion values must be recalculated using the formulas shown in Mandatory Appendix I.

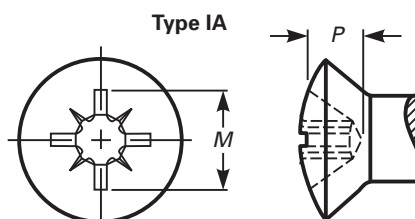


Table 16 Recess Dimensions for Oval 82-deg Countersunk Trim Head Screws

(13)



This type of recess has a large center opening, tapered wings, and blunt bottom, with all edges relieved or rounded.



This type of recess has a large center opening, wide straight wings, and blunt bottom, with all edges relieved or rounded.

Nominal Size or Basic Screw Diameter [Notes (1)–(4)]	Type I				Type IA				
	Recess Dia., <i>M</i> , Ref.	Driver Size	Recess Penetration Gaging Depth, <i>P</i>		Recess Dia., <i>M</i> , Ref.	Driver Size	Recess Penetration Gaging Depth, <i>P</i>		
			Max.	Min.			Max.	Min.	
For Short Screws									
4 0.1120	0.118	1	0.074	0.057	0.118	1	0.074	0.058	
5 0.1250	0.130	1	0.087	0.070	0.130	1	0.086	0.070	
6 0.1380	0.130	1	0.087	0.070	0.130	1	0.086	0.070	
6 0.1380	0.152	2	0.074	0.050	0.152	2	0.074	0.056	
8 0.1640	0.152	2	0.074	0.050	0.152	2	0.074	0.056	
8 0.1640	0.172	2	0.094	0.069	0.172	2	0.093	0.075	
10 0.1900	0.186	2	0.108	0.084	0.186	2	0.108	0.090	
12 0.2160	0.186	2	0.108	0.084	0.186	2	0.108	0.090	
12 0.2160	0.202	2	0.126	0.102	0.202	2	0.125	0.107	
14 0.2420	0.202	2	0.126	0.102	0.202	2	0.125	0.107	
14 0.2420	0.264	3	0.126	0.102	0.264	3	0.135	0.117	
1/4 0.2500	0.202	2	0.126	0.102	0.202	2	0.125	0.107	
1/4 0.2500	0.264	3	0.135	0.111	0.264	3	0.135	0.117	
5/16 0.3125	0.264	3	0.135	0.111	0.264	3	0.135	0.117	
5/16 0.3125	0.284	3	0.156	0.131	0.284	3	0.155	0.137	
3/8 0.3750	0.384	4	0.218	0.194	0.384	4	0.215	0.197	
For Long Screws With Shoulder									
4 0.1120	0.118	1	0.074	0.057	0.118	1	0.074	0.058	
5 0.1250	0.130	1	0.087	0.070	0.130	1	0.086	0.070	
6 0.1380	0.130	1	0.087	0.070	0.130	1	0.086	0.070	
6 0.1380	0.162	2	0.085	0.061	0.162	2	0.084	0.066	
8 0.1640	0.162	2	0.085	0.061	0.162	2	0.084	0.066	
8 0.1640	0.188	2	0.110	0.085	0.188	2	0.109	0.091	
10 0.1900	0.200	2	0.124	0.099	0.200	2	0.122	0.104	
12 0.2160	0.200	2	0.124	0.099	0.200	2	0.122	0.104	
12 0.2160	0.214	2	0.137	0.112	0.214	2	0.136	0.118	
14 0.2420	0.214	2	0.137	0.112	0.214	2	0.136	0.118	
14 0.2420	0.264	3	0.135	0.111	0.264	3	0.135	0.117	
1/4 0.2500	0.214	2	0.137	0.112	0.214	2	0.136	0.118	
1/4 0.2500	0.264	3	0.135	0.111	0.264	3	0.135	0.117	
5/16 0.3125	0.264	3	0.135	0.111	0.264	3	0.135	0.117	
5/16 0.3125	0.264	3	0.156	0.131	0.284	3	0.155	0.137	
3/8 0.3750	0.384	4	0.218	0.194	0.384	4	0.215	0.197	

GENERAL NOTES:

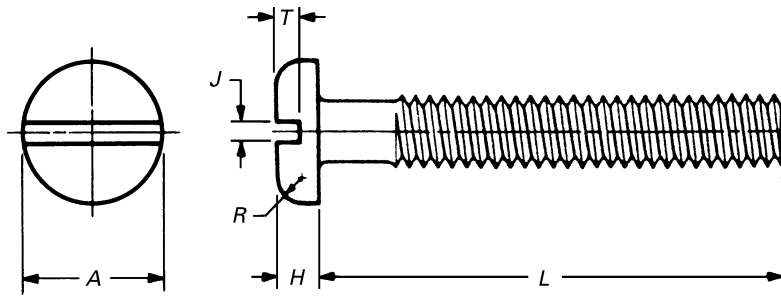
- (a) For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.
 (b) For head dimensions, refer to Table 15.
 (c) For recess inspection, see para. 2.1.3.

NOTES:

- (1) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
 (2) Short machine screws include nominal lengths up to and including 1 1/8 in. for sizes No. 5 and smaller, and 2 in. for sizes No. 6 and larger.
 (3) Short tapping screws are those threaded full length. Refer to para. 4.3 for applicable screw lengths.
 (4) Size 14 is for tapping screws only.



Table 17 Head Dimensions for Slotted Pan Head Screws



Nominal Size or Basic Screw Diameter [Notes (1), (2), and (3)]		Head Diameter, A		Head Height, H		Head Radius, R, Max.	Slot Width, J		Slot Depth, T	
		Max.	Min.	Max.	Min.		Max.	Min.	Max.	Min.
0000	0.0210	0.042	0.036	0.016	0.010	0.007	0.008	0.004	0.008	0.004
000	0.0340	0.066	0.060	0.023	0.017	0.010	0.012	0.008	0.012	0.008
00	0.0470	0.090	0.082	0.032	0.025	0.015	0.017	0.010	0.016	0.010
0	0.0600	0.116	0.104	0.039	0.031	0.020	0.023	0.016	0.022	0.014
1	0.0730	0.142	0.130	0.046	0.038	0.025	0.026	0.019	0.027	0.018
2	0.0860	0.167	0.155	0.053	0.045	0.035	0.031	0.023	0.031	0.022
3	0.0990	0.193	0.180	0.060	0.051	0.037	0.035	0.027	0.036	0.026
4	0.1120	0.219	0.205	0.068	0.058	0.042	0.039	0.031	0.040	0.030
5	0.1250	0.245	0.231	0.075	0.065	0.044	0.043	0.035	0.045	0.034
6	0.1380	0.270	0.256	0.082	0.072	0.046	0.048	0.039	0.050	0.037
7	0.1510	0.296	0.281	0.089	0.079	0.049	0.048	0.039	0.054	0.041
8	0.1640	0.322	0.306	0.096	0.085	0.052	0.054	0.045	0.058	0.045
10	0.1900	0.373	0.357	0.110	0.099	0.061	0.060	0.050	0.068	0.053
12	0.2160	0.425	0.407	0.125	0.112	0.078	0.067	0.056	0.077	0.061
14	0.2420	0.476	0.457	0.139	0.126	0.087	0.075	0.064	0.085	0.068
1/4	0.2500	0.492	0.473	0.144	0.130	0.087	0.075	0.064	0.087	0.070
16	0.2680	0.528	0.508	0.153	0.139	0.094	0.075	0.064	0.093	0.074
18	0.2940	0.579	0.558	0.168	0.153	0.099	0.084	0.072	0.100	0.080
5/16	0.3125	0.615	0.594	0.178	0.162	0.099	0.084	0.072	0.106	0.085
20	0.3200	0.631	0.608	0.182	0.166	0.121	0.084	0.072	0.108	0.087
24	0.3720	0.734	0.709	0.211	0.193	0.143	0.094	0.081	0.123	0.100
3/8	0.3750	0.740	0.716	0.212	0.195	0.143	0.094	0.081	0.124	0.100
7/16	0.4375	0.863	0.837	0.247	0.228	0.153	0.094	0.081	0.142	0.116
1/2	0.5000	0.987	0.958	0.281	0.260	0.175	0.106	0.091	0.161	0.131
9/16	0.5625	1.041	1.000	0.315	0.293	0.197	0.118	0.102	0.179	0.146
5/8	0.6250	1.172	1.125	0.350	0.325	0.219	0.133	0.116	0.197	0.162
3/4	0.7500	1.435	1.375	0.419	0.390	0.263	0.149	0.131	0.234	0.192

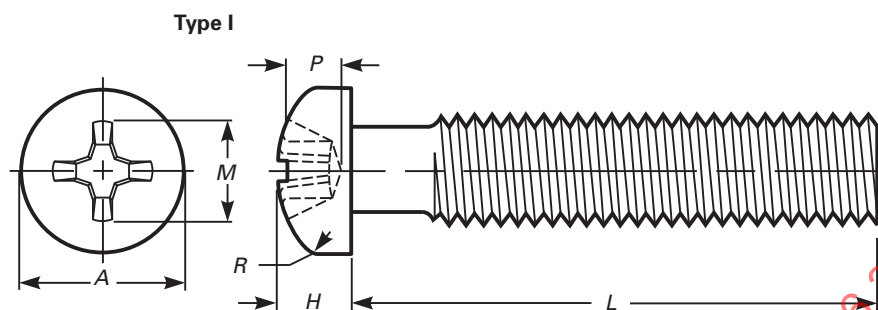
GENERAL NOTES:

- (a) For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.
- (b) Applicable to screw types as indicated below. See referenced tables for thread and point dimensions and minimum practical screw lengths.
- (1) Type A thread forming, except short lengths, see Table 42.
 - (2) Type AB thread forming, see Table 40.
 - (3) Type B and BP thread forming, see Table 41, and Types BF and BT thread cutting, see Table 43.
 - (4) Type C thread forming, see Mandatory Appendix VI; Types D, F, G, and T thread cutting, see Table 44; and Type TRS thread-rolling, see Table 45.
- (c) For recess dimensions, refer to Table 19.
- (d) For slot inspection, see para. 2.1.4.

NOTES:

- (1) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
- (2) Sizes 0000, 000, 00, 1/16, 5/8, and 3/4 are for machine screws only.
- (3) Sizes 7, 14, 16, 18, 20, and 24 are for tapping screws only.



Table 18 Dimensions of Type I Cross Recessed Pan Head Screws

This type of recess has a large center opening, tapered wings, and blunt bottom, with all edges relieved or rounded.

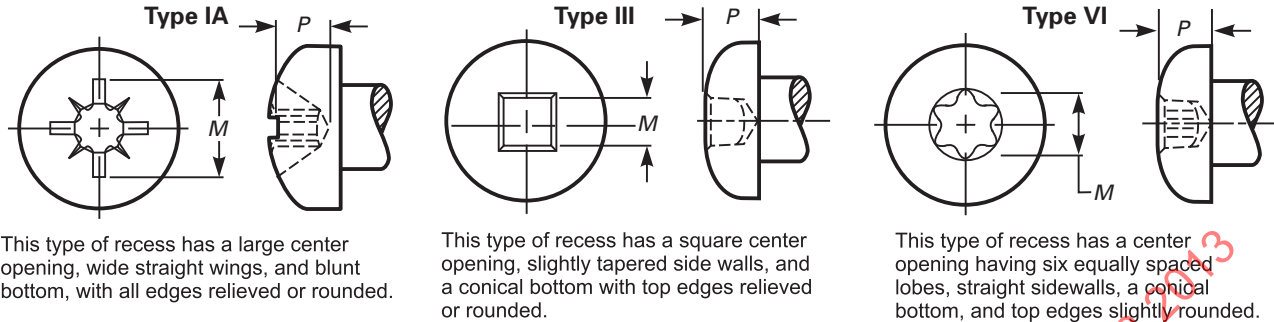
Nominal Size or Basic Screw Diameter [Notes (1), (2), and (3)]		Head Diameter, A		Head Height, H		Head Radius, R, Min.	Recess Diameter, M, Ref.	Driver Size	Recess Penetration Gaging Depth, P	
		Max.	Min.	Max.	Min.				Max.	Min.
0	0.0600	0.116	0.104	0.044	0.036	0.005	0.060	0	0.032	0.014
1	0.0730	0.142	0.130	0.053	0.044	0.005	0.067	0	0.040	0.022
2	0.0860	0.167	0.155	0.062	0.053	0.010	0.097	1	0.052	0.034
3	0.0990	0.193	0.180	0.071	0.062	0.010	0.105	1	0.061	0.043
4	0.1120	0.219	0.205	0.080	0.070	0.010	0.115	1	0.071	0.053
5	0.1250	0.245	0.231	0.089	0.079	0.015	0.152	2	0.072	0.046
6	0.1380	0.270	0.256	0.097	0.087	0.015	0.159	2	0.080	0.055
7	0.1510	0.296	0.281	0.106	0.096	0.015	0.170	2	0.089	0.064
8	0.1640	0.322	0.306	0.115	0.105	0.015	0.175	2	0.097	0.071
10	0.1900	0.373	0.357	0.133	0.122	0.020	0.192	2	0.113	0.089
12	0.2160	0.425	0.407	0.151	0.139	0.025	0.252	3	0.124	0.098
14	0.2420	0.476	0.457	0.169	0.156	0.035	0.274	3	0.144	0.118
1/4	0.2500	0.492	0.473	0.175	0.162	0.035	0.274	3	0.144	0.118
16	0.2680	0.528	0.508	0.187	0.173	0.035	0.286	3	0.158	0.132
18	0.2940	0.579	0.558	0.205	0.191	0.035	0.328	4	0.158	0.134
5/16	0.3125	0.615	0.594	0.218	0.203	0.040	0.343	4	0.173	0.149
20	0.3200	0.631	0.608	0.223	0.208	0.040	0.344	4	0.173	0.149
24	0.3720	0.734	0.709	0.259	0.242	0.040	0.382	4	0.213	0.190
3/8	0.3750	0.740	0.716	0.261	0.244	0.040	0.382	4	0.213	0.190
7/16	0.4375	0.863	0.837	0.305	0.284	0.050	0.406	4	0.239	0.214
1/2	0.5000	0.987	0.958	0.348	0.325	0.055	0.428	4	0.260	0.235
9/16	0.5625	1.041	1.000	0.391	0.366	0.065	0.458	4	0.292	0.268
5/8	0.6250	1.172	1.125	0.434	0.406	0.075	0.575	5	0.310	0.281
3/4	0.7500	1.435	1.375	0.521	0.488	0.085	0.621	5	0.349	0.322

GENERAL NOTES:

- (a) For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.
 (b) For recess inspection, see para. 2.1.3.

NOTES:

- (1) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
 (2) Sizes 9/16, 5/8, and 3/4 are for machine screws only.
 (3) Sizes 7, 14, 16, 18, 20, and 24 are for tapping screws only.

(13) **Table 19 Recess Dimensions for Pan Head Screws (Types IA, III, and VI)**

Nominal Size or Basic Screw Diameter [Notes (1), (2), (3)]	Type IA				Type III				Type VI				Maximum Fallaway	
	Recess Dia., M, Ref.	Driver Size	Recess Penetration Gaging Depth, P		Recess Across Flats, M, Ref.	Driver Size [Note (4)]	Recess Penetration Gaging Depth, P [Note (5)]		Recess Dia., M, Ref.	Driver Size	Recess Penetration Gaging Depth, P [Note (5)]			
			Max.	Min.			Max.	Min.			Max.	Min.		
0	0.0600	0.060	0	0.033	0.017	...	...	...	...	0.058	T5	0.020	0.015	0.009
1	0.0730	0.067	0	0.040	0.024	...	...	...	...	0.069	T6	0.030	0.025	0.014
2	0.0860	0.097	1	0.053	0.037	0.050	00	0.033	0.028	0.094	T8	0.035	0.030	0.019
3	0.0990	0.105	1	0.062	0.046	0.070	0	0.038	0.028	0.094	T8	0.038	0.033	0.019
4	0.1120	0.115	1	0.072	0.056	0.070	0	0.038	0.028	0.111	T10	0.045	0.035	0.022
5	0.1250	0.147	2	0.068	0.050	0.091	1R	0.065	0.050	0.111	T10	0.055	0.045	0.022
6	0.1380	0.155	2	0.076	0.058	0.091	1R	0.065	0.050	0.132	T15	0.055	0.045	0.026
7	0.1510	0.164	2	0.085	0.067	0.091	1R	0.065	0.050	0.132	T15	0.060	0.050	0.026
8	0.1640	0.170	2	0.092	0.074	0.112	2R	0.075	0.060	0.155	T20	0.070	0.055	0.031
10	0.1900	0.185	2	0.108	0.090	0.112	2R	0.075	0.060	0.178	T25	0.085	0.070	0.036
12	0.2160	0.247	3	0.117	0.099	0.133	3R	0.095	0.080	0.200	T27	0.085	0.070	0.040
14	0.2420	0.266	3	0.137	0.119	0.133	3R	0.095	0.080	0.221	T30	0.075	0.060	0.044
1/4	0.2500	0.266	3	0.137	0.119	0.133	3R	0.095	0.080	0.221	T30	0.100	0.085	0.044
16	0.2680	0.278	3	0.149	0.131	0.133	3R	0.095	0.080	0.221	T30	0.110	0.095	0.044
18	0.2940	0.322	4	0.152	0.134	0.191	4R	0.100	0.085	0.266	T40	0.095	0.080	0.047
5/16	0.3125	0.334	4	0.164	0.146	0.191	4R	0.100	0.085	0.266	T40	0.120	0.105	0.047
20	0.3200	0.344	4	0.164	0.146	0.191	4R	0.100	0.085	0.266	T40	0.130	0.115	0.047
24	0.3720	0.370	4	0.201	0.183	0.191	4R	0.100	0.085	0.312	T45	0.145	0.130	0.055
3/8	0.3750	0.370	4	0.201	0.183	0.191	4R	0.100	0.085	0.312	T45	0.145	0.130	0.055
7/16	0.4375	0.392	4	0.224	0.206	...	...	...	...	0.352	T50	0.159	0.144	0.062
1/2	0.5000	0.413	4	0.246	0.228	...	...	...	...	0.446	T55	0.180	0.165	0.078
9/16	0.5625	0.444	4	0.277	0.259	...	...	...	...	...	...	...	...	...
5/8	0.6250	0.558	5	0.295	0.274	...	...	...	...	...	...	...	...	...
3/4	0.7500	0.602	5	0.341	0.320	...	...	...	...	...	...	...	...	...

GENERAL NOTES:

- (a) For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.
 (b) For head dimensions, refer to Table 18.
 (c) For recess inspection, see para. 2.1.3.

NOTES:

- (1) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
 (2) Sizes 9/16, 5/8, and 3/4 are for machine screws only.
 (3) Sizes 7, 14, 16, 18, 20, and 24 are for tapping screws only.
 (4) "R" in the recess size tabulation means regular depth recess.
 (5) Square recesses incorporate a slight taper on the sides of the recess. This taper can result in loss of penetration gaging depth on finished fasteners due to the buildup of plating in the recesses. The recess penetration dimensions specified here are for finished (plated) product. Manufacturers should be advised that they should not use all this tolerance in the heading process, or an out-of-tolerance condition could exist after plating.



Type	Slot Depth, T [Note (4)]			Type I			Type IA			Recess		
	Max.		Min.	Recess Dia., M , Ref.	Driver Size	Penetration Gaging Depth, P		Recess Dia., M , Ref.	Driver Size	Penetration Gaging Depth, P [Note (5)]		Recess Across Flats, M , Ref.
			Max.			Min.	Max.			Min.	Max.	
With Slot	0.022	0.013	0.060	0	0.032	0.014	0.060	0	0.033	0.017	...	
	0.027	0.016	0.067	0	0.040	0.022	0.067	0	0.040	0.024	...	
	0.031	0.020	0.097	1	0.052	0.034	0.097	1	0.053	0.037	0.050	
	0.036	0.023	0.105	1	0.061	0.043	0.105	1	0.062	0.046	0.070	
	0.040	0.027	0.115	1	0.071	0.053	0.115	1	0.072	0.056	0.070	
	0.045	0.030	0.152	2	0.072	0.046	0.147	2	0.068	0.050	0.091	
	0.050	0.033	0.159	2	0.080	0.055	0.155	2	0.076	0.058	0.094	
	0.054	0.036	0.170	2	0.089	0.064	0.164	2	0.085	0.067	0.091	

Table 20 Recess Dimensions for Combination Slotted-Pan Head Screws											
Type	Slot Depth, T [Note (4)]		Type I			Type IA			Recess		
	Max. Min.		Recess Dia., M , Ref.	Driver Size	Penetration Gaging Depth, P		Recess Dia., M , Ref.	Driver Size	Penetration Gaging Depth, P [Note (5)]		Recess Across Flats, M , Ref.
	Max.	Min.			Max.	Min.			Max.	Min.	
With Slot	0.022	0.013	0.060	0	0.032	0.014	0.060	0	0.033	0.017	...
	0.027	0.016	0.067	0	0.040	0.022	0.067	0	0.040	0.024	...
	0.031	0.020	0.097	1	0.052	0.034	0.097	1	0.053	0.037	0.050
	0.036	0.023	0.105	1	0.061	0.043	0.105	1	0.062	0.046	0.070
	0.040	0.027	0.115	1	0.071	0.053	0.115	1	0.072	0.056	0.070
	0.045	0.030	0.152	2	0.072	0.046	0.147	2	0.068	0.050	0.091
	0.050	0.033	0.159	2	0.080	0.055	0.155	2	0.076	0.058	0.094
	0.054	0.036	0.170	2	0.089	0.064	0.164	2	0.085	0.067	0.091

Table 20 Recess Dimensions for Combination Slotted-Pan Head Screws (Cont'd)

Nominal Size or Basic Screw Diameter [Notes (1), (2), and (3)]	Type I				Type IA				Type III			
	Slot Width, <i>J</i>		Slot Depth, <i>T</i> [Note (4)]		Recess Dia., <i>M</i> , Ref.		Driver Size		Recess Dia., <i>M</i> , Ref.		Driver Size	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
12 0.2160	0.067	0.056	0.077	0.055	0.252	0.098	0.124	0.098	0.247	0.117	0.099	0.080
14 0.2420	0.075	0.064	0.085	0.060	0.274	0.118	0.144	0.118	0.266	0.137	0.119	0.080
1/4 0.2500	0.075	0.064	0.087	0.063	0.274	0.118	0.144	0.118	0.266	0.137	0.119	0.080
16 0.2680	0.075	0.064	0.093	0.068	0.286	0.132	0.158	0.132	0.278	0.149	0.131	0.080
18 0.2940	0.084	0.072	0.100	0.072	0.328	0.134	0.158	0.134	0.322	0.152	0.134	0.085
5/16 0.3125	0.084	0.072	0.106	0.076	0.343	0.149	0.173	0.149	0.334	0.164	0.146	0.085
20 0.3200	0.084	0.072	0.108	0.080	0.344	0.149	0.173	0.149	0.344	0.164	0.146	0.085
24 0.3720	0.094	0.081	0.123	0.090	0.382	0.190	0.213	0.190	0.370	0.201	0.183	0.085
3/8 0.3750	0.094	0.081	0.124	0.090	0.382	0.190	0.213	0.190	0.370	0.201	0.183	0.085
7/16 0.4375	0.094	0.081	0.142	0.105	0.406	0.214	0.239	0.214	0.392	0.224	0.206	...
1/2 0.5000	0.106	0.091	0.161	0.118	0.428	0.235	0.260	0.235	0.413	0.246	0.228	...

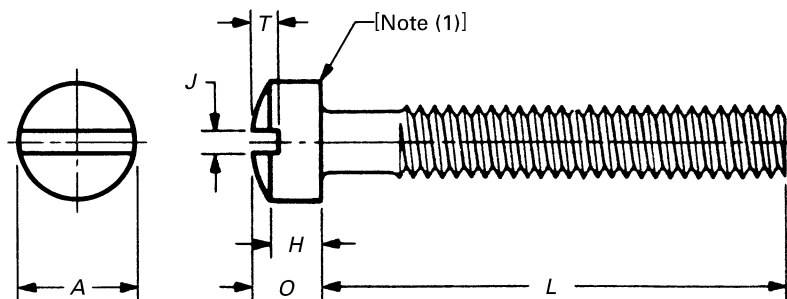
GENERAL NOTES:

- (a) For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.
 (b) For head dimensions, refer to Table 18.

NOTES:

- (1) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
 (2) Sizes $\frac{9}{16}$, $\frac{5}{8}$, and $\frac{3}{4}$ are for machine screws only.
 (3) Sizes 7, 14, 16, 18, 20, and 24 are for tapping screws only.
 (4) For inspection of the recess and slot, see paras. 2.1.3 and 2.1.4, respectively. Due to the underfill of material caused by the combination recess, the minimum slot depths are approximately 10% lower than slotted pan heads.
 (5) Square recesses incorporate a slight taper on the sides of the recess. This taper can result in loss of penetration gaging depth on finished fasteners due to the buildup of plating in the recesses. The recess penetration dimensions specified here are for finished (plated) product. Manufacturers should be advised that they should not use all this tolerance in the heading process, or an out-of-tolerance condition could exist after plating.
 (6) "R" in the recess size tabulation means regular depth recess.



Table 21 Dimensions of Slotted Fillister Head Screws

Nominal Size or Basic Screw Diameter [Notes (2), (3), and (4)]		Head Diameter, A		Head Side Height, H		Total Head Height, O		Slot Width, J		Slot Depth, T	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
0000	0.0210	0.038	0.032	0.019	0.011	0.025	0.015	0.008	0.004	0.012	0.006
000	0.0340	0.059	0.053	0.029	0.021	0.035	0.027	0.012	0.006	0.017	0.011
00	0.0470	0.082	0.072	0.037	0.028	0.047	0.039	0.017	0.010	0.022	0.015
0	0.0600	0.096	0.083	0.043	0.038	0.055	0.047	0.023	0.016	0.025	0.015
1	0.0730	0.118	0.104	0.053	0.045	0.066	0.058	0.026	0.019	0.031	0.020
2	0.0860	0.140	0.124	0.062	0.053	0.083	0.066	0.031	0.023	0.037	0.025
3	0.0990	0.161	0.145	0.070	0.061	0.095	0.077	0.035	0.027	0.043	0.030
4	0.1120	0.183	0.166	0.079	0.069	0.107	0.088	0.039	0.031	0.048	0.035
5	0.1250	0.205	0.187	0.088	0.078	0.120	0.100	0.043	0.035	0.054	0.040
6	0.1380	0.226	0.208	0.096	0.086	0.132	0.111	0.048	0.039	0.060	0.045
7	0.1510	0.248	0.229	0.105	0.094	0.144	0.122	0.048	0.039	0.065	0.049
8	0.1640	0.270	0.250	0.113	0.102	0.156	0.133	0.054	0.045	0.071	0.054
10	0.1900	0.313	0.292	0.130	0.118	0.180	0.156	0.060	0.050	0.083	0.064
12	0.2160	0.357	0.334	0.148	0.134	0.205	0.178	0.067	0.056	0.094	0.074
14	0.2420	0.400	0.376	0.165	0.151	0.230	0.201	0.075	0.064	0.105	0.084
1/4	0.2500	0.414	0.389	0.170	0.155	0.237	0.207	0.075	0.064	0.109	0.087
5/16	0.3125	0.518	0.490	0.211	0.194	0.295	0.262	0.084	0.072	0.137	0.110
3/8	0.3750	0.622	0.590	0.253	0.233	0.355	0.315	0.094	0.081	0.164	0.133
7/16	0.4375	0.625	0.589	0.265	0.242	0.368	0.321	0.094	0.081	0.170	0.135
1/2	0.5000	0.750	0.710	0.297	0.273	0.412	0.362	0.106	0.091	0.190	0.151
9/16	0.5625	0.812	0.768	0.336	0.308	0.466	0.410	0.118	0.102	0.214	0.172
5/8	0.6250	0.875	0.827	0.375	0.345	0.521	0.461	0.133	0.116	0.240	0.193
3/4	0.7500	1.000	0.945	0.441	0.406	0.612	0.542	0.149	0.131	0.281	0.226

GENERAL NOTES:

- (a) For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.
- (b) Applicable to screw types as indicated below. See referenced tables for thread and point dimensions and minimum practical screw lengths.
- (1) Type A thread forming, except short lengths, see Table 42.
- (2) Type AB thread forming, see Table 40.
- (3) Type B and BP thread forming, see Table 41; and Types BF and BT thread cutting, see Table 43.
- (4) Type C thread forming, see Mandatory Appendix VI; Types D, F, G, and T thread cutting, see Table 44; and Type TRS thread-rolling, see Table 45.
- (c) For recess dimensions, refer to Table 22.
- (d) For slot inspection, see para. 2.1.4.

NOTES:

- (1) A slight rounding of the edges at periphery of head shall be permissible provided the diameter of the bearing circle is equal to no less than 90% of the specified minimum head diameter.
- (2) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
- (3) Sizes 0000, 000, 00, 9/16, 5/8, and 3/4 are for machine screws only.
- (4) Sizes 7 and 14 are for tapping screws only.



Table 22 Recess Dimensions for Fillister Head Screws

Nominal Size or Basic Screw Diameter [Notes (1), (2), (3)]	Type I				Type IA				Type III				Type VI			
	Recess		Penetration		Recess		Penetration		Recess		Penetration		Recess		Penetration	
	Recess Dia., M, Ref.	Driver Size	Gaging Depth, P	Max.	Min.	Recess Dia., M, Ref.	Driver Size	Gaging Depth, P	Max.	Min.	Recess Dia., M, Ref.	Driver Size	Gaging Depth, P	Max.	Min.	Maximum Fallaway
0 0.0600	0.060	0	0.032	0.014	0.033	0.017	0	0.033	0.017	0.033	0.017	...	...	...	...	...
1 0.0730	0.067	0	0.040	0.022	0.040	0.024	0	0.040	0.024	0.040	0.024	...	...	...	...	...
2 0.0860	0.097	1	0.052	0.034	0.053	0.037	1	0.053	0.037	0.053	0.037	0	0.033	0.028	0.025	0.012
3 0.0990	0.105	1	0.061	0.043	0.062	0.046	1	0.062	0.046	0.062	0.046	0	0.038	0.028	0.035	0.015
4 0.1120	0.115	1	0.071	0.053	0.072	0.056	1	0.072	0.056	0.072	0.056	0	0.038	0.028	0.030	0.016
5 0.1250	0.136	2	0.056	0.031	0.054	0.036	2	0.054	0.036	0.091	1R	1R	0.065	0.050	0.045	0.022
6 0.1380	0.159	2	0.080	0.055	0.076	0.058	2	0.076	0.058	0.091	1R	1R	0.065	0.050	0.045	0.026
7 0.1510	0.170	2	0.089	0.064	0.085	0.067	2	0.085	0.067	0.091	1R	1R	0.065	0.050	0.050	0.028
8 0.1640	0.175	2	0.097	0.071	0.092	0.074	2	0.092	0.074	0.112	2R	2R	0.075	0.060	0.055	0.031
10 0.1900	0.192	2	0.113	0.089	0.108	0.090	2	0.108	0.090	0.112	2R	2R	0.075	0.060	0.070	0.036
12 0.2160	0.252	3	0.124	0.098	0.117	0.099	3	0.117	0.099	0.133	3R	3R	0.095	0.080	0.070	0.040
14 0.2420	0.274	3	0.144	0.118	0.137	0.119	3	0.137	0.119	0.133	3R	3R	0.095	0.080	0.070	0.040
1/4 0.2500	0.274	3	0.144	0.118	0.137	0.119	3	0.137	0.119	0.133	3R	3R	0.095	0.080	0.100	0.044
5/16 0.3125	0.315	3	0.186	0.160	0.181	0.163	3	0.181	0.163	0.191	4R	4R	0.100	0.085	0.105	0.047
3/8 0.3750	0.382	4	0.213	0.190	0.201	0.183	4	0.201	0.183	0.191	4R	4R	0.100	0.085	0.135	0.055
7/16 0.4375	0.406	4	0.239	0.214	0.224	0.206	4	0.224	0.206	...	...	...	...	...	0.149	0.062
1/2 0.5000	0.428	4	0.260	0.235	0.246	0.228	4	0.246	0.228	...	...	...	...	...	0.170	0.078
9/16 0.5625	0.456	4	0.292	0.268	0.277	0.259	4	0.277	0.259	...	...	...	...	...	0.170	0.078
5/8 0.6250	0.575	5	0.310	0.281	0.295	0.274	5	0.295	0.274	...	...	...	...	...	0.210	0.093
3/4 0.7500	0.621	5	0.349	0.322	0.341	0.320	5	0.341	0.320	...	...	...	...	...	0.275	0.108

This type of recess has a center opening having six equally spaced lobes, straight sidewalls, a conical bottom, and top edges slightly rounded.

This type of recess has a square center opening, slightly tapered side walls, and a conical bottom with top edges relieved or rounded.

This type of recess has a large center opening, wide straight wings, and blunt bottom, with all edges relieved or rounded.

This type of recess has a large center opening, tapered wings, and blunt bottom, with all edges relieved or rounded.



Table 22 Recess Dimensions for Fillister Head Screws (Cont'd)**GENERAL NOTES:**

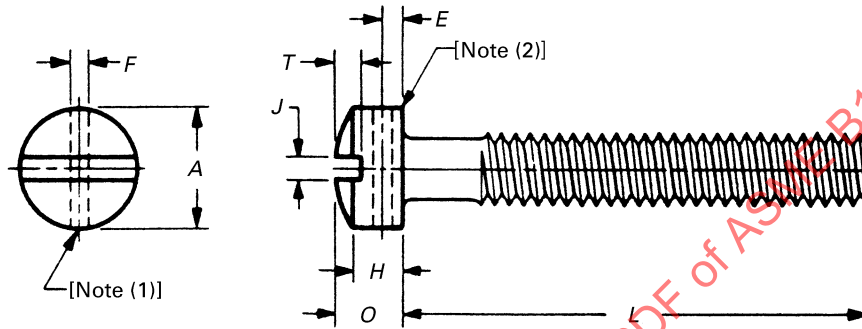
- (a) For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4
- (b) For head dimensions, refer to Table 21.
- (c) For recess inspection, see para. 2.1.3.

NOTES:

- (1) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
- (2) Sizes $\frac{9}{16}$, $\frac{5}{8}$, and $\frac{3}{4}$ are for machine screws only.
- (3) Sizes 7 and 14 are for tapping screws only.
- (4) "R" in the recess size tabulation means regular depth recess.
- (5) Square recesses incorporate a slight taper on the sides of the recess. This taper can result in loss of penetration gaging depth on finished fasteners due to the buildup of plating in the recesses. The recess penetration dimensions specified here are for finished (plated) product. Manufacturers should be advised that they should not use all this tolerance in the heading process, or an out-of-tolerance condition could exist after plating.



**Table 23 Dimensions of Slotted Drilled Fillister Head Screws
(Machine Screws Only)**



Nominal Size or Basic Screw Diameter [Note (3)]	Head Diameter, A		Head Side Height, H		Total Head Height, O		Slot Width, J		Slot Depth, T		Drilled Hole Location, E, Basic [Note (1)]	Drilled Hole Diameter, F, Basic [Note (1)]
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.		
2 0.0860	0.140	0.124	0.062	0.055	0.083	0.070	0.031	0.023	0.030	0.022	0.026	0.031
3 0.0990	0.161	0.145	0.070	0.064	0.095	0.082	0.035	0.027	0.034	0.026	0.030	0.037
4 0.1120	0.183	0.166	0.079	0.072	0.107	0.094	0.039	0.031	0.038	0.030	0.035	0.037
5 0.1250	0.205	0.187	0.088	0.081	0.120	0.106	0.043	0.035	0.042	0.033	0.038	0.046
6 0.1380	0.226	0.208	0.096	0.089	0.132	0.118	0.048	0.039	0.045	0.035	0.043	0.046
8 0.1640	0.270	0.250	0.113	0.106	0.156	0.141	0.054	0.045	0.065	0.054	0.043	0.046
10 0.1900	0.313	0.292	0.130	0.123	0.180	0.165	0.060	0.050	0.075	0.064	0.043	0.046
12 0.2160	0.357	0.334	0.148	0.139	0.205	0.188	0.067	0.056	0.087	0.074	0.053	0.046
1/4 0.2500	0.414	0.389	0.170	0.161	0.237	0.219	0.075	0.064	0.102	0.087	0.062	0.062
5/16 0.3125	0.518	0.490	0.211	0.201	0.295	0.276	0.084	0.072	0.130	0.110	0.078	0.070
3/8 0.3750	0.622	0.590	0.253	0.242	0.355	0.333	0.094	0.081	0.154	0.134	0.094	0.070

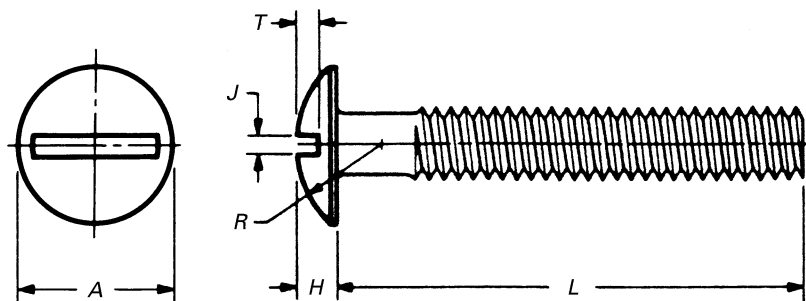
GENERAL NOTES:

- (a) For additional requirements, refer to sections 2 and 3.
(b) For slot inspection, see para. 2.1.4.

NOTES:

- (1) Drilled hole shall be approximately perpendicular to the axis of slot and may be permitted to break through bottom of the slot. Edges of the hole shall be free from burrs.
(2) A slight rounding of the edges at periphery of head shall be permissible provided the diameter of the bearing circle is equal to no less than 90% of the specified minimum head diameter.
(3) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.

Table 24 Dimensions of Slotted Truss Head Screws



Nominal Size or Basic Screw Diameter [Notes (1), (2), (3)]		Head Diameter, A		Head Height, H		Head Radius, R, Max.	Slot Width, J		Slot Depth, T	
		Max.	Min.	Max.	Min.		Max.	Min.	Max.	Min.
0000	0.0210	0.049	0.043	0.014	0.010	0.032	0.009	0.005	0.009	0.005
000	0.0340	0.077	0.071	0.022	0.018	0.051	0.013	0.009	0.013	0.009
00	0.0470	0.106	0.098	0.030	0.024	0.070	0.017	0.010	0.018	0.012
0	0.0600	0.131	0.119	0.037	0.029	0.087	0.023	0.016	0.022	0.014
1	0.0730	0.164	0.149	0.045	0.037	0.107	0.026	0.019	0.027	0.018
2	0.0860	0.194	0.180	0.053	0.044	0.129	0.031	0.023	0.031	0.022
3	0.0990	0.226	0.211	0.061	0.051	0.151	0.035	0.027	0.036	0.026
4	0.1120	0.257	0.241	0.069	0.059	0.169	0.039	0.031	0.040	0.030
5	0.1250	0.289	0.272	0.078	0.066	0.191	0.043	0.035	0.045	0.034
6	0.1380	0.321	0.303	0.086	0.074	0.211	0.048	0.039	0.050	0.037
7	0.1510	0.352	0.333	0.094	0.081	0.231	0.048	0.039	0.054	0.041
8	0.1640	0.384	0.364	0.102	0.088	0.254	0.054	0.045	0.058	0.045
10	0.1900	0.448	0.425	0.118	0.103	0.283	0.060	0.050	0.068	0.053
12	0.2160	0.511	0.487	0.134	0.118	0.336	0.067	0.056	0.077	0.061
14	0.2420	0.557	0.530	0.146	0.129	0.375	0.075	0.064	0.085	0.068
1/4	0.2500	0.573	0.546	0.150	0.133	0.375	0.075	0.064	0.087	0.070
16	0.2680	0.609	0.580	0.159	0.141	0.410	0.075	0.064	0.093	0.074
18	0.2940	0.661	0.630	0.173	0.153	0.446	0.084	0.072	0.100	0.080
5/16	0.3125	0.698	0.666	0.183	0.162	0.457	0.084	0.072	0.106	0.085
20	0.3200	0.713	0.680	0.186	0.165	0.484	0.084	0.072	0.108	0.087
24	0.3720	0.817	0.780	0.213	0.190	0.557	0.094	0.081	0.123	0.100
3/8	0.3750	0.823	0.787	0.215	0.191	0.538	0.094	0.081	0.124	0.100
7/16	0.4375	0.948	0.907	0.248	0.221	0.619	0.094	0.081	0.142	0.116
1/2	0.5000	1.073	1.028	0.280	0.250	0.701	0.106	0.091	0.161	0.131
9/16	0.5625	1.198	1.149	0.312	0.279	0.783	0.118	0.102	0.179	0.146
5/8	0.6250	1.323	1.269	0.345	0.309	0.863	0.133	0.116	0.196	0.162
3/4	0.7500	1.573	1.511	0.410	0.368	1.024	0.149	0.131	0.234	0.182

GENERAL NOTES:

- For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.
- For recess dimensions refer to Table 25.
- Applicable to screw types as indicated below. See referenced tables for thread and point dimensions and minimum practical screw lengths.
 - Type A thread forming, except short lengths, see Table 42.
 - Type AB thread forming, see Table 40.
 - Type B and BP thread forming, see Table 41; and Types BF and BT thread cutting, see Table 43.
 - Type C thread forming, see Mandatory Appendix VI; Types D, F, G, and T thread cutting, see Table 44; and Type TRS thread-rolling, see Table 45.
- For slot inspection, see para. 2.1.4.

NOTES:

- Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
- Sizes 0000, 000, 00, 9/16, 5/8, and 3/4 are for machine screws only.
- Sizes 7, 14, 16, 18, 20, and 24 are for tapping screws only.



(13)

[illegible]

Table 25 Recess Dimensions for Truss Head Screws (Cont'd)

Nominal Size or Basic Screw Diameter [Notes (1), (2), (3)]	Type I				Type IA				Type III				Type VI			
	Recess Dia., M, Ref.		Driver Size		Recess Dia., M, Ref.		Driver Size		Recess Across Flats, M, Ref.		Driver Size [Note (4)]		Recess Penetration Gaging Depth, P [Note (5)]		Recess Dia., M Ref.	
	Penetration Gaging Depth, P		Recess Gaging Depth, P		Penetration Gaging Depth, P		Recess Gaging Depth, P		Penetration Gaging Depth, P		Recess Gaging Depth, P		Penetration Gaging Depth, P		Recess Gaging Depth, P	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
20 0.3200	0.350	0.177	0.151	0.146	0.191	0.191	4R	0.100	0.085	0.085	0.100	0.085	0.100	0.085	0.100	0.085
24 0.3720	0.376	0.206	0.182	0.174	0.191	0.191	4R	0.100	0.085	0.085	0.100	0.085	0.100	0.085	0.100	0.085
3/8 0.3750	0.376	0.206	0.182	0.174	0.191	0.191	4R	0.100	0.085	0.085	0.100	0.085	0.100	0.125	0.110	0.055
7/16 0.4375	0.407	0.237	0.212	0.205	...	...	...	...	...	...	...	...	...	0.155	0.130	0.055
1/2 0.5000	0.437	0.268	0.243	0.233	...	...	...	...	...	...	...	...	...	0.150	0.130	0.062
9/16 0.5625	0.439	0.282	0.258	0.238	...	...	...	...	...	...	...	...	...	0.190	0.165	0.078
5/8 0.6250	0.547	0.289	0.256	0.245	...	...	...	...	...	...	...	...	...	0.190	0.165	0.078
3/4 0.7500	0.608	0.351	0.319	0.302	...	...	...	...	...	...	...	...	...	0.230	0.210	0.093

GENERAL NOTES:

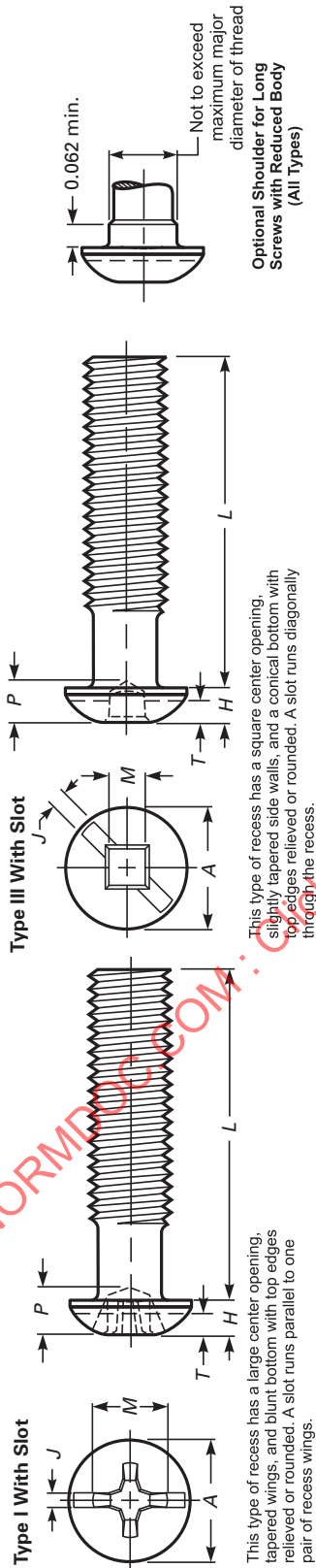
- (a) For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.
 (b) For head dimensions, refer to Table 24. Unless otherwise specified, recessed truss head screws may be supplied with either a full contour or flat top design at the option of the supplier.
 (c) For recess inspection, see para. 2.1.3.

NOTES:

- (1) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
 (2) Sizes $\frac{9}{16}$, $\frac{5}{8}$, and $\frac{3}{4}$ are for machine screws only.
 (3) Sizes 7, 14, 16, 20, and 24 are for tapping screws only.
 (4) "R" in the recess size tabulation means regular depth recess, and "S" means short depth recess.
 (5) Square recesses incorporate a slight taper on the sides of the recess. This taper can result in loss of penetration gaging depth on finished fasteners due to the buildup of plating in the recesses. The recess penetration dimensions specified here are for finished (plated) product. Manufacturers should be advised that they should not use all this tolerance in the heading process, or an out-of-tolerance condition could exist after plating.



Table 26 Dimensions of Combination Slotted Truss Head Screws



Nominal Size or Basic Screw Diameter [Notes (1), (2), (3)]	Type I				Type III							
	Slot Width, <i>J</i>		Slot Depth, <i>T</i> [Note (4)]		Recess Diameter, <i>M</i> , Ref.	Driver Size	Recess Penetration Gaging Depth, <i>P</i>		Recess Across Flats, <i>M</i> , Ref.	Driver Size [Note (5)]	Recess Penetration Gaging Depth, <i>P</i> [Note (6)]	
	Max.	Min.	Max.	Min.			Max.	Min.			Max.	Min.
0 0.0600	0.023	0.016	0.022	0.013	0.056	0	0.030	0.012	...	...	...	...
1 0.0730	0.026	0.019	0.027	0.016	0.064	0	0.038	0.020	...	...	...	...
2 0.0860	0.031	0.023	0.031	0.020	0.097	1	0.052	0.034	0.050	00	0.033	0.028
3 0.0990	0.035	0.027	0.036	0.023	0.103	1	0.059	0.042	0.070	0	0.038	0.028
4 0.1120	0.039	0.031	0.040	0.027	0.105	1	0.062	0.044	0.070	0	0.038	0.028
5 0.1250	0.043	0.035	0.045	0.030	0.121	1	0.078	0.060	0.091	1S	0.055	0.040
6 0.1380	0.048	0.039	0.050	0.033	0.151	2	0.073	0.048	0.091	1S	0.055	0.040
7 0.1510	0.048	0.039	0.054	0.037	0.158	2	0.080	0.055	0.091	1S	0.055	0.040
8 0.1640	0.054	0.045	0.058	0.040	0.166	2	0.088	0.063	0.112	2S	0.063	0.048
10 0.1900	0.060	0.050	0.068	0.048	0.181	2	0.104	0.079	0.112	2R	0.075	0.060
12 0.2160	0.067	0.056	0.077	0.055	0.241	3	0.111	0.086	0.133	3S	0.080	0.065
14 0.2420	0.075	0.064	0.085	0.063	0.256	3	0.126	0.101	0.193	3S	0.080	0.065

Table 26 Dimensions of Combination Slotted Truss Head Screws (Cont'd)

Nominal Size or Basic Screw Diameter [Notes (1), (2), (3)]	Type I				Type III			
	Slot Width, <i>J</i>		Slot Depth, <i>T</i> [Note (4)]		Recess Across Flats, <i>M</i> , Ref.		Recess Penetration Gaging Depth, <i>P</i> [Note (6)]	
	Max.	Min.	Max.	Min.	Recess Diameter, <i>M</i> , Ref.	Driver Size	Max.	Min.
1/4 0.2500	0.075	0.064	0.087	0.063	0.256	3	0.126	0.101
16 0.2680	0.075	0.064	0.093	0.069	0.260	3	0.134	0.109
18 0.2940	0.084	0.072	0.100	0.075	0.316	4	0.145	0.121
5/16 0.3125	0.084	0.072	0.106	0.076	0.345	4	0.173	0.148
20 0.3200	0.084	0.072	0.108	0.082	0.349	4	0.177	0.151
24 0.3720	0.094	0.081	0.123	0.087	0.376	4	0.206	0.182
3/8 0.3750	0.094	0.081	0.124	0.090	0.376	4	0.206	0.182
7/16 0.4375	0.094	0.081	0.142	0.104	0.407	4	0.237	0.212
1/2 0.5000	0.106	0.091	0.161	0.118	0.437	4	0.268	0.243
9/16 0.5625	0.118	0.102	0.179	0.131	0.439	4	0.282	0.258
5/8 0.6250	0.133	0.116	0.196	0.146	0.547	5	0.289	0.256
3/4 0.7500	0.149	0.131	0.234	0.164	0.608	5	0.351	0.319

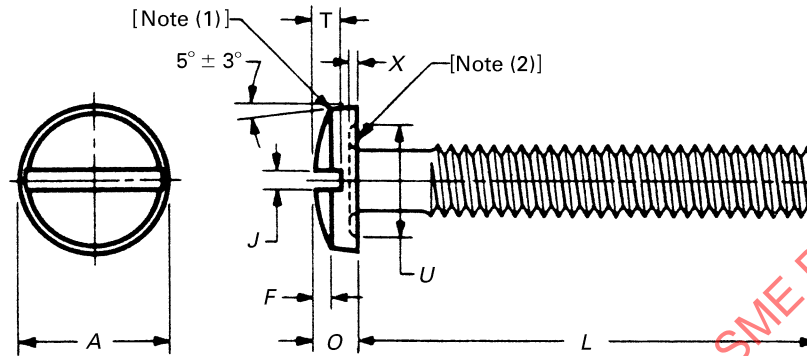
GENERAL NOTES:

- (a) For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.
 (b) For head dimensions, refer to Table 24.

NOTES:

- (1) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
 (2) Sizes $\frac{9}{16}$, $\frac{5}{8}$, and $\frac{3}{4}$ are for machine screws only.
 (3) Sizes 7, 14, 16, 18, 20, and 24 are for tapping screws only.
 (4) For inspection of the recess and slot, see paras. 2.1.3 and 2.1.4, respectively. Due to the underfill of material caused by the combination recess, the minimum slot depths are approximately 10% lower than slotted truss head.
 (5) "R" in the recess size tabulation means regular depth recess, and "S" means short depth recess.
 (6) Square recesses incorporate a slight taper on the sides of the recess. This taper can result in loss of penetration gaging depth on finished fasteners due to the buildup of plating in the recesses. The recess penetration dimensions specified here are for finished (plated) product. Manufacturers should be advised that they should not use all this tolerance in the heading process, or an out-of-tolerance condition could exist after plating.



Table 27 Dimensions of Slotted Binding Head Screws (Machine Screws Only)

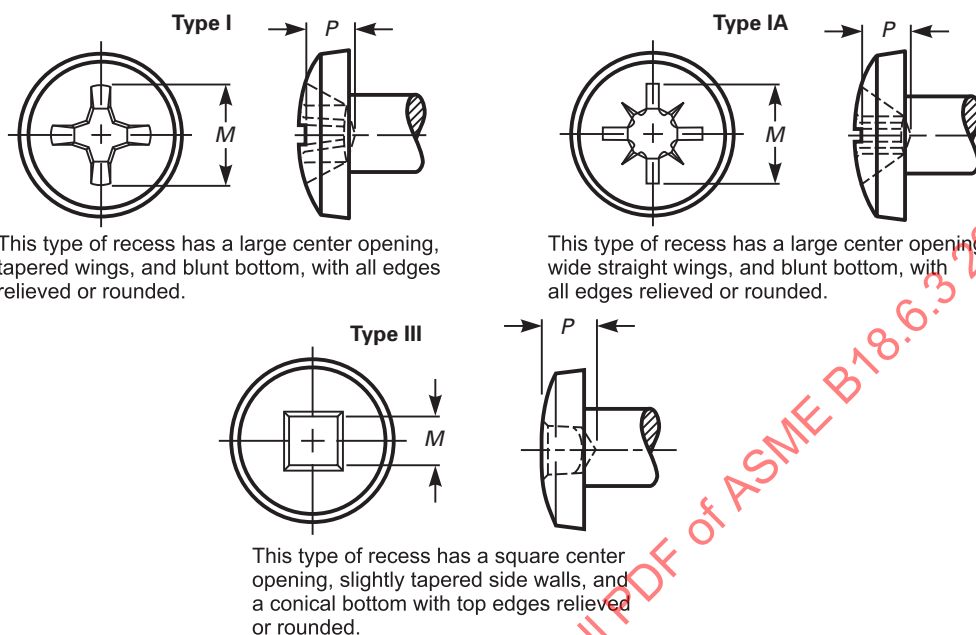
Nominal Size or Basic Screw Diameter [Note (3)]		Head Diameter, A		Total Head Height, O		Head Oval Height, F		Slot Width, J		Slot Depth, T		Undercut Diameter, U [Note (2)]		Undercut Depth, X [Note (2)]	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
0000	0.0210	0.046	0.040	0.014	0.009	0.006	0.003	0.008	0.004	0.009	0.005	...	...	...	...
000	0.0340	0.073	0.067	0.021	0.015	0.008	0.005	0.012	0.006	0.013	0.009	...	...	...	...
00	0.0470	0.098	0.090	0.028	0.023	0.011	0.007	0.017	0.010	0.018	0.012	...	...	...	...
0	0.0600	0.126	0.119	0.032	0.026	0.012	0.008	0.023	0.016	0.018	0.009	0.098	0.086	0.007	0.002
1	0.0730	0.153	0.145	0.041	0.035	0.015	0.011	0.026	0.019	0.024	0.014	0.120	0.105	0.008	0.003
2	0.0860	0.181	0.171	0.050	0.043	0.018	0.013	0.031	0.023	0.030	0.020	0.141	0.124	0.010	0.005
3	0.0990	0.208	0.197	0.059	0.052	0.022	0.016	0.035	0.027	0.036	0.025	0.162	0.143	0.011	0.006
4	0.1120	0.235	0.223	0.068	0.061	0.025	0.018	0.039	0.031	0.042	0.030	0.184	0.161	0.012	0.007
5	0.1250	0.263	0.249	0.078	0.069	0.029	0.021	0.043	0.035	0.048	0.035	0.205	0.180	0.014	0.009
6	0.1380	0.290	0.275	0.087	0.078	0.032	0.024	0.048	0.039	0.053	0.040	0.226	0.199	0.015	0.010
8	0.1640	0.344	0.326	0.105	0.095	0.039	0.029	0.054	0.045	0.065	0.050	0.269	0.236	0.017	0.012
10	0.1900	0.399	0.378	0.123	0.112	0.045	0.034	0.060	0.050	0.077	0.060	0.312	0.274	0.020	0.015
12	0.2160	0.454	0.430	0.141	0.130	0.052	0.039	0.067	0.056	0.089	0.070	0.354	0.311	0.023	0.018
1/4	0.2500	0.525	0.498	0.165	0.152	0.061	0.046	0.075	0.064	0.105	0.084	0.410	0.360	0.026	0.021
5/16	0.3125	0.656	0.622	0.209	0.194	0.077	0.059	0.084	0.072	0.134	0.108	0.513	0.450	0.032	0.027
3/8	0.3750	0.788	0.746	0.253	0.235	0.094	0.071	0.094	0.081	0.163	0.132	0.615	0.540	0.039	0.034

GENERAL NOTES:

- (a) For additional requirements, refer to sections 2 and 3.
 (b) For recess dimensions, refer to Table 28.
 (c) For slot inspection, see para. 2.1.4.

NOTES:

- (1) Break sharp edge on head where spherical and conical surfaces meet.
 (2) Unless otherwise specified by purchaser, slotted binding head machine screws shall not be undercut.
 (3) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.

Table 28 Recess Dimensions for Binding Head Screws (Machine Screws Only)

Nominal Size or Basic Screw Diameter [Note (1)]	Type I				Type IA				Type III			
	Recess Dia., M, Ref.	Driver Size	Recess Penetration Gaging Depth, P		Recess Dia., M, Ref.	Driver Size	Recess Penetration Gaging Depth, P		Recess Across Flats, M, Ref.	Driver Size [Note (2)]	Recess Penetration Gaging Depth, P [Note (3)]	
			Max.	Min.			Max.	Min.			Max.	Min.
0 0.0600	0.060	0	0.033	0.016	0.060	0	0.034	0.018	...	...	...	...
1 0.0730	0.067	0	0.040	0.023	0.067	0	0.043	0.027	...	...	...	...
2 0.0860	0.093	1	0.051	0.034	0.097	1	0.054	0.038	...	...	...	...
3 0.0990	0.103	1	0.061	0.044	0.102	1	0.059	0.043	0.070	0	0.038	0.023
4 0.1120	0.111	1	0.070	0.052	0.110	1	0.068	0.052	0.070	0	0.038	0.023
5 0.1250	0.141	2	0.064	0.040	0.137	2	0.059	0.041	0.091	1S	0.055	0.040
6 0.1380	0.153	2	0.077	0.053	0.149	2	0.072	0.054	0.091	1S	0.055	0.040
8 0.1640	0.179	2	0.103	0.079	0.174	2	0.097	0.079	0.112	2S	0.063	0.048
10 0.1900	0.198	2	0.123	0.098	0.192	2	0.115	0.097	0.112	2S	0.063	0.048
12 0.2160	0.260	3	0.134	0.109	0.253	3	0.125	0.107	0.133	3S	0.080	0.065
1/4 0.2500	0.274	3	0.147	0.123	0.267	3	0.139	0.121	0.133	3S	0.080	0.065
5/16 0.3125	0.343	4	0.175	0.152	0.332	4	0.163	0.145	0.191	4R	0.100	0.080
3/8 0.3750	0.393	4	0.227	0.203	0.380	4	0.213	0.195	0.191	4R	0.100	0.080

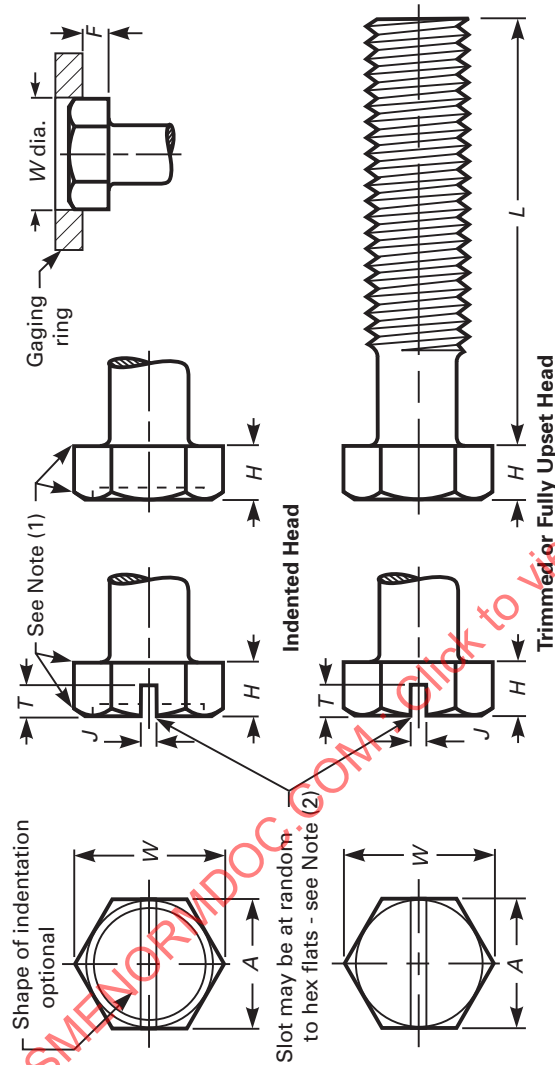
GENERAL NOTES:

- (a) For additional requirements, refer to sections 2 and 3.
 (b) For head dimensions, refer to Table 27.
 (c) For recess inspection, see para. 2.1.3.

NOTES:

- (1) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
 (2) "R" in the recess size tabulation means regular depth recess, and "S" means short depth recess.
 (3) Square recesses incorporate a slight taper on the sides of the recess. This taper can result in loss of penetration gaging depth on finished fasteners due to the buildup of plating in the recesses. The recess penetration dimensions specified here are for finished (plated) product. Manufacturers should be advised that they should not use all this tolerance in the heading process, or an out-of-tolerance condition could exist after plating.

Table 29 Dimensions of Plain (Unslotted) and Slotted Regular and Large Hex Head Screws



Nominal Size or Basic Screw Diameter [Notes (3), (4)]	Regular Head [Note (5)]				Large Head [Notes (5), (8)]				Head Height, <i>H</i>		Slot Width, <i>J</i>		Slot Depth, <i>T</i>		Protrusion Beyond Gaging Ring, <i>F</i> , Min. [Note (7)]
	Width Across Flats, <i>A</i> [Note (6)]		Across Corners, <i>W</i> , Min.		Width Across Flats, <i>A</i> [Note (6)]		Across Corners, <i>W</i> , Min.		Max.		Min.		Max.		
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.		
1 0.0730	0.125	0.120					0.044	0.036							0.022
2 0.0860	0.125	0.120					0.050	0.040							0.024
3 0.0990	0.188	0.181					0.055	0.044							0.026
4 0.1120	0.188	0.181	0.219	0.213	0.238	0.238	0.060	0.049	0.039	0.031	0.036	0.025			0.029
5 0.1250	0.188	0.181	0.250	0.244	0.272	0.272	0.070	0.058	0.043	0.035	0.042	0.030			0.035
6 0.1380	0.250	0.244					0.093	0.080	0.048	0.039	0.046	0.033			0.048
7 0.1510	0.250	0.244					0.093	0.080	0.048	0.039	0.054	0.040			0.048
8 0.1640	0.250	0.244	0.312	0.305	0.340	0.340	0.110	0.096	0.054	0.045	0.066	0.052			0.058
10 0.1900	0.312	0.305					0.120	0.105	0.060	0.050	0.072	0.057			0.063
12 0.2160	0.312	0.305	0.375	0.367	0.409	0.409	0.155	0.139	0.067	0.056	0.093	0.077			0.083
14 0.2420	0.375	0.367	0.438	0.428	0.477	0.477	0.190	0.172	0.075	0.064	0.101	0.083			0.103
1/4 0.2500	0.375	0.367	0.438	0.428	0.477	0.477	0.190	0.172	0.075	0.064	0.101	0.083			0.103
5/16 0.3125	0.500	0.489					0.230	0.208	0.084	0.072	0.122	0.100			0.125

Table 29 Dimensions of Plain (Unslotted) and Slotted Regular and Large Hex Head Screws (Cont'd)

Nominal Size or Basic Screw Diameter [Notes (3), (4)]	Regular Head [Note (5)]		Large Head [Notes (5), (8)]		Head Height, <i>H</i>	Slot Width, <i>J</i>		Slot Depth, <i>T</i>		Protrusion Beyond Gaging Ring, <i>F</i> , Min. [Note (7)]	
	Width Across Flats, <i>A</i> [Note (6)]		Width Across Flats, <i>A</i> [Note (6)]			Across Corners, <i>W</i> , Min.		[Notes (2), (9)]			
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.			
	[Notes (6), (7)]	[Notes (6), (7)]	[Notes (6), (7)]	[Notes (6), (7)]	[Notes (6), (7)]	[Notes (6), (7)]	[Notes (6), (7)]	[Notes (6), (7)]			
20	0.3200	0.500	0.489	0.545	...	...	0.208	0.072	0.122	0.100	0.125
24	0.3720	0.562	0.551	0.614	...	...	0.270	0.081	0.156	0.131	0.162
$\frac{3}{8}$	0.3750	0.562	0.551	0.614	...	...	0.270	0.094	0.156	0.131	0.162
$\frac{7}{16}$	0.4375	0.625	0.610	0.682	...	...	0.321	...	...	...	0.193
$\frac{1}{2}$	0.5000	0.750	0.735	0.820	...	...	0.400	0.367	...	...	0.220

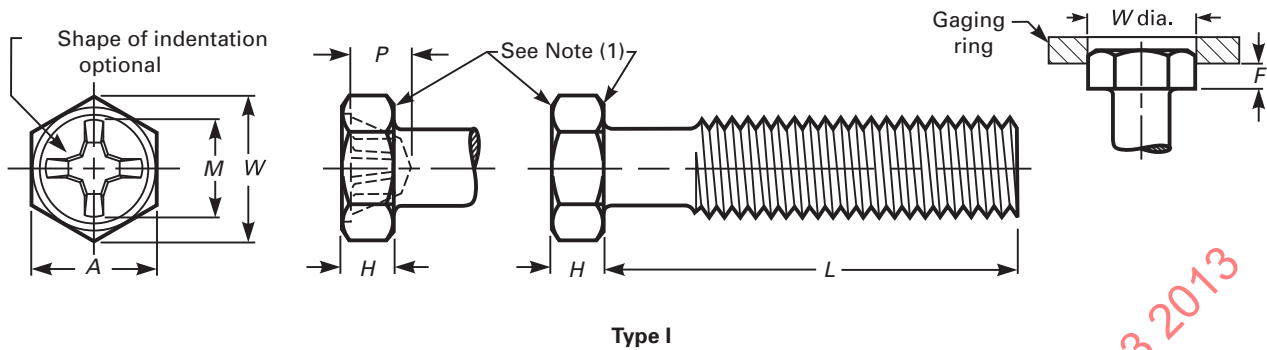
GENERAL NOTES:

- For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.
- For recess dimensions, refer to Table 30.
- Applicable to screw types as indicated below. See referenced tables for thread and point dimensions and minimum practical screw lengths.
 - Type A thread forming, except short lengths, see Table 42.
 - Type AB thread forming, see Table 40.
 - Type B and BP thread forming, see Table 41; and Types BF and BT thread cutting, see Table 43.
 - Type C thread forming, see Mandatory Appendix VI; Types D, F, G, and T thread cutting, see Table 44; and Type TRS thread-rolling, see Table 45.
- For slot inspection, see para. 2.1.4.

NOTES:

- A slight rounding of all edges and corners of the hex surfaces of indented hex heads shall be permissible, provided the diameter of the bearing circle is equal to no less than 90% of the specified minimum width-across-flats dimension.
- Unless otherwise specified by the purchaser, hex head machine screws are not slotted.
- Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
- Sizes 7, 14, 20, and 24 are for tapping screws only.
- Unless otherwise specified by the purchaser, regular hex heads shall be furnished, and both regular and large head styles may be indented head, trimmed head, or fully upset head construction, at the option of the manufacturer.
- Dimensions across flats and across corners of the head shall be measured at the point of maximum metal. The taper of the sides of the hex (the angle between one side and the axis) shall not exceed 2 deg or 0.004 in., whichever is greater, the specified width across flats being the large dimension.
- The rounding due to lack of fill on all six corners of the head shall be reasonably uniform, and the width across corners of the head shall be such that when a sharp ring having an inside diameter equal to the specified minimum width across corners is placed on the top and bottom of the head, the head shall protrude by an amount equal to or greater than the *F* value tabulated. See Mandatory Appendix II for across-corners gaging of hex heads.
- Large hex heads are intended for screw and washer assemblies (sems) as specified in ASME B18.13, and other applications requiring large bearing.
- Slot depth beyond the bottom of the indentation on indented heads shall not be less than one-third of the minimum slot depth specified.



(13) **Table 30 Recess Dimensions for Indented Regular and Large Hex Head Screws****Type VI**

Nominal Size or Basic Screw Diameter [Notes (1), (2), (3)]	Type I					Type VI				
	Recess Diameter, M , Ref.	Driver Size	Recess Penetration Gaging Depth, P		Recess Diameter, M , Ref.	Driver Size	Recess Penetration Gaging Depth, P		Maximum Fallaway	
			Max.	Min.			Max.	Min.		
1 0.0730	0.072	0	0.054	0.036	...	...	...	...	...	...
2 0.0860	0.086	1	0.054	0.036	...	...	...	...	...	...
3 0.0990	0.092	1	0.060	0.042	...	...	...	...	...	...
4 0.1120	0.097	1	0.067	0.049	0.111	T10	0.040	0.035	0.022	0.022
5 0.1250	0.105	1	0.076	0.058	0.111	T10	0.050	0.040	0.022	0.022
6 0.1380	0.148	2	0.089	0.064	0.132	T15	0.051	0.040	0.026	0.026
7 0.1510	0.148	2	0.089	0.064	0.132	T15	0.051	0.040	0.026	0.026
8 0.1640	0.168	2	0.115	0.090	0.155	T20	0.065	0.050	0.031	0.031
10 0.1900	0.178	2	0.127	0.102	0.178	T25	0.080	0.065	0.036	0.036
12 0.2160	0.247	3	0.152	0.127	0.200	T27	0.080	0.065	0.040	0.040
14 0.2420	0.277	3	0.186	0.161	0.221	T30	0.095	0.080	0.044	0.044
1/4 0.2500	0.277	3	0.186	0.161	0.221	T30	0.095	0.080	0.044	0.044
5/16 0.3125	0.359	4	0.234	0.210	0.266	T40	0.125	0.100	0.047	0.047
20 0.3200	0.359	4	0.234	0.210	0.266	T40	0.125	0.100	0.047	0.047
24 0.3720	0.387	4	0.267	0.243	0.312	T45	0.155	0.125	0.055	0.055
3/8 0.3750	0.387	4	0.267	0.243	0.312	T45	0.155	0.125	0.055	0.055

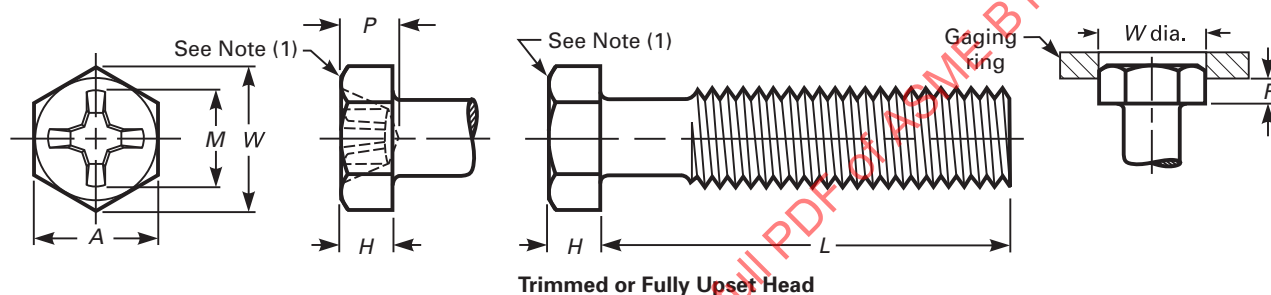
GENERAL NOTES:

- (a) For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.
 (b) For head dimensions, refer to Table 29.
 (c) For recess inspection, see para. 2.1.3.

NOTES:

- (1) A slight rounding of all edges and corners of the hex surfaces of indented hex heads shall be permissible, provided the diameter of the bearing circle is equal to no less than 90% of the specified minimum width-across-flats dimension.
 (2) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
 (3) Sizes 7, 14, 20, and 24 are for tapping screws only.



Table 31 Recess Dimensions for Type I Nonindented Regular and Large Hex Head Screws

Nominal Size or Basic Screw Diameter [Note (2)]	Recess Dia., <i>M</i> , Ref.	Driver Size	Recess Penetration Gaging Depth, <i>P</i>	
			Max.	Min.
8 0.1640	0.183	2	0.110	0.087
10 0.1900	0.198	2	0.125	0.102
12 0.2160	0.262	3	0.139	0.116
$\frac{1}{4}$ 0.2500	0.277	3	0.154	0.131
$\frac{5}{16}$ 0.3125	0.359	4	0.196	0.174
$\frac{3}{8}$ 0.3750	0.387	4	0.225	0.203

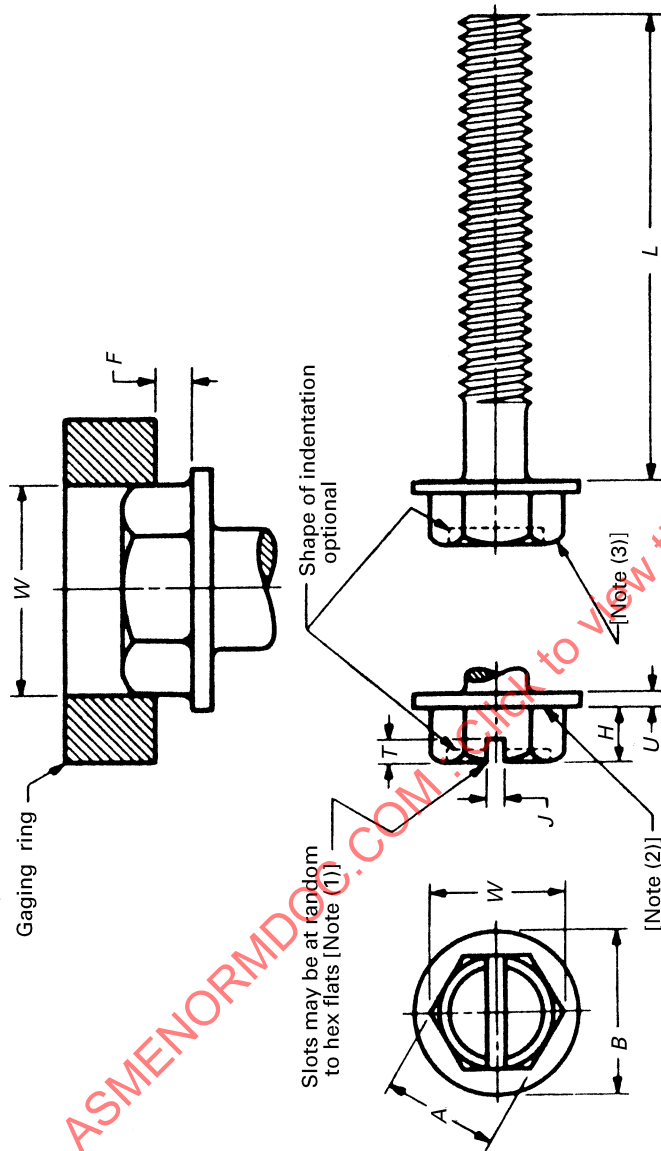
GENERAL NOTES:

- (a) For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.
- (b) For head dimensions, refer to Table 29.
- (c) For recess inspection, see para. 2.1.3.

NOTES:

- (1) A slight rounding of all edges and corners of the hex surfaces of indented hex heads shall be permissible, provided the diameter of the bearing circle is equal to no less than 90% of the specified minimum width-across-flats dimension.
- (2) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.

Table 32 Dimensions of Plain and Slotted Hex Washer Head Screws



Nominal Size or Basic Screw Diameter [Notes (4), (5)]	Width Across Flats, A [Note (6)]		Width Across Corners W , Min. [Notes (6), (7)]		Head Height, H [Note (2)]		Washer Diameter, B [Note (3)]		Washer Thickness, U [Note (4)]		Slot Width, J [Note (1)]		Slot Depth, T [Notes (1), (8)]		Protrusion Beyond Gaging Ring, F , Min. [Note (7)]	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
2 0.0860	0.125	0.120	0.134	0.050	0.040	0.154	0.016	0.010	0.031	0.031	0.042	0.025	0.026	0.029	0.035	0.048
3 0.0990	0.125	0.120	0.134	0.055	0.044	0.163	0.016	0.010	0.031	0.031	0.042	0.025	0.026	0.029	0.035	0.048
4 0.1120	0.188	0.181	0.202	0.060	0.049	0.225	0.019	0.011	0.039	0.039	0.049	0.030	0.033	0.033	0.048	0.058
5 0.1250	0.188	0.181	0.202	0.070	0.058	0.240	0.025	0.015	0.043	0.043	0.054	0.030	0.033	0.033	0.048	0.058
6 0.1380	0.250	0.244	0.272	0.093	0.080	0.302	0.025	0.015	0.048	0.048	0.060	0.030	0.033	0.033	0.048	0.058
7 0.1510	0.250	0.244	0.272	0.093	0.080	0.302	0.029	0.017	0.048	0.048	0.060	0.030	0.033	0.033	0.048	0.058
8 0.1640	0.250	0.244	0.272	0.110	0.096	0.322	0.031	0.019	0.054	0.054	0.060	0.030	0.033	0.033	0.048	0.058
10 0.1900	0.312	0.305	0.340	0.120	0.105	0.384	0.031	0.019	0.060	0.060	0.060	0.030	0.033	0.033	0.048	0.058
12 0.2160	0.312	0.305	0.340	0.155	0.139	0.432	0.039	0.022	0.067	0.067	0.067	0.030	0.033	0.033	0.048	0.058
14 0.2420	0.375	0.367	0.409	0.190	0.172	0.520	0.050	0.030	0.075	0.075	0.075	0.030	0.033	0.033	0.048	0.058
1/4 0.2500	0.375	0.367	0.409	0.190	0.172	0.520	0.050	0.030	0.075	0.075	0.075	0.030	0.033	0.033	0.048	0.058
5/16 0.3125	0.500	0.489	0.545	0.230	0.208	0.676	0.055	0.035	0.084	0.084	0.084	0.030	0.033	0.033	0.048	0.058



Table 32 Dimensions of Plain and Slotted Hex Washer Head Screws (Cont'd)

Nominal Size or Basic Screw Diameter [Notes (4), (5)]	Width Across Flats, A [Note (6)]		Width Across Corners W, Min.		Head Height, H		Washer Diameter, B		Washer Thickness, U		Slot Width, J [Note (1)]		Slot Depth, T [Notes (1), (8)]		Protrusion Beyond Gaging Ring, F, Min. [Note (7)]
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	
20	0.3200	0.500	0.489	0.545	0.230	0.208	0.676	0.624	0.055	0.035	0.084	0.072	0.134	0.100	0.125
24	0.3720	0.562	0.551	0.614	0.295	0.270	0.780	0.720	0.063	0.037	0.084	0.072	0.134	0.100	0.162
3/8	0.3750	0.562	0.551	0.614	0.295	0.270	0.780	0.720	0.063	0.037	0.094	0.081	0.168	0.131	0.162
7/16	0.4375	0.625	0.610	0.682	0.348	0.321	0.870	0.790	0.073	0.043	0.094	0.081	0.175	0.140	0.193
1/2	0.5000	0.750	0.735	0.820	0.400	0.367	1.040	0.960	0.085	0.050	0.106	0.091	0.195	0.155	0.220

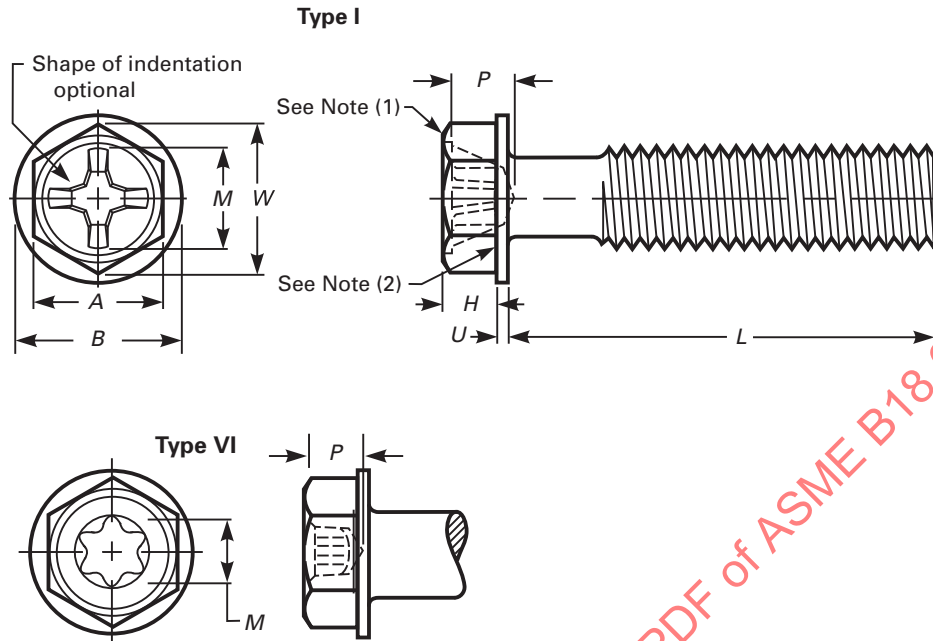
GENERAL NOTES:

- (a) For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.
 (b) For recess dimensions, refer to Table 33.
 (c) Applicable to screw types as indicated below. See referenced tables for thread and point dimensions and minimum practical screw lengths.
 (1) Type A thread forming, except short lengths, see Table 42.
 (2) Type AB thread forming, see Table 40.
 (3) Type B and BP thread forming, see Table 41; and Types BF and BT thread cutting, see Table 43.
 (4) Type C thread forming, see Mandatory Appendix VI; Types D, F, G, and T thread cutting, see Table 44; and Type TRS thread-rolling, see Table 45.
 (d) For slot inspection, see para. 2.1.4.

NOTES:

- (1) Unless otherwise specified by the purchaser, hex washer head screws are not slotted.
 (2) Fillet radius, R, at the junction of the sides of the hex and the top of the washer shall not exceed 0.15 times the basic screw diameter.
 (3) A slight rounding of all edges and corners of the hex surfaces shall be permissible.
 (4) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
 (5) Sizes 7, 14, 20, and 24 are for tapping screws only.
 (6) Dimensions across flats and across corners of the head shall be measured at the point of maximum metal. The taper of the sides of the hex (the angle between one side and the axis) shall not exceed 2 deg or 0.004 in., whichever is greater, the specified width across flats being the large dimension.
 (7) The rounding due to lack of fill on all six corners of the head shall be reasonably uniform, and the width-across-corners of the head shall be such that when a sharp ring having an inside diameter equal to the specified minimum width-across-corners is placed on the top of the head, the hex portion of the head shall protrude by an amount equal to or greater than the F value tabulated. See Mandatory Appendix II for across-corners gaging of hex heads.
 (8) Slot depth beyond the bottom of the indentation shall not be less than one-third of the minimum slot depth specified.



(13) **Table 33 Recess Dimensions for Indented Hex Washer Head Screws**

Type I					Type VI				
Nominal Size or Basic Screw Diameter [Notes (3), (4)]	Recess Dia., M, Ref.	Driver Size	Recess Penetration Gaging Depth, P [Note (5)]		Recess Dia., M, Ref.	Driver Size	Recess Penetration Gaging Depth, P [Note (5)]		Maximum Fallaway
			Max.	Min.			Max.	Min.	
4 0.1120	0.097	1	0.067	0.049	...	...	...	...	...
5 0.1250	0.105	1	0.076	0.058	0.111	T10	0.050	0.040	0.022
6 0.1380	0.148	2	0.089	0.064	0.132	T15	0.055	0.045	0.026
7 0.1510	0.148	2	0.089	0.064	0.132	T15	0.055	0.045	0.026
8 0.1640	0.168	2	0.115	0.090	0.155	T20	0.070	0.055	0.031
10 0.1900	0.178	2	0.127	0.102	0.178	T25	0.075	0.060	0.036
12 0.2160	0.247	3	0.152	0.127	0.200	T27	0.085	0.070	0.040
14 0.2420	0.277	3	0.186	0.161	0.221	T30	0.100	0.085	0.044
1/4 0.2500	0.277	3	0.186	0.161	0.221	T30	0.100	0.085	0.044
5/16 0.3125	0.358	4	0.234	0.219	0.266	T40	0.120	0.105	0.047
20 0.3200	0.358	4	0.234	0.219	0.266	T40	0.120	0.105	0.047
24 0.3720	0.386	4	0.267	0.243	0.312	T45	0.145	0.130	0.055
3/8 0.3750	0.386	4	0.267	0.243	0.312	T45	0.145	0.130	0.055

GENERAL NOTES:

- (a) For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.
 (b) For head dimensions, refer to Table 32.
 (c) For recess inspection, see para. 2.1.3.

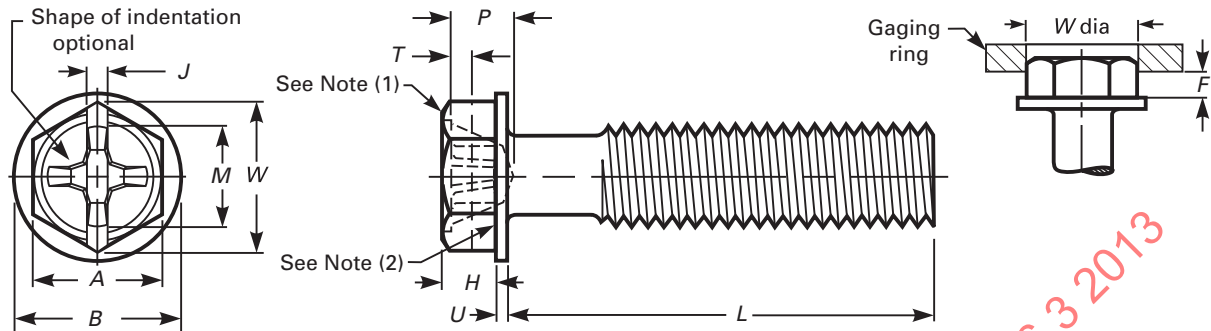
NOTES:

- (1) A slight rounding of all edges and corners of the hex surfaces shall be permissible.
 (2) Fillet radius, R , at the junction of the sides of the hex and the top of the washer shall not exceed 0.15 times the basic screw diameter.
 (3) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
 (4) Sizes 7, 14, 20, and 24 are for tapping screws only.
 (5) The recess depths and penetration given are intended to include the depth of the indentation. Due to possible variations in the indentation depths, there could be variations in these dimensions. In these cases, the requirements are to be as agreed upon between the manufacturer and the purchaser.



Table 34 Recess Dimensions for Combination Slotted Type I Indented Hex Washer Head Screws

(13)



Nominal Size or Basic Screw Diameter [Notes (3), (4)]	Recess Dia., M, Ref.	Driver Size	Slot Width, J		Slot Depth, T		Recess Penetration Gaging Depth, P [Note (5)]	
			Max.	Min.	Max.	Min.	Max.	Min.
4 0.1120	0.097	1	0.039	0.031	0.042	0.024	0.067	0.049
5 0.1250	0.105	1	0.043	0.035	0.049	0.028	0.076	0.058
6 0.1380	0.148	2	0.048	0.039	0.053	0.030	0.089	0.064
7 0.1510	0.148	2	0.048	0.039	0.053	0.030	0.089	0.064
8 0.1640	0.168	2	0.054	0.045	0.074	0.048	0.115	0.090
10 0.1900	0.178	2	0.060	0.050	0.080	0.052	0.127	0.102
12 0.2160	0.247	3	0.067	0.056	0.103	0.072	0.152	0.127
14 0.2420	0.277	3	0.075	0.064	0.111	0.078	0.186	0.161
1/4 0.2500	0.277	3	0.075	0.064	0.111	0.078	0.186	0.161
5/16 0.3125	0.358	4	0.084	0.072	0.134	0.100	0.234	0.210
3/8 0.3750	0.386	4	0.094	0.081	0.168	0.161	0.267	0.243

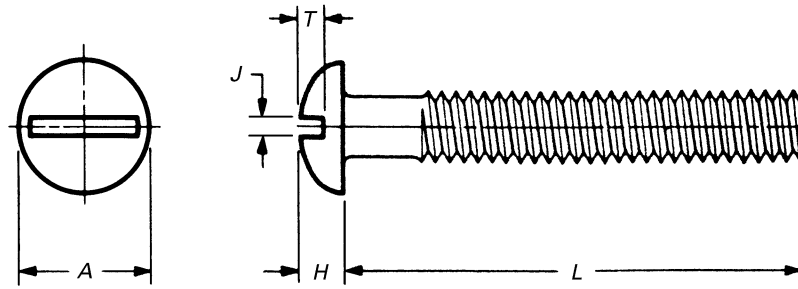
GENERAL NOTES:

- For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.
- The specified minimum slot depths are approximately 10% lower than those for slotted hex washer heads. That portion of the slot depth that penetrates beyond the bottom of the indentation shall not be less than one-third of the minimum slot depth specified.
- For head dimensions, refer to Table 32.
- For recess inspection, see para. 2.1.3.

NOTES:

- A slight rounding of all edges and corners of the hex surfaces shall be permissible.
- Fillet radius, R , at the junction of the sides of the hex and the top of the washer shall not exceed 0.15 times the basic screw diameter.
- Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
- Sizes 7 and 14 are for tapping screws only.
- The recess depths, slot depths, and penetration given are intended to include the depth of the indentation. Due to possible variations in the indentation depths, there could be variations in these dimensions. In these cases, the requirements are to be as agreed upon between the manufacturer and the purchaser.



Table 35 Dimensions of Slotted Round Head Screws

Nominal Size or Basic Screw Diameter [Notes (1), (2), (3)]		Head Diameter, A		Head Height, H		Slot Width, J		Slot Depth, T	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
0000	0.0210	0.041	0.035	0.022	0.016	0.008	0.004	0.017	0.013
000	0.0340	0.062	0.056	0.031	0.025	0.012	0.008	0.018	0.012
00	0.0470	0.089	0.080	0.045	0.036	0.017	0.010	0.026	0.018
0	0.0600	0.113	0.099	0.053	0.043	0.023	0.016	0.039	0.029
1	0.0730	0.138	0.122	0.061	0.051	0.026	0.019	0.044	0.033
2	0.0860	0.162	0.146	0.069	0.059	0.031	0.023	0.048	0.037
3	0.0990	0.187	0.169	0.078	0.067	0.035	0.027	0.053	0.040
4	0.1120	0.211	0.193	0.086	0.075	0.039	0.031	0.058	0.044
5	0.1250	0.236	0.217	0.095	0.083	0.043	0.035	0.063	0.047
6	0.1380	0.260	0.240	0.103	0.091	0.048	0.039	0.068	0.051
7	0.1510	0.285	0.264	0.111	0.099	0.048	0.039	0.072	0.055
8	0.1640	0.309	0.287	0.120	0.107	0.054	0.045	0.077	0.058
10	0.1900	0.359	0.334	0.137	0.123	0.060	0.050	0.087	0.065
12	0.2160	0.408	0.382	0.153	0.139	0.067	0.056	0.096	0.073
14	0.2420	0.457	0.429	0.170	0.155	0.075	0.064	0.106	0.080
1/4	0.2500	0.472	0.443	0.175	0.160	0.075	0.064	0.109	0.082
16	0.2680	0.506	0.476	0.187	0.171	0.075	0.064	0.115	0.087
18	0.2940	0.555	0.523	0.204	0.187	0.084	0.072	0.125	0.094
5/16	0.3125	0.590	0.557	0.216	0.198	0.084	0.072	0.132	0.099
20	0.3200	0.604	0.570	0.220	0.203	0.084	0.072	0.134	0.101
24	0.3720	0.702	0.664	0.254	0.235	0.094	0.081	0.154	0.116
3/8	0.3750	0.708	0.670	0.256	0.237	0.094	0.081	0.155	0.117
7/16	0.4375	0.750	0.707	0.328	0.307	0.094	0.081	0.196	0.148
1/2	0.5000	0.813	0.766	0.355	0.332	0.106	0.091	0.211	0.159
9/16	0.5625	0.938	0.887	0.410	0.385	0.118	0.102	0.242	0.183
5/8	0.6250	1.000	0.944	0.438	0.411	0.133	0.116	0.258	0.195
3/4	0.7500	1.250	1.185	0.547	0.516	0.149	0.131	0.320	0.242

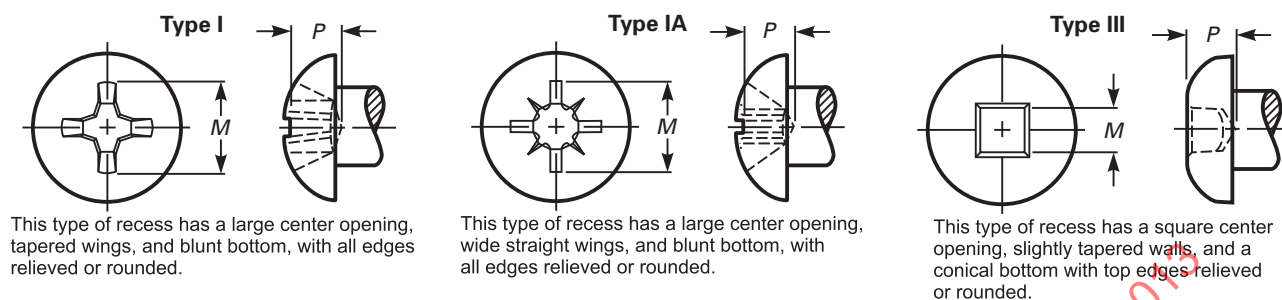
GENERAL NOTES:

- For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.
- Use of round head screws is not recommended; use pan head screws. See para. 2.2.11 and Tables 17 through 20.
- For recess dimensions, refer to Table 36.
- Applicable to screw types as indicated below. See referenced tables for thread and point dimensions and minimum practical screw lengths.
 - Type A thread forming, except short lengths, see Table 42.
 - Type B and BP thread forming, see Table 41; and Types BF and BT thread cutting, see Table 43.
 - Type C thread forming, see Mandatory Appendix VI; Types D, F, G, and T thread cutting, see Table 44; and Type TRS thread-rolling, see Table 45.
- For slot inspection, see para. 2.1.4.

NOTES:

- Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
- Sizes 0000, 000, 00, 5/16, 5/8, and 3/4 are for machine screws only.
- Sizes 7, 14, 16, 18, 20, and 24 are for tapping screws only.



Table 36 Recess Dimensions for Round Head Screws

Nominal Size or Basic Screw Diameter [Notes (1), (2), (3)]	Type I				Type IA				Type III			
	Recess Dia., M, Ref.	Driver Size	Recess Penetration Gaging Depth, P		Recess Dia., M, Ref.	Driver Size	Recess Penetration Gaging Depth, P		Recess Across Flats, M, Ref.	Driver Size [Note (4)]	Recess Penetration Gaging Depth, P [Note (5)]	
			Max.	Min.			Max.	Min.			Max.	Min.
0 0.0600	0.066	0	0.035	0.015	...	...	...	...	...	...	...	...
1 0.0730	0.075	0	0.045	0.026	...	...	...	...	...	...	...	...
2 0.0860	0.093	1	0.046	0.027	0.092	1	0.047	0.031	...	...	...	...
3 0.0990	0.102	1	0.055	0.035	...	...	...	...	0.070	0	0.038	0.028
4 0.1120	0.111	1	0.065	0.046	0.110	1	0.067	0.051	0.070	0	0.038	0.028
5 0.1250	0.147	2	0.063	0.035	0.142	2	0.063	0.045	0.091	1R	0.065	0.050
6 0.1380	0.155	2	0.073	0.045	0.150	2	0.071	0.053	0.091	1R	0.065	0.050
7 0.1510	0.164	2	0.081	0.055	...	...	...	...	0.091	1R	0.065	0.050
8 0.1640	0.171	2	0.090	0.064	0.164	2	0.086	0.068	0.112	2R	0.075	0.060
10 0.1900	0.188	2	0.108	0.082	0.182	2	0.105	0.087	0.112	2R	0.075	0.060
12 0.2160	0.242	3	0.108	0.082	0.234	3	0.103	0.085	0.133	3R	0.095	0.080
14 0.2420	0.258	3	0.125	0.099	...	...	...	...	0.133	3R	0.095	0.080
1/4 0.2500	0.261	3	0.130	0.104	0.255	3	0.126	0.108	0.133	3R	0.095	0.080
16 0.2680	0.274	3	0.142	0.119	...	...	...	...	0.133	3R	0.095	0.080
18 0.2940	0.322	4	0.147	0.121	...	...	...	...	0.191	4R	0.100	0.085
5/16 0.3125	0.301	3	0.170	0.144	0.291	3	0.162	0.144	0.191	4R	0.100	0.085
20 0.3200	0.338	4	0.163	0.137	...	...	...	...	0.191	4R	0.100	0.085
24 0.3720	0.380	4	0.208	0.182	...	...	...	...	0.191	4R	0.100	0.085
3/8 0.3750	0.380	4	0.208	0.182	0.368	4	0.195	0.177	0.191	4R	0.100	0.085
7/16 0.4375	0.395	4	0.221	0.196	...	...	...	...	...	...	...	...
1/2 0.5000	0.409	4	0.236	0.211	...	...	...	...	...	...	...	...
9/16 0.5625	0.447	4	0.272	0.245	...	...	...	...	...	...	...	...
5/8 0.6250	0.542	5	0.285	0.244	...	...	...	...	...	...	...	...
3/4 0.7500	0.642	5	0.385	0.346	...	...	...	...	...	...	...	...

GENERAL NOTES:

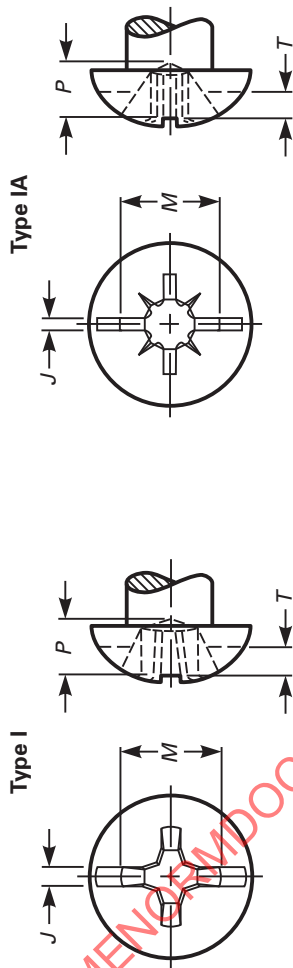
- For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.
- Use of round head screws is not recommended; use pan head screws. See para. 2.2.11 and Tables 17 through 20.
- For head dimensions, refer to Table 35.
- For recess inspection, see para. 2.1.3.

NOTES:

- Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
- Sizes 9/16, 5/8, and 3/4 are for machine screws only.
- Sizes 7, 14, 16, 18, 20, and 24 are for tapping screws only.
- "R" in the recess size tabulation means regular depth recess.
- Square recesses incorporate a slight taper on the sides of the recess. This taper can result in loss of penetration gaging depth on finished fasteners due to the buildup of plating in the recesses. The recess penetration dimensions specified here are for finished (plated) product. Manufacturers should be advised that they should not use all this tolerance in the heading process, or an out-of-tolerance condition could exist after plating.



Table 37 Recess Dimensions for Combination Slotted Round Head Screws



This type of recess has a large center opening, tapered wings, and blunt bottom, with all edges relieved or rounded. A slot crosses the head aligned with one pair of wings.

This type of recess has a large center opening, wide straight wings, and blunt bottom, with all edges relieved or rounded. A slot crosses the head aligned with one pair of wings.

Nominal Size or Basic Screw Diameter [Notes (1), (2), (3)]	Slot Width, J		Slot Depth, T		Type I			Type IA		
	Max.	Min.	Max.	Min.	Recess Dia., M, Ref.	Driver Size	Recess Penetration Gaging Depth, P Max.	Recess Dia., M, Ref.	Driver Size	Recess Penetration Gaging Depth, P Max.
0 0.0600	0.023	0.016	0.039	0.029	0.066	0	0.035	...	...	...
1 0.0730	0.026	0.019	0.044	0.033	0.075	0	0.045	...	...	...
2 0.0860	0.031	0.023	0.048	0.037	0.093	1	0.046	0.092	1	0.047
3 0.0990	0.035	0.027	0.053	0.040	0.102	1	0.055	...	...	...
4 0.1120	0.039	0.031	0.058	0.044	0.111	1	0.065	0.110	1	0.067
5 0.1250	0.043	0.035	0.063	0.047	0.147	2	0.063	0.142	2	0.063
6 0.1380	0.048	0.039	0.068	0.051	0.155	2	0.073	0.150	2	0.071
7 0.1510	0.048	0.039	0.072	0.055	0.164	2	0.081	...	...	...
8 0.1640	0.054	0.045	0.077	0.058	0.171	2	0.090	0.164	2	0.086
10 0.1900	0.060	0.050	0.087	0.065	0.188	2	0.108	0.182	2	0.105
12 0.2160	0.067	0.056	0.096	0.073	0.242	3	0.108	0.234	3	0.103
14 0.2420	0.075	0.064	0.106	0.080	0.258	3	0.125	...	...	...
1/4 0.2500	0.075	0.064	0.109	0.082	0.261	3	0.130	0.255	3	0.126
16 0.2680	0.075	0.064	0.115	0.087	0.274	3	0.142	...	...	...
18 0.2940	0.084	0.072	0.125	0.094	0.322	4	0.147	...	...	...
5/16 0.3125	0.084	0.072	0.132	0.099	0.301	3	0.170	0.291	3	0.162
20 0.3200	0.084	0.072	0.134	0.101	0.338	4	0.163	...	...	...
24 0.3720	0.094	0.081	0.154	0.116	0.380	4	0.208	...	...	...
3/8 0.3750	0.094	0.081	0.155	0.117	0.380	4	0.208	0.368	4	0.195
7/16 0.4375	0.094	0.081	0.196	0.148	0.395	4	0.221	...	...	...



Table 37 Recess Dimensions for Combination Slotted Round Head Screws (Cont'd)

Nominal Size or Basic Screw Diameter [Notes (1), (2), (3)]	Type I				Type IA			
	Slot Width, <i>J</i>		Slot Depth, <i>T</i>		Recess Dia., <i>M</i> , Ref.		Recess Penetration Gaging Depth, <i>P</i>	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
$\frac{1}{2}$ 0.5000	0.106	0.091	0.211	0.159	0.409	0.211	0.236	0.211
$\frac{9}{16}$ 0.5625	0.118	0.102	0.242	0.183	0.447	0.245	0.272	0.245
$\frac{5}{8}$ 0.6250	0.133	0.116	0.258	0.195	0.542	0.244	0.285	0.244
$\frac{3}{4}$ 0.7500	0.149	0.131	0.320	0.242	0.642	0.346	0.385	0.346

GENERAL NOTES:

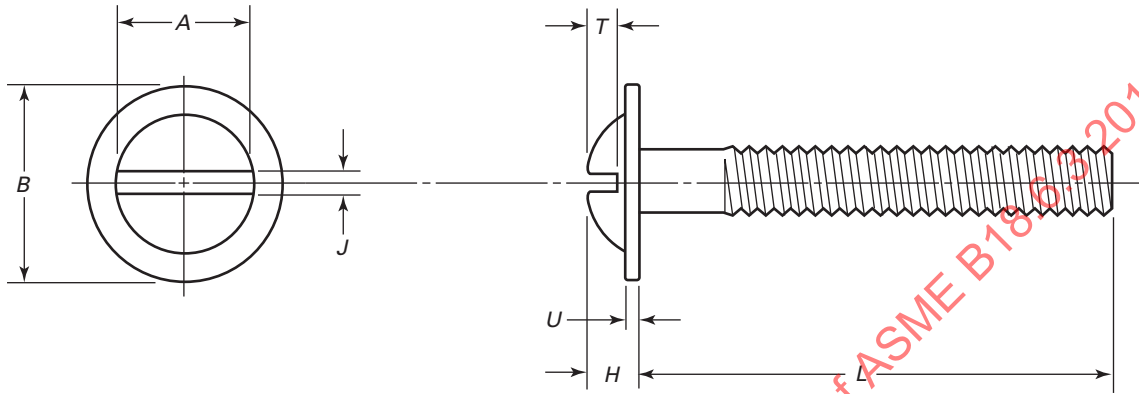
- For additional requirements for machine screws, refer to sections 2 and 3, and for tapping screws refer to sections 2 and 4.
- Use of round head screws is not recommended; use pan head screws. See para. 2.2.11 and Tables 17 through 20.
- For head dimensions, refer to Table 35.
- Due to the underfill of material caused by the combination recess, the minimum slot depths are approximately 10% lower than those for slotted round heads.
- For recess inspection, see para. 2.1.3.

NOTES:

- Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
- Sizes $\frac{9}{16}$, $\frac{5}{8}$, and $\frac{3}{4}$ are for machine screws only.
- Sizes 7, 14, 16, 18, 20, and 24 are for tapping screws only.



(13)

Table 38 Dimensions of Slotted Round Washer Head Screws

Nominal Size or Basic Screw Diameter [Notes (1), (2)]		Crown Diameter, A, Ref.	Washer Diameter, B		Head Height, H		Washer Thickness, U, Ref.	Slot Width, J		Slot Depth, T	
			Max.	Min.	Max.	Min.		Max.	Min.	Max.	Min.
2	0.0860	0.136	0.202	0.186	0.062	0.050	0.030	0.031	0.023	0.037	0.030
3	0.0990	0.156	0.232	0.215	0.070	0.058	0.030	0.035	0.027	0.042	0.034
4	0.1120	0.177	0.261	0.243	0.079	0.067	0.030	0.039	0.031	0.048	0.038
5	0.1250	0.198	0.291	0.272	0.088	0.075	0.040	0.043	0.035	0.053	0.041
6	0.1380	0.218	0.321	0.301	0.096	0.084	0.040	0.048	0.039	0.058	0.043
7	0.1510	0.238	0.350	0.330	0.105	0.092	0.040	0.048	0.039	0.060	0.045
8	0.1640	0.259	0.380	0.358	0.113	0.101	0.040	0.054	0.045	0.067	0.051
10	0.1900	0.300	0.439	0.416	0.130	0.118	0.050	0.060	0.050	0.071	0.055
12	0.2160	0.341	0.498	0.473	0.148	0.134	0.050	0.067	0.056	0.085	0.067
14	0.2420	0.382	0.558	0.531	0.165	0.151	0.050	0.075	0.064	0.095	0.080
1/4	0.2500	0.396	0.576	0.548	0.170	0.157	0.050	0.075	0.064	0.098	0.083
16	0.2680	0.423	0.617	0.588	0.182	0.168	0.060	0.075	0.064	0.105	0.088
18	0.2940	0.661	0.676	0.646	0.199	0.185	0.060	0.084	0.072	0.113	0.094
5/16	0.3125	0.494	0.719	0.687	0.211	0.197	0.060	0.084	0.072	0.118	0.100
20	0.3200	0.505	0.736	0.703	0.216	0.202	0.060	0.084	0.072	0.125	0.115
24	0.3720	0.587	0.854	0.818	0.251	0.236	0.060	0.094	0.081	0.137	0.115
3/8	0.3750	0.593	0.861	0.825	0.253	0.238	0.060	0.094	0.081	0.139	0.117
7/16	0.4375	0.691	1.004	0.963	0.294	0.278	0.070	0.094	0.081	0.165	0.140
1/2	0.5000	0.790	1.146	1.101	0.335	0.319	0.090	0.106	0.091	0.180	0.155

GENERAL NOTES:

- (a) For additional requirements, for machine screws, refer to sections 2 and 3; and for tapping screws, refer to sections 2 and 4.
 (b) For slot inspection, see para. 2.1.4.
 (c) For recess dimensions, refer to Table 39.

NOTES:

- (1) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
 (2) Sizes 7, 14, 20, and 24 are for tapping screws only.



(13)

Nominal Size or Basic Screw Diameter [Notes (1), (2)]	Type I				Type VI				Fallaway Max.
	Recess Dia., M, Ref.	Driver Size	Recess Penetration Gaging Depth, P		Recess Dia., M, Ref.	Driver Size	Recess Penetration Gaging Depth, P		
			Max.	Min.			Max.	Min.	
2 0.0860	0.099	1	0.046	0.021	0.081	T7	0.035	0.030	0.019
3 0.0990	0.107	1	0.056	0.033	0.094	T8	0.035	0.030	0.019
4 0.1120	0.116	1	0.065	0.044	0.111	T9	0.040	0.035	0.022
5 0.1250	0.139	2	0.054	0.026	0.111	T10	0.045	0.035	0.022
6 0.1380	0.147	2	0.061	0.033	0.132	T15	0.060	0.050	0.026
7 0.1510	0.150	2	0.065	0.037	0.132	T15	0.070	0.060	0.026
8 0.1640	0.161	2	0.076	0.048	0.155	T20	0.065	0.050	0.031
10 0.1900	0.177	2	0.093	0.066	0.178	T25	0.075	0.060	0.036
12 0.2160	0.228	3	0.094	0.066	0.200	T27	0.080	0.065	0.040
14 0.2420	0.241	3	0.105	0.077	0.221	T30	0.085	0.070	0.044
1/4 0.2500	0.244	3	0.107	0.080	0.221	T30	0.090	0.075	0.044
16 0.2680	0.261	3	0.126	0.096	0.221	T30	0.105	0.090	0.044
18 0.2940	0.279	3	0.144	0.118	0.266	T40	0.105	0.090	0.047
5/16 0.3125	0.292	3	0.156	0.129	0.266	T40	0.120	0.105	0.047



Table 39 Recess Dimensions for Round Washer Head Screws (Cont'd)

Nominal Size or Basic Screw Diameter [Notes (1), (2)]	Type I			Type VI		
	Recess Dia., M, Ref.	Driver Size	Recess Penetration Gaging Depth, P Max. Min.	Recess Dia., M, Ref.	Driver Size	Recess Penetration Gaging Depth, P Max. Min.
20 0.3200	0.325	4	0.145 0.118	0.266	T40	0.125 0.110
24 0.3720	0.347	4	0.170 0.144	0.312	T45	0.125 0.110
$\frac{3}{8}$ 0.3750	0.348	4	0.170 0.144	0.312	T45	0.130 0.115
$\frac{7}{16}$ 0.4375	0.366	4	0.190 0.165	0.352	T50	0.150 0.135
$\frac{1}{2}$ 0.5000	0.383	4	0.210 0.180	0.446	T55	0.170 0.155
						0.047 0.055
						0.055 0.062
						0.062 0.078

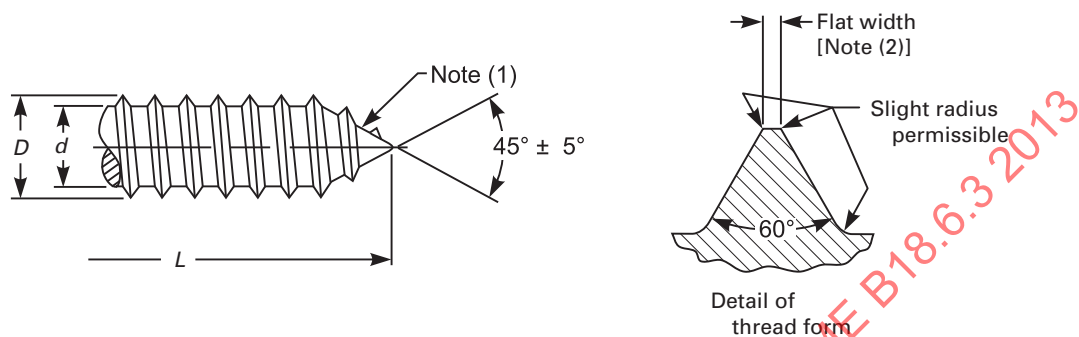
GENERAL NOTES:

- (a) For additional requirements, for machine screws, refer to sections 2 and 3; and for tapping screws, refer to sections 2 and 4.
 (b) For recess inspection, see para. 2.1.3.
 (c) For head dimensions, refer to Table 38.

NOTES:

- (1) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
 (2) Sizes 7, 14, 16, 18, 20, and 24 are for tapping screws only.



Table 40 Dimensions of Threads and Points for Types AB and ABR Thread-Forming Tapping Screws

Nominal Size [Note (3)] or Basic Screw Diameter		Threads per inch	Major Diameter, <i>D</i>		Minor Diameter, <i>d</i>		Minimum Practical Nominal Screw Lengths, <i>L</i>	
			Max.	Min.	Max.	Min.	90-deg Heads	Csk. Heads
0	0.0600	48	0.060	0.054	0.036	0.033	1/8	5/32
1	0.0730	42	0.075	0.069	0.049	0.046	5/32	3/16
2	0.0860	32	0.088	0.082	0.064	0.060	3/16	7/32
3	0.0990	28	0.101	0.095	0.075	0.071	3/16	1/4
4	0.1120	24	0.114	0.108	0.086	0.082	7/32	9/32
5	0.1250	20	0.130	0.123	0.094	0.090	1/4	5/16
6	0.1380	20	0.139	0.132	0.104	0.099	9/32	11/32
7	0.1510	19	0.154	0.147	0.115	0.109	5/16	3/8
8	0.1640	18	0.166	0.159	0.122	0.116	5/16	3/8
10	0.1900	16	0.189	0.182	0.141	0.135	3/8	7/16
12	0.2160	14	0.215	0.208	0.164	0.157	7/16	21/32
1/4	0.2500	14	0.246	0.237	0.192	0.185	1/2	19/32
5/16	0.3125	12	0.315	0.306	0.244	0.236	5/8	3/4
3/8	0.3750	12	0.380	0.371	0.309	0.299	3/4	29/32
7/16	0.4375	10	0.440	0.429	0.359	0.349	7/8	1 1/32
1/2	0.5000	10	0.504	0.493	0.423	0.413	1	1 5/32

GENERAL NOTES:

- (a) For additional requirements, refer to section 4.
 (b) Sizes shown in boldface type are preferred.
 (c) For determining the effective grip length of Type AB screws, see Nonmandatory Appendix B.

NOTES:

(1) Point:

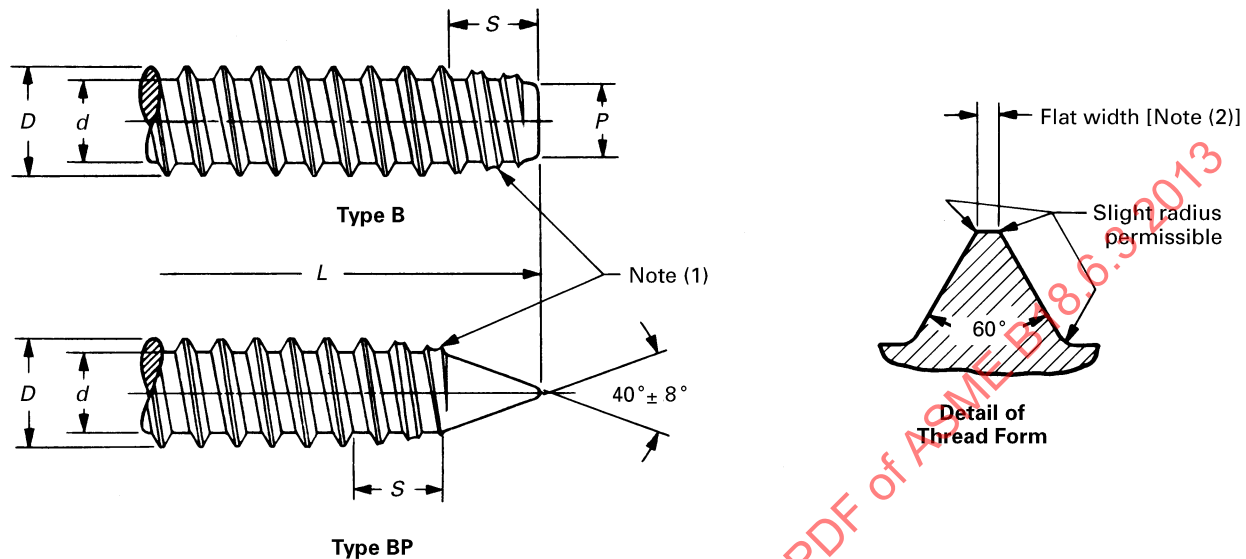
(a) No extrusion of excess metal beyond the apex of the point resulting from thread rolling shall be permissible. A slight rounding or truncation of the point is desirable.

(b) If a nonsharp point is specifically required, designate the screws as "ABR." The reference point radius is 15% of the *D* diameter.

(2) The width of flat at crest of thread shall not exceed 0.004 in. for sizes up to and including No. 8, and 0.006 in. for larger sizes.

(3) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.



Table 41 Dimensions of Threads and Points for Types B and BP Thread-Forming Tapping Screws

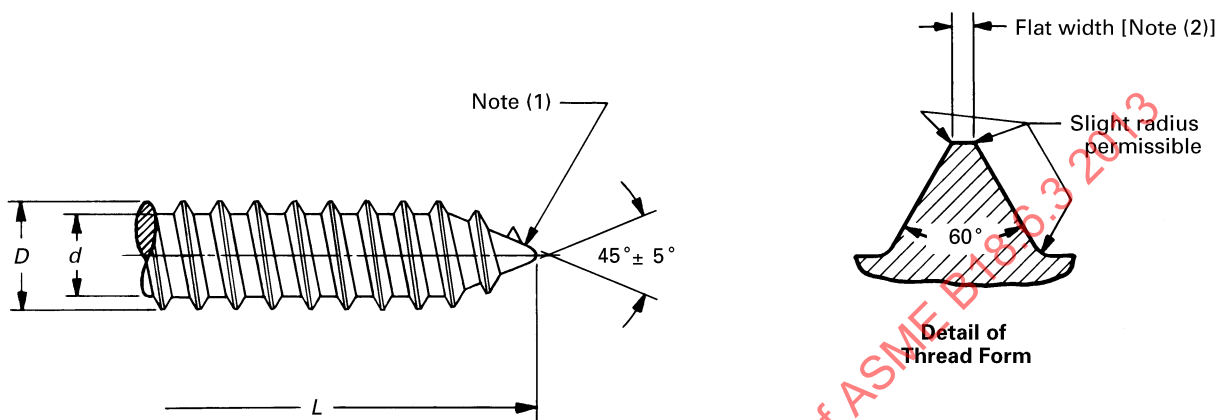
Minimum Practical Nominal Screw Lengths, <i>L</i>													
										Type B		Type BP	
										90-deg Heads	Csk. Heads	90-deg Heads	Csk. Heads
Nominal Size [Note (3)] or Basic Screw Diameter	Threads per Inch	Major Diameter, <i>D</i>		Minor Diameter, <i>d</i>		Point Diameter, <i>P</i> Ref.	Point Taper Length, <i>S</i>						
		Max.	Min.	Max.	Min.		Max.	Min.					
0	0.0600	48	0.060	0.054	0.036	0.033	0.031	0.042	0.031	1/8	1/8	5/32	3/16
1	0.0730	42	0.075	0.069	0.049	0.046	0.044	0.048	0.036	1/8	5/32	3/16	7/32
2	0.0860	32	0.088	0.082	0.064	0.060	0.058	0.062	0.047	5/32	3/16	1/4	9/32
3	0.0990	28	0.101	0.095	0.075	0.071	0.068	0.071	0.054	3/16	7/32	9/32	5/16
4	0.1120	24	0.114	0.108	0.086	0.082	0.079	0.083	0.063	3/16	1/4	5/16	11/32
5	0.1250	20	0.130	0.123	0.094	0.090	0.087	0.100	0.075	7/32	9/32	11/32	13/32
6	0.1380	20	0.139	0.132	0.104	0.099	0.095	0.100	0.075	1/4	9/32	3/8	7/16
7	0.1510	19	0.154	0.147	0.115	0.109	0.105	0.105	0.079	1/4	5/16	13/32	15/32
8	0.1640	18	0.166	0.159	0.122	0.116	0.112	0.111	0.083	9/32	11/32	7/16	1/2
10	0.1900	16	0.189	0.182	0.141	0.135	0.130	0.125	0.094	5/16	3/8	1/2	19/32
12	0.2160	14	0.215	0.208	0.164	0.157	0.152	0.143	0.107	11/32	7/16	9/16	21/32
1/4	0.2500	14	0.246	0.237	0.192	0.185	0.179	0.143	0.107	3/8	1/2	21/32	3/4
5/16	0.3125	12	0.315	0.306	0.244	0.236	0.230	0.167	0.125	15/32	19/32	27/32	31/32
3/8	0.3750	12	0.380	0.371	0.309	0.299	0.293	0.167	0.125	17/32	11/16	15/16	1 1/8
7/16	0.4375	10	0.440	0.429	0.359	0.349	0.343	0.200	0.150	5/8	25/32	1 1/8	1 1/4
1/2	0.5000	10	0.504	0.493	0.423	0.413	0.407	0.200	0.150	11/16	27/32	1 1/4	1 13/32

GENERAL NOTES:

- (a) For additional requirements, refer to section 4.
 (b) For determining the effective grip length of BP screws, see Nonmandatory Appendix B.

NOTES:

- (1) Threads within point taper length shall have unfinished crests.
 (2) The width of flat at crest of thread shall not exceed 0.004 in. for sizes up to and including No. 8, and 0.006 in. for larger sizes.
 (3) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.

Table 42 Dimensions of Threads and Points for Type A Thread-Forming Tapping Screws

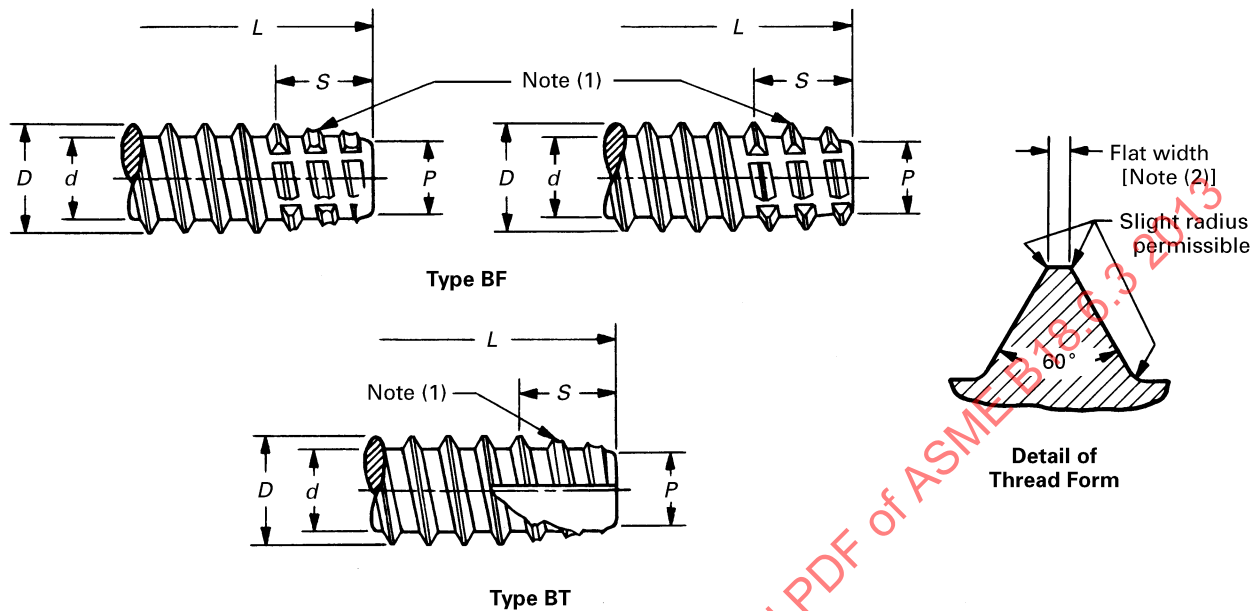
Nominal Size [Note (3)] or Basic Screw Diameter		Threads per in.	Major Diameter, D		Minor Diameter, d		For These Lengths or Shorter, Use Type AB, L [Note (4)]	
			Max.	Min.	Max.	Min.	90-deg Heads	Csk. Heads
0	0.0600	40	0.060	0.057	0.042	0.039	$\frac{1}{8}$	$\frac{3}{16}$
1	0.0730	32	0.075	0.072	0.051	0.048	$\frac{1}{8}$	$\frac{3}{16}$
2	0.0860	32	0.088	0.084	0.061	0.056	$\frac{5}{32}$	$\frac{3}{16}$
3	0.0990	28	0.101	0.097	0.076	0.071	$\frac{3}{16}$	$\frac{7}{32}$
4	0.1120	24	0.114	0.110	0.083	0.078	$\frac{3}{16}$	$\frac{1}{4}$
5	0.1250	20	0.130	0.126	0.095	0.090	$\frac{3}{16}$	$\frac{1}{4}$
6	0.1380	18	0.141	0.136	0.102	0.096	$\frac{1}{4}$	$\frac{5}{16}$
7	0.1510	16	0.158	0.152	0.114	0.108	$\frac{5}{16}$	$\frac{3}{8}$
8	0.1640	15	0.168	0.162	0.123	0.116	$\frac{3}{8}$	$\frac{7}{16}$
10	0.1900	12	0.194	0.188	0.133	0.126	$\frac{3}{8}$	$\frac{1}{2}$
12	0.2160	11	0.221	0.215	0.162	0.155	$\frac{7}{16}$	$\frac{9}{16}$
14	0.2420	10	0.254	0.248	0.185	0.178	$\frac{1}{2}$	$\frac{5}{8}$
16	0.2680	10	0.280	0.274	0.197	0.189	$\frac{9}{16}$	$\frac{3}{4}$
18	0.2940	9	0.306	0.300	0.217	0.209	$\frac{5}{8}$	$\frac{13}{16}$
20	0.3200	9	0.333	0.327	0.234	0.226	$\frac{11}{16}$	$1\frac{13}{16}$
24	0.3720	9	0.390	0.383	0.291	0.282	$\frac{3}{4}$	1

GENERAL NOTES:

- (a) For additional requirements, refer to section 4.
 (b) Sizes shown in boldface type are preferred.
 (c) For determining the effective grip length of Type AB screws, see Nonmandatory Appendix B.

NOTES:

- (1) No extrusion of excess metal beyond the apex of the point resulting from thread rolling shall be permissible. A slight rounding or truncation of the point is desirable.
 (2) The width of flat at crest of thread shall not exceed 0.004 in. for sizes up to and including No. 8, and 0.006 in. for larger sizes.
 (3) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
 (4) For screws in these nominal lengths and shorter, use Type AB screws specified in Table 40.

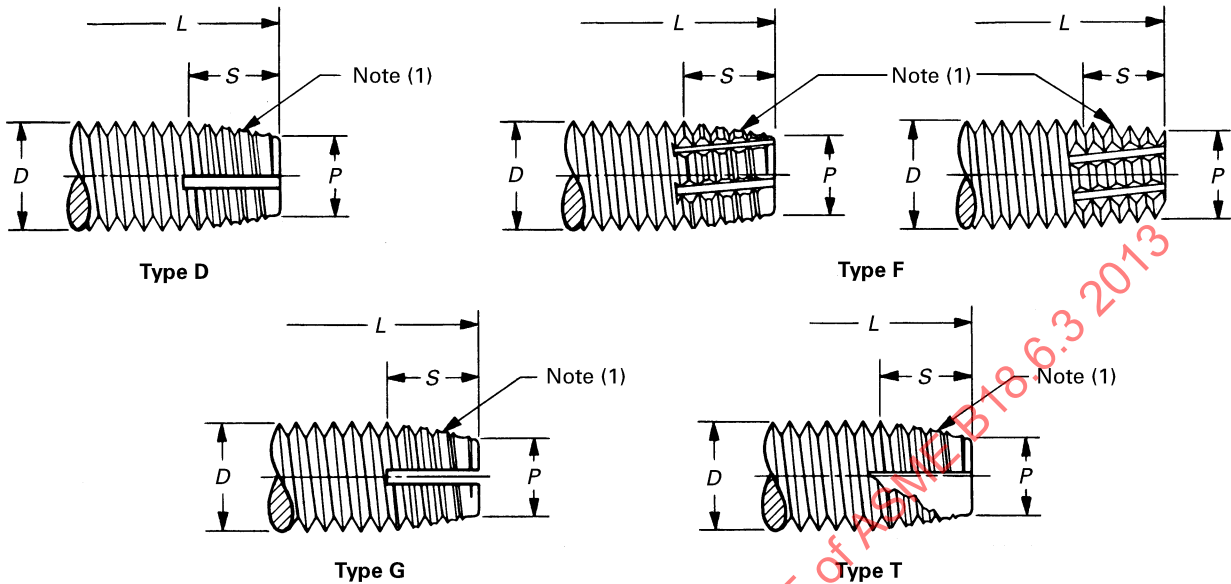
Table 43 Dimensions of Threads and Points for Types BF and BT Thread-Cutting Tapping Screws

										Minimum Practical Nominal Screw Lengths, <i>L</i>	
Nominal Size [Note (3)] or Basic Screw Diameter		Threads per Inch	Major Diameter, <i>D</i>		Minor Diameter, <i>d</i>		Point Diameter, <i>P</i>	Point Taper Length, <i>S</i>		90-deg Heads	Csk. Heads
			Max.	Min.	Max.	Min.	Ref.	Max.	Min.		
0	0.0600	48	0.060	0.054	0.036	0.033	0.031	0.042	0.031	¹ / ₈	¹ / ₈
1	0.0730	42	0.075	0.069	0.049	0.046	0.044	0.048	0.036	¹ / ₈	⁵ / ₃₂
2	0.0860	32	0.088	0.082	0.064	0.060	0.058	0.062	0.047	⁵ / ₃₂	³ / ₁₆
3	0.0990	28	0.101	0.095	0.075	0.071	0.068	0.071	0.054	³ / ₁₆	⁷ / ₃₂
4	0.1120	24	0.114	0.108	0.086	0.082	0.079	0.083	0.063	³ / ₁₆	¹ / ₄
5	0.1250	20	0.130	0.123	0.094	0.090	0.087	0.100	0.075	⁷ / ₃₂	⁹ / ₃₂
6	0.1380	20	0.139	0.132	0.104	0.099	0.095	0.100	0.075	¹ / ₄	⁹ / ₃₂
7	0.1510	19	0.154	0.147	0.115	0.109	0.105	0.105	0.079	¹ / ₄	⁵ / ₁₆
8	0.1640	18	0.166	0.159	0.122	0.116	0.112	0.111	0.083	⁹ / ₃₂	¹¹ / ₃₂
10	0.1900	16	0.189	0.182	0.141	0.135	0.130	0.125	0.094	⁵ / ₁₆	³ / ₈
12	0.2160	14	0.215	0.208	0.164	0.157	0.152	0.143	0.107	¹¹ / ₃₂	⁷ / ₁₆
¹ / ₄	0.2500	14	0.246	0.237	0.192	0.185	0.179	0.143	0.107	³ / ₈	¹ / ₂
⁵ / ₁₆	0.3125	12	0.315	0.306	0.244	0.236	0.230	0.167	0.125	¹⁵ / ₃₂	¹⁹ / ₃₂
³ / ₈	0.3750	12	0.380	0.371	0.309	0.299	0.293	0.167	0.125	¹⁷ / ₃₂	¹¹ / ₁₆
⁷ / ₁₆	0.4375	10	0.440	0.429	0.359	0.349	0.343	0.200	0.150	⁵ / ₈	²⁵ / ₃₂
¹ / ₂	0.5000	10	0.504	0.493	0.423	0.413	0.407	0.200	0.150	¹¹ / ₁₆	²⁷ / ₃₂

GENERAL NOTE: For additional requirements, refer to section 4.

NOTES:

- (1) Points of screws shall be tapered and fluted or slotted as illustrated above for the respective types. The flute on Type BT screws shall have an included angle of 90 deg to 95 deg and the thread cutting edge located above the axis of screw. Tapered threads shall have unfinished crests, and the flutes or slots shall extend through first full form thread beyond taper except for Type BF screws on which tapered threads may be complete at manufacturer's option and flutes may be one pitch short of first full form thread. Other details of taper and flute design shall be optional with the manufacturer provided the screws meet the specified performance requirements.
- (2) The width of flat at crest of thread shall not exceed 0.004 in. for sizes up to and including No. 8, and 0.006 in. for larger sizes.
- (3) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.

Table 44 Dimensions of Threads and Points for Types D, F, G, and T Thread-Cutting Tapping Screws

Nominal Size [Note (2)] or Basic Screw Diameter		Threads per Inch	Major Diameter, <i>D</i>		Point Diameter, <i>P</i>	Point Taper Length, <i>S</i> [Note (3)]				Determinant Lengths for Point Taper, <i>L</i> [Note (3)]		Minimum Practical Nominal Screw Lengths, <i>L</i>	
						For Short Screws		For Long Screws		90-deg Heads	Csk. Heads	90-deg Heads	Csk. Heads
			Max.	Min.	Ref.	Max.	Min.	Max.	Min.				
2	0.0860	56	0.0860	0.0813	0.068	0.062	0.045	0.080	0.062	$\frac{5}{32}$	$\frac{3}{16}$	$\frac{5}{32}$	$\frac{3}{16}$
2	0.0860	64	0.0860	0.0816	0.070	0.055	0.039	0.070	0.055	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{8}$	$\frac{5}{32}$
3	0.0990	48	0.0990	0.0938	0.078	0.073	0.052	0.094	0.073	$\frac{3}{16}$	$\frac{7}{32}$	$\frac{5}{32}$	$\frac{7}{32}$
3	0.0990	56	0.0990	0.0942	0.081	0.062	0.045	0.080	0.062	$\frac{5}{32}$	$\frac{3}{16}$	$\frac{5}{32}$	$\frac{3}{16}$
4	0.1120	40	0.1120	0.1061	0.087	0.088	0.062	0.112	0.088	$\frac{7}{32}$	$\frac{1}{4}$	$\frac{3}{16}$	$\frac{1}{4}$
4	0.1120	48	0.1120	0.1068	0.091	0.073	0.052	0.094	0.073	$\frac{3}{16}$	$\frac{7}{32}$	$\frac{5}{32}$	$\frac{7}{32}$
5	0.1250	40	0.1250	0.1191	0.100	0.088	0.062	0.112	0.088	$\frac{7}{32}$	$\frac{9}{32}$	$\frac{3}{16}$	$\frac{1}{4}$
5	0.1250	44	0.1250	0.1195	0.102	0.080	0.057	0.102	0.080	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{3}{16}$	$\frac{1}{4}$
6	0.1380	32	0.1380	0.1312	0.107	0.109	0.078	0.141	0.109	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{1}{4}$	$\frac{5}{16}$
6	0.1380	40	0.1380	0.1321	0.113	0.088	0.062	0.112	0.088	$\frac{7}{32}$	$\frac{9}{32}$	$\frac{3}{16}$	$\frac{1}{4}$
8	0.1640	32	0.1640	0.1571	0.132	0.109	0.078	0.141	0.109	$\frac{1}{4}$	$\frac{11}{32}$	$\frac{1}{4}$	$\frac{5}{16}$
8	0.1640	36	0.1640	0.1577	0.136	0.097	0.069	0.125	0.097	$\frac{7}{32}$	$\frac{5}{16}$	$\frac{7}{32}$	$\frac{9}{32}$
10	0.1900	24	0.1900	0.1818	0.148	0.146	0.104	0.188	0.146	$\frac{11}{32}$	$\frac{7}{16}$	$\frac{5}{16}$	$\frac{13}{32}$
10	0.1900	32	0.1900	0.1831	0.158	0.109	0.078	0.141	0.109	$\frac{1}{4}$	$\frac{11}{32}$	$\frac{1}{4}$	$\frac{5}{16}$
12	0.2160	24	0.2160	0.2078	0.174	0.146	0.104	0.188	0.146	$\frac{11}{32}$	$\frac{7}{16}$	$\frac{5}{16}$	$\frac{13}{32}$
12	0.2160	28	0.2160	0.2085	0.180	0.125	0.089	0.161	0.125	$\frac{5}{16}$	$\frac{13}{32}$	$\frac{9}{32}$	$\frac{3}{8}$
$\frac{1}{4}$	0.2500	20	0.2500	0.2408	0.200	0.175	0.125	0.225	0.175	$\frac{13}{32}$	$\frac{17}{32}$	$\frac{3}{8}$	$\frac{1}{2}$
$\frac{1}{4}$	0.2500	28	0.2500	0.2425	0.214	0.125	0.089	0.161	0.125	$\frac{5}{16}$	$\frac{13}{32}$	$\frac{9}{32}$	$\frac{3}{8}$
$\frac{5}{16}$	0.3125	18	0.3125	0.3026	0.257	0.194	0.139	0.250	0.194	$\frac{15}{32}$	$\frac{19}{32}$	$\frac{7}{16}$	$\frac{9}{16}$
$\frac{5}{16}$	0.3125	24	0.3125	0.3042	0.271	0.146	0.104	0.188	0.146	$\frac{11}{32}$	$\frac{15}{32}$	$\frac{5}{16}$	$\frac{15}{32}$
$\frac{3}{8}$	0.3750	16	0.3750	0.3643	0.312	0.219	0.156	0.281	0.219	$\frac{1}{2}$	$\frac{11}{16}$	$\frac{15}{32}$	$\frac{5}{8}$
$\frac{3}{8}$	0.3750	24	0.3750	0.3667	0.333	0.146	0.104	0.188	0.146	$\frac{11}{32}$	$\frac{1}{2}$	$\frac{5}{16}$	$\frac{1}{2}$
$\frac{7}{16}$	0.4375	14	0.4375	0.4258	0.366	0.250	0.179	0.321	0.250	$\frac{19}{32}$	$\frac{3}{4}$	$\frac{9}{16}$	$\frac{23}{32}$
$\frac{7}{16}$	0.4375	20	0.4375	0.4281	0.387	0.175	0.125	0.225	0.175	$\frac{13}{32}$	$\frac{9}{16}$	$\frac{3}{8}$	$\frac{17}{32}$
$\frac{1}{2}$	0.5000	13	0.5000	0.4876	0.423	0.269	0.192	0.346	0.269	$\frac{5}{8}$	$\frac{25}{32}$	$\frac{19}{32}$	$\frac{3}{4}$
$\frac{1}{2}$	0.5000	20	0.5000	0.4906	0.450	0.175	0.125	0.225	0.175	$\frac{13}{32}$	$\frac{9}{16}$	$\frac{3}{8}$	$\frac{17}{32}$

Table 44 Dimensions of Threads and Points for Types D, F, G, and T Thread-Cutting Tapping Screws (Cont'd)

GENERAL NOTE: For additional requirements, refer to sections 2 and 4.

NOTES:

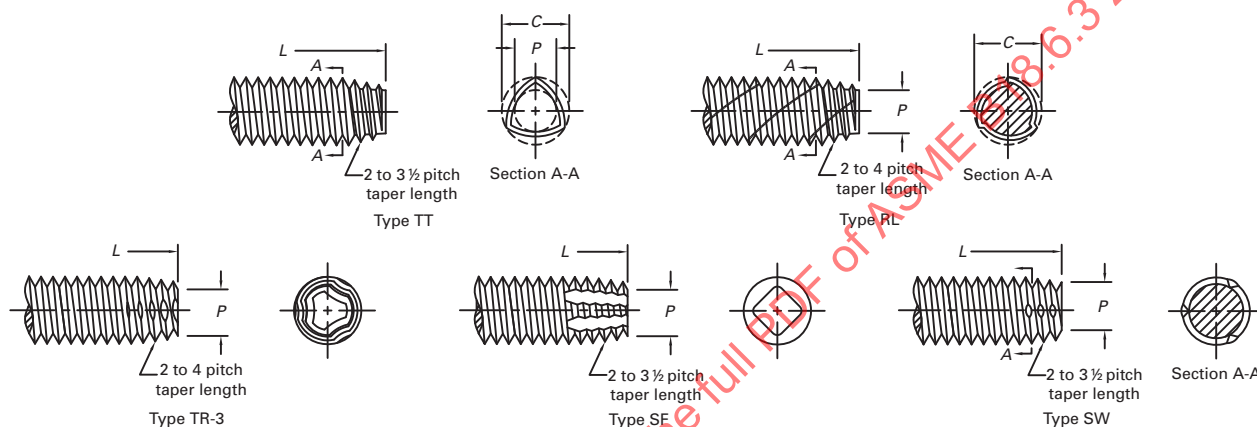
- (1) Points of screws shall be tapered and fluted or slotted as illustrated above for the respective types. The flute on Type T screws shall have an included angle of 90 deg to 95 deg and the thread cutting edge located above the axis of screw. Tapered threads shall have unfinished crests, and the flutes or slots shall extend through the first full thread beyond taper except for Type F screws on which tapered threads may be complete at manufacturer's option and flutes may be one pitch short of the first full form thread. Other details of taper and flute design shall be optional with the manufacturer, provided the screws meet the specified performance requirements.
- (2) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
- (3) Screws of these nominal lengths and shorter shall have point taper lengths specified for short screws. Longer lengths shall have point taper lengths specified for long screws.

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Table 45 Dimensions of Type TRS Tapping Screws

(13)



Nominal Screw Size	Basic Screw Diameter	Maximum Major or C Diameter, in.	Maximum Point or P Diameter, in.
2-56	0.0860	0.0875	0.0700
3-48	0.0990	0.1010	0.0810
4-40	0.1120	0.1145	0.0900
5-40	0.1250	0.1275	0.1030
6-32	0.1380	0.1410	0.1110
8-32	0.1640	0.1670	0.1370
10-24	0.1900	0.1940	0.1530
10-32	0.1900	0.1930	0.1630
12-24	0.2120	0.2200	0.1790
1/4-20	0.2500	0.2550	0.2060
5/16-18	0.3125	0.3180	0.2640
3/8-16	0.3750	0.3810	0.3200
7/16-14	0.4375	0.4445	0.3750
1/2-20	0.5000	0.5075	0.4330

GENERAL NOTE: The point diameter is acceptable if at least the first 360 deg thread enters a gage having a hole size equal to the specified maximum point diameter. The hole tolerance of the gage is +0/-0.001 in.

Table 46 Thread Lengths for Types A, AB, B, BF, BP, and BT Tapping Screws

Nominal Screw Size	Nominal Screw Length, <i>L</i>	Equal to or Shorter Than Nominal Length, <i>L</i>		Longer Than Nominal Length, <i>L</i>
		Fully Threaded		Partially Threaded
		Type A Only	Types AB, B, BF, BP, and BT	Types A, AB, B, BF, BP, and BT
		<i>Y</i> Max. [Note (1)]	<i>Y</i> Max. [Note (1)]	<i>L_T</i> Min. [Note (2)]
0	$\frac{7}{16}$	0.025	0.021	0.360
1	$\frac{9}{16}$	0.031	0.024	0.440
2	$\frac{5}{8}$	0.031	0.031	0.520
3	$\frac{3}{4}$	0.036	0.036	0.590
4	$\frac{13}{16}$	0.042	0.042	0.670
5	$\frac{15}{16}$	0.050	0.050	0.750
6	1	0.056	0.050	0.830
7	$1\frac{1}{8}$	0.062	0.053	0.910
8	$1\frac{1}{4}$	0.067	0.056	0.980
10	$1\frac{3}{8}$	0.083	0.062	1.140
12	$1\frac{5}{8}$	0.091	0.071	1.300
14	$1\frac{3}{4}$	0.100	...	1.450
$\frac{1}{4}$	$1\frac{13}{16}$	...	0.071	1.500
16	$1\frac{13}{16}$	0.100	...	1.500
18	$1\frac{13}{16}$	0.111	...	1.500
$\frac{5}{16}$	$1\frac{13}{16}$	...	0.083	1.500
20	$1\frac{7}{8}$	0.111	...	1.500
24	$1\frac{7}{8}$	0.111	...	1.500
$\frac{3}{8}$	$1\frac{7}{8}$	...	0.083	1.500
$\frac{7}{16}$	$1\frac{7}{8}$	...	0.100	1.500
$\frac{1}{2}$	$1\frac{7}{8}$	...	0.100	1.500

NOTES:

- (1) Tabulated values are equal to 1 times the pitch length of the thread, rounded to three decimal places.
 (2) Tabulated values through No. 14 size are equal to 6 times the basic screw diameter, rounded to two decimal places.



Table 47 Thread Lengths for Types C, D, F, G, T, and TRS Tapping Screws

Fully Threaded											
Nominal Screw Size	For Nominal Screw Lengths Equal to or Shorter Than	Unthreaded Length Under Head		For Nominal Screw Lengths		Unthreaded Length Under Head		Partially Threaded			
		Y Max. [Note (1)]	Coarse Thread			Fine Thread	Y Max. [Note (2)]	Coarse Thread	Fine Thread	Full-Form Thread Length	
				Longer Than	Equal to or Shorter Than					Longer Than	L _T Min. [Note (3)]
2	1/4	0.018	0.016	1/4	5/8	0.036	0.032	5/8	0.520		
3	5/16	0.021	0.018	5/16	3/4	0.042	0.036	3/4	0.590		
4	11/32	0.025	0.021	11/32	7/8	0.050	0.042	7/8	0.670		
5	3/8	0.025	0.023	3/8	1	0.050	0.046	1	0.750		
6	13/32	0.031	0.025	13/32	1 1/16	0.062	0.050	1 1/16	0.830		
8	1/2	0.031	0.028	1/2	1 3/16	0.062	0.056	1 3/16	0.980		
10	9/16	0.042	0.031	9/16	1 3/8	0.083	0.062	1 3/8	1.140		
12	5/8	0.042	0.036	5/8	1 9/16	0.083	0.071	1 9/16	1.300		
1/4	3/4	0.050	0.036	3/4	1 13/16	0.100	0.071	1 13/16	1.500		
5/16	15/16	0.056	0.042	15/16	1 7/8	0.111	0.083	1 7/8	1.500		
3/8	1 1/8	0.062	0.042	1 1/8	2	0.125	0.083	2	1.500		
7/16	1 5/16	0.071	0.050	1 5/16	2	0.143	0.100	2	1.500		
1/2	1 1/2	0.077	0.050	1 1/2	2	0.154	0.100	2	1.500		

NOTES:

- (1) Tabulated values are equal to 1 times the pitch length of the thread, rounded to three decimal places.
- (2) Tabulated values are equal to 2 times the pitch length of the thread, rounded to three decimal places.
- (3) Tabulated values through No. 12 size are equal to 6 times the basic screw diameter, rounded to two decimal places.



Table 48 Standard Test-Plate Thickness and Hole Sizes for Drive-Test Inspection of Tapping Screws

Nominal Screw Size	Thickness						Hole Size											
	Types AB, A, B, BP, and C						Types D, F, G, and T						Type C					
	Types AB, A, B, BP, and C			Types D, F, G, and T			Types D, F, G, and T			Types D, F, G, and T			Type C			Types AB, B, and BP		
	Gage	Max.	Min.	Max.	Min.	Max.	Max.	Min.	Max.	Max.	Min.	Max.	Drill Size	Hole Diam.	Drill Size	Hole Diam.	Drill Size	Hole Diam.
2	18	0.0500	0.0460	0.0800	0.0760	0.1270	0.1270	0.1230	0.1230	0.1270	0.1230	0.1230	0.1270	0.1230	0.1230	0.1270	0.1230	0.1230
3	18	0.0500	0.0460	0.0960	0.0920	0.1270	0.1270	0.1230	0.1230	0.1270	0.1230	0.1230	0.1270	0.1230	0.1230	0.1270	0.1230	0.1230
4	18	0.0500	0.0460	0.1110	0.1070	0.1270	0.1270	0.1230	0.1230	0.1270	0.1230	0.1230	0.1270	0.1230	0.1230	0.1270	0.1230	0.1230
5	18	0.0500	0.0460	0.1110	0.1070	0.1270	0.1270	0.1230	0.1230	0.1270	0.1230	0.1230	0.1270	0.1230	0.1230	0.1270	0.1230	0.1230
6	14	0.0770	0.0730	0.1425	0.1385	0.1270	0.1270	0.1230	0.1230	0.1270	0.1230	0.1230	0.1270	0.1230	0.1230	0.1270	0.1230	0.1230
7	14	0.0770	0.0730	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
8	14	0.0770	0.0730	0.1420	0.1380	0.1905	0.1845	0.1845	0.1845	0.1905	0.1845	0.1845	0.1905	0.1845	0.1845	0.1905	0.1845	0.1845
10	1/8	0.1270	0.1230	0.1905	0.1845	0.1905	0.1845	0.1845	0.1845	0.1905	0.1845	0.1845	0.1905	0.1845	0.1845	0.1905	0.1845	0.1845
12	1/8	0.1270	0.1230	0.1905	0.1845	0.1905	0.1845	0.1845	0.1845	0.1905	0.1845	0.1845	0.1905	0.1845	0.1845	0.1905	0.1845	0.1845
14	1/8	0.1270	0.1230	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1/4	3/16	0.1905	0.1845	0.2530	0.2470	0.2540	0.2460	...	...	...	...	...	...	...	...	...	...	...
16	3/16	0.1905	0.1845	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
18	3/16	0.1905	0.1845	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
5/16	3/16	0.1905	0.1845	0.3155	0.3095	0.3175	0.3075	...	...	...	...	...	...	...	...	...	...	...
20	3/16	0.1905	0.1845	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
24	3/16	0.1905	0.1845	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3/8	3/16	0.1905	0.1845	0.3780	0.3720	0.3800	0.3700	...	...	...	...	...	...	...	...	...	...	...
7/16	3/16	0.1905	0.1845	...	...	0.4425	0.4325	...	...	...	...	...	...	...	...	...	...	...
1/2	3/16	0.1905	0.1845	...	...	0.5050	0.4950	...	...	...	...	...	...	...	...	...	...	...



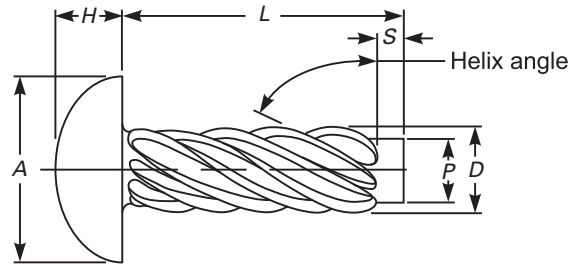
Table 49 Maximum Drive Torque for Type TRS Tapping Screws

Nominal Screw Size	Basic Screw Diameter	Type TRS Maximum Drive Torque	
		in.-lb	ft-lb
2-56	0.0860	6	...
3-48	0.0990	9.5	...
4-40	0.1120	13	...
5-40	0.1250	16	...
6-32	0.1380	20	...
8-32	0.1640	32	...
10-24	0.1900	52	...
10-32	0.1900	60	...
12-24	0.2120	77	...
1/4-20	0.2500	120	10
5/16-18	0.3125	240	20
3/8-16	0.3750	300	25
7/16-14	0.4375	480	40
1/2-13	0.5000	660	55

GENERAL NOTE: These are the maximum drive values regardless of plating or coating on the parts.

Table 50 Torsional Strength Requirements for Tapping Screws

Minimum Torsional Strength, lb-in.						
Nominal Screw Size	Type A	Types AB, B, BF, BP, and BT	Types C, D, F, G, and T		Type TRS Torsional Strength	
			Coarse Thread	Fine Thread	Coarse Thread	Fine Thread
2	4	4	5	6	6	...
3	9	9	9	10	10	...
4	12	13	13	15	14	...
5	18	18	18	20	22	...
6	24	24	23	27	24	...
7	30	30	...	...	...	...
8	39	39	42	47	48	...
10	48	56	56	74	65	74
12	83	88	93	108	93	...
14	125	...	...	...	...	...
1/4	...	142	140	179	156	...
16	152	...	...	...	...	...
18	196	...	...	...	...	...
5/16	...	290	306	370	330	...
20	250	...	...	...	...	...
24	492	...	...	...	...	...
3/8	...	590	560	710	600	...
7/16	...	620	700	820	840	...
1/2	...	1,020	1,075	1,285	...	1,080

Table 51 Dimensions of Round Head Type U Metallic Drive Screws

Nominal Size [Note (1)] or Basic Screw Diameter		Number of Thread Starts	Outside Diameter, <i>D</i>		Head Diameter, <i>A</i>		Head Height, <i>H</i>		Pilot Diameter, <i>P</i>		Recommended Hole Size	
			Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Drill Size No.	Hole Diameter
00	0.0600	6	0.060	0.057	0.099	0.090	0.034	0.026	0.049	0.046	55	0.052
0	0.0750	6	0.075	0.072	0.127	0.118	0.049	0.041	0.063	0.060	51	0.067
2	0.1000	8	0.100	0.097	0.162	0.146	0.069	0.059	0.083	0.080	44	0.086
4	0.1160	7	0.116	0.112	0.211	0.193	0.086	0.075	0.096	0.092	37	0.104
6	0.1400	7	0.140	0.136	0.260	0.240	0.103	0.091	0.116	0.112	31	0.120
7	0.1540	8	0.154	0.150	0.285	0.264	0.111	0.099	0.126	0.122	29	0.136
8	0.1670	8	0.167	0.162	0.309	0.287	0.120	0.107	0.136	0.132	27	0.144
10	0.1820	8	0.182	0.177	0.359	0.334	0.137	0.123	0.150	0.146	20	0.161
12	0.2120	8	0.212	0.206	0.408	0.382	0.153	0.139	0.177	0.173	11	0.191
14	0.2420	9	0.242	0.236	0.457	0.429	0.170	0.155	0.202	0.198	2	0.221
$\frac{5}{16}$	0.3150	11	0.315	0.309	0.590	0.557	0.216	0.198	0.272	0.267	M	0.295
$\frac{3}{8}$	0.3780	12	0.378	0.371	0.708	0.670	0.256	0.237	0.334	0.329	T	0.358
Nominal Screw Length, <i>L</i>			$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1 in. and over	
Pilot Length ± 0.015 , <i>S</i>			0.047	0.047	0.047	0.047	0.062	0.062	0.078	0.078	0.125	

GENERAL NOTE: For additional requirements, refer to section 5.

NOTE:

(1) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.

MANDATORY APPENDIX I

PROTRUSION GAGING OF FLAT COUNTERSUNK HEADS

Suitability of flat countersunk head screws, except the No. 0000, No. 000, and No. 00 sizes, and undercut flat countersunk head screws, except the No. 0 and No. 1 sizes, for application in countersinks designed to the principal dimensions of the screws may be determined by the use of a protrusion gage as illustrated in Fig. I-1.

The gaging dimensions and the gage diameters are specified in the dimensional tables for flat countersunk head and undercut flat countersunk head screws. The protrusion limits shown in the tables shall apply only when the gaging diameter is exactly as indicated, with the gaging edge of a sharpness obtained by lapping the hole and the top surface of the gage. Any variation in the gaging diameter will require recalculation of protrusion values by the original formulas given below.

Maximum protrusion:^{1,2}

$$\text{Max. } F = \frac{\text{Max. sharp head diameter} - \text{gage hole diameter}}{2} \times \tan \left(90 \text{ deg} - \frac{\text{Min. head angle}}{2} \right)$$

¹ Protrusion values shown in dimensional tables were calculated from these formulas and rounded to the nearest 0.001 in., upward for the maximum and downward for the minimum.

² See formulas for maximum and minimum sharp head diameters in Nonmandatory Appendix C.

Minimum protrusion:^{1,2}

$$\text{Min. } F = \frac{\text{Min. sharp head diameter} - \text{gage hole diameter}}{2} \times \tan \left(90 \text{ deg} - \frac{\text{Max. head angle}}{2} \right)$$

or correction of protrusion in accordance with the following formula:

$$F' = F \frac{A - G'}{A - G}$$

where

A = head diameter (maximum or minimum for maximum or minimum protrusion, respectively)

F = tabulated protrusion value

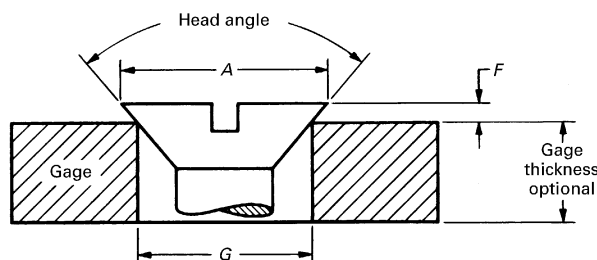
F' = corrected protrusion value

G = tabulated gage diameter

G' = measured gage diameter

To ensure adequate service life, the protrusion gage should be made of tool steel having a hardness not less than 60 Rockwell C (60 HRC).

Fig. I-1 Protrusion Gage



MANDATORY APPENDIX II

ACROSS-CORNERS GAGING OF HEX HEADS

Suitability of across-corners dimensions of hex head and hex washer head screws may be determined by the use of gaging rings as described below.

When the gaging ring is placed on the top of a hex or hex washer head screw, and also on the bottom of a hex head screw, at right angles to the axis of the screw, the head (hex portion of washer head) must protrude beyond the ring by an amount equal to 60% of the minimum head height, H . For convenience, the minimum protrusion values are given in the dimensional tables for hex and hex washer head screws.

The gaging ring shall have an inside diameter equal to the tabulated minimum width across-corners, within a tolerance of $+0.0003$ in. The gaging edges of the ring shall be sharp, and opposite faces shall be parallel. To insure adequate service life, the ring should be made of tool steel and have a hardness not less than 60 Rockwell C.

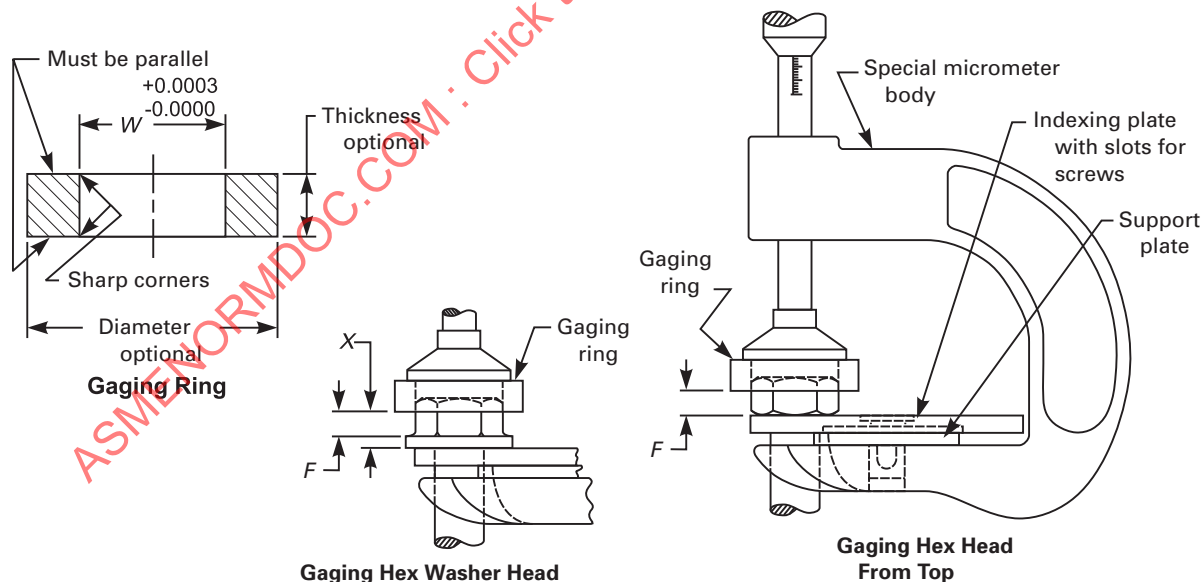
A typical gaging fixture is shown in Fig. II-1 with an explanation of its application; however, any equivalent means may be used.

To check hex head screws from the top, an initial reading shall be taken with the gaging ring placed on the indexing plate. Then, with the screw placed in the fixture, the gaging ring shall be placed on top of the screw head and a second reading taken. The difference between the two readings is equal to the protrusion, F , of the head beyond the gaging ring.

To check hex washer head screws, the gaging procedure shall be exactly the same as that for checking hex head screws from the top. However, in this case, the difference, X , between the two readings includes the washer thickness, and it is necessary to deduct the actual (measured) thickness of the washer portion from the difference, X , to obtain the protrusion, F , of the hex beyond the gaging ring.

Gaging the bottom of the head on hex head screws may be accomplished in the same manner as gaging the top, except the ring is placed below the head. The same protrusion values shall apply.

Fig. II-1 Typical Gaging Fixture



MANDATORY APPENDIX III

GAGING OF RECESSED HEADS, TYPES I, IA, AND III¹

III-1 PENETRATION GAGING

Penetration gaging is a test to determine the suitability of recesses in the heads of screws and may be used to indicate deficiencies in the dimensional aspects of the recesses specified in the dimensional tables. (Refer to Fig. III-1 for illustration of penetration gages for Types I, IA, and III recesses.) Penetrations that are too deep indicate the possibility of a thin section between the head and the shank of the screw, a weakness that might result in twisting-off screw heads during tightening of the screws. Screws with shallow penetration might result in production problems such as reaming of recess or excessive wear on driver bits.

Penetration gaging depth values for the various styles of recessed heads are included in the dimensional tables for the respective heads. These values were predicated originally on the gaging of plain finish (unplated or uncoated) screws. However, subsequent experience has shown that the Type I recess penetration limits as tabulated, and the Type IA and Type III recess penetration depths with the tabulated minimum limit reduced by up to 0.005 in. are suitable for the gaging of screws having coating thickness of up to and including 0.0003 in. on significant surfaces. See Table III-1.

This allowance makes up for the loss of depth brought about by the plating buildup on the sides of the recess.

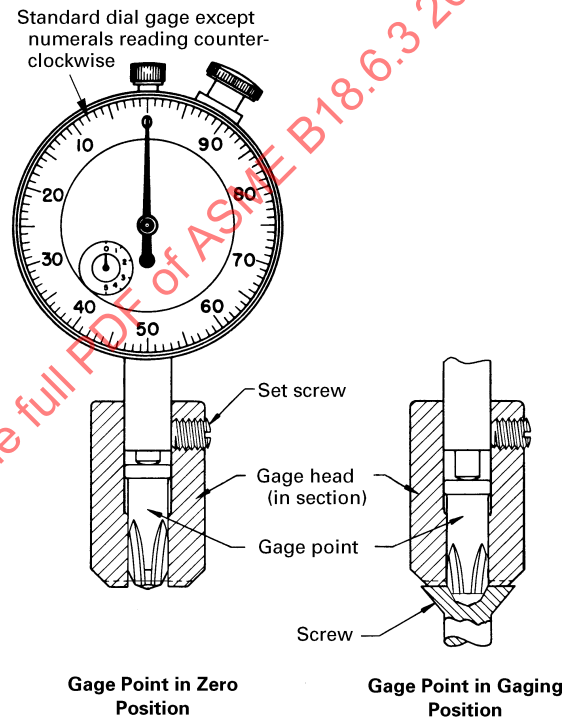
Screws having heavier coatings, which fail to meet minimum penetration, must be stripped of finish and gaged for acceptance or rejection in the plain condition.

Specified in Tables III-2 through III-5 are dimensions of gage points to be used for penetration gaging the Types I, IA, and III recesses. These gage points approach as nearly as possible the perfect driver form. Also specified are gage heads and bushings, which adapt the gage points to standard dial gages.

Penetration depths for Types I and IA recesses are gaged relative to a reference plane defined by the intersection of the edge of the recess wings with the top surface of the screw head. This plane is the same as the top surface on flat head screws but is somewhat below the topmost point on heads with rounded top surfaces. Knife edges or tapered ridges on the gage head are used to establish the reference plane.

Penetration depths for Type III recesses are gaged relative to a reference plane defined by the intersection of the edge of the recess square with the top surface of

Fig. III-1 Penetration Gage for Types I, IA, and III Recesses



the screw head. This plane is the same as the top surface on flat head screws but may be somewhat below the topmost point on heads with rounded top surfaces. A reverse reading indicator is used to determine the penetration of the gage point into the recess. The gage may be zeroed on any flat surface.

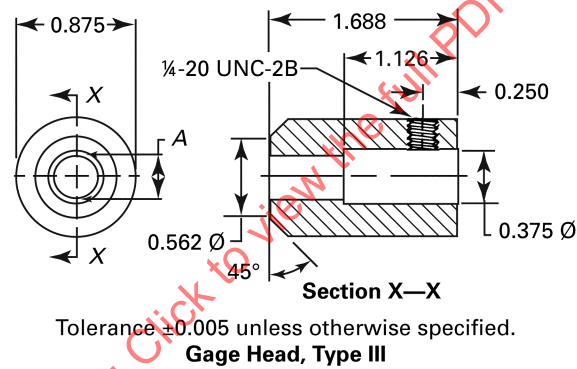
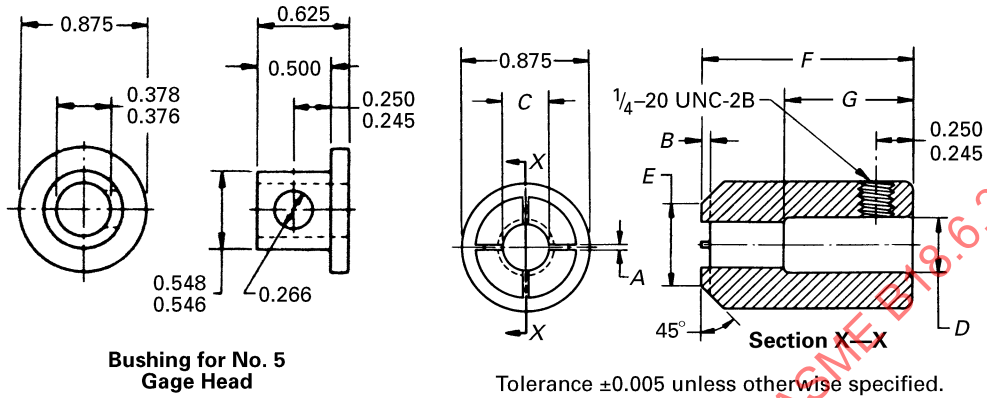
III-2 FIT GAGING ON TYPE III RECESSES

In addition to the penetration gage, a "fit" gage is also required for Type III recesses. Dimensions for fit gage points are specified in Table III-5. Fit is gaged by the insertion of the gage point into the recess, and a determination made as to how well the gage seats into the recess. The gage should produce a very tight fit with the recess. This is sometimes referred to a "stick fit." A lack of this tight fit may indicate a problem with the shape of the recess.

The fit gage and the penetration gage combine to effectively determine the suitability of the Type III recess.

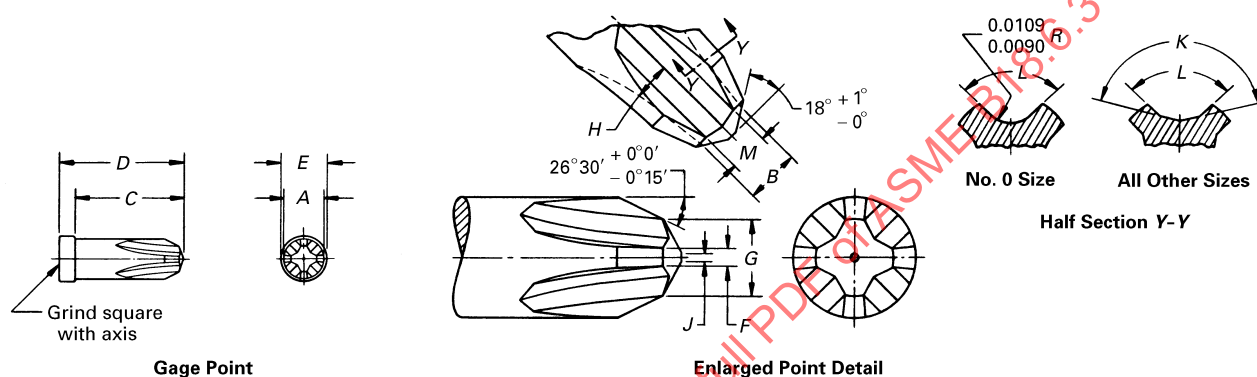
¹ See Mandatory Appendix VII for Type VI information.

(13) **Table III-1 Dimensions of Gage Heads for Types I, IA, and III Recesses**



Recess Gage		A	B	C	D	E	F	G
Type	Size	(± 0.002)	(± 0.003)	(± 0.0002)	(± 0.001)	(± 0.005)	(± 0.005)	(± 0.005)
I and IA	No. 0	0.008	0.015	0.0460	0.377	0.562	1.688	1.126
	No. 1	0.012	0.020	0.0880	0.377	0.562	1.688	1.126
	No. 2	0.018	0.031	0.1420	0.377	0.562	1.688	1.126
	No. 3	0.022	0.037	0.2100	0.377	0.562	1.688	1.126
	No. 4	0.031	0.062	0.3130	0.377	0.562	1.688	1.126
	No. 5	0.041	0.094	0.5010	0.550	0.750	1.896	1.134
III	No. 1	N/A	N/A	0.1420	0.377	0.562	1.688	1.126
	No. 2	N/A	N/A	0.1615	0.377	0.562	1.688	1.126
	No. 3	N/A	N/A	0.2100	0.377	0.562	1.688	1.126
	No. 4	N/A	N/A	0.2715	0.377	0.562	1.688	1.126

Table III-2 Dimensions of Gage Heads for Type I Recess



Dimensions of Gage Points

Size of Recess Gage	Point Diam., <i>A</i>	Point Width, <i>B</i>	Length, <i>C</i>	Length, <i>D</i>	Diam., <i>E</i>	Wing		Point Width, <i>G</i>	Milling Angle, <i>H</i>	Flat on End, <i>J</i>		Base Flute Angle, <i>K</i>	Side Flute Angle, <i>L</i>	Flute Width at Bottom, <i>M</i>
		+0.0000				Thickness, <i>F</i>	Max.			Min.	+0°15'			
	±0.0002	-0.0010	±0.005	±0.005	±0.005	Max.	Min.	-0.0000	-0°15'	Max.	Min.	-0°00'	-0°00'	-0.0010
No. 0	0.0450	0.0240	0.656	0.781	0.094	0.012	0.010	0.0320	7°00'	0.015	0.010	[Note (1)]	92°00'	0.0151
														[Note (2)]
No. 1	0.0870	0.0394	0.688	0.812	0.156	0.020	0.018	0.0500	7°00'	0.020	0.015	138°00'	92°00'	0.0202
No. 2	0.1410	0.0606	0.750	0.875	0.219	0.025	0.023	0.0900	5°45'	0.020	0.015	140°00'	92°00'	0.0434
No. 3	0.2090	0.0983	0.781	0.906	0.250	0.031	0.029	0.1500	5°45'	0.020	0.015	146°00'	92°00'	0.0826
No. 4	0.3120	0.1407	0.844	0.969	0.359	0.044	0.042	0.2000	7°00'	0.020	0.015	153°00'	92°00'	0.1078
No. 5	0.5000	0.2310	1.031	1.156	0.531	0.063	0.061	0.3110	7°00'	0.025	0.020	162°46'	92°00'	0.1730

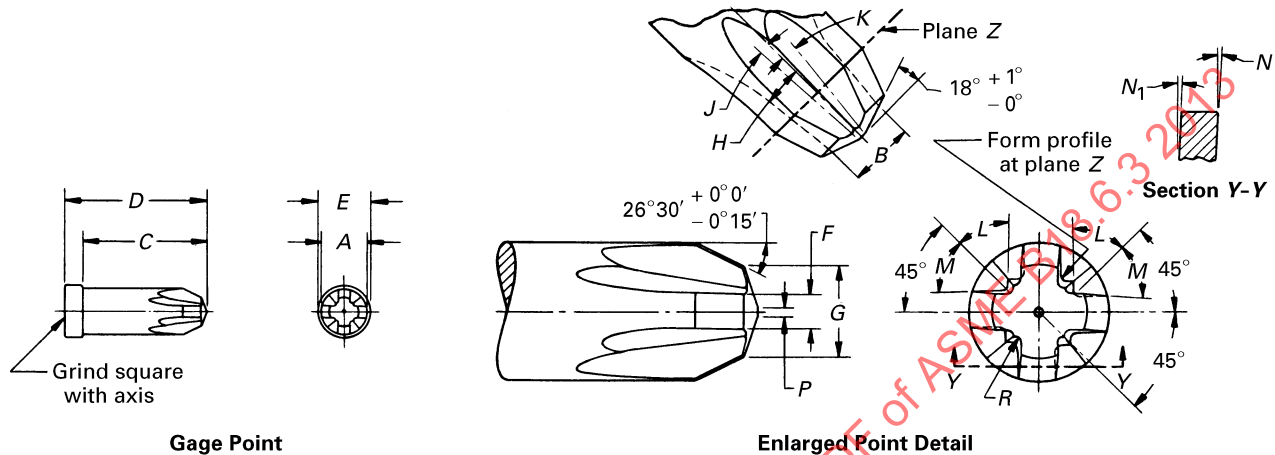
GENERAL NOTE: For additional reference, see Table III-1 illustration.

NOTES:

- (1) Base of flute on size No. 0 is 0.0090-in. to 0.0109-in. radius.
 (2) Tolerance on size No. 0 is +0.0000 and -0.0026 in.



Table III-3 Dimensions of Gage Points for Type IA Recess



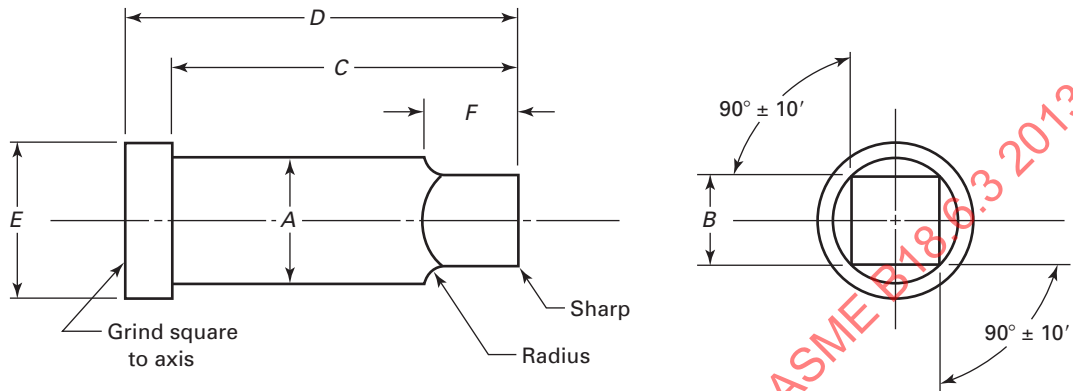
Size of Recess Gage	Point Diameter, A (±0.0002)	Point Width, B (at Base of Radius, R)		Length, C (±0.005)	Length, D (±0.005)	Diameter, E (±0.005)	Wing Thickness, F (+0.0010 -0.0000)	Point Width G (+0.001 -0.000)	
		Max.	Min.						
No. 0	0.0450	0.0280	0.0265	0.656	0.781	0.094	0.0165	0.035	
No. 1	0.0870	0.0438	0.0423	0.688	0.812	0.156	0.0265	0.054	
No. 2	0.1410	0.0670	0.0655	0.750	0.875	0.219	0.0380	0.095	
No. 3	0.2090	0.1020	0.1005	0.781	0.906	0.250	0.0530	0.155	
No. 4	0.3120	0.1520	0.1505	0.844	0.969	0.359	0.0810	0.203	
No. 5	0.5000	0.2420	0.2400	1.031	1.156	0.531	0.0910	0.315	

Size of Recess Gage	Milling Angle, H (+0°00' -0°06')	Milling Offset Angle, J (+0°06' -0°00')	Milling Offset Angle, K (+0°06' -0°00')	Rib Form Angle, L (+0°07' -0°00') [Note (1)]	Wing Form Angle, M, (+0°07' -0°00') [Note (1)]	Wing Offset Angle, N	Wing Offset Angle, N ₁	Flat on End, P (+0.005 -0.000)	Radius, R	
									Max.	Min.
No. 0	7° 00'	4° 23'	7° 45'	46° 00'	46° 00'	22'	2° 00'	0.010	0.004	0.003
No. 1	7° 00'	4° 23'	7° 45'	46° 00'	46° 00'	22'	2° 00'	0.015	0.005	0.004
No. 2	5° 45'	3° 00'	6° 20'	46° 00'	46° 00'	17'	2° 04'	0.015	0.008	0.006
No. 3	5° 45'	3° 00'	6° 20'	56° 15'	46° 00'	17'	2° 04'	0.015	0.012	0.008
No. 4	7° 00'	4° 23'	7° 45'	56° 15'	46° 00'	22'	2° 00'	0.015	0.020	0.014
No. 5	7° 00'	4° 23'	7° 45'	56° 15'	46° 00'	22'	2° 00'	0.020	0.040	0.035

NOTE:

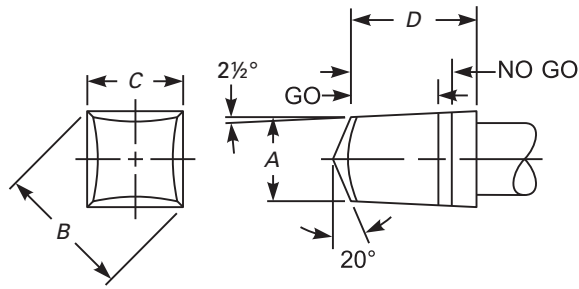
(1) These dimensions are measured normal to the milling cut.

Table III-4 Dimensions of Type III Square Penetration Gage Points



Size of Recess Gage	Gage Point Diameter, A	Width Across Flats, B	Stem Length, C	Overall Length, D	Head Diameter, E	Point Length, F
	+0.0005 -0.0000	+0.0005 -0.0000	+0.005 -0.005	+0.005 -0.005	+0.000 -0.015	+0.030 -0.000
00	0.1005	0.0490	0.785	0.875	0.187	0.075
0	0.1005	0.0690	0.785	0.875	0.187	0.125
1	0.1405	0.0900	0.785	0.875	0.187	0.187
2	0.1605	0.1110	0.785	0.875	0.250	0.187
3	0.2085	0.1315	0.785	0.875	0.250	0.187
4	0.2705	0.1895	0.785	0.875	0.312	0.212

Table III-5 Dimensions of Type III Square Fit Gage Points



Size of Recess Gage	Across Flats at Point, A		Across Corners, B	Across Flats at Top, C	Length, D		Gaging Lines					
	Max.	Min.			Ref.	Ref.	Max.	Min.	Regular Socket "R"		Short Socket "S"	
									GO	NO GO	GO	NO GO
0	0.0700	0.0695	0.1153	0.0815	0.145	0.125	0.014/0.019	0.035/0.038	N/A	N/A		
1	0.0908	0.0903	0.1447	0.1023	0.145	0.125	0.039/0.046	0.060/0.065	0.029/0.041	0.045/0.055		
2	0.1121	0.1116	0.1787	0.1263	0.176	0.156	0.049/0.056	0.070/0.075	0.037/0.049	0.053/0.063		
3	0.1327	0.1322	0.2117	0.1497	0.207	0.187	0.069/0.076	0.090/0.095	0.054/0.066	0.070/0.080		
4	0.1905	0.1900	0.3012	0.2130	0.270	0.250	0.074/0.081	0.095/0.100	N/A	N/A		

MANDATORY APPENDIX IV

WOBBLE GAGING OF RECESSED HEADS

(13)

Wobble gaging provides a means for determining the compatibility of recesses in the heads of screws with companion screw drivers, and will indicate the point where deviations in the recess contours affect satisfactory driver engagement. Recesses that exhibit excessive wobble characteristics will result in poor screw driveability because of driver cam-out prior to attaining normal torque level, damage to recesses, accelerated driver wear, or a combination thereof.

The allowable total wobble gaging limits for the various types of recesses included herein were predicated originally on the gaging of plain finish (unplated or uncoated) screws. However, subsequent experience has shown these limits to be suitable for the gaging of screws having coating thickness up to and including 0.0003 in. on significant surfaces. Screws having heavier coatings that fail to meet the wobble gaging requirements must be stripped of finish and gaged for acceptance or rejection in the plain condition.

Wobble gaging fixtures, as illustrated in Fig. IV-1, and appropriate recess master plug gages with handles and position indicators punch for the respective recess types are available through the screw suppliers. Dimensions of the points on master plug gages are, except for the body diameters tabulated herein, the same as those specified for the respective gage points in Mandatory Appendix III. The screw to be gaged shall be placed into

the screw-holding chuck and oriented such that one set of recess wings or one side is parallel to the upright back plate. The screw shall be so positioned and the chuck shall be tightened sufficiently to prevent any tilting of the screw in the chuck when taking wobble readings.

The position gage pointer and handle with the proper master plug gage for the recess size being checked shall be positioned in the slot of the degree scale on the top plate and the point of the plug gage inserted into the screw recess. It is essential that registry between the cross lines of the pointer and the recess wings or side be maintained. To correct any misalignment, the chuck position lock screw should be loosened, the chuck rotated until registry is obtained, and the chuck raised or lowered until the gage pointer is flush with the top of the degree scale. The chuck position lock screw should then be tightened and the readings taken. The gage handle, with downward pressure applied, should be moved from side to side until resistance is encountered and the total reading between points of travel of the gage pointer is recorded. The allowable angular wobble limits shall not exceed the values tabulated in Tables IV-1 and IV-2. Cross lines on the gage pointer should be rechecked with plug gage wings or flats to make certain cross lines and gage wings or flats are registered on identical radials.



Fig. IV-1 Wobble Gaging Fixture

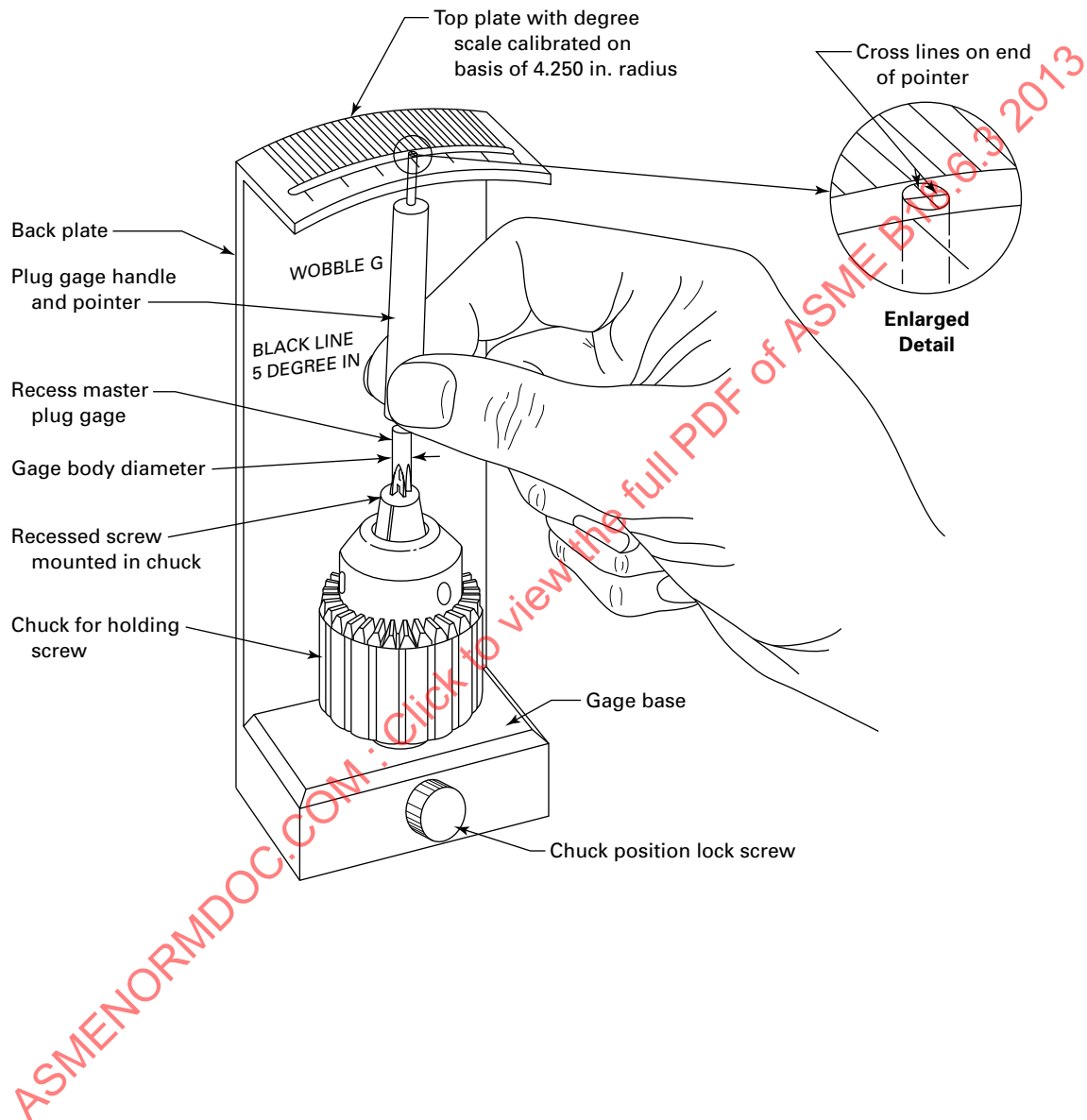


Table IV-1 Gage Body Diameters

Size of Recess Gage	Type I Recess		Type IA Recess			
	Ground Gage		Ground Gage		Pressed Gage	
	Max.	Min.	Max.	Min.	Max.	Min.
No. 0	0.135	0.115	0.135	0.115	...	...
No. 1	0.198	0.178	0.198	0.178	0.275	0.255
No. 2	0.260	0.240	0.260	0.240	0.275	0.255
No. 3	0.323	0.303	0.323	0.303	0.370	0.350
No. 4	0.385	0.365	0.385	0.365	0.475	0.455
No. 5	0.760	0.740	0.760	0.740	...	...

GENERAL NOTE: Diameters of Type II recess gages are same as penetration gage points shown in Mandatory Appendix III.

Table IV-2 Gaging Limits for Types I, IA, and III Recesses

Size of Recess Gage	Maximum Allowable Total Wobble, deg		
	Type I	Type IA	Type III
No. 0	N/A	N/A	N/A
No. 1	15	12	3
No. 2	12	10	3
No. 3	10	8	3
No. 4	10	8	3
No. 5	10	8	N/A

MANDATORY APPENDIX V

DIMENSIONS FOR NO. 0000, NO. 000, AND NO. 00 THREAD SIZES

The dimensional data for the No. 0000, No. 000, and No. 00 thread sizes are provided in Table V-1 for convenient reference until such time as these thread sizes may be adequately documented in an appropriate standard relating specifically to screw threads.

Table V-1 Dimensions for No. 0000, No. 000, and No. 00 Thread Sizes

Nominal Size and Threads per Inch [Note (1)]	Series Designation	External							
		Class	Allowance	Major Diameter		Pitch Diameter			Minor Diameter
				Max.	Min.	Max.	Min.	Tol.	
0000-160 or 0.0210-160	NS	2	0.0000	0.0210	0.0195	0.0169	0.0158	0.0011	0.0128
000-120 or 0.0340-120	NS	2	0.0000	0.0340	0.0325	0.0286	0.0272	0.0014	0.0232
00-90 or 0.0470-90	NS	2	0.0000	0.0470	0.0450	0.0398	0.0382	0.0016	0.0326
00-96 or 0.0470-96	NS	2	0.0000	0.0470	0.0450	0.0402	0.0386	0.0016	0.0334

Nominal Size and Threads per Inch [Note (1)]	Series Designation	Class	Internal					
			Minor Diameter [Note (2)]		Pitch Diameter			Major Diameter, Min.
			Min.	Max.	Min.	Max.	Tol.	
0000-160 or 0.0210-160	NS	2	...	...	0.0169	0.0181	0.0012	0.0210
000-120 or 0.0340-120	NS	2	...	...	0.0286	0.0300	0.0014	0.0340
00-90 or 0.0470-90	NS	2	...	...	0.0398	0.0414	0.0016	0.0470
00-96 or 0.0470-96	NS	2	...	...	0.0402	0.0418	0.0016	0.0470

NOTES:

- (1) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
- (2) The minor diameter limits for internal threads are not specified; they are determined by the amount of thread engagement necessary to satisfy the strength requirements and tapping performance in the intended application.



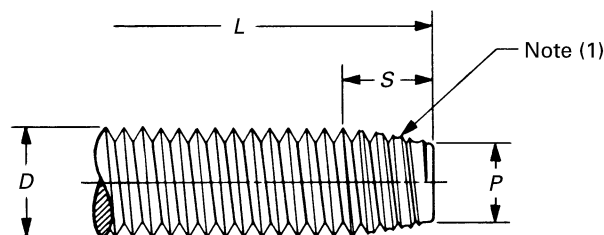
MANDATORY APPENDIX VI DIMENSIONS OF TYPE C TAPPING SCREWS

For dimensions of threads and points for Type C thread-forming tapping screws, see Table VI-1.

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Table VI-1 Dimensions of Threads and Points for Type C Thread-Forming Tapping Screws



Nominal Size [Note (2)] or Basic Screw Diameter		Threads per Inch	Major Diameter, <i>D</i>		Point Diameter, <i>P</i>	Point Taper Length, <i>S</i> [Note (3)]				Determinant Lengths for Point Taper, <i>L</i> [Note (3)]		Minimum Practical Nominal Screw Lengths, <i>L</i>	
						For Short Screws		For Long Screws		90-deg Heads	Csk. Heads	90-deg Heads	Csk. Heads
			Max.	Min.	Ref.	Max.	Min.	Max.	Min.				
2	0.0860	56	0.0860	0.0813	0.068	0.062	0.045	0.080	0.062	⁵ / ₃₂	³ / ₁₆	⁵ / ₃₂	³ / ₁₆
2	0.0860	64	0.0860	0.0816	0.070	0.055	0.039	0.070	0.055	¹ / ₈	³ / ₁₆	¹ / ₈	⁵ / ₃₂
3	0.0990	48	0.0990	0.0938	0.078	0.073	0.052	0.094	0.073	³ / ₁₆	⁷ / ₃₂	⁵ / ₃₂	⁷ / ₃₂
3	0.0990	56	0.0990	0.0942	0.081	0.062	0.045	0.080	0.062	⁵ / ₃₂	³ / ₁₆	⁵ / ₃₂	³ / ₁₆
4	0.1120	40	0.1120	0.1061	0.087	0.088	0.062	0.112	0.088	⁷ / ₃₂	¹ / ₄	³ / ₁₆	¹ / ₄
4	0.1120	48	0.1120	0.1068	0.091	0.073	0.052	0.094	0.073	³ / ₁₆	⁷ / ₃₂	⁵ / ₃₂	⁷ / ₃₂
5	0.1250	40	0.1250	0.1191	0.100	0.088	0.062	0.112	0.088	⁷ / ₃₂	⁹ / ₃₂	³ / ₁₆	¹ / ₄
5	0.1250	44	0.1250	0.1195	0.102	0.080	0.057	0.102	0.080	³ / ₁₆	¹ / ₄	³ / ₁₆	¹ / ₄
6	0.1380	32	0.1380	0.1312	0.107	0.109	0.078	0.141	0.109	¹ / ₄	⁵ / ₁₆	¹ / ₄	⁵ / ₁₆
6	0.1380	40	0.1380	0.1321	0.113	0.088	0.062	0.112	0.088	⁷ / ₃₂	⁹ / ₃₂	³ / ₁₆	¹ / ₄
8	0.1640	32	0.1640	0.1571	0.132	0.109	0.078	0.141	0.109	¹ / ₄	¹¹ / ₃₂	¹ / ₄	⁵ / ₁₆
8	0.1640	36	0.1640	0.1577	0.136	0.097	0.069	0.125	0.097	⁷ / ₃₂	⁵ / ₁₆	⁷ / ₃₂	⁹ / ₃₂
10	0.1900	24	0.1900	0.1818	0.148	0.146	0.104	0.188	0.146	¹¹ / ₃₂	⁷ / ₁₆	⁵ / ₁₆	¹³ / ₃₂
10	0.1900	32	0.1900	0.1831	0.158	0.109	0.078	0.141	0.109	¹ / ₄	¹¹ / ₃₂	¹ / ₄	⁵ / ₁₆
12	0.2160	24	0.2160	0.2078	0.174	0.146	0.104	0.188	0.146	¹¹ / ₃₂	⁷ / ₁₆	⁵ / ₁₆	¹³ / ₃₂
12	0.2160	28	0.2160	0.2085	0.180	0.125	0.089	0.161	0.125	⁵ / ₁₆	¹³ / ₃₂	⁹ / ₃₂	³ / ₈
¹ / ₄	0.2500	20	0.2500	0.2408	0.200	0.175	0.125	0.225	0.175	¹³ / ₃₂	¹⁷ / ₃₂	³ / ₈	¹ / ₂
¹ / ₄	0.2500	28	0.2500	0.2425	0.214	0.125	0.089	0.161	0.125	⁵ / ₁₆	¹³ / ₃₂	⁹ / ₃₂	³ / ₈
⁵ / ₁₆	0.3125	18	0.3125	0.3026	0.257	0.194	0.139	0.250	0.194	¹⁵ / ₃₂	¹⁹ / ₃₂	⁷ / ₁₆	⁹ / ₁₆
⁵ / ₁₆	0.3125	24	0.3125	0.3042	0.271	0.146	0.104	0.188	0.146	¹¹ / ₃₂	¹⁵ / ₃₂	⁵ / ₁₆	¹⁵ / ₃₂
³ / ₈	0.3750	16	0.3750	0.3643	0.312	0.219	0.156	0.281	0.219	¹ / ₂	¹¹ / ₁₆	¹⁵ / ₃₂	⁵ / ₈
³ / ₈	0.3750	24	0.3750	0.3667	0.333	0.146	0.104	0.188	0.146	¹¹ / ₃₂	¹ / ₂	⁵ / ₁₆	¹ / ₂
⁷ / ₁₆	0.4375	14	0.4375	0.4258	0.366	0.250	0.179	0.321	0.250	¹⁹ / ₃₂	³ / ₄	⁹ / ₁₆	²³ / ₃₂
⁷ / ₁₆	0.4375	20	0.4375	0.4281	0.387	0.175	0.125	0.225	0.175	¹³ / ₃₂	⁹ / ₁₆	³ / ₈	¹⁷ / ₃₂
¹ / ₂	0.5000	13	0.5000	0.4876	0.423	0.269	0.192	0.346	0.269	⁵ / ₈	²⁵ / ₃₂	¹⁹ / ₃₂	³ / ₄
¹ / ₂	0.5000	20	0.5000	0.4906	0.450	0.175	0.125	0.225	0.175	¹³ / ₃₂	⁹ / ₁₆	³ / ₈	¹⁷ / ₃₂

GENERAL NOTES:

- (a) For additional requirements, refer to section 4.
 (b) Not recommended for new designs. See para. 4.1.1.5.

NOTES:

- (1) Threads within point taper length shall have unfinished crests.
 (2) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
 (3) Screws of these nominal lengths and shorter shall have point taper lengths specified for short screws. Longer lengths shall have point taper lengths specified for long screws.

MANDATORY APPENDIX VII

TYPE VI RECESS GAGE REQUIREMENTS

VII-1 SCOPE

This Mandatory Appendix outlines the inspection method and acceptance criteria for internal fastener drive configurations having six lobes.

VII-2 DEFINITION

The recess drive system configuration is a gearlike shape comprised of six equally spaced external radii connected by six equally spaced internal radii recessed into the product's head. The recess penetration depth, I , maximum fallaway depth, and maximum counterbore depth shall be inspected for the requirements specified in this Standard. See Table VII-1.

VII-3 GAGE TYPE

Gages shall be manufactured of tool steel hardened and tempered to a minimum of Rockwell C61.

VII-3.1 GO Gages

The internal GO gages inspect the acceptability of the configuration, the depth of the internal drive, or both.

VII-3.2 NO GO Gages

The internal NO GO gages determine the amount of nonconforming configuration (fallaway) present in the internal drive.

VII-4 INSPECTION

The gaging for the internal drive consists of one GO gage and two NO GO gages. One NO GO gage inspects the external radii and the circumscribing diameter created around them. The second NO GO gage inspects the inscribing circle created by the six-point tangent to the extreme points of the six internal radii.

Internal gages measure the depth that each of the gaging elements enters the recess. To obtain accurate

measurements, the gage must be inspected periodically to assure the gage's indicator registers zero when the gaging element is depressed into the gage body where the end of the gage element is flush with the face of the gage body.

VII-5 RECESS ACCEPTABILITY

The internal drive is acceptable only if it conforms to the four inspections described in paras. VII-5.1 through VII-5.4.

VII-5.1 Penetration Depth

The GO gage shall enter the recess to the depth indicated by the product specification or print.

VII-5.2 Counterbore Depth

Rotate the GO gage 15 deg to prevent alignment with the lobes of the recess. Place it into the top portion of the recess. The depth must not exceed the counterbore depth defined in this Standard.

VII-5.3 Lobe Fallaway Depth

The lobular NO GO gage must not enter the recess more than the maximum depth indicated in this Standard.

VII-5.4 I.D. Fallaway Depth

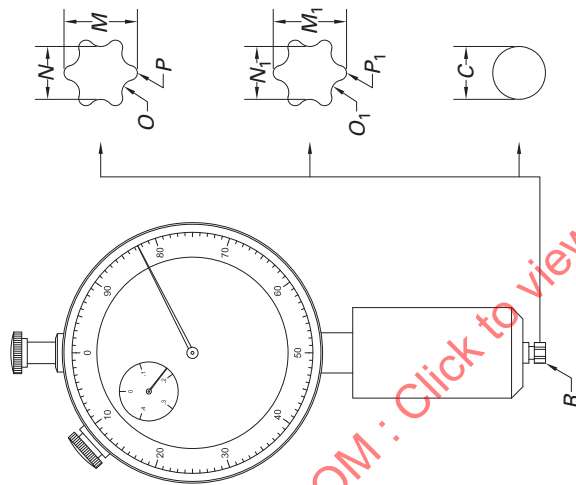
The cylindrical NO GO gage must not enter the recess more than the maximum depth indicated by the product specification or print. The same fallaway value applies to both the lobed and cylindrical gage inspection.

VII-6 RECESS UNACCEPTABILITY

Screws having heavy coatings that fail to meet the penetration gaging requirements shall be stripped of the coating and inspected for acceptance in the plain (uncoated) condition.



Table VII-1 Dimensions for Type VI Recess Gage Elements



Drive and Gage Size Number	GO Gage Dimensions										Fallaway Gage Dimensions										All Ele- ments	
	GO										Fallaway										Gage Point Radius, R	Max.
	Diameter Over Lobes, M		Width Between Lobes, N		Radius Between Lobes, O		Radius of Lobes, P		Diameter Over Lobes, M_1		Width Between Lobes, N_1 , Max.		Radius Between Lobes, O_1 , Max.		Radius of Lobes, P_1		NO GO Cylindrical Diameter, C					
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Max.	Min.	Max.	Min.	Max.	Min.			
6	0.0673	0.0667	0.0482	0.0476	0.0156	0.0146	0.0053	0.0051	0.0703	0.0700	0.0512	0.0136	0.0071	0.0067	0.0569	0.0567	0.001	0.001				
7	0.0798	0.0792	0.0572	0.0566	0.0177	0.0174	0.0065	0.0062	0.0828	0.0825	0.0602	0.0160	0.0083	0.0080	0.0646	0.0584	0.001	0.001				
8	0.0925	0.0919	0.0664	0.0658	0.0206	0.0195	0.0076	0.0074	0.0955	0.0952	0.0694	0.0186	0.0094	0.0090	0.0758	0.0756	0.001	0.001				
9	0.0998	0.0992	0.0718	0.0712	0.0223	0.0215	0.0083	0.0080	0.1028	0.1025	0.0747	0.0202	0.0098	0.0097	0.0820	0.0744	0.001	0.001				
10	0.1093	0.1087	0.0785	0.0779	0.0240	0.0230	0.0091	0.0089	0.1123	0.1120	0.0815	0.0219	0.0109	0.0105	0.0900	0.0898	0.001	0.001				
15	0.1303	0.1297	0.0932	0.0926	0.0287	0.0277	0.0106	0.0104	0.1333	0.1330	0.0961	0.0266	0.0124	0.0120	0.1089	0.1087	0.003	0.003				
20	0.1533	0.1527	0.1094	0.1088	0.0343	0.0332	0.0121	0.0119	0.1563	0.1560	0.1124	0.0322	0.0139	0.0135	0.1293	0.1291	0.003	0.003				
25	0.1758	0.1752	0.1254	0.1248	0.0367	0.0357	0.0149	0.0146	0.1798	0.1795	0.1294	0.0341	0.0172	0.0168	0.1467	0.1465	0.003	0.003				
27	0.1978	0.1972	0.1409	0.1403	0.0441	0.0431	0.0155	0.0152	0.2018	0.2015	0.1449	0.0416	0.0175	0.0174	0.1651	0.1446	0.003	0.003				
30	0.2188	0.2182	0.1564	0.1558	0.0475	0.0465	0.0179	0.0176	0.2228	0.2225	0.1604	0.0450	0.0202	0.0198	0.1837	0.1835	0.003	0.003				



Table VII-1 Dimensions for Type VI Recess Gage Elements (Cont'd)

Drive and Gage Size Number	GO Gage Dimensions						Fallaway Gage Dimensions						All Elements						
	GO						Fallaway												
	Diameter Over Lobes, M		Width Between Lobes, N		Radius Between Lobes, O		Radius of Lobes, P		Diameter Over Lobes, M_1		Width Between Lobes, N_1 , Max.		Radius Between Lobes, O_1 , Max.		Radius of Lobes, P_1		NO GO		Gage Point Radius, R
																	Max.	Min.	
40	0.2633	0.2627	0.1882	0.1876	0.0567	0.0557	0.0216	0.0214	0.2683	0.2680	0.1932	0.1932	0.0537	0.0244	0.0240	0.2207	0.2205	0.003	
45	0.3093	0.3087	0.2193	0.2187	0.0712	0.0702	0.0227	0.0225	0.3143	0.3140	0.2243	0.2243	0.0682	0.0255	0.0251	0.2624	0.2622	0.003	
50	0.3493	0.3487	0.2512	0.2506	0.0720	0.0710	0.0306	0.0304	0.3543	0.3540	0.2562	0.2562	0.0690	0.0334	0.0330	0.2907	0.2906	0.003	
55	0.4433	0.4427	0.3128	0.3122	0.1056	0.1046	0.0303	0.0301	0.4493	0.4490	0.3188	0.3188	0.1020	0.0336	0.0332	0.3805	0.3803	0.003	
60	0.5243	0.5237	0.3742	0.3736	0.1140	0.1130	0.0421	0.0419	0.5313	0.5310	0.3812	0.3812	0.1100	0.0459	0.0455	0.4467	0.4465	0.003	
70	0.6143	0.6137	0.4370	0.4364	0.1374	0.1364	0.0471	0.0469	0.6213	0.6210	0.4440	0.4440	0.1334	0.0509	0.0505	0.5254	0.5252	0.003	
80	0.6943	0.6937	0.4985	0.4979	0.1429	0.1427	0.0602	0.0600	0.7023	0.7020	0.5065	0.5065	0.1389	0.0644	0.0640	0.5876	0.5874	0.003	
90	0.7888	0.7882	0.5609	0.5603	0.1764	0.1754	0.0604	0.0601	0.7978	0.7975	0.5699	0.5699	0.1714	0.0652	0.0648	0.6758	0.6756	0.003	
100	0.8758	0.8752	0.6234	0.6228	0.1944	0.1934	0.0679	0.0676	0.8848	0.8845	0.6324	0.6324	0.1894	0.0727	0.0723	0.7490	0.7488	0.003	

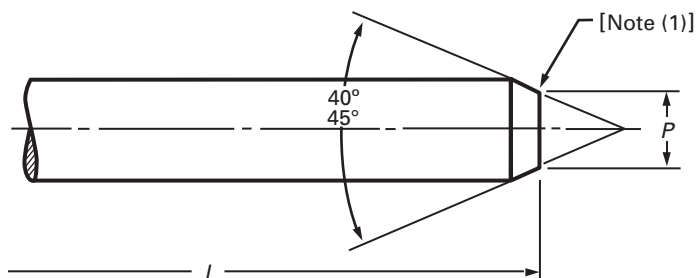


NONMANDATORY APPENDIX A DIMENSIONS OF HEADER POINTS FOR MACHINE SCREWS BEFORE THREADING

See Table A-1 on following page.

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Table A-1 Dimensions of Header Points for Machine Screws Before Threading

Nominal Size [Note (2)] or Basic Screw Diameter	Threads per inch	Point Diameter, P		Nominal Screw Length, L , Max. [Note (3)]
		Max.	Min.	
2 0.0860	56	0.057	0.050	$\frac{1}{2}$
	64	0.060	0.053	$\frac{1}{2}$
4 0.1120	40	0.074	0.065	$\frac{1}{2}$
	48	0.079	0.070	$\frac{1}{2}$
5 0.1250	40	0.086	0.076	$\frac{1}{2}$
	44	0.088	0.079	$\frac{1}{2}$
6 0.1380	32	0.090	0.080	$\frac{3}{4}$
	40	0.098	0.087	$\frac{3}{4}$
8 0.1640	32	0.114	0.102	1
	36	0.118	0.106	1
10 0.1900	24	0.125	0.112	$1\frac{1}{4}$
	32	0.138	0.124	$1\frac{1}{4}$
12 0.2160	24	0.149	0.134	$1\frac{3}{8}$
	28	0.156	0.141	$1\frac{3}{8}$
$\frac{1}{4}$ 0.2500	20	0.170	0.153	$1\frac{1}{2}$
	28	0.187	0.169	$1\frac{1}{2}$
$\frac{5}{16}$ 0.3125	18	0.221	0.200	$1\frac{1}{2}$
	24	0.237	0.215	$1\frac{1}{2}$
$\frac{3}{8}$ 0.3750	16	0.270	0.244	$1\frac{1}{2}$
	24	0.295	0.267	$1\frac{1}{2}$
$\frac{7}{16}$ 0.4375	14	0.316	0.287	$1\frac{1}{2}$
	20	0.342	0.310	$1\frac{1}{2}$
$\frac{1}{2}$ 0.5000	13	0.367	0.333	$1\frac{1}{2}$
	20	0.399	0.362	$1\frac{1}{2}$

GENERAL NOTE: For additional requirements, refer to section 3.

NOTES:

- (1) Edges of the point may be rounded, and end of the point need not be flat nor perpendicular to the axis of the shank.
- (2) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
- (3) Header points apply to these nominal lengths or shorter. The pointing of longer lengths may require machining to the dimensions specified.

NONMANDATORY APPENDIX B

DETERMINATION OF MAXIMUM EFFECTIVE DESIGN GRIP LENGTHS

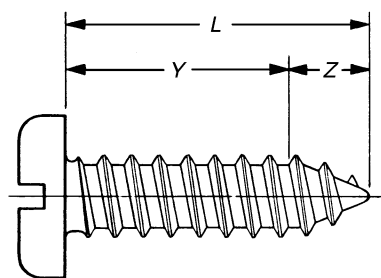
For design reference purposes and selection of proper screw lengths, it is often necessary to determine the maximum effective design grip length [that portion of the screw length extending from the head to the first complete (full form) thread beyond the point taper] on the respective types of tapping screws.

For those types of screws having specified point taper lengths, the maximum effective design grip length is determined by deducting the maximum point taper length from the minimum screw length. For Types AB, A, and BP screws having points, the lengths of which

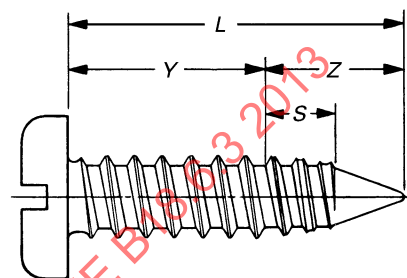
are not tabulated, it is necessary to use suitable factors reflecting the maximum point lengths for calculating the maximum effective design grip length. The constants specified in Table B-1 are intended solely to assist the user in this purpose and shall not be subject to inspection.

It should be noted that for sems, an additional allowance to provide for the height of the washer must also be considered when determining the maximum effective design grip length.



Table B-1 Constants for Determining Maximum Effective Design Grip Length on Types AB, A, and BP Tapping Screws

$Y = L - Z$
 Where L = minimum screw length
 Y = maximum effective design grip length (minimum distance from head to first full form thread behind point)
 Z = constant for point length (see tabulation below)

**Types AB and A****Type BP**

Nominal Screw Size	Constant for Point Length, Z		
	Derived From Formula $\cot 20^\circ \left(\frac{\text{max. minor diam.}}{2} \right) + 1 \text{ pitch}$		Derived From Formula $\cot 16^\circ \left(\frac{\text{max. minor diam.}}{2} \right) + 1 \text{ pitch} + S \text{ max.}$
	For Type AB	For Type A	For Type BP [Note (1)]
0	0.070	0.083	0.105
1	0.091	0.101	0.133
2	0.119	0.115	0.174
3	0.139	0.140	0.202
4	0.160	0.156	0.233
5	0.179	0.181	0.264
6	0.193	0.195	0.281
7	0.211	0.219	0.306
8	0.224	0.237	0.324
10	0.256	0.266	0.371
12	0.296	0.314	0.429
14	...	0.354	...
1/4	0.335	...	0.478
16	...	0.371	...
18	...	0.409	...
5/16	0.418	...	0.592
20	...	0.432	...
24	...	0.511	...
3/8	0.508	...	0.706
7/16	0.593	...	0.826
1/2	0.681	...	0.938

GENERAL NOTE: Type A not recommended; use Type AB (see paras. 4.1.1.1 and 4.1.1.4).

NOTE:

(1) Refer to Table 41 for S maximum values applicable to respective sizes.

NONMANDATORY APPENDIX C FORMULAS FOR DIMENSIONS

Formulas for the dimensions of head diameter, head height, and slot depth for various types of head screws are provided in Tables C-1 through C-14.

Formulas for dimensions of square and hex nuts are provided in Table C-15.

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Table C-1 Flat Countersunk Head Screws

Screw Size	Head Diameter	
0000 through 00	No formulas; see tables	
0 through $\frac{3}{8}$	Max. A (sharp) = $2.040 D - 0.003$ ref. [Note (1)] Min. A (sharp) = $1.960 D - 0.013$ ref. [Note (1)] Max. A (rounded or flat) = $1.920 D - 0.003$ [Note (2)] Min. A (rounded or flat) = $1.820 D - 0.013$ [Note (2)] Gaging diameter $G = 1.830 D - 0.033$	
$\frac{7}{16}$	Max. A (sharp) = $2.000 D - 0.063$ ref. [Note (1)] Min. A (sharp) = $1.920 D - 0.073$ ref. [Note (1)] Max. A (rounded or flat) = $1.880 D - 0.063$ [Note (2)] Min. A (rounded or flat) = $1.800 D - 0.073$ [Note (2)] Gaging diameter $G = 1.790 D - 0.093$	
$\frac{1}{2}$ through $\frac{3}{4}$	Max. A (sharp) = $2.000 D - 0.125$ ref. [Note (1)] Min. A (sharp) = $1.920 D - 0.135$ ref. [Note (1)] Max. A (rounded or flat) = $1.880 D - 0.125$ [Note (2)] Min. A (rounded or flat) = $1.800 D - 0.135$ [Note (2)] Gaging diameter $G = 1.790 D - 0.155$	
Screw Size	Head Height	Slot Depth
0000 through 00	No formulas; see tables	No formulas; see tables
0 through $\frac{3}{8}$	Max. $H = 0.619 D - 0.002$ Min. $H = 0.552 D - 0.007$ ref. [Note (1)]	Max. $T = 0.288 D - 0.002$ Min. $T = 0.192 D - 0.002$
$\frac{7}{16}$	Max. $H = 0.596 D - 0.038$ Min. $H = 0.529 D - 0.042$ ref. [Note (1)]	Max. $T = 0.274 D - 0.017$ Min. $T = 0.184 D - 0.015$
$\frac{1}{2}$ through $\frac{3}{4}$	Max. $H = 0.596 D - 0.075$ Min. $H = 0.529 D - 0.078$ ref. [Note (1)]	Max. $T = 0.274 D - 0.034$ Min. $T = 0.184 D - 0.027$

GENERAL NOTE: D is the basic diameter of the screw.

NOTES:

- (1) Values no longer tabulated; formulas are retained here for reference purposes only.
 (2) Values based on a sidewall of approximately $2\frac{1}{2}\%$ of the head diameter.



Table C-2 Undercut Flat Countersunk Head Screws

Screw Size	Head Diameter	
0 through $\frac{3}{8}$	Max. A (sharp) = $2.040 D - 0.003$ ref. [Note (1)] Min. A (sharp) = $1.960 D - 0.013$ ref. [Note (1)] Max. A (rounded or flat) = $1.920 D - 0.003$ [Note (2)] Min. A (rounded or flat) = $1.820 D - 0.013$ [Note (2)] Gaging diameter G = $1.830 D - 0.033$	
$\frac{7}{16}$	Max. A (sharp) = $2.000 D - 0.063$ ref. [Note (1)] Min. A (sharp) = $1.920 D - 0.073$ ref. [Note (1)] Max. A (rounded or flat) = $1.880 D - 0.063$ [Note (2)] Min. A (rounded or flat) = $1.800 D - 0.073$ [Note (2)] Gaging diameter G = $1.790 D - 0.093$	
$\frac{1}{2}$	Max. A (sharp) = $2.000 D - 0.125$ ref. [Note (1)] Min. A (sharp) = $1.920 D - 0.135$ ref. [Note (1)] Max. A (rounded or flat) = $1.880 D - 0.125$ [Note (2)] Min. A (rounded or flat) = $1.800 D - 0.135$ [Note (2)] Gaging diameter G = $1.790 D - 0.155$	
Screw Size	Head Height	Slot Depth
0 through $\frac{3}{8}$	Max. H = $0.432 D - 0.001$ Min. H = $0.386 D - 0.005$	Max. T = $0.202 D - 0.001$ Min. T = $0.134 D - 0.001$
$\frac{7}{16}$	Max. H = $0.417 D - 0.026$ Min. H = $0.370 D - 0.029$	Max. T = $0.192 D - 0.012$ Min. T = $0.129 D - 0.011$
$\frac{1}{2}$	Max. H = $0.417 D - 0.052$ Min. H = $0.370 D - 0.055$	Max. T = $0.192 D - 0.024$ Min. T = $0.129 D - 0.019$

GENERAL NOTE: D is the basic diameter of the screw.

NOTES:

- (1) Values no longer tabulated; formulas are retained here for reference purposes only.
 (2) Values based on a sidewall of approximately $2\frac{1}{2}\%$ of the head diameter.

Table C-3 100 deg Flat Countersunk Head Screws

Screw Size	Head Diameter	Head Height	Slot Depth
0000 through 00	No formulas; see tables	No formulas; see tables	No formulas; see tables
0 through $\frac{3}{8}$	Max. A (sharp) = $2.040 D - 0.003$ ref. [Note (1)] Min. A (sharp) = $1.960 D - 0.013$ ref. [Note (1)] Max. A (rounded or flat) = $1.920 D - 0.003$ [Note (2)] Min. A (rounded or flat) = $1.800 D - 0.013$ [Note (2)] Gaging diameter G = $1.790 D - 0.033$	Max. H = $0.444 D - 0.001$ Min. H = $0.396 D - 0.005$ ref. [Note (1)]	Max. T = $0.222 D - 0.0005$ Min. T = $0.184 D - 0.004$

GENERAL NOTE: D is the basic diameter of the screw.

NOTES:

- (1) Values no longer tabulated; formulas are retained here for reference purposes only.
 (2) Values based on a sidewall of approximately $2\frac{1}{2}\%$ of the head diameter.



Table C-4 Close Tolerance 100 deg Flat Countersunk Head Screws

Screw Size	Head Diameter	Head Height	Slot Depth
0 through $\frac{5}{8}$	Max. A (sharp) = $2.040 D - 0.003$ ref. [Note (1)] Min. A (sharp) = $2.000 D - 0.009$ ref. [Note (1)] Max. A (rounded or flat) = $1.920 D - 0.003$ [Note (2)] Min. A (rounded or flat) = $1.800 D - 0.013$ [Note (2)] Gaging diameter G = $1.790 D - 0.033$	Max. H = $0.444 D - 0.001$ Min. H = $0.396 D - 0.005$ ref. [Note (1)]	Max. T = $0.222 D - 0.0005$ Min. T = $0.184 D - 0.004$

GENERAL NOTE: D is the basic diameter of the screw.

NOTES:

- (1) Values no longer tabulated; formulas are retained here for reference purposes only.
 (2) Values based on a sidewall of approximately $2\frac{1}{2}\%$ of the head diameter.

Table C-5 Oval Countersunk Head Screws

Screw Size	Head Diameter	Total Head Height
00	No formulas; see tables	No formulas; see tables
0 through $\frac{3}{8}$	Max. A (sharp) = $2.040 D - 0.003$ ref. [Note (1)] Min. A (sharp) = $1.960 D - 0.013$ ref. [Note (1)] Max. A (rounded or flat) = $1.920 D - 0.003$ [Note (2)] Min. A (rounded or flat) = $1.820 D - 0.013$ [Note (2)] Gaging diameter G = $1.830 D - 0.033$	Max. O = $0.923 D + 0.001$ Min. O = $0.820 D - 0.008$
$\frac{7}{16}$	Max. A (sharp) = $2.000 D - 0.063$ ref. [Note (1)] Min. A (sharp) = $1.920 D - 0.073$ ref. [Note (1)] Max. A (rounded or flat) = $1.880 D - 0.063$ [Note (2)] Min. A (rounded or flat) = $1.800 D - 0.073$ [Note (2)] Gaging diameter G = $1.790 D - 0.093$	Max. O = $0.896 D - 0.047$ Min. O = $0.789 D - 0.050$
$\frac{1}{2}$ through $\frac{3}{4}$	Max. A (sharp) = $2.000 D - 0.125$ ref. Min. A (sharp) = $1.920 D - 0.135$ ref. Max. A (rounded or flat) = $1.880 D - 0.125$ [Note (2)] Min. A (rounded or flat) = $1.800 D - 0.135$ [Note (2)] Gaging diameter G = $1.790 D - 0.155$	Max. O = $0.896 D - 0.094$ Min. O = $0.789 D - 0.094$
Screw Size	Head Side Height	Slot Depth
00	No formulas; see tables	No formulas; see tables
0 through $\frac{3}{8}$	Max. H = $0.619 D - 0.002$ Min. H = $0.552 D - 0.007$ ref. [Note (1)]	Max. T = $0.556 D - 0.003$ Min. T = $0.460 D - 0.003$
$\frac{7}{16}$	Max. H = $0.596 D - 0.038$ Min. H = $0.529 D - 0.042$ ref. [Note (1)]	Max. T = $0.547 D - 0.029$ Min. T = $0.466 D - 0.030$
$\frac{1}{2}$ through $\frac{3}{4}$	Max. H = $0.596 D - 0.075$ Min. H = $0.529 D - 0.078$ ref. [Note (1)]	Max. T = $0.547 D - 0.057$ Min. T = $0.466 D - 0.055$

GENERAL NOTE: D is the basic diameter of the screw.

NOTES:

- (1) Values no longer tabulated; formulas are retained here for reference purposes only.
 (2) Values based on a sidewall of approximately $2\frac{1}{2}\%$ of the head diameter.



Table C-6 Undercut Oval Countersunk Head Screws

Screw Size	Total Head Height	Head Side Height	Slot Depth
0 through $\frac{3}{8}$	Max. $O = 0.736 D + 0.002$ Min. $O = 0.654 D - 0.006$	Max. $H = 0.432 D - 0.001$ Min. $H = 0.386 D - 0.005$ ref. [Note (1)]	Max. $T = 0.480 D - 0.001$ Min. $T = 0.402 D - 0.002$
$\frac{7}{16}$	Max. $O = 0.717 D - 0.035$ Min. $O = 0.630 D - 0.037$	Max. $H = 0.417 D - 0.026$ Min. $H = 0.370 D - 0.029$ ref. [Note (1)]	Max. $T = 0.473 D - 0.023$ Min. $T = 0.404 D - 0.023$
$\frac{1}{2}$	Max. $O = 0.717 D - 0.071$ Min. $O = 0.630 D - 0.071$	Max. $H = 0.417 D - 0.052$ Min. $H = 0.370 D - 0.055$ ref. [Note (1)]	Max. $T = 0.473 D - 0.033$ Min. $T = 0.404 D - 0.033$

GENERAL NOTES:

- (a) Formulas same as for oval countersunk head except as shown above.
 (b) D is the basic diameter of the screw.

NOTE:

- (1) Values no longer tabulated; formulas are retained here for reference purposes only.

Table C-7 Pan Head Screws

Screw Size	Head Diameter	Head Height		Slot Depth
		Slotted	Recessed	
0000 through 00	No formulas; see tables	No formulas; see tables	...	No formulas; see tables
0 through 12	Max. $A = 1.980 D - 0.003$ Min. $A = 1.940 D - 0.012$	Max. $H = 0.550 D + 0.006$ Min. $H = 0.520 D$	Max. $H = 0.692 D + 0.002$ Min. $H = 0.652 D - 0.003$	Max. $T = 0.350 D + 0.001$ Min. $T = 0.300 D - 0.004$
$\frac{1}{4}$ through $\frac{1}{2}$	Max. $A = 1.980 D - 0.003$ Min. $A = 1.940 D - 0.012$	Max. $H = 0.550 D + 0.006$ Min. $H = 0.520 D$	Max. $H = 0.692 D + 0.002$ Min. $H = 0.652 D - 0.001$	Max. $T = 0.293 D + 0.014$ Min. $T = 0.246 D + 0.008$
$\frac{9}{16}$ through $\frac{3}{4}$	Max. $A = 2.100 D - 0.140$ Min. $A = 2.000 D - 0.125$	Max. $H = 0.550 D + 0.006$ Min. $H = 0.520 D$	Max. $H = 0.692 D + 0.002$ Min. $H = 0.652 D - 0.001$	Max. $T = 0.293 D + 0.014$ Min. $T = 0.246 D + 0.008$

GENERAL NOTE: D is the basic diameter of the screw.



Table C-8 Truss Head Screws

Screw Size	Head Diameter	Head Height	Slot Depth
0000 through 00	No formulas; see tables	No formulas; see tables	No formulas; see tables
0 through 12	Max. $A = 2.440 D - 0.015$ Min. $A = 2.360 D - 0.023$	Max. $H = 0.620 D$ Min. $H = 0.570 D - 0.005$	Max. $T = 0.350 D + 0.001$ Min. $T = 0.300 D - 0.004$
$\frac{1}{4}$ through $\frac{3}{4}$	Max. $A = 2.000 D + 0.073$ Min. $A = 1.930 D + 0.063$	Max. $H = 0.520 D + 0.020$ Min. $H = 0.470 D + 0.015$	Max. $T = 0.293 D + 0.014$ Min. $T = 0.246 D + 0.008$

GENERAL NOTE: D is the basic diameter of the screw.

Table C-9 Fillister Head Screws

Screw Size	Head Diameter	Total Head Height	Slot Depth
0000 through 1	No formulas; see tables	No formulas; see tables	No formulas; see tables
2 through $\frac{3}{8}$	Max. $A = 1.670 D - 0.004$ Min. $A = 1.610 D - 0.014$	Max. $O = \max. H + \max. F$ Min. $O = \min. H + \min. F$	Max. $T = 0.440 D - 0.001$ Min. $T = 0.374 D - 0.007$
$\frac{7}{16}$	Max. $A = 1.000 D + 0.188$ Min. $A = 0.940 D + 0.178$	Max. $O = \max. H + \max. F$ Min. $O = \min. H + \min. F$	Max. $T = 0.500 (\min. O) + 0.010$ Min. $T = \max. T - 0.066 D - 0.005$
$\frac{1}{2}$ through $\frac{3}{4}$	Max. $A = 1.000 D + 0.250$ Min. $A = 0.940 D + 0.240$	Max. $O = \max. H + \max. F$ Min. $O = \min. H + \min. F$	Max. $T = 0.500 (\min. O) + 0.010$ Min. $T = \max. T - 0.066 D - 0.005$

Screw Size	Head Side Height	Oval Height
0000 through 1	No formulas; see tables	No formulas; see tables
2 through $\frac{3}{8}$	Max. $H = 0.660 D + 0.005$ Min. $H = 0.622 D$	Max. $F = 0.280 D - 0.003$ Min. $F = 0.240 D - 0.008$
$\frac{7}{16}$	Max. $H = 0.550 D + 0.022$ Min. $H = 0.510 D + 0.017$	Max. $F = 0.220 D + 0.006$ Min. $F = 0.180 D + 0.001$
$\frac{1}{2}$ through $\frac{3}{4}$	Max. $H = 0.550 D + 0.027$ Min. $H = 0.510 D + 0.022$	Max. $F = 0.220 D + 0.008$ Min. $F = 0.180 D + 0.003$

GENERAL NOTE: D is the basic diameter of the screw.

Table C-10 Drilled Fillister Head Screws

Screw Size	Head Diameter	Total Head Height	Head Side Height	Oval Height
0 through $\frac{3}{8}$	Max. $A = 1.670 D - 0.004$ Min. $A = 1.610 D - 0.014$	Max. $O = \max. H + \max. F$ Min. $O = \min. H + \min. F$	Max. $H = 0.660 D + 0.005$ Min. $H = 0.645 D$	Max. $F = 0.280 D - 0.003$ Min. $F = 0.265 D - 0.008$

GENERAL NOTE: D is the basic diameter of the screw.

