

ASME B18.6.3-2024

(Revision of ASME B18.6.3-2013)

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

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AN AMERICAN NATIONAL STANDARD



**The American Society of
Mechanical Engineers**

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Two Park Avenue • New York, NY • 10016 USA

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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 3* 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 3* was reorganized and enlarged, and the following operating scope was established:

The scope of Subcommittee 3* 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 3* 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 3* 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 3* would retain responsibility for machine screw nuts. Following this 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 3* 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 3* 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.

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

Following issuance of the 1962 document, Subcommittee 3^{*} 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. ASME B18.6.3-2013 corrected the reported errors and updated the quality requirements to reflect the publication of ASME B18.18. ASME B18.6.3-2013 was approved as an American National Standard on February 5, 2013.

Since publication of ASME B18.6.3-2013, users have requested guidance or clarification on a number of issues. In 2016, a joint task group was formed with the SAE Fastener Committee to review these items. The primary items addressed were updating guidance on hydrogen embrittlement testing, lowering core hardness and updating case hardening practices to conform to current industry best practices, revising the tapping screw thread length to accommodate more definitive and practical identification of thread termination, and updating items missed in the 2013 revision.

ASME B18.6.3-2024 was approved by the American National Standards Institute as an American National Standard on January 22, 2024.

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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J. Medcalf, *Vice Chair*
S. Khan, *Secretary*

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Revisions and Errata. The committee processes revisions to this Standard on a periodic basis 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 in the next edition of the Standard.

In addition, the committee may post errata on the committee web page. Errata become effective on the date posted. Users can register on the committee web page to receive e-mail notifications of posted errata.

This Standard is always open for comment, and the committee welcomes proposals for revisions. Such proposals should be as specific as possible, citing the paragraph number, the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent background information and supporting documentation.

Cases

(a) The most common applications for cases are

(1) to permit early implementation of a revision based on an urgent need

(2) to provide alternative requirements

(3) to allow users to gain experience with alternative or potential additional requirements prior to incorporation directly into the Standard

(4) to permit the use of a new material or process

(b) Users are cautioned that not all jurisdictions or owners automatically accept cases. Cases are not to be considered as approving, recommending, certifying, or endorsing any proprietary or specific design, or as limiting in any way the freedom of manufacturers, constructors, or owners to choose any method of design or any form of construction that conforms to the Standard.

(c) A proposed case shall be written as a question and reply in the same format as existing cases. The proposal shall also include the following information:

(1) a statement of need and background information

(2) the urgency of the case (e.g., the case concerns a project that is underway or imminent)

(3) the Standard and the paragraph, figure, or table number

(4) the editions of the Standard to which the proposed case applies

(d) A case is effective for use when the public review process has been completed and it is approved by the cognizant supervisory board. Approved cases are posted on the committee web page.

Interpretations. Upon request, the committee will issue an interpretation of any requirement of this Standard. An interpretation can be issued only in response to a request submitted through the online Inquiry Submittal Form at <https://go.asme.org/InterpretationRequest>. Upon submitting the form, the inquirer will receive an automatic e-mail confirming receipt.

ASME does not act as a consultant for specific engineering problems or for the general application or understanding of the Standard requirements. If, based on the information submitted, it is the opinion of the committee that the inquirer should seek assistance, the request will be returned with the recommendation that such assistance be obtained. Inquirers can track the status of their requests at <https://go.asme.org/Interpretations>.

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.

Interpretations are published in the ASME Interpretations Database at <https://go.asme.org/Interpretations> as they are issued.

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 committee. Information on future committee meetings can be found on the committee web page at <https://go.asme.org/B18committee>.

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ASME B18.6.3-2024

SUMMARY OF CHANGES

Following approval by the ASME B18 Standards Committee and ASME, and after public review, ASME B18.6.3-2024 was approved by the American National Standards Institute on January 22, 2024.

In ASME B18.6.3-2024, figures and tables have been redesignated. ASME B18.6.3-2024 includes the following additional changes identified by a margin note, **(24)**.

<i>Page</i>	<i>Location</i>	<i>Change</i>
1	1.7	Updated
2	2.1.1	Revised
3	2.1.5	Subparagraphs (a) through (c) revised
4	3.2	Revised
5	3.8.3	Revised in its entirety, and para. 3.8.4 deleted
5	3.9	Second sentence revised
5	3.11	(1) Subparagraph (a)(7) revised (2) Example (2) deleted, and subsequent Examples redesignated
6	4.1.1.4	Revised
6	4.1.2.1	Penultimate sentence revised
7	4.1.3	Revised
7	4.2	Second sentence revised
7	4.3	(1) Revised in its entirety (2) Former Figure 3 deleted
8	4.8.1.1	Second sentence deleted
8	4.8.1.2	Revised
9	4.8.1.3	Reference to SAE J423 revised to SAE J42 and in-text table revised
9	4.9	Reference to ASTM F1941 revised to ASTM F1941/F1941M
9	4.11.1	Revised
10	4.11.5	(1) First sentence added (2) Second paragraph revised in its entirety
11	5.6	First sentence revised
11	5.7	Reference to ASTM F1941 revised to ASTM F1941/F1941M
81	Figure 4.3.1-1	Former Figure 1 revised
82	Figure 4.3.2-1	Former Figure 2 revised
15	Table 2.2.1-2	Note (6) added
23	Table 2.2.2-2	Note (6) added
27	Table 2.2.3-2	Values in “Type III, Driver Size” column revised
43	Table 2.2.5-3	Note (6) added
48	Table 2.2.6-2	Note (6) added
53	Table 2.2.7-2	Note (6) added
61	Table 2.2.9-2	Note (4) added

<i>Page</i>	<i>Location</i>	<i>Change</i>
65	Table 2.2.10-2	Note (6) added
73	Table 2.2.12-2	Note (3) added
74	Table 4.1.1.1-1	Former General Note (d) redesignated as Note (1)(c)
75	Table 4.1.1.2-1	Former General Note (c) added to Note (1)
76	Table 4.1.1.4-1	(1) Nominal Sizes 2, 4, 6, 8, 10, and 12 made bold and Note (1) revised (2) Former General Note (d) added to Note (1)
96	Figure IV-1	Revised
102	Table VII-2-1	(1) For drive and gage size number 7, minimum diameter M and maximum diameter P_1 revised (2) For drive and gage size numbers 9 and 50, maximum diameter C revised
121	Table D-1	"In Asbestos Compositions" section deleted
123	Table D-2	"In Asbestos Compositions" section deleted
132	Table D-5	"In Asbestos Compositions" section 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, see ASME B18.12.

1.6 Comparison With ISO

This Standard has no ISO counterpart.

1.7 Referenced Standards

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). The American Society of Mechanical Engineers.

ASME B1.3. Screw Thread Gaging Systems for Acceptability: Inch and Metric Screw Threads (UN, UNR, UNJ, M, and MJ). The American Society of Mechanical Engineers.

The American Society of Mechanical Engineers.

ASME B18.2.9. Straightness Gage and Gaging for Bolts and Screws. The American Society of Mechanical Engineers.

ASME B18.12. Glossary of Terms for Mechanical Fasteners. The American Society of Mechanical Engineers.

ASME B18.18. Quality Assurance for Fasteners. The American Society of Mechanical Engineers.

(24)

ASME B18.24. Part Identifying Number (PIN) Code System for B18 Fastener Products. The American Society of Mechanical Engineers.

ASTM A380. Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems. ASTM International.

ASTM E1137. Standard Specification for Industrial Platinum Resistance Thermometers. ASTM International.

ASTM F468. Standard Specification for Nonferrous Bolts, Hex Cap Screws, Socket Head Cap Screws, and Studs for General Use. ASTM International.

ASTM F837. Standard Specification for Stainless Steel Socket Head Cap Screws. ASTM International.

ASTM F1941/F1941M. Electrodeposited Coatings on Mechanical Fasteners, Inch and Metric. ASTM International.

ASTM F2328. Standard Test Method for Determining Decarburization and Carburization in Hardened and Tempered Threaded Steel Bolts, Screws, Studs, and Nuts. ASTM International.

ASTM F3393. Zinc-Flake Coating Systems for Fasteners. ASTM International.

SAE J81. Thread Rolling Screws. SAE International.

SAE J423. Methods of Measuring Case Depth. SAE International.

1.8 Inspection and Quality Assurance

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 mechanical tests indicated in this Standard.

2 GENERAL DATA FOR MACHINE SCREW AND TAPPING SCREW HEADS

2.1 Heads

- (24) **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 between the points specified for "Total Head Height" and "Side Head Height." Any points relating to the top of the head shall represent metal-to-metal measurement so that any truncation of rounded head contours from the slot or recess shall not be considered.

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. The head height delineating the conical bearing surface is a reference dimension.

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 recesses, 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: (24)

(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 diametrical tolerance zone 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 diametrical tolerance zone 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 diametrical tolerance zone equivalent to 12% of the basic screw diameter or 0.020 in., whichever is greater, regardless of feature size.

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 achieve fastener strength.

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 2.2.1-1 through 2.2.1-4. Dimensions of close tolerance 100-deg flat countersunk heads are given in Tables 2.2.1-5 and 2.2.1-6.

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 2.2.2-1 and 2.2.2-2.

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 2.2.3-1 through 2.2.3-4.

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. 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 2.2.4-1 through 2.2.4-4.

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 2.2.5-1 through 2.2.5-4.

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 2.2.6-1 and 2.2.6-2. Dimensions of drilled fillister head machine screws are given in Table 2.2.6-3.

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 2.2.7-1 through 2.2.7-3.

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 2.2.8-1 and 2.2.8-2.

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 2.2.9-1](#) through [2.2.9-3](#).

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 2.2.10-1](#) through [2.2.10-3](#).

2.2.11 Round Head. The round head has a semi-elliptical 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 2.2.11-1](#) through [2.2.11-3](#).

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 2.2.12-1](#) and [2.2.12-2](#).

3 GENERAL DATA FOR MACHINE SCREWS

3.1 Machine Screw Threads

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.

(24) 3.2 Machine Screw Length of Thread

The full threaded length of a machine screw is defined as the distance to the first full-form thread when measured parallel to the axis of a screw from the bearing surface of the head, to the face of a nonchamfered or noncounterbored special 3A GO thread ring gage assembled by hand as far as the thread will permit. Machine screws shall have thread lengths conforming to the following:

(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:

$$L_o = L + C$$

where

C = 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. minimum 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 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 of a typical gage design and an inspection procedure, see 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.

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.

3.8.3 Other Materials. When specified, machine screws may be made from other materials. The material and proper- (24)
ties shall be agreed to by the supplier and the purchaser.

3.9 Machine Screw Finish

Unless otherwise specified, screws shall be supplied with a natural (as processed) finish, unplated or uncoated. When a plating type and code is specified, it shall conform to the requirements of ASTM F1941/F1941M. 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

(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 or plating, if required

EXAMPLES:

- (1) Slotted pan head machine screws, ASME B18.6.3, $\frac{1}{4}$ – 20 $\times$ 1 $\frac{1}{4}$, hardened carbon steel, zinc plated per ASTM F1941/F1941M Fe/Zn 3A.
 - (2) Hexagon washer head machine screw, ASME B18.6.3, 0.375 – 16 $\times$ 1.50, unhardened carbon steel.
 - (3) Type I cross recessed flat countersunk head machine screw, ASME B18.6.3, 0.190 – 24 $\times$ 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 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 4.1.1.1-1](#).

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 4.1.1.2-1](#).

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 4.1.1.2-1](#).

- (24) **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 and resin-impregnated plywood. Dimensions are given for reference purposes in [Table 4.1.1.4-1](#).

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. 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](#).

- (24) **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 and other similar compositions. Dimensions are given in Table 4.1.2.1-1.

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 4.1.2.2-1. 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. (24)

Thread-rolling tapping screws are generally for application in materials where the installer wishes to have a thread engagement longer than one screw diameter; the installer does not wish to create chips during installation; and/or the installer 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 by either the screw breaking or the 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 4.1.3-1.

4.2 Threads and Points

The threads and points applicable to screws covered by this Standard are generally described in para. 4.1. Types 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. (24)

4.3 Tapping Screw Length of Thread

Tapping screws shall have thread lengths conforming to the specifications detailed in paras. 4.3.1 and 4.3.2. (24)

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 4.3.1-1, the thread shall extend as close to the underside of the head as practical without impinging on the fillet radius, but no closer than the Y distance from the underside of the head to the first indication of the thread from the blank diameter ("first scratch") as shown in Figure 4.3.1-1. Screws of nominal lengths, L , longer than those tabulated in Table 4.3.1-1 shall have a minimum length of full-form thread as shown in the " L_T Min." column of Table 4.3.1-1, unless otherwise specified by the purchaser.

4.3.2 Types C, D, F, G, T, and TRS. For screws of nominal lengths within the ranges listed under the "Fully Threaded" column of Table 4.3.2-1, the thread shall extend as close to the head as practical without impinging on the fillet radius but no greater than the Y distance from the underside of the head to the first scratch as shown in Figure 4.3.2-1. Screws of nominal lengths longer than those tabulated under the "Partially Threaded" column of Table 4.3.2-1 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:

$$L_o = L + C$$

where

C = 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, see ASME B18.2.9.

4.8 Tapping Screw Materials

4.8.1 Steel. Tapping screws are fabricated from low carbon steel, in the ranges given below. The screws are carburized during the quenching and tempering process resulting in a hardened surface designed to meet the performance requirements set forth in these standards. 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.

(24) **4.8.1.1 Core Hardness.** Screws shall have a core hardness of Rockwell C28-36.

(24) **4.8.1.2 Case Hardness.** Screws shall have a minimum case hardness of Rockwell C45-53, when tested as specified in SAE J81, section 4.2.

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. (24)

Nominal Size	Total Case Depth, in.	
	Min.	Max.
No. 2 through No. 7	0.002	0.007
No. 8 and No. 12	0.004	0.009
Larger than No. 12	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/F1941M. 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

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 steel test plates having a hardness of Rockwell B70 to B90, as specified in Table 4.11.1-1. (24)

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 4.11.1-1 were predicated 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 4.11.2-1 regardless of their finish or coating. Speed of driving the screws shall not exceed 500 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 4.11.3-1 for the type and size of screw being tested. A typical fixture for conducting torsional strength tests on tapping screws is depicted in Figure 4.11.3-1.

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 using a hammer and applying a single or repeated blows, as necessary, to achieve a permanent bend. Head separation shall be cause for rejection.

- (24) **4.11.5 Hydrogen Embrittlement Test.** This test is applicable when required by the plating or coating specification (e.g., ASTM F1941/F1941M, ASTM F3393). Electroplated screws shall be installed into a steel test plate as specified in [Table 4.11.1-1](#) 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 runout 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.

Begin by tightening five screws into a test plate for hydrogen embrittlement testing (per [Table 4.11.1-1](#)) to fracture (i.e., breaking torque). If fracture cannot be achieved because the threads or recess strip, then the maximum torque achieved may be used. Calculate the average of the five breaking torque values. Tighten sample screws to 80% of the average breaking torque value (i.e., test torque). The screws shall be allowed to remain in this tightened state for a period of 24 hr (i.e., sustained loading period). Fracture of any part of the screw during the 24-hr sustained loading period constitutes failure. At the end of the 24-hr sustained loading period, the screws should be loosened and the initial test torque shall be reapplied (i.e., retightened). Fracture of any part of the screw as a result of retightening prior to achieving the test torque constitutes failure.

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 × 1 $\frac{1}{4}$, Type AB, steel plated zinc per ASTM F1941/F1941M Fe/Zn 3A.
- (2) Type 1 cross recessed pan head tapping screw, ASME B18.6.3, 6 – 32 × $\frac{3}{4}$, 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 experimenting 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 5-1](#).

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 5-1, 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

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 may be made from other materials; the materials and properties shall be agreed to by the supplier and purchaser.

5.6 Test Requirements

(24)

Type U metallic drive screws shall be driven into steel test plates having a hardness of Rockwell B70 to B90 and having the thickness of Type C as specified in Table 4.11.1-1 and hole sizes as specified in Table 5-1. The screws shall produce mating threads in the test plates without breaking or shearing of the screw threads.

5.7 Drive Screw Designation

(24)

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

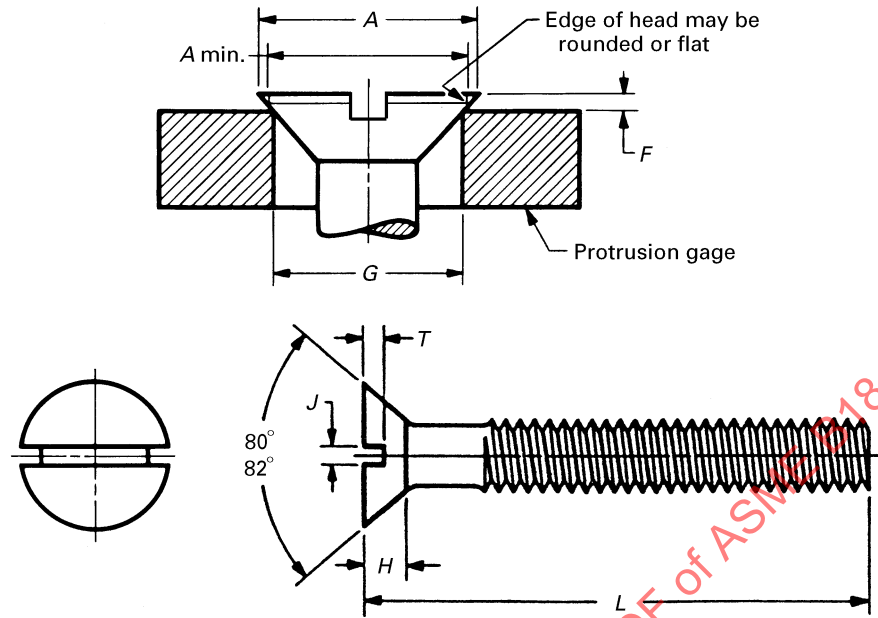
- (1) round head metallic drive screw, ASME B18.6.3
- (2) nominal diameter (number, fraction, or decimal equivalent)
- (3) length (fraction or decimal equivalent)
- (4) material
- (5) protective finish including standard number

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/F1941M, 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.

Table 2.2.1-1
Dimensions of Slotted Flat Countersunk Head Screws



Nominal Size [Note (1)]	Basic Screw Diameter [Notes (2), (3)]	Machine Screw Length, L [Note (4)]	Type A and AB Tapping Screw Length, L [Note (4)]	Other Types of Tapping Screw Length, L	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)]
					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

Table 2.2.1-1
Dimensions of Slotted Flat Countersunk Head Screws (Cont'd)

Nominal Size [Note (1)]	Basic Screw Diameter [Notes (2), (3)]	Machine Screw Length, <i>L</i> [Note (4)]	Type A and AB Tapping Screw Length, <i>L</i> [Note (4)]	Other Types of Tapping Screw Length, <i>L</i>	Head Diameter, <i>A</i>		Head Height, <i>H</i> , Ref. [Note (5)]	Slot Width, <i>J</i>		Slot Depth, <i>T</i>		Protrusion Above Gaging Diameter, <i>F</i> [Note (6)]		Gaging Diameter, <i>G</i> [Note (6)]
					Max.	Min.		Max.	Min.	Max.	Min.	Max.	Min.	
6	0.1380	$\frac{3}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	0.262	0.238	0.083	0.048	0.039	0.038	0.024	0.036	0.021	0.220
7	0.1510	...	$\frac{3}{8}$	$\frac{3}{8}$	0.287	0.262	0.091	0.048	0.039	0.041	0.027	0.037	0.022	0.243
8	0.1640	$\frac{1}{4}$	$\frac{7}{16}$	$\frac{7}{16}$	0.312	0.285	0.100	0.054	0.045	0.045	0.029	0.039	0.023	0.267
10	0.1900	$\frac{5}{16}$	$\frac{1}{2}$	$\frac{1}{2}$	0.362	0.333	0.116	0.060	0.050	0.053	0.034	0.042	0.025	0.313
12	0.2160	$\frac{3}{8}$	$\frac{9}{16}$	$\frac{9}{16}$	0.412	0.380	0.132	0.067	0.056	0.060	0.039	0.045	0.027	0.362
14	0.2420	...	$\frac{5}{8}$	...	0.462	0.427	0.148	0.075	0.064	0.068	0.044	0.049	0.029	0.410
$\frac{1}{4}$	0.2500	$\frac{7}{16}$	$\frac{5}{8}$	$\frac{5}{8}$	0.477	0.442	0.153	0.075	0.064	0.070	0.046	0.050	0.029	0.424
16	0.2680	...	$\frac{3}{4}$	...	0.512	0.475	0.164	0.075	0.064	0.075	0.049	0.052	0.031	0.457
18	0.2940	...	$\frac{13}{16}$	...	0.561	0.522	0.180	0.084	0.072	0.083	0.054	0.055	0.033	0.505
$\frac{5}{16}$	0.3125	$\frac{1}{2}$	$\frac{13}{16}$	$\frac{5}{8}$	0.597	0.556	0.191	0.084	0.072	0.088	0.058	0.057	0.034	0.539
20	0.3200	...	$\frac{13}{16}$	...	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
$\frac{3}{8}$	0.3750	$\frac{9}{16}$	...	$\frac{5}{8}$	0.717	0.670	0.230	0.094	0.081	0.106	0.070	0.065	0.039	0.653
$\frac{7}{16}$	0.4375	$\frac{5}{8}$	...	$\frac{3}{4}$	0.760	0.715	0.223	0.094	0.081	0.103	0.066	0.073	0.044	0.690
$\frac{1}{2}$	0.5000	$\frac{3}{4}$	...	$\frac{3}{4}$	0.815	0.765	0.223	0.106	0.091	0.103	0.065	0.081	0.049	0.739
$\frac{9}{16}$	0.5625	...	...	...	0.932	0.878	0.260	0.118	0.102	0.120	0.077	0.089	0.053	0.851
$\frac{5}{8}$	0.6250	...	...	...	1.050	0.990	0.298	0.133	0.116	0.137	0.088	0.097	0.058	0.962
$\frac{3}{4}$	0.7500	...	...	...	1.285	1.215	0.372	0.149	0.131	0.171	0.111	0.112	0.067	1.186

GENERAL NOTES:

- For additional requirements for machine screws, see [sections 2 and 3](#), and for tapping screws see [sections 2 and 4](#).
- Applicable to screw types as indicated below. See referenced tables for thread and point dimensions.
 - For Type A thread forming, except short lengths, see [Table 4.1.1.4-1](#).
 - For Type AB thread forming, see [Table 4.1.1.1-1](#).
 - For Type B and BP thread forming, see [Table 4.1.2.1](#) and Types BF and BT thread cutting, see [Table 4.1.2.1-1](#).
 - For Type C thread forming, see [Mandatory Appendix VI](#); Types D, F, G, and T thread cutting, see [Table 4.1.2.2-1](#); and Type TRS thread rolling, see [Table 4.1.3-1](#).
- For recess dimensions, see [Table 2.2.1-2](#).
- 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, $\frac{9}{16}$, $\frac{5}{8}$, and $\frac{3}{4}$ are for machine screws only.
- Sizes 7, 14, 16, 18, 20, and 24 are for tapping screws only.
- Screws of these lengths and shorter shall have undercut heads as shown in [Table 2.2.3-1](#). For tapping screws, use Type AB undercut head screws in place of Type A screws for these lengths and shorter.
- Tabulated values determined from formula for maximum *H* in [Nonmandatory Appendix C](#).

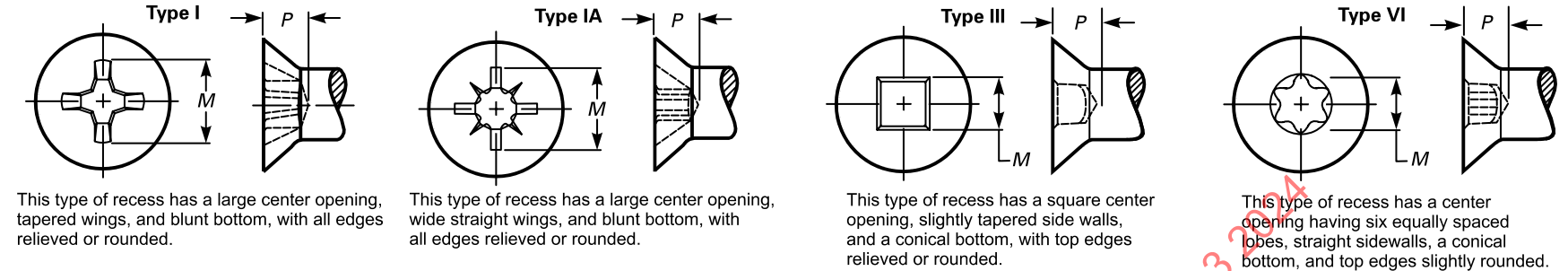
Table 2.2.1-1
Dimensions of Slotted Flat Countersunk Head Screws (Cont'd)

NOTES: (Cont'd)

- (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 2.2.1-2
Recess Dimensions for Flat Countersunk Head Screws

(24)



Type I				Type IA				Type III				Type VI						
Nominal Size [Note (1)]	Basic Screw Diameter [Notes (2), (3)]	Recess Dia., M, Ref.	Driver Size	Recess Penetration Gaging Depth, P		Recess Dia., M, Ref.	Driver Size	Recess Penetration Gaging Depth, P		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		Maximum Fallaway [Note (6)]
				Max.	Min.			Max.	Min.			Max.	Min.			Max.	Min.	
0	0.060	0.062	0	0.036	0.020	0.062	0	0.037	0.021	...	...	...	...	...	...	...	...	...
1	0.073	0.070	0	0.044	0.028	0.070	0	0.045	0.029	...	...	...	...	0.058	T5	0.017	0.012	0.010
2	0.086	0.096	1	0.056	0.040	0.096	1	0.053	0.037	0.050	00	0.033	0.028	0.069	T6	0.022	0.017	0.014
3	0.099	0.100	1	0.061	0.045	0.100	1	0.058	0.042	0.070	0	0.038	0.028	0.094	T8	0.025	0.020	0.019
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	0.028	0.019
5	0.125	0.148	2	0.075	0.052	0.148	2	0.071	0.053	0.091	1S	0.055	0.040	0.111	T10	0.045	0.035	0.022
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	0.035	0.022
7	0.151	0.176	2	0.103	0.080	0.176	2	0.099	0.081	0.091	1R	0.065	0.050	0.132	T15	0.045	0.035	0.022
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	0.040	0.026
10	0.190	0.198	2	0.125	0.102	0.198	2	0.122	0.104	0.112	2R	0.075	0.060	0.155	T20	0.065	0.050	0.031
12	0.216	0.262	3	0.139	0.116	0.262	3	0.136	0.118	0.133	3R	0.095	0.080	0.178	T25	0.070	0.055	0.036
14	0.242	0.276	3	0.154	0.131	0.276	3	0.151	0.133	0.133	3R	0.095	0.080	0.200	T27	0.080	0.065	0.040
1/4	0.250	0.276	3	0.154	0.131	0.276	3	0.151	0.133	0.133	3R	0.095	0.080	0.200	T27	0.090	0.075	0.040
16	0.268	0.296	3	0.174	0.151	0.296	3	0.171	0.153	0.133	3R	0.095	0.080	0.221	T30	0.070	0.055	0.042
18	0.294	0.358	4	0.196	0.174	0.358	4	0.193	0.175	0.191	4R	0.100	0.085	0.221	T30	0.090	0.075	0.042
5/16	0.313	0.358	4	0.196	0.174	0.358	4	0.193	0.175	0.191	4R	0.100	0.085	0.266	T40	0.105	0.087	0.047
20	0.320	0.372	4	0.210	0.188	0.372	4	0.206	0.188	0.191	4R	0.100	0.085	0.266	T40	0.115	0.095	0.047
24	0.372	0.386	4	0.225	0.203	0.386	4	0.222	0.204	0.191	4R	0.100	0.085	0.266	T40	0.125	0.105	0.047
3/8	0.375	0.386	4	0.225	0.203	0.386	4	0.222	0.204	0.191	4R	0.100	0.085	0.266	T40	0.135	0.115	0.047

**Table 2.2.1-2
Recess Dimensions for Flat Countersunk Head Screws (Cont'd)**

		Type I				Type IA				Type III				Type VI				
Nominal Size [Note (1)]	Basic Screw Diameter [Notes (2), (3)]	Recess Dia., M, Ref.	Driver Size	Recess Penetration Gaging Depth, P		Recess Dia., M, Ref.	Driver Size	Recess Penetration Gaging Depth, P		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		Maximum Fallaway [Note (6)]
				Max.	Min.			Max.	Min.			Max.	Min.			Max.	Min.	
$\frac{7}{16}$	0.438	0.402	4	0.241	0.219	0.402	4	0.238	0.220	...	...	...	...	0.352	T50	0.125	0.105	0.062
$\frac{1}{2}$	0.500	0.418	4	0.256	0.234	0.418	4	0.253	0.235	...	...	...	...	0.352	T50	0.135	0.120	0.062
$\frac{9}{16}$	0.563	0.443	4	0.280	0.258	0.440	4	0.276	0.258	...	...	...	...	0.446	T55	0.160	0.140	0.078
$\frac{5}{8}$	0.625	0.565	5	0.309	0.283	0.566	5	0.307	0.286	...	...	...	...	0.446	T55	0.160	0.140	0.078
$\frac{3}{4}$	0.750	0.628	5	0.373	0.347	0.630	5	0.372	0.351	...	...	...	...	0.529	T60	0.230	0.205	0.093

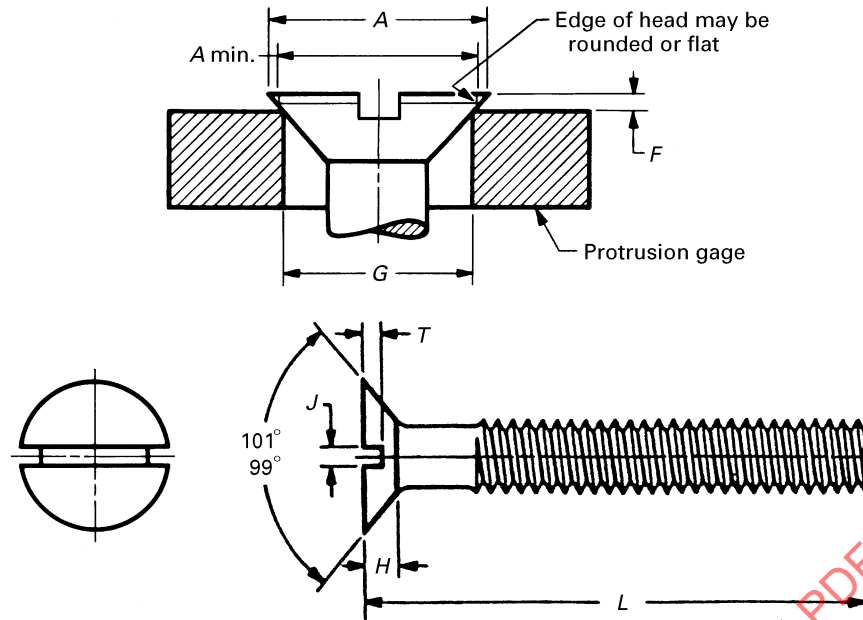
GENERAL NOTES:

- For additional requirements for machine screws, see [sections 2 and 3](#), and for tapping screws see [sections 2 and 4](#).
- For head dimensions, see [Table 2.2.1-1](#).
- 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.
- "R" in the recess size tabulation means regular depth recess, and "S" means short 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.
- Fallaway is the distance that a NO GO gaging member enters the recess.

Table 2.2.1-3
Dimensions of Slotted 100-deg Flat Countersunk Head Screws (Machine Screws Only)



Nominal Size [Note (1)]	Basic Screw Diameter	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.	[Note (3)]
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

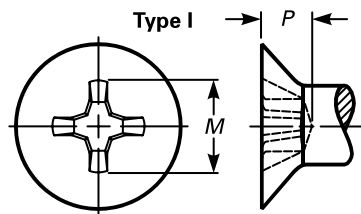
GENERAL NOTES:

- (a) For additional requirements, see [sections 2 and 3](#).
 (b) For recess dimensions, see [Table 2.2.1-4](#).
 (c) For slot inspection, see [para. 2.1.4](#).

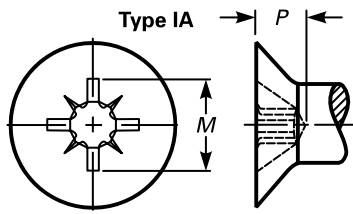
NOTES:

- (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.

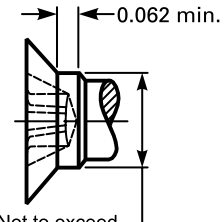
Table 2.2.1-4
Recess Dimensions for 100-deg Flat Countersunk Head Screws (Machine Screws Only)



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.

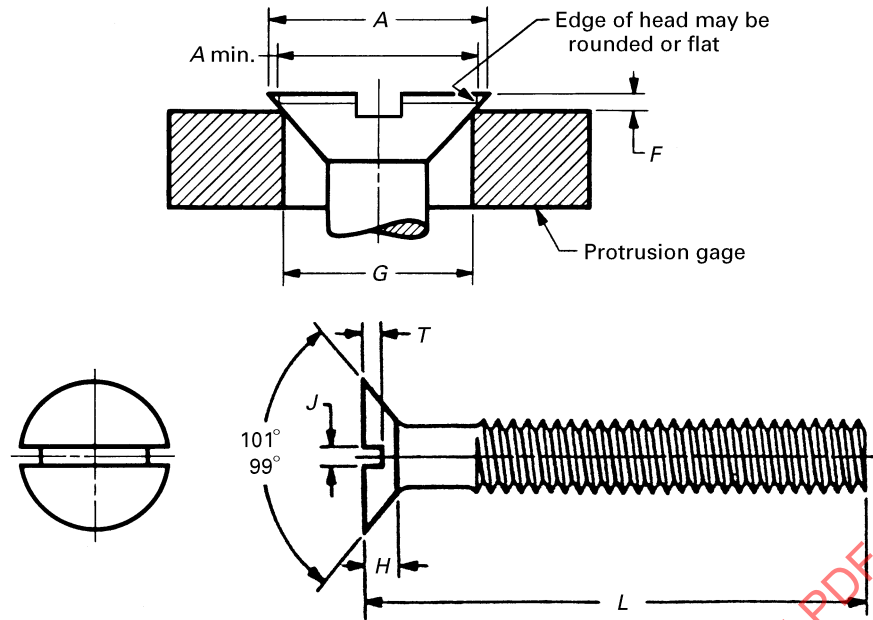


**Optional Shoulder for
Long Recessed Head Screws
With Reduced Body**

Type I						Type IA			
Nominal Size [Note (1)]	Basic Screw Diameter	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 2.2.1-5
Dimensions of Slotted Close Tolerance 100-deg Flat Countersunk Head Screws (Machine Screws Only)



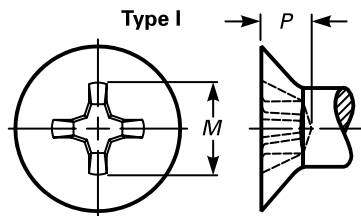
Nominal Size [Note (1)]	Basic Screw Diameter	Head Diameter, <i>A</i>		Head Height, <i>H</i> [Note (2)]	Slot Width, <i>J</i>		Slot Depth, <i>T</i>		Protrusion Above Gaging Diameter, <i>F</i> [Note (3)]		Gaging Diameter, <i>G</i>
		Max.	Min.	Ref.	Max.	Min.	Max.	Min.	Max.	Min.	[Note (3)]
4	0.1120	0.212	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, see [sections 2](#) and [3](#).

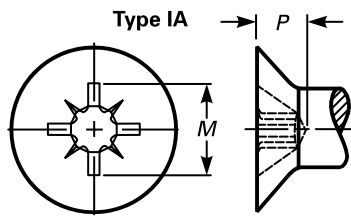
NOTES:

- (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](#).

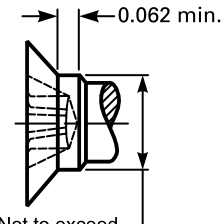
Table 2.2.1-6
Recess Dimensions for Close Tolerance 100-deg Flat Countersunk Head Screws (Machine Screws Only)



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.



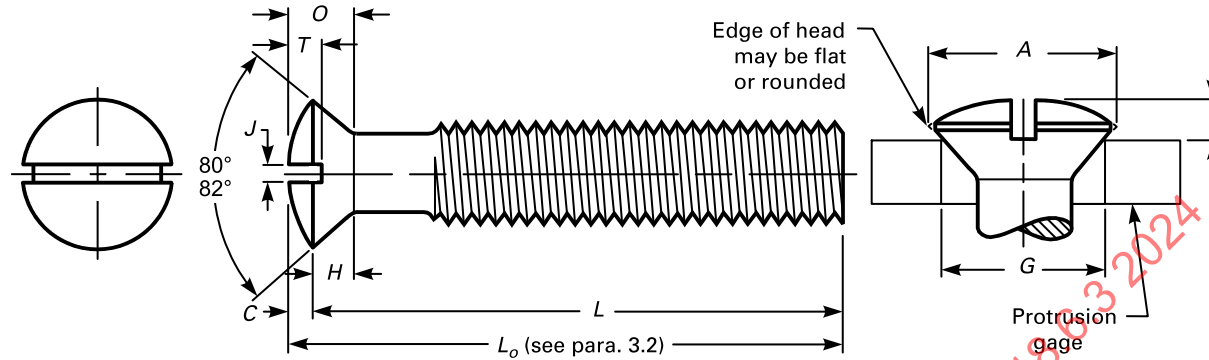
Not to exceed maximum major diameter of thread

**Optional Shoulder for
Long Recessed Head Screws
With Reduced Body**

Type I						Type IA			
Nominal Size [Note (1)]	Basic Screw Diameter	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
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
7/16	0.4375	0.360	4	0.198	0.176	0.360	4	0.194	0.176
1/2	0.5000	0.386	4	0.226	0.204	0.386	4	0.222	0.204
9/16	0.5625	0.418	4	0.256	0.234	0.418	4	0.253	0.235
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 2.2.2-1
Dimensions of Slotted Oval Countersunk Head Screws



Nominal Size [Note (1)]	Basic Screw Diameter [Notes (2), (3)]	Machine Screw Length, L [Note (4)]	Type A and AB Tapping Screw Length, L [Note (4)]	Other Types of Tapping Screw Length, L	Head Diameter, A		Head Side Height, H, Ref. [Note (5)]	Head Crown Height, C, Ref.	Total Head Height, O, Ref. [Note (6)]	Slot Width, J		Slot Depth, T		Protrusion Above Gaging Diameter, F [Note (7)]		Gaging Diameter, G [Note (7)]
					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	0.026	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
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

Table 2.2.2-1
Dimensions of Slotted Oval Countersunk Head Screws (Cont'd)

Nominal Size [Note (1)]	Basic Screw Diameter [Notes (2), (3)]	Machine Screw Length, <i>L</i> [Note (4)]	Type A and AB Tapping Screw Length, <i>L</i> [Note (4)]	Other Types of Tapping Screw Length, <i>L</i>	Head Diameter, <i>A</i>		Head Side Height, <i>H</i> , Ref. [Note (5)]	Head Crown Height, <i>C</i> , Ref.	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)]
					Max.	Min.				Max.	Min.	Max.	Min.	Max.	Min.	
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
$\frac{3}{8}$	0.3750	$\frac{9}{16}$	...	$\frac{5}{8}$	0.717	0.670	0.230	0.117	0.347	0.094	0.081	0.206	0.170	0.182	0.139	0.653
$\frac{7}{16}$	0.4375	$\frac{5}{8}$	...	$\frac{3}{4}$	0.760	0.715	0.223	0.122	0.345	0.094	0.081	0.210	0.174	0.195	0.150	0.690
$\frac{1}{2}$	0.5000	$\frac{3}{4}$	...	$\frac{3}{4}$	0.815	0.765	0.223	0.131	0.354	0.106	0.091	0.216	0.176	0.212	0.163	0.739
$\frac{9}{16}$	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
$\frac{5}{8}$	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
$\frac{3}{4}$	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:

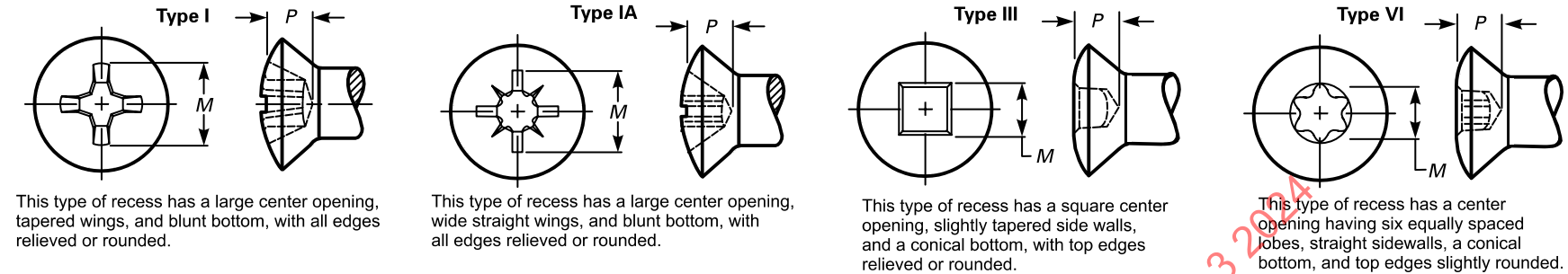
- (a) For additional requirements for machine screws, see [sections 2 and 3](#), and for tapping screws see [sections 2 and 4](#).
- (b) Applicable to screw types as indicated below. See referenced tables for thread and point dimensions.
- (1) For Type A thread forming, except short lengths, see [Table 4.1.1.4-1](#).
- (2) For Type AB thread forming, see [Table 4.1.1.1-1](#).
- (3) For Type B and BP thread forming, see [Table 4.1.1.2-1](#) and Types BF and BT thread cutting, see [Table 4.1.2.1-1](#).
- (4) For Type C thread forming, see [Mandatory Appendix VI](#); Types D, F, G, and T thread cutting, see [Table 4.1.2.2-1](#); and Type TRS thread-rolling, see [Table 4.1.3-1](#).
- (c) For recess dimensions, see [Table 2.2.2-2](#).
- (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 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 2.2.3-3](#). 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 2.2.2-2
Recess Dimensions of Oval Countersunk Head Screws

(24)



Nominal Size [Note (1)]	Basic Screw Diameter [Notes (2), (3)]	Type I		Type IA		Type III		Type VI		Recess, AF, 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)]		Maximum Fallaway [Note (6)]
		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.	
0	0.0600	0.068	0	0.038	0.020	0.068	0	0.042	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	0.069	T6	0.022	0.017	0.014
3	0.0990	0.118	1	0.074	0.057	0.118	1	0.074	0.058	0.070	0	0.038	0.028	0.094	T8	0.025	0.022	0.019
4	0.1120	0.130	1	0.087	0.070	0.130	1	0.086	0.070	0.070	0	0.038	0.028	0.094	T8	0.033	0.028	0.019
5	0.1250	0.152	2	0.074	0.050	0.152	2	0.074	0.056	0.091	1R	0.065	0.050	0.111	T10	0.055	0.045	0.022
6	0.1380	0.172	2	0.094	0.069	0.172	2	0.093	0.075	0.091	1R	0.065	0.050	0.132	T15	0.055	0.045	0.026
7	0.1510	0.176	2	0.100	0.075	0.176	2	0.099	0.081	0.091	1R	0.065	0.050	0.132	T15	0.060	0.050	0.028
8	0.1640	0.186	2	0.108	0.084	0.186	2	0.108	0.090	0.112	2R	0.075	0.060	0.155	T20	0.071	0.055	0.031
10	0.1900	0.202	2	0.126	0.102	0.202	2	0.125	0.107	0.112	2R	0.075	0.060	0.178	T25	0.090	0.070	0.036
12	0.2160	0.264	3	0.135	0.111	0.264	3	0.135	0.117	0.133	3R	0.095	0.080	0.200	T27	0.090	0.070	0.040
14	0.2420	0.282	3	0.156	0.131	0.282	3	0.153	0.135	0.133	3R	0.095	0.080	0.221	T30	0.095	0.075	0.042
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	0.221	T30	0.105	0.085	0.044
16	0.2680	0.326	3	0.197	0.172	0.326	3	0.197	0.179	0.133	3R	0.095	0.080	0.221	T30	0.115	0.095	0.045
18	0.2940	0.374	4	0.206	0.182	0.374	4	0.205	0.187	0.191	4R	0.100	0.085	0.266	T40	0.115	0.095	0.045
5/16	0.3125	0.384	4	0.218	0.194	0.384	4	0.215	0.197	0.191	4R	0.100	0.085	0.266	T40	0.125	0.105	0.047
20	0.3200	0.394	4	0.225	0.201	0.394	4	0.225	0.207	0.191	4R	0.100	0.085	0.266	T40	0.130	0.110	0.050
24	0.3720	0.430	4	0.262	0.238	0.430	4	0.261	0.243	0.191	4R	0.100	0.085	0.312	T45	0.155	0.130	0.055
3/8	0.3750	0.404	4	0.237	0.213	0.404	4	0.235	0.217	0.191	4R	0.100	0.085	0.312	T45	0.155	0.130	0.055
7/16	0.4375	0.416	4	0.249	0.225	0.416	4	0.247	0.229	...	...	...	...	0.352	T50	0.150	0.130	0.062

**Table 2.2.2-2
Recess Dimensions of Oval Countersunk Head Screws (Cont'd)**

		Type I		Type IA				Type III				Type VI						
Nominal Size [Note (1)]	Basic Screw Diameter [Notes (2), (3)]	Recess Dia., M, Ref.	Driver Size	Recess Penetration Gaging Depth, P		Recess Dia., M, Ref.	Driver Size	Recess Penetration Gaging Depth, P		Recess, AF, Ref.	Driver Size Note (4)	Recess Penetration Gaging Depth, P [Note (5)]		Recess Dia., M, Ref.	Driver Size	Recess Penetration Gaging Depth, P		Maximum Fallaway [Note (6)]
				Max.	Min.			Max.	Min.			Max.	Min.			Max.	Min.	
1/2	0.5000	0.430	4	0.263	0.239	0.430	4	0.262	0.244	...	...	...	...	0.352	T50	0.169	0.150	0.062
9/16	0.5625	0.462	4	0.296	0.272	0.450	4	0.285	0.267	...	...	...	...	0.446	T55	0.190	0.165	0.078
5/8	0.6250	0.580	5	0.323	0.291	0.562	5	0.300	0.279	...	...	...	...	0.446	T55	0.190	0.165	0.078
3/4	0.7500	0.642	5	0.388	0.357	0.624	5	0.362	0.341	...	...	...	...	0.529	T60	0.230	0.210	0.093

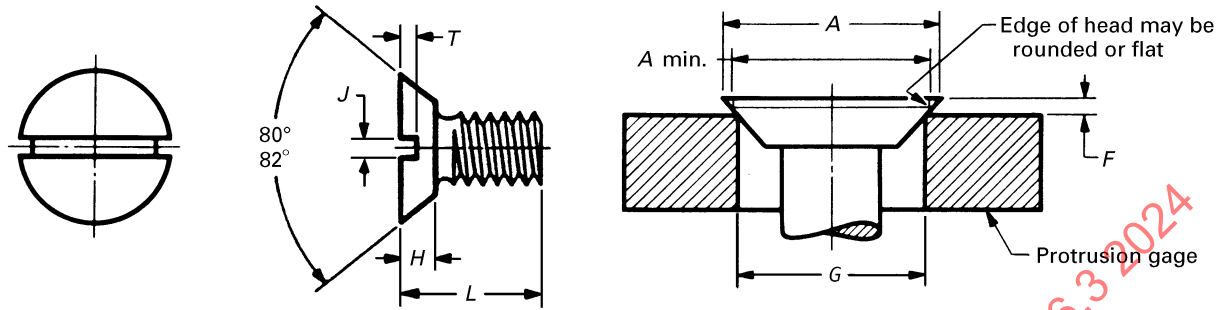
GENERAL NOTES:

- (a) For additional requirements for machine screws, see [sections 2 and 3](#), and for tapping screws see [sections 2 and 4](#).
- (b) For head dimensions, see [Table 2.2.2-1](#).
- (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 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, 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.
- (6) Fallaway is the distance that a NO GO gaging member enters the recess.

Table 2.2.3-1
Dimensions of Slotted Undercut 82-deg Flat Countersunk Head Screws



Nominal Size [Note (1)]	Basic Screw Diameter [Notes (2), (3)]	Machine Screw Length, L [Note (3)]	Type A and AB Tapping Screw Length, L [Note (3)]	Other Types of Tapping Screw Length, L	Head Diameter, A		Head Height, H		Slot Width, J		Slot Depth, T		Protrusion Above Gaging Diameter, F [Note (4)]		Gaging Diameter, G [Note (4)]
					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

**Table 2.2.3-1
Dimensions of Slotted Undercut 82-deg Flat Countersunk Head Screws (Cont'd)**

Nominal Size [Note (1)]	Basic Screw Diameter [Notes (2), (3)]	Machine Screw Length, <i>L</i> [Note (3)]	Type A and AB Tapping Screw Length, <i>L</i> [Note (3)]	Other Types of Tapping Screw Length, <i>L</i>	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)]	
					Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
$\frac{3}{8}$	0.3750	$\frac{9}{16}$	...	$\frac{5}{8}$	0.717	0.670	0.161	0.140	0.094	0.081	0.075	0.049	0.065	0.039	0.653	
$\frac{7}{16}$	0.4375	$\frac{5}{8}$	...	$\frac{3}{4}$	0.760	0.715	0.156	0.133	0.094	0.081	0.072	0.045	0.073	0.044	0.690	
$\frac{1}{2}$	0.5000	$\frac{3}{4}$	...	$\frac{3}{4}$	0.815	0.765	0.156	0.130	0.106	0.091	0.072	0.046	0.081	0.049	0.739	

GENERAL NOTES:

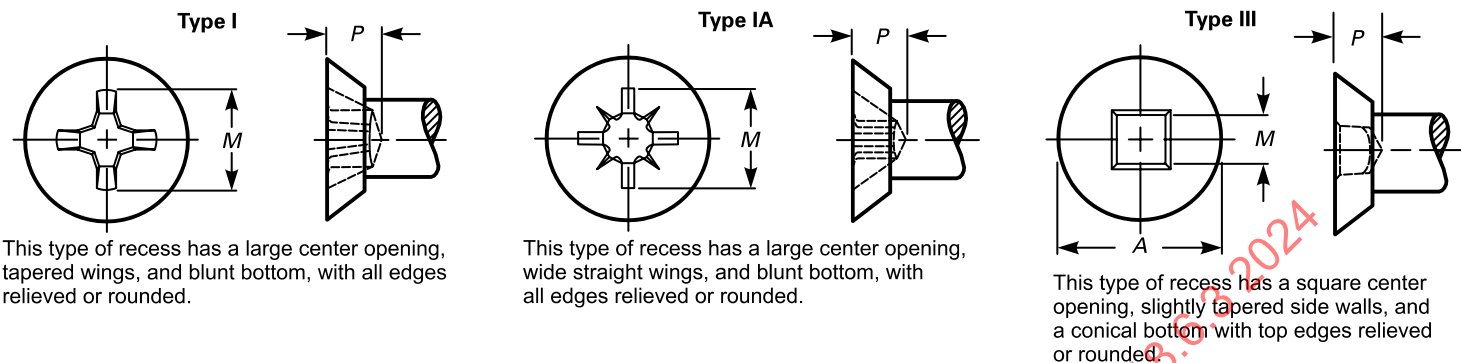
- (a) For additional requirements for machine screws, see [sections 2 and 3](#), and for tapping screws see [sections 2 and 4](#).
- (b) Applicable to screw types as indicated below. See referenced tables for thread and point dimensions and minimum practical screw lengths.
 - (1) For Type AB thread forming, see [Table 4.1.1.1-1](#).
 - (2) For Type B and BP thread forming, see [Table 4.1.1.2-1](#); and Types BF and BT thread cutting, see [Table 4.1.2.1-1](#).
 - (3) For Type C thread forming, see [Mandatory Appendix VI](#); Types D, F, G, and T thread cutting, see [Table 4.1.2.2-1](#); and Type TRS thread rolling, see [Table 4.1.3-1](#).
- (c) For recess dimensions, see [Table 2.2.3-2](#).
- (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) 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 2.2.1-1](#).
- (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 2.2.3-2
Recess Dimensions for Undercut 82-deg Flat Countersunk Head Screws

(24)



Nominal Size [Note (1)]	Basic Screw Diameter [Note (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	0.062	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	1S	0.027	0.017
7	0.1510	0.148	2	0.075	0.052	0.148	2	0.071	0.053	0.091	1S	0.027	0.017
8	0.1640	0.168	2	0.095	0.072	0.168	2	0.091	0.073	0.112	2S	0.037	0.027
10	0.1900	0.182	2	0.110	0.087	0.182	2	0.107	0.089	0.112	2S	0.037	0.027
12	0.2160	0.226	3	0.104	0.081	0.226	3	0.100	0.082	0.133	3S	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

Table 2.2.3-2
Recess Dimensions for Undercut 82-deg Flat Countersunk Head Screws (Cont'd)

		Type I			Type IA			Type III					
Nominal Size [Note (1)]	Basic Screw Diameter [Note (2)]	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.
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	...	...	...	...

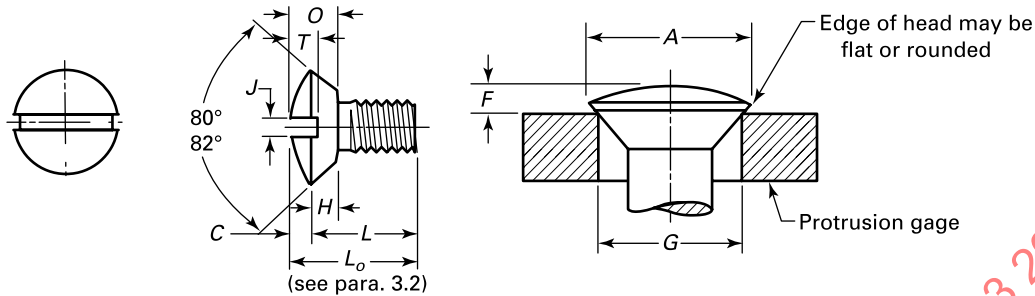
GENERAL NOTES:

- (a) For additional requirements for machine screws, see [sections 2 and 3](#), and for tapping screws see [sections 2 and 4](#).
- (b) For head dimensions, see [Table 2.2.3-1](#).
- (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) 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 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 2.2.3-3
Dimensions of Slotted Undercut Oval Countersunk Head Screws



Nominal Size [Note (1)]	Basic Screw Diameter [Note (2)]	Machine Screw Length, L [Note (3)]	Type A and AB Tapping Screw, Length, L [Note (3)]	Other Types of Tapping Screw Length, L	Head Diameter, A		Head Side Height, H, Ref. [Note (4)]	Head Crown Height, C, Ref.	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.	
0	0.0600	1/8	3/16	1/8	0.112	0.096	0.025	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	0.056	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	0.065	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	0.075	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	0.084	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	0.094	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	0.104	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	0.113	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	0.123	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	0.142	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	0.161	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	0.180	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	0.186	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	0.199	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	0.218	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	0.232	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	0.237	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	0.275	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	0.278	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	0.279	0.239	0.094	0.081	0.184	0.154	0.195	0.150	0.690

**Table 2.2.3-3
Dimensions of Slotted Undercut Oval Countersunk Head Screws (Cont'd)**

Nominal Size [Note (1)]	Basic Screw Diameter [Note (2)]	Machine Screw Length, <i>L</i> [Note (3)]	Type A and AB Tapping Screw, Length, <i>L</i> [Note (3)]	Other Types of Tapping Screw Length, <i>L</i>	Head Diameter, <i>A</i>		Head Side Height, <i>H</i> , Ref. [Note (4)]	Head Crown Height, <i>C</i> , Ref.	Total Head Height, <i>O</i>		Slot Width, <i>J</i>		Slot Depth, <i>T</i>		Protrusion Above Gaging Diameter, <i>F</i> [Note (5)]		Gaging Diameter, <i>G</i> [Note (5)]
					Max.	Min.			Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	
1/2	0.5000	3/4	...	3/4	0.815	0.765	0.156	0.131	0.288	0.244	0.106	0.091	0.204	0.169	0.212	0.163	0.739

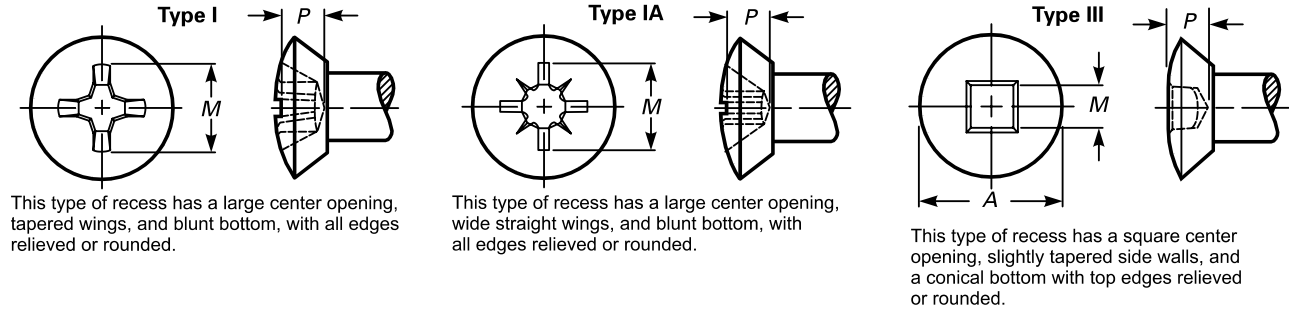
GENERAL NOTES:

- (a) For additional requirements for machine screws, see [sections 2 and 3](#), and for tapping screws see [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) For Type AB thread forming, see [Table 4.1.1.1-1](#).
 - (2) For Type B and BP thread forming, see [Table 4.1.1.2-1](#), and Types BF and BT thread cutting, see [Table 4.1.2.1-1](#).
 - (3) For Type C thread forming, see [Mandatory Appendix VI](#); Types D, F, G, and T thread cutting, see [Table 4.1.2.2-1](#); and Type TRS thread-rolling, see [Table 4.1.3-1](#).
- (c) For recess dimensions, see [Table 2.2.3-4](#).
- (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 2.2.2-1](#).
- (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 2.2.3-4
Recess Dimensions for Undercut Oval 82-deg Countersunk Head Screws



Type I						Type IA				Type III			
Nominal Size [Note (1)]	Basic Screw Diameter [Note (2)]	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>		Recess Across Flats, <i>M</i> , Ref.	Driver Size [Note (3)]	Recess Penetration Gaging Depth, <i>P</i> [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	...	...	...	...

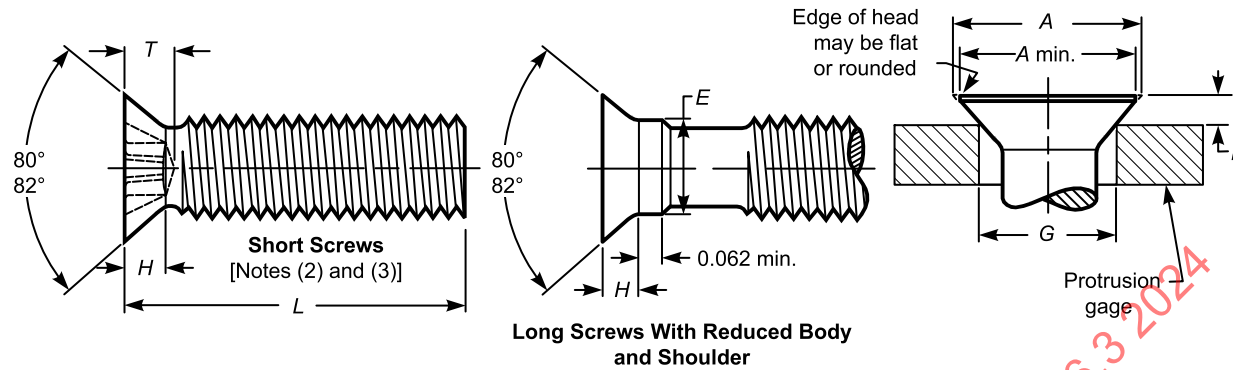
GENERAL NOTES:

- (a) For additional requirements for machine screws, see [sections 2 and 3](#), and for tapping screws see [sections 2 and 4](#).
 (b) For head dimensions, see [Table 2.2.3-3](#).
 (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 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 2.2.4-1
Dimensions of Flat Countersunk Trim Head Screws



Nominal Size [Note (1)]	Basic Screw Diameter [Notes (2)-(4)]	Head Size	Shoulder Diameter, E		Maximum Shoulder Diameter, E, Type A, Tapping Screws [Note (5)]	Minimum 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.	
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:

- (a) For additional requirements for machine screws, see sections 2 and 3, and for tapping screws see sections 2 and 4.
 (b) Applicable to screw types as indicated below. See referenced tables for thread and point dimensions.
 (1) For Type A thread forming, except short lengths, see Table 4.1.1.4-1.
 (2) For Type AB thread forming, see Table 4.1.1.1-1.

Table 2.2.4-1
Dimensions of Flat Countersunk Trim Head Screws (Cont'd)

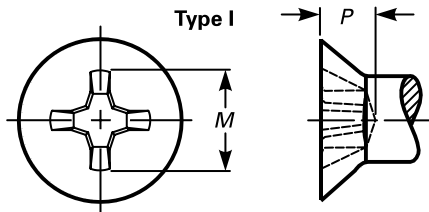
GENERAL NOTES: (Cont'd)

- (3) For Type B and BP thread forming, see [Table 4.1.1.2-1](#); and Types BF and BT thread cutting, see [Table 4.1.2.1-1](#).
- (4) For Type C thread forming, see [Mandatory Appendix VI](#); Types D, F, G, and T thread cutting, see [Table 4.1.2.2-1](#); and Type TRS thread-rolling, see [Table 4.1.3-1](#).
- (c) For recess dimensions, see [Table 2.2.4-2](#).
- (d) For slot inspection, see [para. 2.1.4](#).

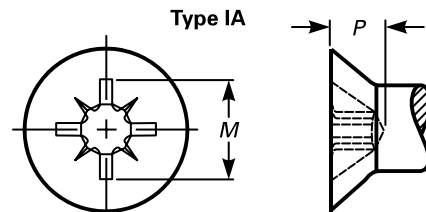
NOTES:

- (1) Where specifying nominal size in the 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 $1\frac{1}{8}$ 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. See [para. 4.3](#) for applicable screw lengths.
- (4) Size 14 is for tapping screws only.
- (5) 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.
- (6) Tabulated values determined from formula for maximum H 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](#).

Table 2.2.4-2
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.

Type I							Type IA			
Nominal Size [Note (1)]	Basic Screw Diameter [Notes (2)–(4)]	Head Size	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
1¼	0.2500	10	0.198	2	0.125	0.102	0.198	2	0.122	0.104
1¼	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	1¼	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

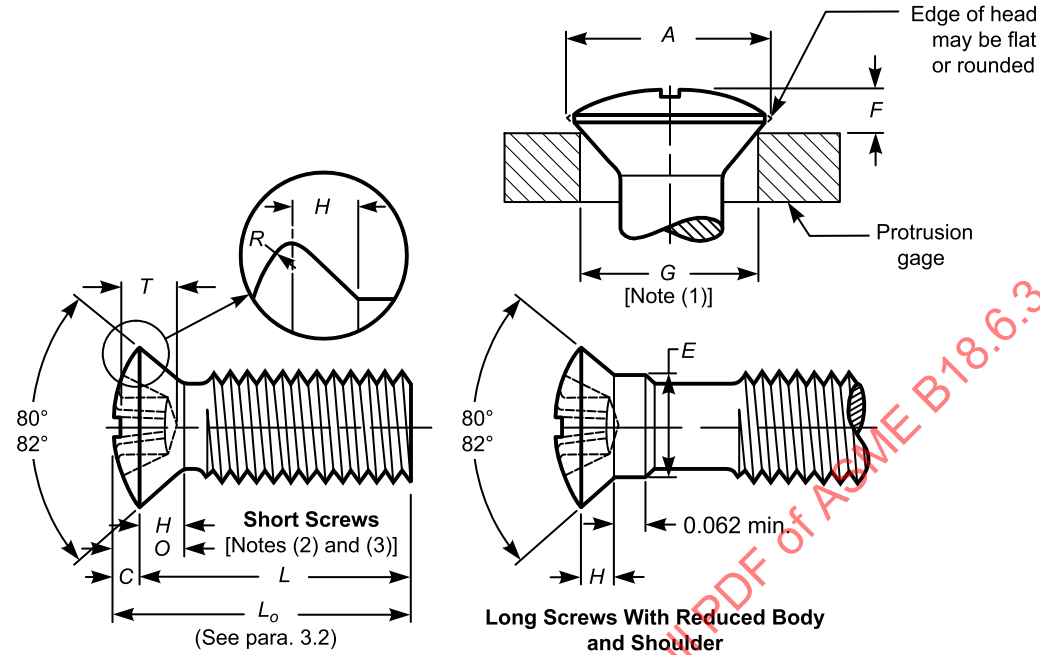
GENERAL NOTES:

- For additional requirements for machine screws, see [sections 2 and 3](#), and for tapping screws see [sections 2 and 4](#).
- For head dimensions, see [Table 2.2.4-1](#).
- 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. See [para. 4.3](#) for applicable screw lengths.
- Size 14 is for tapping screws only.

Table 2.2.4-3
Dimensions of Oval 82-deg Countersunk Trim Head Screws



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

Table 2.2.4-3
Dimensions of Oval 82-deg Countersunk Trim Head Screws (Cont'd)

Nominal Size [Note (4)]	Basic Screw Diameter [Note (5)]	Head Size	Machine Screw Sho1der Diameter, <i>E</i>		Mimimum Shoulder Diameter, <i>E</i> , Type A Tapping Screws [Note (6)]	Mimimum 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.	Total Head Height, <i>O</i> , Ref. [Note (7)]	Head Radius, <i>R</i> , Ref.	Protrusion Above Gaging Diameter, <i>F</i> [Note (8)]		Gaging Diameter, <i>G</i> [Note (8)]
			Max.	Min.			Max.	Min.							
For Short Screws [Notes (2), (3)] (Cont'd)															
12	0.216	10	...	...	...	...	0.362	0.333	0.111	0.060	0.166	0.029	0.102	0.075	0.313
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
¼	0.250	10	...	...	...	...	0.362	0.333	0.091	0.060	0.146	0.029	0.102	0.075	0.313
¼	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
¼	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
¼	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

GENERAL NOTES:

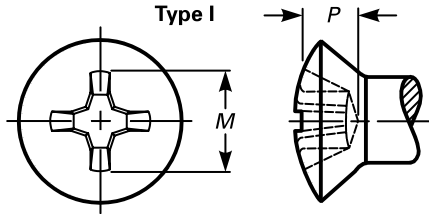
- (a) For additional requirements for machine screws, see [sections 2 and 3](#), and for tapping screws see [sections 2 and 4](#).
- (b) Applicable to screw types as indicated below. See referenced tables for thread and point dimensions and minimum practical screw lengths.
- (1) For Type A thread forming, except short lengths, see [Table 4.1.1.4-1](#).
- (2) For Type AB thread forming, see [Table 4.1.1.1-1](#).
- (3) For Type B and BP thread forming, see [Table 4.1.1.2-1](#); and Types BF and BT thread cutting, see [Table 4.1.2.1-1](#).
- (4) For Type C thread forming, see [Mandatory Appendix VI](#); Types D, F, G, and T thread cutting, see [Table 4.1.2.2-1](#); and Type TRS thread-rolling, see [Table 4.1.3-1](#).
- (c) For recess dimensions, see [Table 2.2.4-4](#).
- (d) For slot inspection, see [para. 2.1.4](#).

Table 2.2.4-3
Dimensions of Oval 82-deg Countersunk Trim Head Screws (Cont'd)

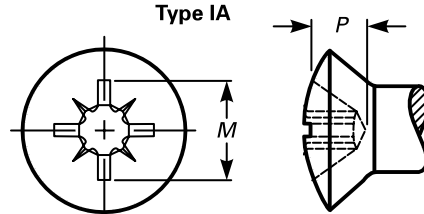
NOTES:

- (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. See [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 2.2.4-4
Recess Dimensions for Oval 82-deg 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.

Type I						Type IA			
Nominal Size [Note (1)]	Basic Screw Diameter [Notes (2)–(4)]	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.
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

Table 2.2.4-4
Recess Dimensions for Oval 82-deg Countersunk Trim Head Screws (Cont'd)

GENERAL NOTES:

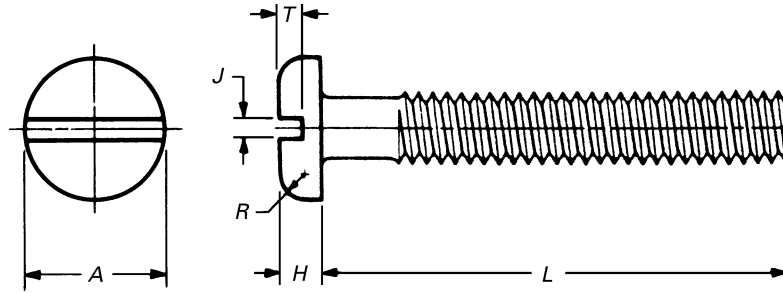
- (a) For additional requirements for machine screws, see [sections 2](#) and [3](#), and for tapping screws see [sections 2](#) and [4](#).
- (b) For head dimensions, see [Table 2.2.4-3](#).
- (c) For recess inspection, see [para. 2.1.3](#).

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 $1\frac{1}{8}$ 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. See [para. 4.3](#) for applicable screw lengths.
- (4) Size 14 is for tapping screws only.

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Table 2.2.5-1
Head Dimensions for Slotted Pan Head Screws



Nominal Size [Note (1)]	Basic Screw Diameter [Notes (2), (3)]	Head Diameter, <i>A</i>		Head Height, <i>H</i>		Maximum Head Radius, <i>R</i>	Slot Width, <i>J</i>		Slot Depth, <i>T</i>	
		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, see [sections 2 and 3](#), and for tapping screws see [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) For Type A thread forming, except short lengths, see [Table 4.1.1.4-1](#).
- (2) For Type AB thread forming, see [Table 4.1.1.1-1](#).
- (3) For Type B and BP thread forming, see [Table 4.1.1.2-1](#), and Types BF and BT thread cutting, see [Table 4.1.2.1-1](#).
- (4) For Type C thread forming, see [Mandatory Appendix VI](#); Types D, F, G, and T thread cutting, see [Table 4.1.2.2-1](#); and Type TRS thread-rolling, see [Table 4.1.3-1](#).
- (c) For recess dimensions, see [Table 2.2.5-3](#).
- (d) For slot inspection, see [para. 2.1.4](#).

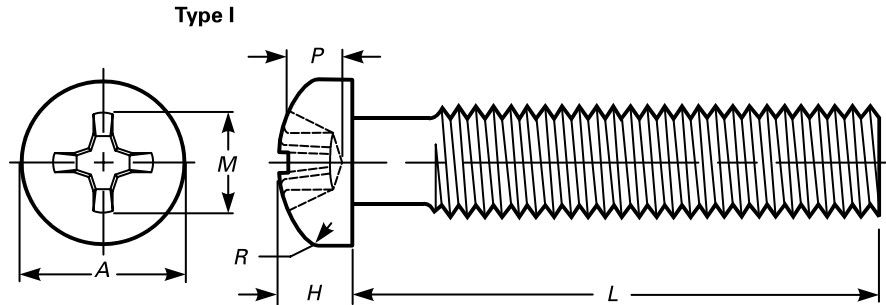
Table 2.2.5-1
Head Dimensions for Slotted Pan Head Screws (Cont'd)

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.

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Table 2.2.5-2
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 [Note (1)]	Basic Screw Diameter [Notes (2), (3)]	Head Diameter, <i>A</i>		Head Height, <i>H</i>		Minimum Head Radius, <i>R</i>	Recess Diameter, <i>M</i> , Ref.	Driver Size	Recess Penetration Gaging Depth, <i>P</i>	
		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:

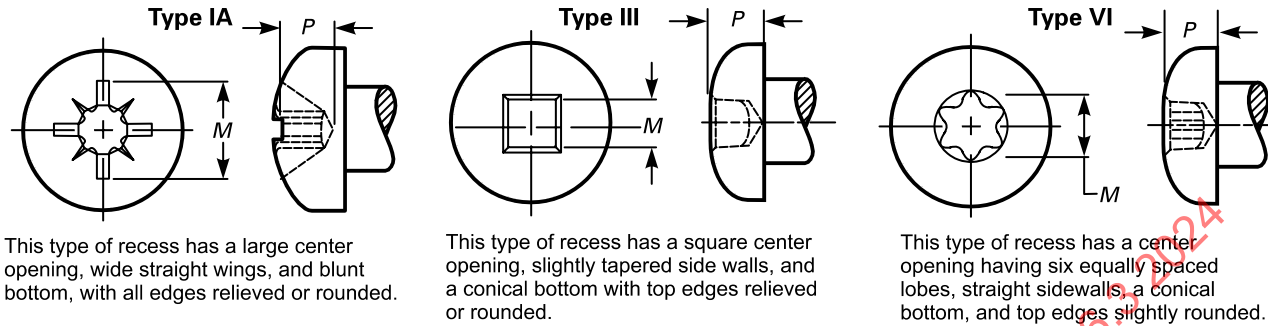
- (a) For additional requirements for machine screws, see [sections 2 and 3](#), and for tapping screws see [sections 2 and 4](#).
(b) For recess inspection, see [para. 2.1.3](#).

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.

Table 2.2.5-3
Recess Dimensions for Pan Head Screws (Types IA, III, and VI)

(24)



Type IA						Type III				Type VI				
Nominal Size [Note (1)]	Basic Screw Diameter [Notes (2), (3)]	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)]		Maximum Fallaway [Note (6)]
				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
1¼	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

**Table 2.2.5-3
Recess Dimensions for Pan Head Screws (Types IA, III, and VI) (Cont'd)**

Type IA						Type III				Type VI				
Nominal Size [Note (1)]	Basic Screw Diameter [Notes (2), (3)]	Recess Dia., <i>M</i> , Ref.	Driver Size	Recess Penetration Gaging Depth, <i>P</i>		Recess Across Flats, <i>M</i> , Ref	Driver Size [Note (4)]	Recess Penetration Gaging Depth, <i>P</i> [Note (5)]		Recess Dia., <i>M</i> , Ref.	Driver Size	Recess Penetration Gaging Depth, <i>P</i> [Note (5)]		Maximum Fallaway [Note (6)]
				Max.	Min.			Max	Min.			Max.	Min.	
$\frac{7}{16}$	0.4375	0.392	4	0.224	0.206	...	...	...	...	0.352	T50	0.159	0.144	0.062
$\frac{1}{2}$	0.5000	0.413	4	0.246	0.228	...	...	...	...	0.446	T55	0.180	0.165	0.078
$\frac{9}{16}$	0.5625	0.444	4	0.277	0.259	...	...	...	...	...	...	...	...	...
$\frac{5}{8}$	0.6250	0.558	5	0.295	0.274	...	...	...	...	...	...	...	...	...
$\frac{3}{4}$	0.7500	0.602	5	0.341	0.320	...	...	...	...	...	...	...	...	...

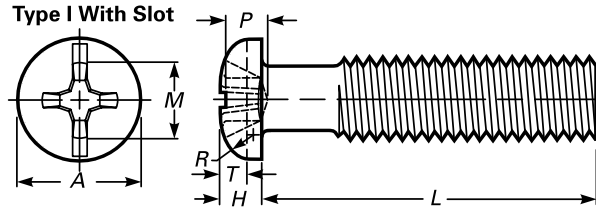
GENERAL NOTES:

- For additional requirements for machine screws, see [sections 2 and 3](#), and for tapping screws see [sections 2 and 4](#).
- For head dimensions, see [Table 2.2.5-2](#).
- For recess inspection, see [para. 2.1.3](#).

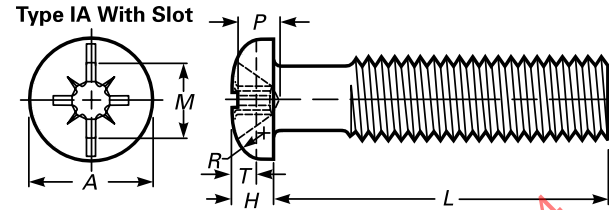
NOTES:

- 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.
- "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.
- Fallaway is the distance that a NO GO gaging member enters the recess.

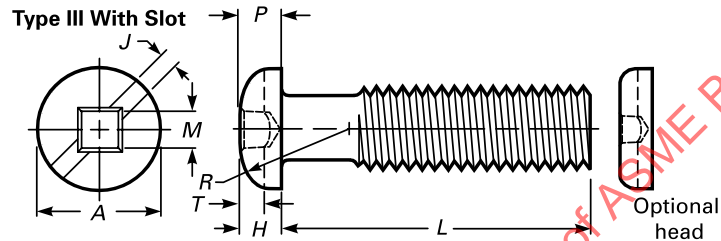
Table 2.2.5-4
Recess Dimensions for Combination Slotted-Pan Head Screws



This type of recess has a large center opening, tapered wings, and blunt bottom, with all edges relieved or rounded. A slot runs parallel to one pair of recess wings.



This type of recess has a large center opening, wide straight wings, and blunt bottom, with all edges relieved or rounded. A slot runs parallel to one pair of recess wings.



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

Optional head design

Nominal Size [Note (1)]	Basic Screw Diameter [Notes (2), (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 Penetration Gaging Depth, <i>P</i>		Recess Dia., <i>M</i> , Ref.	Driver Size	Recess Penetration Gaging Depth, <i>P</i> [Note (5)]		Recess Across Flats, <i>M</i> , Ref.	Driver Size [Note (6)]	Recess Penetration Gaging Depth, <i>P</i> [Note (5)]	
		Max.	Min.	Max.	Min.			Max.	Min.			Max.	Min.			Max.	Min.
0	0.0600	0.023	0.016	0.022	0.013	0.060	0	0.032	0.014	0.060	0	0.033	0.017	...	...	...	...
1	0.0730	0.026	0.019	0.027	0.016	0.067	0	0.040	0.022	0.067	0	0.040	0.024	...	...	...	...
2	0.0860	0.031	0.023	0.031	0.020	0.097	1	0.052	0.034	0.097	1	0.053	0.037	0.050	00	0.033	0.028
3	0.0990	0.035	0.027	0.036	0.023	0.105	1	0.061	0.043	0.105	1	0.062	0.046	0.070	0	0.038	0.028
4	0.1120	0.039	0.031	0.040	0.027	0.115	1	0.071	0.053	0.115	1	0.072	0.056	0.070	0	0.038	0.028
5	0.1250	0.043	0.035	0.045	0.030	0.152	2	0.072	0.046	0.147	2	0.068	0.050	0.091	1R	0.065	0.050
6	0.1380	0.048	0.039	0.050	0.033	0.159	2	0.080	0.055	0.155	2	0.076	0.058	0.091	1R	0.065	0.050
7	0.1510	0.048	0.039	0.054	0.036	0.170	2	0.089	0.064	0.164	2	0.085	0.067	0.091	1R	0.065	0.050
8	0.1640	0.054	0.045	0.058	0.041	0.175	2	0.097	0.071	0.170	2	0.092	0.074	0.112	2R	0.075	0.060
10	0.1900	0.060	0.050	0.068	0.048	0.192	2	0.113	0.089	0.185	2	0.108	0.090	0.112	2R	0.075	0.060

Table 2.2.5-4
Recess Dimensions for Combination Slotted-Pan Head Screws (Cont'd)

		Type I								Type IA				Type III					
Nominal Size [Note (1)]	Basic Screw Diameter [Notes (2), (3)]	Slot Width, <i>J</i>		Slot Depth, <i>T</i> [Note (4)]		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> [Note (5)]		Recess Across Flats, <i>M</i> , Ref.	Driver Size [Note (6)]	Recess Penetration Gaging Depth, <i>P</i> [Note (5)]			
								Max.	Min.			Max.	Min.						
		Max.	Min.	Max.	Min.			Max.	Min.										
12	0.2160	0.067	0.056	0.077	0.055	0.252	3	0.124	0.098	0.247	3	0.117	0.099	0.133	3R	0.095	0.080		
14	0.2420	0.075	0.064	0.085	0.060	0.274	3	0.144	0.118	0.266	3	0.137	0.119	0.133	3R	0.095	0.080		
1/4	0.2500	0.075	0.064	0.087	0.063	0.274	3	0.144	0.118	0.266	3	0.137	0.119	0.133	3R	0.095	0.080		
16	0.2680	0.075	0.064	0.093	0.068	0.286	3	0.158	0.132	0.278	3	0.149	0.131	0.133	3R	0.095	0.080		
18	0.2940	0.084	0.072	0.100	0.072	0.328	4	0.158	0.134	0.322	4	0.152	0.134	0.191	4R	0.100	0.085		
5/16	0.3125	0.084	0.072	0.106	0.076	0.343	4	0.173	0.149	0.334	4	0.164	0.146	0.191	4R	0.100	0.085		
20	0.3200	0.084	0.072	0.108	0.080	0.344	4	0.173	0.149	0.344	4	0.164	0.146	0.191	4R	0.100	0.085		
24	0.3720	0.094	0.081	0.123	0.090	0.382	4	0.213	0.190	0.370	4	0.201	0.183	0.191	4R	0.100	0.085		
3/8	0.3750	0.094	0.081	0.124	0.090	0.382	4	0.213	0.190	0.370	4	0.201	0.183	0.191	4R	0.100	0.085		
7/16	0.4375	0.094	0.081	0.142	0.105	0.406	4	0.239	0.214	0.392	4	0.224	0.206	...	...	...	...		
1/2	0.5000	0.106	0.091	0.161	0.118	0.428	4	0.260	0.235	0.413	4	0.246	0.228	...	...	...	...		

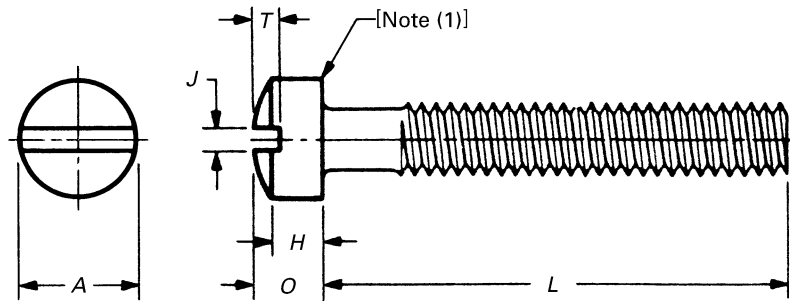
GENERAL NOTES:

- For additional requirements for machine screws, see [sections 2 and 3](#), and for tapping screws see [sections 2 and 4](#).
- For head dimensions, see [Table 2.2.5-2](#).

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.
- 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.
- 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.
- "R" in the recess size tabulation means regular depth recess.

Table 2.2.6-1
Dimensions of Slotted Fillister Head Screws



Nominal Size [Note (2)]	Basic Screw Diameter [Notes (3), (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

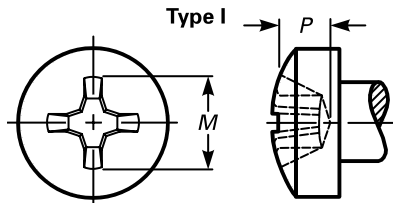
GENERAL NOTES:

- (a) For additional requirements for machine screws, see [sections 2 and 3](#), and for tapping screws see [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) For Type A thread forming, except short lengths, see [Table 4.1.1.4-1](#).
- (2) For Type AB thread forming, see [Table 4.1.1.1-1](#).
- (3) For Type B and BP thread forming, see [Table 4.1.1.2-1](#); and Types BF and BT thread cutting, see [Table 4.1.2.1-1](#).
- (4) For Type C thread forming, see [Mandatory Appendix VI](#); Types D, F, G, and T thread cutting, see [Table 4.1.2.2-1](#); and Type TRS thread-rolling, see [Table 4.1.3-1](#).
- (c) For recess dimensions, see [Table 2.2.6-2](#).
- (d) For slot inspection, see [para. 2.1.4](#).

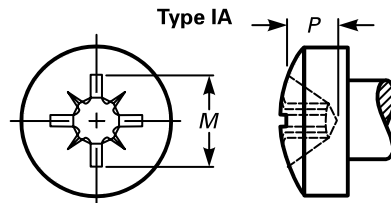
NOTES:

- (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, 1/16, 5/16, and 3/4 are for machine screws only.
- (4) Sizes 7 and 14 are for tapping screws only.

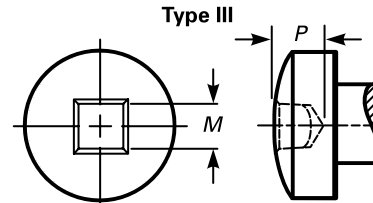
Table 2.2.6-2
Recess Dimensions for Fillister Head Screws



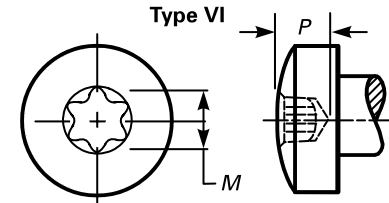
This type of recess has a large center opening, tapered wings, and blunt bottom, with all edges relieved or rounded.



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.



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

		Type I				Type IA				Type III				Type VI				
Nominal Size [Note (1)]	Basic Screw Diameter [Notes (2), (3)]	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>		Recess Across Flats, <i>M</i> , Ref.	Driver Size [Note (4)]	Recess Penetration Gaging Depth, <i>P</i> [Note (5)]		Recess Dia., <i>M</i> Ref.	Driver Size	Recess Penetration Gaging Depth, <i>P</i> [Note (5)]		Maximum Fallaway [Note (6)]
				Max.	Min.			Max.	Min.			Max.	Min.					
0	0.0600	0.060	0	0.032	0.014	0.060	0	0.033	0.017	...	...	...	...	...	...	...	...	...
1	0.0730	0.067	0	0.040	0.022	0.067	0	0.040	0.024	...	...	...	...	...	...	...	...	...
2	0.0860	0.097	1	0.052	0.034	0.097	1	0.053	0.037	0.050	00	0.033	0.028	0.069	T6	0.030	0.025	0.012
3	0.0990	0.105	1	0.061	0.043	0.105	1	0.062	0.046	0.070	0	0.038	0.028	0.094	T8	0.040	0.035	0.015
4	0.1120	0.115	1	0.071	0.053	0.115	1	0.072	0.056	0.070	0	0.038	0.028	0.101	T10	0.040	0.030	0.016
5	0.1250	0.136	2	0.056	0.031	0.133	2	0.054	0.036	0.091	1R	0.065	0.050	0.111	T10	0.055	0.045	0.022
6	0.1380	0.159	2	0.080	0.055	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	0.170	2	0.089	0.064	0.164	2	0.085	0.067	0.091	1R	0.065	0.050	0.132	T15	0.060	0.050	0.028
8	0.1640	0.175	2	0.097	0.071	0.170	2	0.092	0.074	0.112	2R	0.075	0.060	0.155	T20	0.071	0.055	0.031
10	0.1900	0.192	2	0.113	0.089	0.186	2	0.108	0.090	0.112	2R	0.075	0.060	0.178	T25	0.090	0.070	0.036
12	0.2160	0.252	3	0.124	0.098	0.247	3	0.117	0.099	0.133	3R	0.095	0.080	0.200	T27	0.090	0.070	0.040
14	0.2420	0.274	3	0.144	0.118	0.266	3	0.137	0.119	0.133	3R	0.095	0.080	0.221	T27	0.090	0.070	0.040
1/4	0.2500	0.274	3	0.144	0.118	0.266	3	0.137	0.119	0.133	3R	0.095	0.080	0.221	T30	0.120	0.100	0.044
5/16	0.3125	0.315	3	0.186	0.160	0.308	3	0.181	0.163	0.191	4R	0.100	0.085	0.266	T40	0.125	0.105	0.047
3/8	0.3750	0.382	4	0.213	0.190	0.370	4	0.201	0.183	0.191	4R	0.100	0.085	0.312	T45	0.155	0.135	0.055
7/16	0.4375	0.406	4	0.239	0.214	0.392	4	0.224	0.206	...	...	...	...	0.352	T50	0.169	0.149	0.062
1/2	0.5000	0.428	4	0.260	0.235	0.413	4	0.246	0.228	...	...	...	...	0.446	T55	0.190	0.170	0.078
9/16	0.5625	0.456	4	0.292	0.268	0.444	4	0.277	0.259	...	...	...	...	0.446	T55	0.190	0.170	0.078
5/8	0.6250	0.575	5	0.310	0.281	0.558	5	0.295	0.274	...	...	...	...	0.529	T60	0.230	0.210	0.093
3/4	0.7500	0.621	5	0.349	0.322	0.602	5	0.341	0.320	...	...	...	...	0.619	T70	0.295	0.275	0.108

Table 2.2.6-2
Recess Dimensions for Fillister Head Screws (Cont'd)

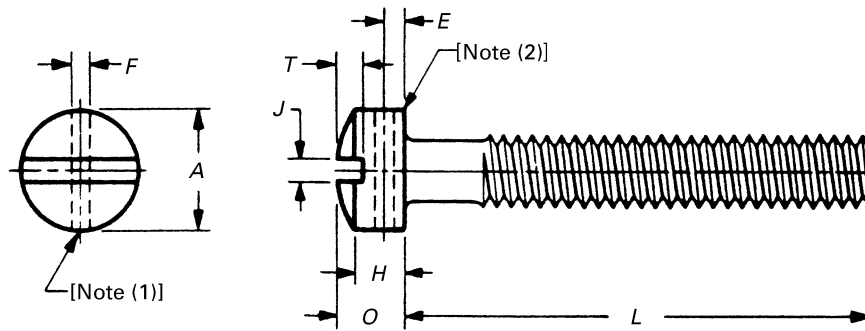
GENERAL NOTES:

- (a) For additional requirements for machine screws, see [sections 2 and 3](#), and for tapping screws see [sections 2 and 4](#).
- (b) For head dimensions, see [Table 2.2.6-1](#).
- (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 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.
- (6) Fallaway is the distance that a NO GO gaging member enters the recess.

Table 2.2.6-3
Dimensions of Slotted Drilled Fillister Head Screws (Machine Screws Only)



Nominal Size [Note (3)]	Basic Screw Diameter	Head Diameter, A		Head Side Height, H		Total Head Height, O		Slot Width, J		Slot Depth, T		Drilled Hole Location, Basic, E [Note (1)]	Drilled Hole Diameter, Basic, F [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

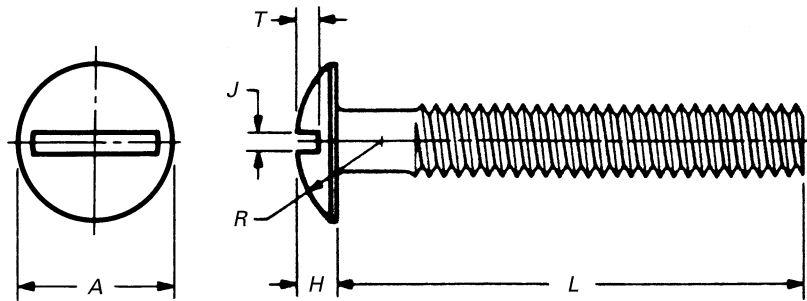
GENERAL NOTES:

- (a) For additional requirements, see [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 2.2.7-1
Dimensions of Slotted Truss Head Screws



Nominal Size [Note (1)]	Basic Screw Diameter [Notes (2), (3)]	Head Diameter, A		Head Height, H		Maximum Head, R	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, see [sections 2 and 3](#), and for tapping screws see [sections 2 and 4](#).
- For recess dimensions see [Table 2.2.7-2](#).
- Applicable to screw types as indicated below. See referenced tables for thread and point dimensions and minimum practical screw lengths.
 - For Type A thread forming, except short lengths, see [Table 4.1.1.4-1](#).
 - For Type AB thread forming, see [Table 4.1.1.1-1](#).
 - For Type B and BP thread forming, see [Table 4.1.1.2-1](#); and Types BF and BT thread cutting, see [Table 4.1.2.1-1](#).
 - For Type C thread forming, see [Mandatory Appendix VI](#); Types D, F, G, and T thread cutting, see [Table 4.1.2.2-1](#); and Type TRS thread-rolling, see [Table 4.1.3-1](#).
- For slot inspection, see [para. 2.1.4](#).

Table 2.2.7-1
Dimensions of Slotted Truss Head Screws (Cont'd)

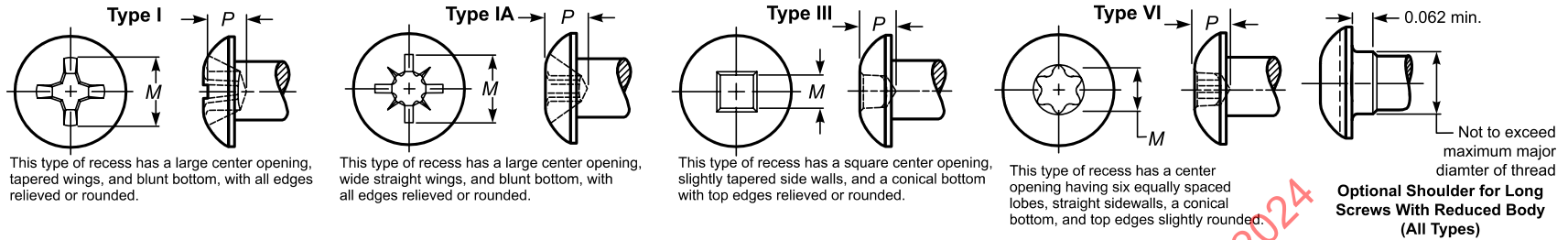
NOTES:

- (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.

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Table 2.2.7-2
Recess Dimensions for Truss Head Screws

(24)



Nominal Size [Note (1)]	Basic Screw Diameter [Notes (2), (3)]	Type I			Type IA			Type III			Type VI					
		Recess Dia., M, Ref.	Driver Size	Recess Penetration Gaging Depth, P		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.	Driver Size	Recess Penetration Gaging Depth, P		Maximum Fallaway [Note (6)]
				Max.	Min.					Max.	Min.			Max.	Min.	
0	0.0600	0.056	0	0.030	0.012	0.055	0	0.030	0.014	...	...	...	...	...	...	...
1	0.0730	0.064	0	0.038	0.020	0.063	0	0.038	0.022	...	...	...	...	...	...	...
2	0.0860	0.097	1	0.052	0.034	0.091	1	0.049	0.033	0.050	0.00	0.033	0.028	...	...	...
3	0.0990	0.103	1	0.059	0.042	0.098	1	0.056	0.040	0.070	0	0.038	0.028	...	...	...
4	0.1120	0.105	1	0.062	0.044	0.101	1	0.059	0.043	0.070	0	0.038	0.028	...	...	...
5	0.1250	0.121	1	0.078	0.060	0.117	1	0.075	0.059	0.091	1S	0.055	0.040	...	...	...
6	0.1380	0.151	2	0.073	0.048	0.141	2	0.065	0.047	0.091	1S	0.055	0.040	0.111	T10	0.055 0.045 0.022
7	0.1510	0.158	2	0.080	0.055	0.148	2	0.072	0.054	0.091	1S	0.055	0.040	0.132	T15	0.045 0.035 0.024
8	0.1640	0.166	2	0.088	0.063	0.155	2	0.079	0.061	0.112	2S	0.063	0.048	0.132	T15	0.055 0.045 0.026
10	0.1900	0.181	2	0.104	0.079	0.171	2	0.095	0.077	0.112	2R	0.075	0.060	0.155	T20	0.071 0.055 0.031
12	0.2160	0.241	3	0.111	0.086	0.227	3	0.101	0.083	0.133	3S	0.080	0.065	0.178	T25	0.090 0.070 0.036
14	0.2420	0.256	3	0.126	0.101	0.242	3	0.115	0.097	0.133	3S	0.080	0.065	0.200	T27	0.090 0.070 0.040
1/4	0.2500	0.256	3	0.126	0.101	0.241	3	0.115	0.097	0.133	3S	0.080	0.065	0.200	T27	0.090 0.070 0.040
16	0.2680	0.260	3	0.134	0.109	0.250	3	0.123	0.105	0.191	4R	0.100	0.085	0.221	T30	0.085 0.070 0.042
18	0.2940	0.316	4	0.145	0.121	0.300	4	0.133	0.115	0.191	4R	0.100	0.085	0.221	T30	0.090 0.075 0.045
5/16	0.3125	0.345	4	0.173	0.148	0.326	4	0.161	0.143	0.191	4R	0.100	0.085	0.266	T40	0.095 0.080 0.047
20	0.3200	0.350	4	0.177	0.151	0.330	4	0.164	0.146	0.191	4R	0.100	0.085	0.266	T40	0.100 0.085 0.050
24	0.3720	0.376	4	0.206	0.182	0.358	4	0.192	0.174	0.191	4R	0.100	0.085	0.312	T45	0.100 0.085 0.052
3/8	0.3750	0.376	4	0.206	0.182	0.357	4	0.192	0.174	0.191	4R	0.100	0.085	0.312	T45	0.125 0.110 0.055
7/16	0.4375	0.407	4	0.237	0.212	0.387	4	0.223	0.205	...	...	...	...	0.312	T45	0.155 0.130 0.055
1/2	0.5000	0.437	4	0.268	0.243	0.415	4	0.251	0.233	...	...	...	...	0.352	T50	0.150 0.130 0.062

**Table 2.2.7-2
Recess Dimensions for Truss Head Screws (Cont'd)**

		Type I				Type IA				Type III				Type VI				
Nominal Size [Note (1)]	Basic Screw Diameter [Notes (2), (3)]	Recess Dia., <i>M</i> , Ref.	Driver Size	Recess Pene- tration Gaging Depth, <i>P</i>		Recess Dia., <i>M</i> , Ref.	Driver Size	Recess Pene- tration Gaging Depth, <i>P</i>		Recess Across Flats, <i>M</i> , Ref.	Driver Size [Note (4)]	Recess Penetration Gaging Depth, <i>P</i> [Note (5)]		Recess Dia., <i>M</i> , Ref.	Driver Size	Recess Pene- tration Gaging Depth, <i>P</i>		Maximum Fallaway [Note (6)]
				Max.	Min.			Max.	Min.			Max.	Min.			Max.	Min.	
9/16	0.5625	0.439	4	0.282	0.258	0.420	4	0.256	0.238	...	...	...	...	0.446	T55	0.190	0.165	0.078
5/8	0.6250	0.547	5	0.289	0.256	0.524	5	0.266	0.245	...	...	...	...	0.446	T55	0.190	0.165	0.078
3/4	0.7500	0.608	5	0.351	0.319	0.581	5	0.323	0.302	...	...	...	...	0.529	T60	0.230	0.210	0.093

GENERAL NOTES:

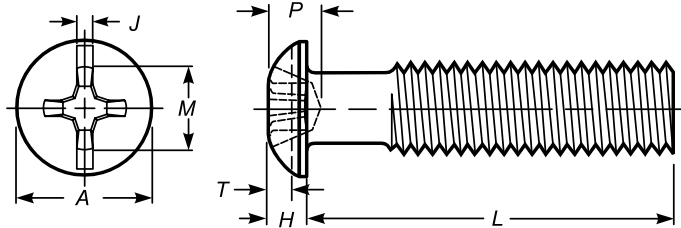
- (a) For additional requirements for machine screws, see [sections 2 and 3](#), and for tapping screws see [sections 2 and 4](#).
- (b) For head dimensions, see [Table 2.2.7-1](#). Unless otherwise specified, recessed truss head screws may be supplied with either a full contour or flat top design at 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, 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 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) Fallaway is the distance that a NO GO gaging member enters the recess.

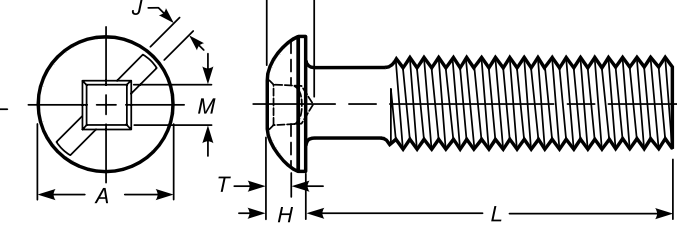
Table 2.2.7-3
Dimensions of Combination Slotted Truss Head Screws

Type I With Slot

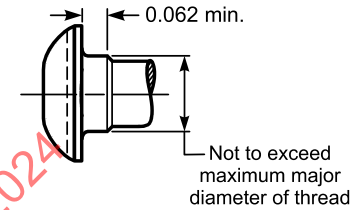


This type of recess has a large center opening, tapered wings, and blunt bottom with top edges relieved or rounded. A slot runs parallel to one pair of recess wings.

Type III With Slot



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



Optional Shoulder for Long Screws With Reduced Body (All Types)

Nominal Size [Note (1)]	Basic Screw Diameter [Notes (2), (3)]	Slot Width, J		Slot Depth, T [Note (4)]		Type I					Type III		
						Recess Diameter, M, Ref.	Driver Size	Recess Penetration Gaging Depth, P		Recess Across Flats, M, Ref.	Driver Size [Note (5)]	Recess Penetration Gaging Depth, P [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	1S	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	0.133	3S	0.080	0.065
1/4	0.2500	0.075	0.064	0.087	0.063	0.256	3	0.126	0.101	0.133	3S	0.080	0.065
16	0.2680	0.075	0.064	0.093	0.069	0.260	3	0.134	0.109	0.191	4R	0.100	0.085
18	0.2940	0.084	0.072	0.100	0.075	0.316	4	0.145	0.121	0.191	4R	0.100	0.085
5/16	0.3125	0.084	0.072	0.106	0.076	0.345	4	0.173	0.148	0.191	4R	0.100	0.085
20	0.3200	0.084	0.072	0.108	0.082	0.349	4	0.177	0.151	0.191	4R	0.100	0.085
24	0.3720	0.094	0.081	0.123	0.087	0.376	4	0.206	0.182	0.191	4R	0.100	0.085
3/8	0.3750	0.094	0.081	0.124	0.090	0.376	4	0.206	0.182	0.191	4R	0.100	0.085

**Table 2.2.7-3
Dimensions of Combination Slotted Truss Head Screws (Cont'd)**

Nominal Size [Note (1)]	Basic Screw Diameter [Notes (2), (3)]	Slot Width, <i>J</i>		Slot Depth, <i>T</i> [Note (4)]		Type I				Type III			
						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.
$\frac{7}{16}$	0.4375	0.094	0.081	0.142	0.104	0.407	4	0.237	0.212	...	...	...	...
$\frac{1}{2}$	0.5000	0.106	0.091	0.161	0.118	0.437	4	0.268	0.243	...	...	...	...
$\frac{9}{16}$	0.5625	0.118	0.102	0.179	0.131	0.439	4	0.282	0.258	...	...	...	...
$\frac{5}{8}$	0.6250	0.133	0.116	0.196	0.146	0.547	5	0.289	0.256	...	...	...	...
$\frac{3}{4}$	0.7500	0.149	0.131	0.234	0.164	0.608	5	0.351	0.319	...	...	...	...

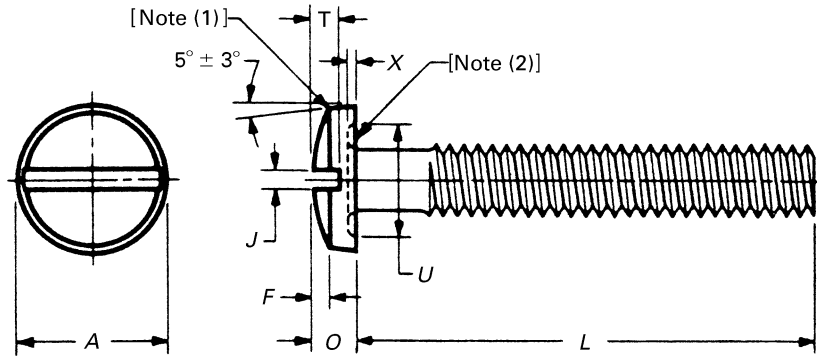
GENERAL NOTES:

- (a) For additional requirements for machine screws, see [sections 2 and 3](#), and for tapping screws see [sections 2 and 4](#).
(b) For head dimensions, see [Table 2.2.7-1](#).

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 2.2.8-1
Dimensions of Slotted Binding Head Screws (Machine Screws Only)



Nominal Size [Note (3)]	Basic Screw Diameter	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

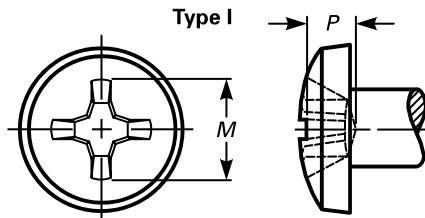
GENERAL NOTES:

- (a) For additional requirements, see [sections 2 and 3](#).
 (b) For recess dimensions, see [Table 2.2.8 -2](#).
 (c) For slot inspection, see [para. 2.1.4](#).

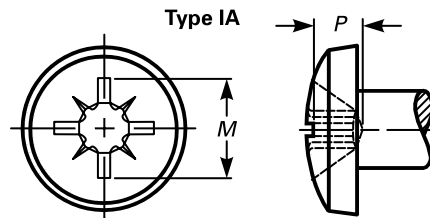
NOTES:

- (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.

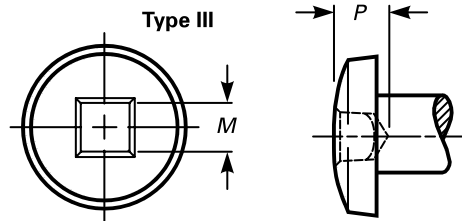
Table 2.2.8-2
Recess Dimensions for Binding Head Screws (Machine Screws Only)



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.



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

Type I														Type IA				Type III			
Nominal Size [Note (1)]	Basic Screw Diameter	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>		Recess Across Flats, <i>M</i> , Ref.	Driver Size [Note (2)]	Recess Penetration Gaging Depth, <i>P</i> [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								

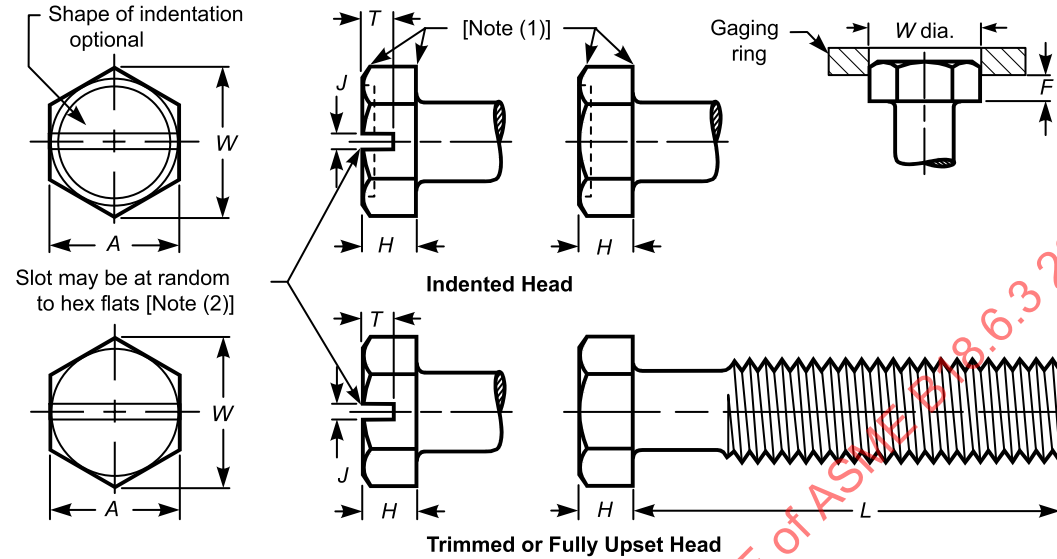
GENERAL NOTES:

- For additional requirements, see sections 2 and 3.
- For head dimensions, see Table 2.2.8-1.
- 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.
- "R" in the recess size tabulation means regular depth recess, and "S" means short 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 2.2.9-1
Dimensions of Plain (Unslotted) and Slotted Regular and Large Hex Head Screws



Nominal Size [Notes (3), (4)]	Basic Screw Diameter	Regular Head [Note (5)]			Large Head [Notes (5), (8)]				Slot Width, <i>J</i> [Note (2)]		Slot Depth, <i>T</i> [Notes (2), (9)]		Minimum Protrusion Beyond Gaging Ring, <i>F</i> [Note (7)]	
		Width Across Flats, <i>A</i> [Note (6)]		Minimum Across Corners, <i>W</i> [Notes (6), (7)]	Width Across Flats, <i>A</i> [Note (6)]		Minimum Across Corners, <i>W</i> [Notes (6), (7)]	Head Height <i>H</i>						
		Max.	Min.		Max.	Min.								
		Max.	Min.	Max.	Min.									
1	0.0730	0.125	0.120	0.134	...	...	...	0.044	0.036	...	...	...	...	0.022
2	0.0860	0.125	0.120	0.134	...	...	...	0.050	0.040	...	...	...	...	0.024
3	0.0990	0.188	0.181	0.202	...	...	...	0.055	0.044	...	...	...	...	0.026
4	0.1120	0.188	0.181	0.202	0.219	0.213	0.238	0.060	0.049	0.039	0.031	0.036	0.025	0.029
5	0.1250	0.188	0.181	0.202	0.250	0.244	0.272	0.070	0.058	0.043	0.035	0.042	0.030	0.035
6	0.1380	0.250	0.244	0.272	...	...	...	0.093	0.080	0.048	0.039	0.046	0.033	0.048
7	0.1510	0.250	0.244	0.272	...	...	...	0.093	0.080	0.048	0.039	0.054	0.040	0.048
8	0.1640	0.250	0.244	0.272	0.312	0.305	0.340	0.110	0.096	0.054	0.045	0.066	0.052	0.058
10	0.1900	0.312	0.305	0.340	...	...	...	0.120	0.105	0.060	0.050	0.072	0.057	0.063
12	0.2160	0.312	0.305	0.340	0.375	0.367	0.409	0.155	0.139	0.067	0.056	0.093	0.077	0.083
14	0.2420	0.375	0.367	0.409	0.438	0.428	0.477	0.190	0.172	0.075	0.064	0.101	0.083	0.103
1/4	0.2500	0.375	0.367	0.409	0.438	0.428	0.477	0.190	0.172	0.075	0.064	0.101	0.083	0.103
5/16	0.3125	0.500	0.489	0.545	...	...	...	0.230	0.208	0.084	0.072	0.122	0.100	0.125

Table 2.2.9-1
Dimensions of Plain (Unslotted) and Slotted Regular and Large Hex Head Screws (Cont'd)

Nominal Size [Notes (3), (4)]	Basic Screw Diameter	Regular Head [Note (5)]			Large Head [Notes (5), (8)]			Head Height <i>H</i>		Slot Width, <i>J</i> [Note (2)]		Slot Depth, <i>T</i> [Notes (2), (9)]		Minimum Protrusion Beyond Gaging Ring, <i>F</i> [Note (7)]
		Width Across Flats, <i>A</i> [Note (6)]		Minimum Across Corners, <i>W</i> [Notes (6), (7)]	Width Across Flats, <i>A</i> [Note (6)]		Minimum Across Corners, <i>W</i> [Notes (6), (7)]							
		Max.	Min.		Max.	Min.								
		Max.	Min.	Max.	Min.									
20	0.3200	0.500	0.489	0.545	...	...	...	0.230	0.208	0.084	0.072	0.122	0.100	0.125
24	0.3720	0.562	0.551	0.614	...	...	...	0.295	0.270	0.094	0.081	0.156	0.131	0.162
$\frac{3}{8}$	0.3750	0.562	0.551	0.614	...	...	...	0.295	0.270	0.094	0.081	0.156	0.131	0.162
$\frac{7}{16}$	0.4375	0.625	0.610	0.682	...	...	...	0.348	0.321	...	...	...	...	0.193
$\frac{1}{2}$	0.5000	0.750	0.735	0.820	...	...	...	0.400	0.367	...	...	...	...	0.220

GENERAL NOTES:

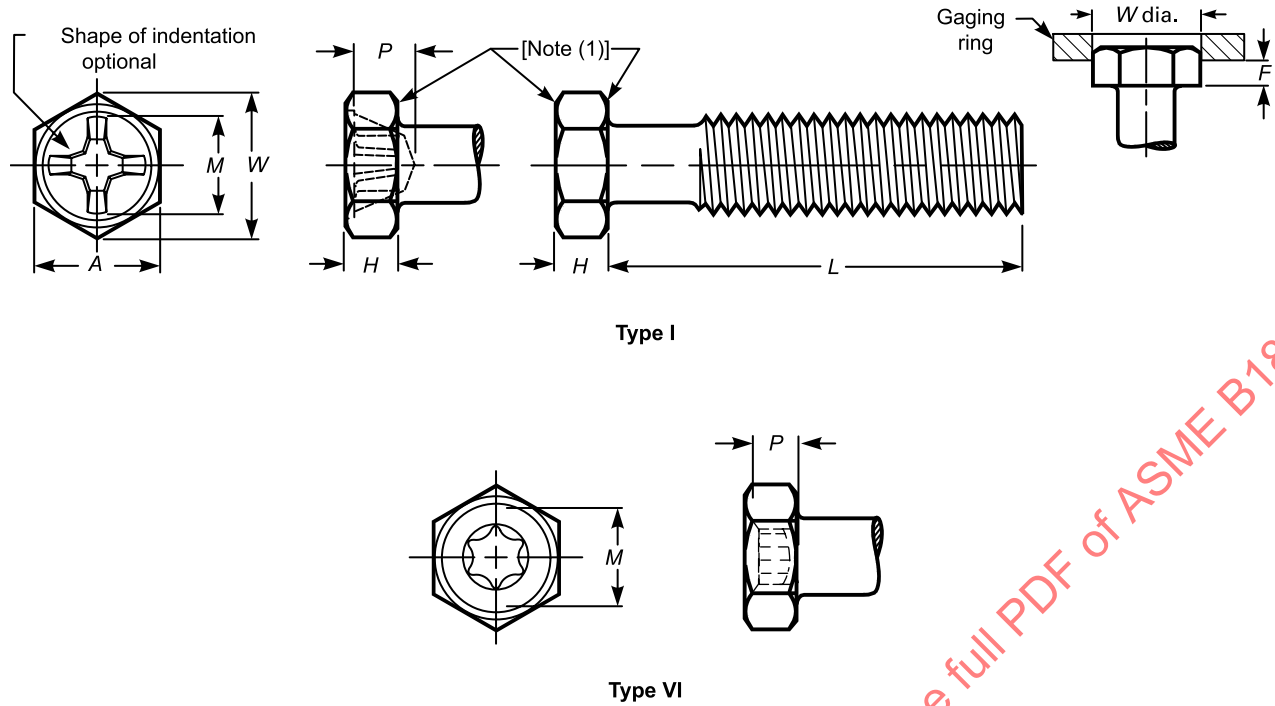
- (a) For additional requirements for machine screws, see [sections 2 and 3](#), and for tapping screws see [sections 2 and 4](#).
- (b) For recess dimensions, see [Table 2.2.9-2](#).
- (c) Applicable to screw types as indicated below. See referenced tables for thread and point dimensions and minimum practical screw lengths.
 - (1) For Type A thread forming, except short lengths, see [Table 4.1.1.4-1](#).
 - (2) For Type AB thread forming, see [Table 4.1.1.1-1](#).
 - (3) For Type B and BP thread forming, see [Table 4.1.1.2-1](#); and Types BF and BT thread cutting, see [Table 4.1.2.1-1](#).
 - (4) For Type C thread forming, see [Mandatory Appendix VI](#); Types D, F, G, and T thread cutting, see [Table 4.1.2.2-1](#); and Type TRS thread-rolling, see [Table 4.1.3-1](#).
- (d) For slot inspection, see [para. 2.1.4](#).

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) Unless otherwise specified by the purchaser, hex head machine screws are not slotted.
- (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) 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.
- (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 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.
- (8) Large hex heads are intended for screw and washer assemblies (sems) as specified in ASME B18.13, and other applications requiring large bearing.
- (9) Slot depth beyond the bottom of the indentation on indented heads shall not be less than one-third of the minimum slot depth specified.

Table 2.2.9-2
Recess Dimensions for Indented Regular and Large Hex Head Screws

(24)



Nominal Size [Note (1)]	Basic Screw Diameter [Notes (2), (3)]	Type I			Type VI			Maximum Fallaway [Note (4)]	
		Recess Diameter, M, Ref.	Driver Size	Recess Penetration Gaging Depth, P		Recess Diameter, M, Ref.	Driver Size	Recess Penetration Gaging Depth, P	
				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
5	0.1250	0.105	1	0.076	0.058	0.111	T10	0.050	0.040
6	0.1380	0.148	2	0.089	0.064	0.132	T15	0.051	0.040
7	0.1510	0.148	2	0.089	0.064	0.132	T15	0.051	0.040
8	0.1640	0.168	2	0.115	0.090	0.155	T20	0.065	0.050
10	0.1900	0.178	2	0.127	0.102	0.178	T25	0.080	0.065
12	0.2160	0.247	3	0.152	0.127	0.200	T27	0.080	0.065
14	0.2420	0.277	3	0.186	0.161	0.221	T30	0.095	0.080
1/4	0.2500	0.277	3	0.186	0.161	0.221	T30	0.095	0.080
5/16	0.3125	0.359	4	0.234	0.210	0.266	T40	0.125	0.100
20	0.3200	0.359	4	0.234	0.210	0.266	T40	0.125	0.100
24	0.3720	0.387	4	0.267	0.243	0.312	T45	0.155	0.125
3/8	0.3750	0.387	4	0.267	0.243	0.312	T45	0.155	0.125

GENERAL NOTES:

- (a) For additional requirements for machine screws, see sections 2 and 3, and for tapping screws see sections 2 and 4.
 (b) For head dimensions, see Table 2.2.9-1.
 (c) For recess inspection, see para. 2.1.3.

NOTES:

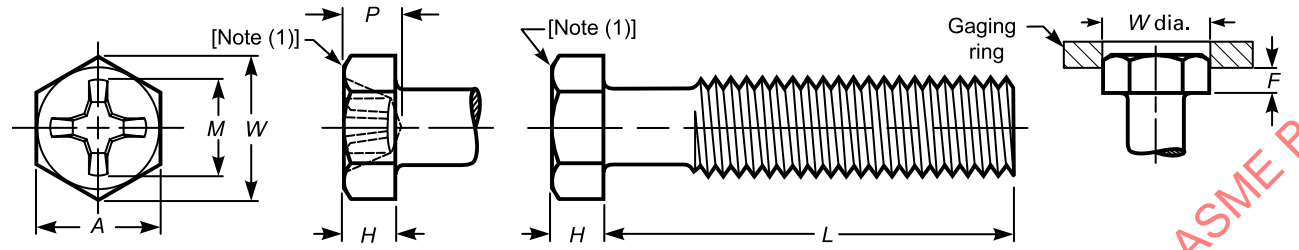
- (1) A slight rounding of all edges and corners of the hex surfaces of indented hex heads shall be permissible, provided the diameter of the bearing circle is equal to no less than 90% of the specified minimum width-across-flats dimension.

Table 2.2.9-2
Recess Dimensions for Indented Regular and Large Hex Head Screws (Cont'd)

NOTES: (Cont'd)

- (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.
 (4) Fallaway is the distance that a NO GO gaging member enters the recess.

Table 2.2.9-3
Recess Dimensions for Type I Nonindented Regular and Large Hex Head Screws



Trimmed or Fully Upset Head

Nominal Size [Note (2)]	Basic Screw Diameter	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

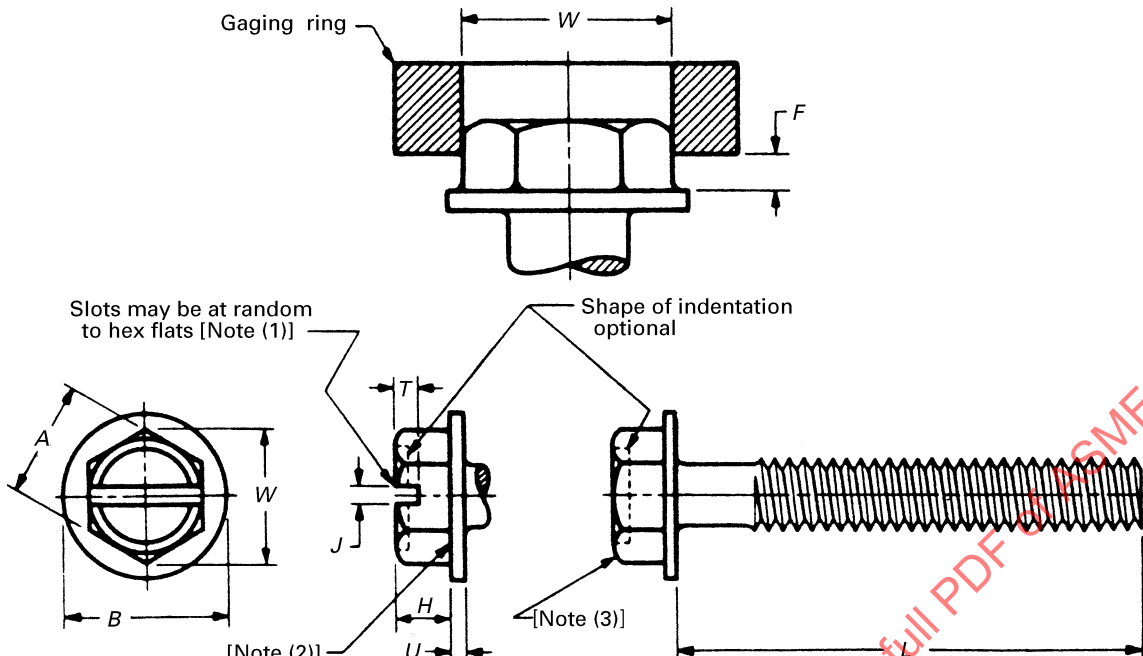
GENERAL NOTES:

- (a) For additional requirements for machine screws, see [sections 2 and 3](#), and for tapping screws see [sections 2 and 4](#).
 (b) For head dimensions, see [Table 2.2.9-1](#).
 (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 2.2.10-1
Dimensions of Plain and Slotted Hex Washer Head Screws



Nominal Size [Notes (4), (5)]	Basic Screw Diameter	Width Across Flats, A [Note (6)]		Minimum Width Across Corners, W [Notes (6), (7)]	Head Height, H		Washer Diameter, B		Washer Thickness, U		Slot Width, J [Note (1)]		Slot Depth, T [Notes (1), (8)]		Minimum Protrusion Beyond Gaging Ring, F [Note (7)]
		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	0.166	0.154	0.016	0.010	...	...	...	...	0.024
3	0.0990	0.125	0.120	0.134	0.055	0.044	0.177	0.163	0.016	0.010	...	...	...	...	0.026
4	0.1120	0.188	0.181	0.202	0.060	0.049	0.243	0.225	0.019	0.011	0.039	0.031	0.042	0.025	0.029
5	0.1250	0.188	0.181	0.202	0.070	0.058	0.260	0.240	0.025	0.015	0.043	0.035	0.049	0.030	0.035
6	0.1380	0.250	0.244	0.272	0.093	0.080	0.328	0.302	0.025	0.015	0.048	0.039	0.053	0.033	0.048
7	0.1510	0.250	0.244	0.272	0.093	0.080	0.328	0.302	0.029	0.017	0.048	0.039	0.053	0.033	0.048
8	0.1640	0.250	0.244	0.272	0.110	0.096	0.348	0.322	0.031	0.019	0.054	0.045	0.074	0.052	0.058
10	0.1900	0.312	0.305	0.340	0.120	0.105	0.414	0.384	0.031	0.019	0.060	0.050	0.080	0.057	0.063
12	0.2160	0.312	0.305	0.340	0.155	0.139	0.432	0.398	0.039	0.022	0.067	0.056	0.103	0.077	0.083
14	0.2420	0.375	0.367	0.409	0.190	0.172	0.520	0.480	0.050	0.030	0.075	0.064	0.111	0.083	0.103
1/4	0.2500	0.375	0.367	0.409	0.190	0.172	0.520	0.480	0.050	0.030	0.075	0.064	0.111	0.083	0.103
5/16	0.3125	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
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, see [sections 2 and 3](#), and for tapping screws see [sections 2 and 4](#).
- (b) For recess dimensions, see [Table 2.2.10-2](#).
- (c) Applicable to screw types as indicated below. See referenced tables for thread and point dimensions and minimum practical screw lengths.
- (1) For Type A thread forming, except short lengths, see [Table 4.1.1.4-1](#).
- (2) For Type AB thread forming, see [Table 4.1.1.1-1](#).
- (3) For Type B and BP thread forming, see [Table 4.1.1.2-1](#); and Types BF and BT thread cutting, see [Table 4.1.2.1-1](#).
- (4) For Type C thread forming, see [Mandatory Appendix VI](#); Types D, F, G, and T thread cutting, see [Table 4.1.2.2-1](#); and Type TRS thread-rolling, see [Table 4.1.3-1](#).
- (d) For slot inspection, see [para. 2.1.4](#).

Table 2.2.10-1
Dimensions of Plain and Slotted Hex Washer Head Screws (Cont'd)

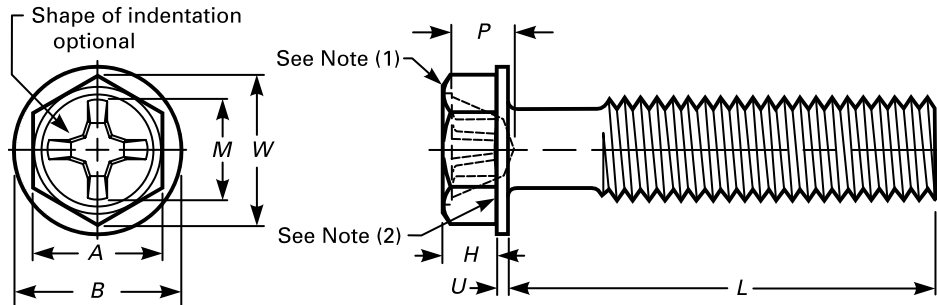
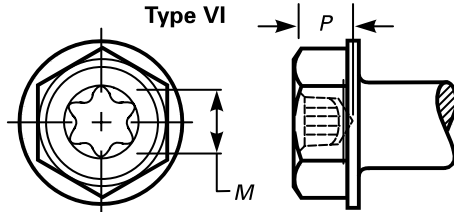
NOTES:

- (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.

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Table 2.2.10-2
Recess Dimensions for Indented Hex Washer Head Screws

(24)

Type I**Type VI**

Type I						Type VI				
Nominal Size [Notes (3), (4)]	Basic Screw Diameter	Recess Dia., <i>M</i> , Ref.	Driver Size	Recess Penetration Gaging Depth, <i>P</i> [Note (5)]		Recess Dia., <i>M</i> , Ref.	Driver Size	Recess Penetration Gaging Depth, <i>P</i> [Note (5)]		Maximum Fallaway [Note (6)]
				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
$\frac{1}{4}$	0.2500	0.277	3	0.186	0.161	0.221	T30	0.100	0.085	0.044
$\frac{5}{16}$	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
$\frac{3}{8}$	0.3750	0.386	4	0.267	0.243	0.312	T45	0.145	0.130	0.055

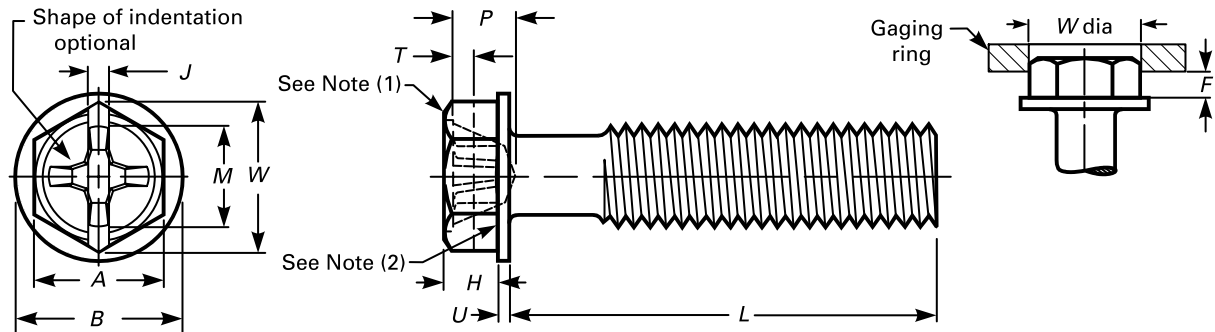
GENERAL NOTES:

- (a) For additional requirements for machine screws, see sections 2 and 3, and for tapping screws see sections 2 and 4.
 (b) For head dimensions, see Table 2.2.10-1.
 (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.
 (6) Fallaway is the distance that a NO GO gaging member enters the recess.

Table 2.2.10-3
Recess Dimensions for Combination Slotted Type I Indented Hex Washer Head Screws



Nominal Size [Notes (3), (4)]				Slot Width, <i>J</i>		Slot Depth, <i>T</i>		Recess Penetration Gaging Depth, <i>P</i> [Note (5)]	
Basic Screw Diameter	Recess Dia., <i>M</i> , Ref.	Driver Size		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

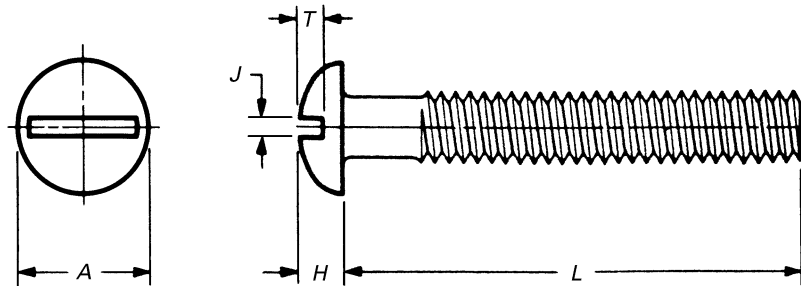
GENERAL NOTES:

- For additional requirements for machine screws, see [sections 2 and 3](#), and for tapping screws see [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, see [Table 2.2.10-1](#).
- 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 2.2.11-1
Dimensions of Slotted Round Head Screws



Nominal Size [Notes (1)–(3)]	Basic Screw Diameter	Head Diameter, <i>A</i>		Head Height, <i>H</i>		Slot Width, <i>J</i>		Slot Depth, <i>T</i>	
		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	0.054	0.045	0.072	0.055
8	0.1640	0.309	0.287	0.120	0.107	0.059	0.048	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
3/4	0.6250	1.000	0.944	0.438	0.411	0.133	0.116	0.258	0.195
7/8	0.7500	1.250	1.185	0.547	0.516	0.149	0.131	0.320	0.242

GENERAL NOTES:

- (a) For additional requirements for machine screws, see [sections 2 and 3](#), and for tapping screws see [sections 2 and 4](#).
 (b) Use of round head screws is not recommended; use pan head screws. See [para. 2.2.11](#) and [Tables 2.2.5-1 through 2.2.5-4](#).
 (c) For recess dimensions, see [Table 2.2.11-2](#).
 (d) Applicable to screw types as indicated below. See referenced tables for thread and point dimensions and minimum practical screw lengths.
 (1) For Type A thread forming, except short lengths, see [Table 4.1.1.4-1](#).
 (2) For Type B and BP thread forming, see [Table 4.1.1.2-1](#); and Types BF and BT thread cutting, see [Table 4.1.2.1-1](#).
 (3) For Type C thread forming, see [Mandatory Appendix VI](#); Types D, F, G, and T thread cutting, see [Table 4.1.2.2-1](#); and Type TRS thread-rolling, see [Table 4.1.3-1](#).
 (e) 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, 5/16, 5/8, and 3/4 are for machine screws only.

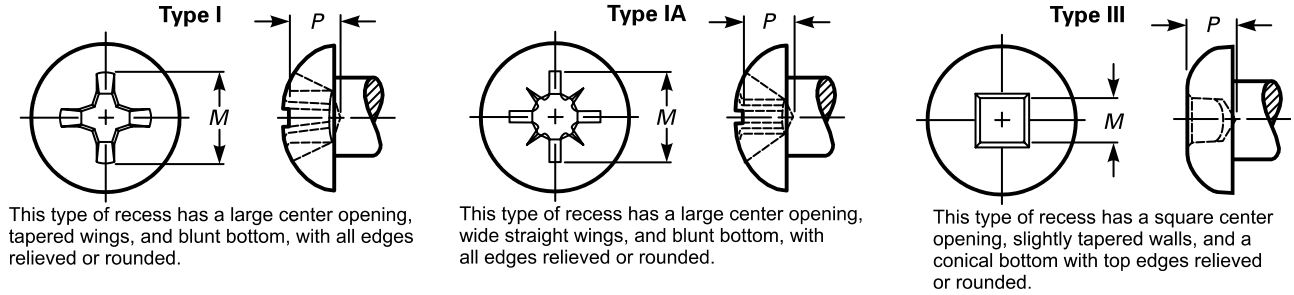
Table 2.2.11-1
Dimensions of Slotted Round Head Screws (Cont'd)

NOTES: (Cont'd)

(3) Sizes 7, 14, 16, 18, 20, and 24 are for tapping screws only.

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Table 2.2.11-2
Recess Dimensions for Round Head Screws



Nominal Size [Notes (1)–(3)]	Basic Screw Diameter	Recess Dia., <i>M</i> , Ref.	Driver Size	Type I		Recess Dia., <i>M</i> , Ref.	Driver Size	Type IA		Recess Across Flats, <i>M</i> , Ref.	Driver Size [Note (4)]	Type III	
				Recess Penetration Gaging Depth, <i>P</i>				Recess Penetration Gaging Depth, <i>P</i>				Recess Penetration Gaging Depth, <i>P</i> [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	...	...	...	...	...	...	...	...

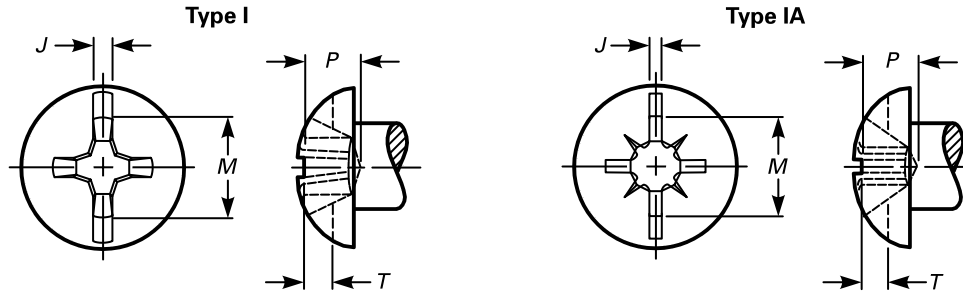
GENERAL NOTES:

- For additional requirements for machine screws, see [sections 2 and 3](#), and for tapping screws see [sections 2 and 4](#).
- Use of round head screws is not recommended; use pan head screws. See [para. 2.2.11](#) and [Tables 2.2.5-1 through 2.2.5-4](#).
- For head dimensions, see [Table 2.2.11-1](#).
- 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.
- "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 2.2.11-3
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 [Notes (1)–(3)]	Basic Screw Diameter	Type I						Type IA					
		Slot Width, <i>J</i>		Slot Depth, <i>T</i>		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.			Max.	Min.			Max.	Min.
0	0.0600	0.023	0.016	0.039	0.029	0.066	0	0.035	0.015	...	...	...	...
1	0.0730	0.026	0.019	0.044	0.033	0.075	0	0.045	0.026	...	...	...	...
2	0.0860	0.031	0.023	0.048	0.037	0.093	1	0.046	0.027	0.092	1	0.047	0.031
3	0.0990	0.035	0.027	0.053	0.040	0.102	1	0.055	0.035	...	...	...	...
4	0.1120	0.039	0.031	0.058	0.044	0.111	1	0.065	0.046	0.110	1	0.067	0.051
5	0.1250	0.043	0.035	0.063	0.047	0.147	2	0.063	0.035	0.142	2	0.063	0.045
6	0.1380	0.048	0.039	0.068	0.051	0.155	2	0.073	0.045	0.150	2	0.071	0.053
7	0.1510	0.048	0.039	0.072	0.055	0.164	2	0.081	0.055	...	...	...	...
8	0.1640	0.054	0.045	0.077	0.058	0.171	2	0.090	0.064	0.164	2	0.086	0.068
10	0.1900	0.060	0.050	0.087	0.065	0.188	2	0.108	0.082	0.182	2	0.105	0.087
12	0.2160	0.067	0.056	0.096	0.073	0.242	3	0.108	0.082	0.234	3	0.103	0.085
14	0.2420	0.075	0.064	0.106	0.080	0.258	3	0.125	0.099	...	...	...	...
1/4	0.2500	0.075	0.064	0.109	0.082	0.261	3	0.130	0.104	0.255	3	0.126	0.108
16	0.2680	0.075	0.064	0.115	0.087	0.274	3	0.142	0.119	...	...	...	...
18	0.2940	0.084	0.072	0.125	0.094	0.322	4	0.147	0.121	...	...	...	...
5/16	0.3125	0.084	0.072	0.132	0.099	0.301	3	0.170	0.144	0.291	3	0.162	0.144
20	0.3200	0.084	0.072	0.134	0.101	0.338	4	0.163	0.137	...	...	...	...
24	0.3720	0.094	0.081	0.154	0.116	0.380	4	0.208	0.182	...	...	...	...
3/8	0.3750	0.094	0.081	0.155	0.117	0.380	4	0.208	0.182	0.368	4	0.195	0.177
7/16	0.4375	0.094	0.081	0.196	0.148	0.395	4	0.221	0.196	...	...	...	...
1/2	0.5000	0.106	0.091	0.211	0.159	0.409	4	0.236	0.211	...	...	...	...
9/16	0.5625	0.118	0.102	0.242	0.183	0.447	4	0.272	0.245	...	...	...	...
5/8	0.6250	0.133	0.116	0.258	0.195	0.542	5	0.285	0.244	...	...	...	...
3/4	0.7500	0.149	0.131	0.320	0.242	0.642	5	0.385	0.346	...	...	...	...

GENERAL NOTES:

- For additional requirements for machine screws, see [sections 2 and 3](#), and for tapping screws see [sections 2 and 4](#).
- Use of round head screws is not recommended; use pan head screws. See [para. 2.2.11](#) and [Tables 2.2.5-1 through 2.2.5-4](#).
- For head dimensions, see [Table 2.2.11-1](#).
- 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](#).

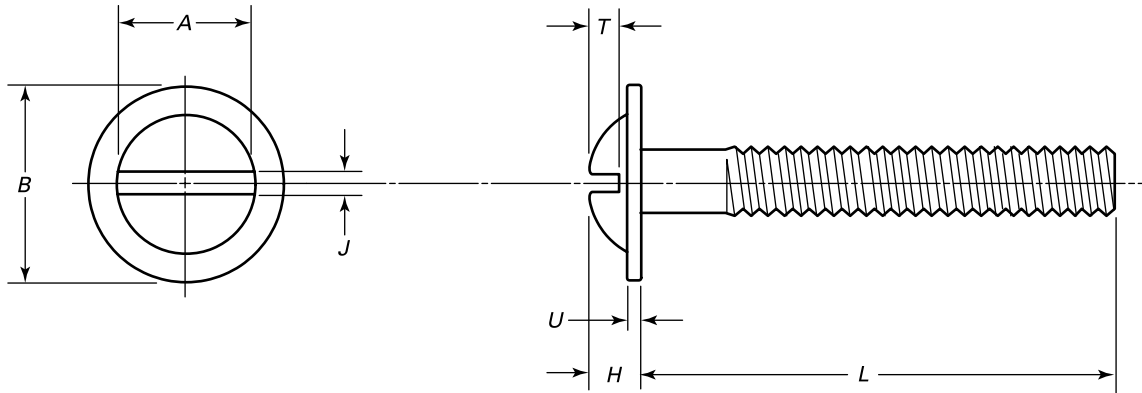
Table 2.2.11-3
Recess Dimensions for Combination Slotted Round Head Screws (Cont'd)

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.

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Table 2.2.12-1
Dimensions of Slotted Round Washer Head Screws



Nominal Size [Notes (1), (2)]	Basic Screw Diameter	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:

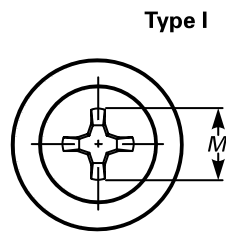
- (a) For additional requirements, for machine screws, see [sections 2 and 3](#); and for tapping screws, see [sections 2 and 4](#).
 (b) For slot inspection, see [para. 2.1.4](#).
 (c) For recess dimensions, see [Table 2.2.12-2](#).

NOTES:

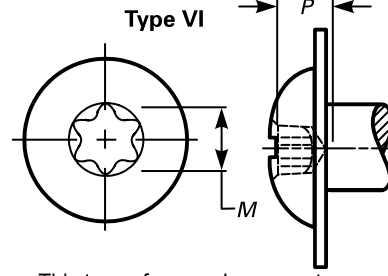
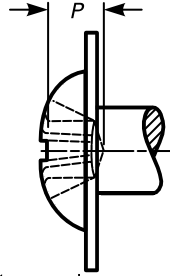
- (1) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
 (2) Sizes 7, 14, 20, and 24 are for tapping screws only.

Table 2.2.12-2
Recess Dimensions for Round Washer Head Screws

(24)

**Type I**

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

**Type VI**

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

Type I						Type VI				
Nominal Size [Notes (1), (2)]	Basic Screw Diameter	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>		Maximum Fallaway [Note (3)]
				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
20	0.3200	0.325	4	0.145	0.118	0.266	T40	0.125	0.110	0.047
24	0.3720	0.347	4	0.170	0.144	0.312	T45	0.125	0.110	0.055
3/8	0.3750	0.348	4	0.170	0.144	0.312	T45	0.130	0.115	0.055
7/16	0.4375	0.366	4	0.190	0.165	0.352	T50	0.150	0.135	0.062
1/2	0.5000	0.383	4	0.210	0.184	0.446	T55	0.170	0.155	0.078

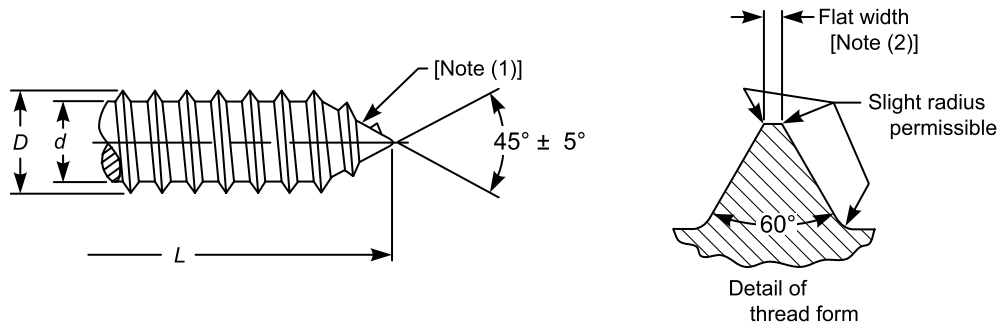
GENERAL NOTES:

- (a) For additional requirements, for machine screws, see [sections 2 and 3](#); and for tapping screws, see [sections 2 and 4](#).
 (b) For recess inspection, see [para. 2.1.3](#).
 (c) For head dimensions, see [Table 2.2.12-1](#).

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.
 (3) Fallaway is the distance that a NO GO gaging member enters the recess.

(24) **Table 4.1.1.1-1**
Dimensions of Threads and Points for Types AB and ABR Thread-Forming Tapping Screws



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

GENERAL NOTES:

- (a) For additional requirements, see [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.

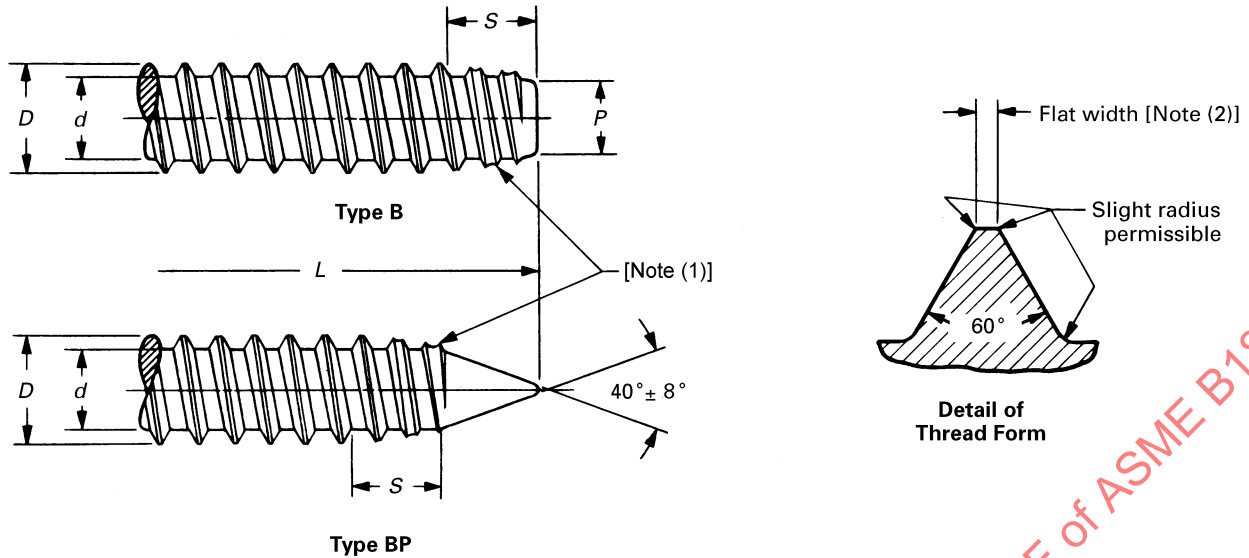
(c) Point form is as-rolled during manufacturing and may exhibit slight rounding at the tip.

(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 4.1.1.2-1
Dimensions of Threads and Points for Types B and BP Thread-Forming Tapping Screws

(24)



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

GENERAL NOTES:

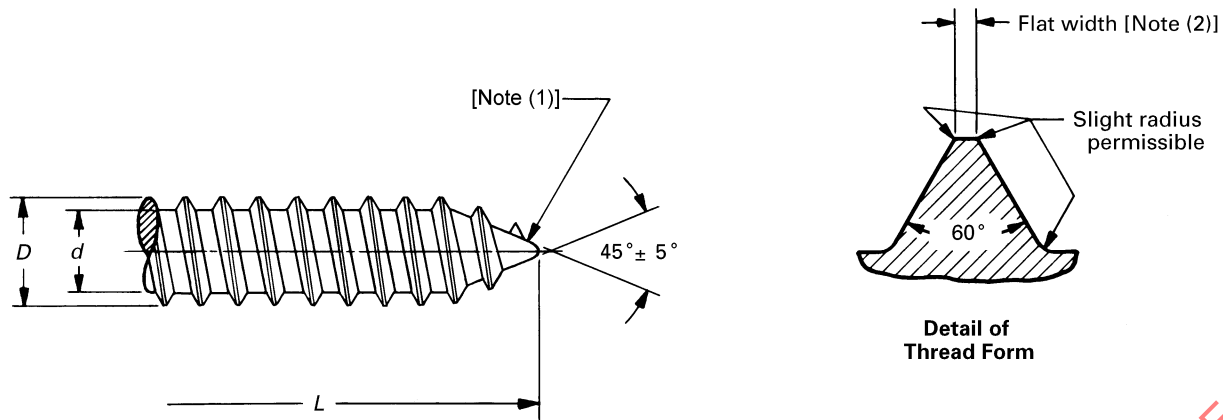
- (a) For additional requirements, see [section 4](#).
 (b) For determining the effective grip length of BP screws, see [Nonmandatory Appendix B](#).

NOTES:

- (1) Threads within point taper length shall have unfinished crests. Point form is as-rolled during manufacturing and may exhibit slight rounding at the tip.
 (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.

(24)

Table 4.1.1.4-1
Dimensions of Threads and Points for Type A Thread-Forming Tapping Screws



Nominal Size [Note (3)]	Basic Screw Diameter	Threads per in.	Major Diameter, <i>D</i>		Minor Diameter, <i>d</i>		Length, <i>L</i> [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

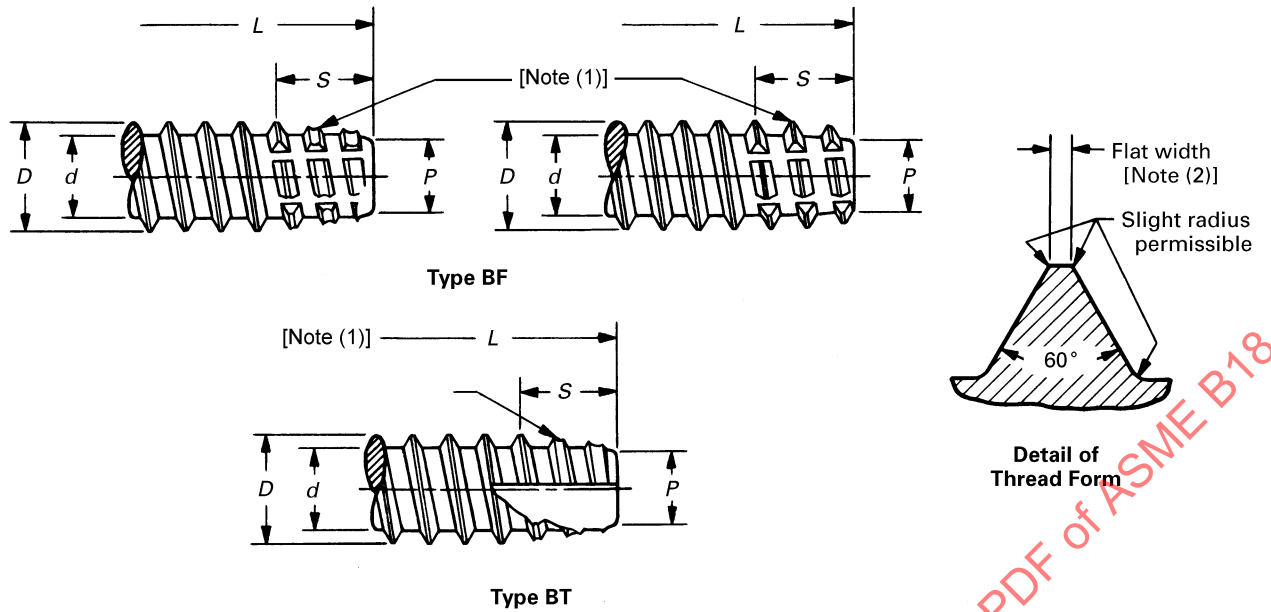
GENERAL NOTES:

- (a) For additional requirements, see [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. Point form is as-rolled during manufacturing and may exhibit slight rounding at the tip.
 (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 4.1.1.1-1](#).

Table 4.1.2.1-1
Dimensions of Threads and Points for Types BF and BT Thread-Cutting Tapping Screws



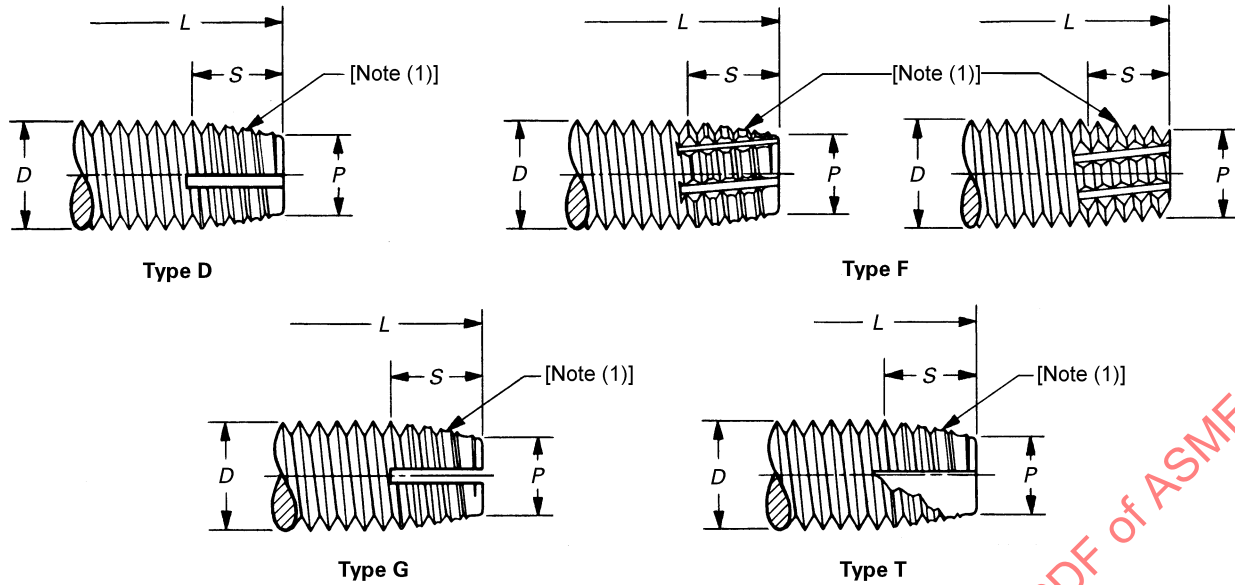
Nominal Size [Note (3)]	Basic Screw Diameter	Threads per inch	Major Diameter, D		Minor Diameter, d		Point Diameter, P	Point Taper Length, S		Minimum Practical Nominal Screw Lengths, L	
			Max.	Min.	Max.	Min.	Ref.	Max.	Min.	90-deg Heads	Csk. Heads
0	0.0600	48	0.060	0.054	0.036	0.033	0.031	0.042	0.031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

GENERAL NOTE: For additional requirements, see [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 4.1.2.2-1
Dimensions of Threads and Points for Types D, F, G, and T Thread-Cutting Tapping Screws



Nominal Size [Note (2)]	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					
			Max.	Min.	Ref.	Max.	Min.	Max.	Min.	90-deg Heads	Csk. Heads	90-deg Heads	Csk. Heads
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	$\frac{13}{32}$	$\frac{9}{16}$	$\frac{3}{8}$	$\frac{17}{32}$

Table 4.1.2.2-1
Dimensions of Threads and Points for Types D, F, G, and T Thread-Cutting Tapping Screws (Cont'd)

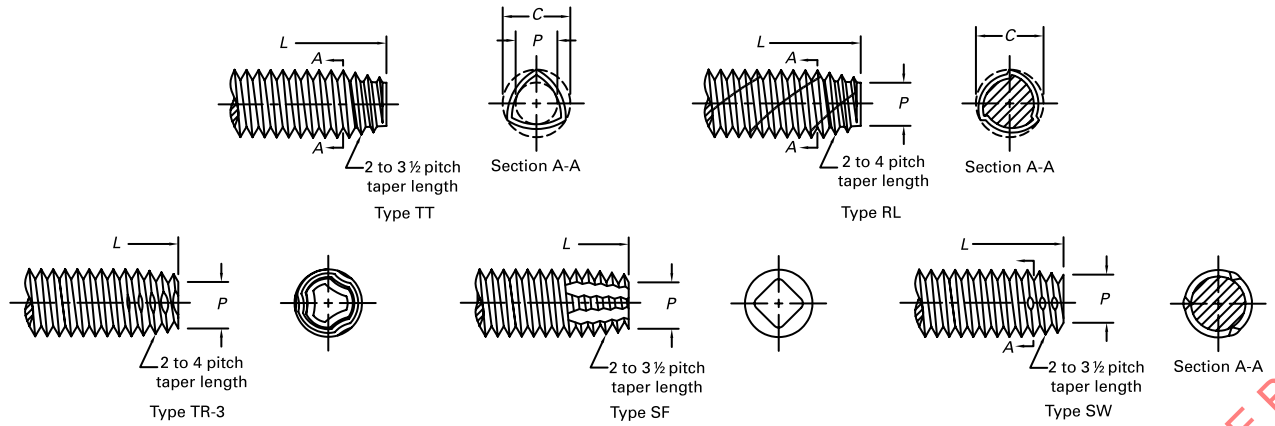
Nominal Size [Note (2)]	Basic Screw Diameter	Threads per inch	Major Diameter, <i>D</i>		Point Diameter, <i>P</i>	Point Taper Length, <i>S</i> [Note (3)]				Determinant Lengths for Point Taper, <i>L</i> [Note (3)]		Minimum Practical Nominal Screw Lengths, <i>L</i>	
						For Short Screws		For Long Screws					
			Max.	Min.	Ref.	Max.	Min.	Max.	Min.	90-deg Heads	Csk. Heads	90-deg Heads	Csk. Heads
			$\frac{1}{2}$	0.5000	13	0.5000	0.4876	0.423	0.269	0.192	0.346	0.269	$\frac{5}{8}$
$\frac{1}{2}$	0.5000	20	0.5000	0.4906	0.450	0.175	0.125	0.225	0.175	$\frac{13}{32}$	$\frac{9}{16}$	$\frac{3}{8}$	$\frac{17}{32}$

GENERAL NOTE: For additional requirements, see [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.

Table 4.1.3-1
Dimensions of Type TRS Tapping Screws



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 4.3.1-1
Thread Lengths for Types A, AB, B, BF, BP, and BT Tapping Screws

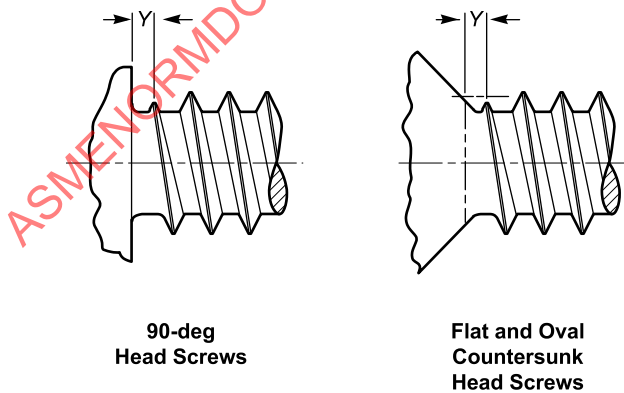
Nominal Screw Size	Nominal Screw Length, L	Equal to or Shorter Than Nominal Length, L		Longer Than Nominal Length, L
		Fully Threaded		Partially Threaded
		Type A Only	Types AB, B, BF, BP, and BT	Types A, AB, B, BF, BP, and BT
		Y Max. [Note (1)]	Y Max. [Note (1)]	L_T Min. [Note (2)]
0	$\frac{7}{16}$	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	$1\frac{13}{16}$	0.042	0.042	0.670
5	$1\frac{15}{16}$	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.

Figure 4.3.1-1
Types A, AB, B, BF, BP, and BT



(24)

Table 4.3.2-1
Thread Lengths for Types C, D, F, G, T, and TRS Tapping Screws

Fully Threaded								Partially 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		Full-Form Thread Length	
		Y Max. [Note (1)]				Y Max. [Note (2)]			
		Coarse Thread	Fine Thread	Longer Than	Shorter Than	Coarse Thread	Fine Thread		
2	$\frac{1}{4}$	0.018	0.016	$\frac{1}{4}$	$\frac{5}{8}$	0.036	0.032	$\frac{5}{8}$	0.520
3	$\frac{5}{16}$	0.021	0.018	$\frac{5}{16}$	$\frac{3}{4}$	0.042	0.036	$\frac{3}{4}$	0.590
4	$\frac{11}{32}$	0.025	0.021	$\frac{11}{32}$	$\frac{7}{8}$	0.050	0.042	$\frac{7}{8}$	0.670
5	$\frac{3}{8}$	0.025	0.023	$\frac{3}{8}$	1	0.050	0.046	1	0.750
6	$\frac{13}{32}$	0.031	0.025	$\frac{13}{32}$	$1\frac{1}{16}$	0.062	0.050	$1\frac{1}{16}$	0.830
8	$\frac{1}{2}$	0.031	0.028	$\frac{1}{2}$	$1\frac{3}{16}$	0.062	0.056	$1\frac{3}{16}$	0.980
10	$\frac{9}{16}$	0.042	0.031	$\frac{9}{16}$	$1\frac{3}{8}$	0.083	0.062	$1\frac{3}{8}$	1.140
12	$\frac{5}{8}$	0.042	0.036	$\frac{5}{8}$	$1\frac{9}{16}$	0.083	0.071	$1\frac{9}{16}$	1.300
$\frac{1}{4}$	$\frac{3}{4}$	0.050	0.036	$\frac{3}{4}$	$1\frac{13}{16}$	0.100	0.071	$1\frac{13}{16}$	1.500
$\frac{5}{16}$	$\frac{15}{16}$	0.056	0.042	$\frac{15}{16}$	$1\frac{7}{8}$	0.111	0.083	$1\frac{7}{8}$	1.500
$\frac{3}{8}$	$1\frac{1}{8}$	0.062	0.042	$1\frac{1}{8}$	2	0.125	0.083	2	1.500
$\frac{7}{16}$	$1\frac{5}{16}$	0.071	0.050	$1\frac{5}{16}$	2	0.143	0.100	2	1.500
$\frac{1}{2}$	$1\frac{1}{2}$	0.077	0.050	$1\frac{1}{2}$	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.

Figure 4.3.2-1
Types C, D, F, G, T, and TRS

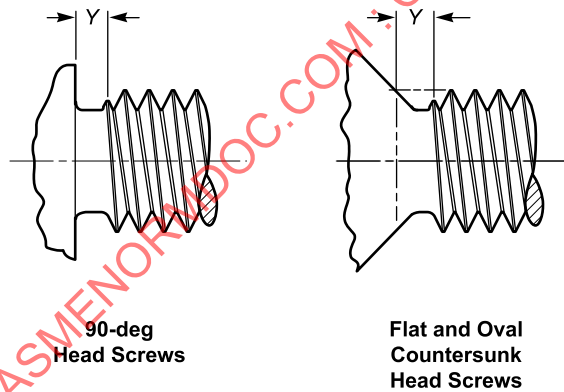


Table 4.11.1-1
Standard Test-Plate Thickness and Hole Sizes for Drive-Test Inspection of Tapping Screws

Nominal Screw Size	Thickness								Hole Size															
									Type A		Types AB, B, and BP		Type C				Types D, F, G, and T				Type TRS			
	Types AB, A, B, BP, and C		Types D, F, G, and T		Type TRS		Coarse Thread						Fine Thread		Coarse Thread		Fine Thread		Coarse Thread		Fine Thread			
Gage	Max.	Min.	Max.	Min.	Max.	Min.	Drill Size	Hole Dia.	Drill Size	Hole Dia.	Drill Size	Hole Dia.	Drill Size	Hole Dia.	Drill Size	Hole Dia.	Drill Size	Hole Dia.	Drill Size	Hole Dia.	Drill Size	Hole Dia.		
2	18	0.0500	0.0460	0.0800	0.0760	0.1270	0.1230	#48	0.0760	#48	0.0760	#48	0.0760	#48	0.0760	#49	0.0730	...	...	1.90 mm	0.075	...	...	
3	18	0.0500	0.0460	0.0960	0.0920	0.1270	0.1230	#46	0.0810	#46	0.0810	#44	0.0860	#43	0.0890	#46	0.0810	...	...	2.20 mm	0.087	...	...	
4	18	0.0500	0.0460	0.1110	0.1070	0.1270	0.1230	#44	0.0860	#44	0.0860	#41	0.0960	#40	0.0980	#41	0.0960	...	...	#40	0.098	...	...	
5	18	0.0500	0.0460	0.1110	0.1070	0.1270	0.1230	#36	0.1065	#36	0.1065	#35	0.1100	#35	0.1100	#37	0.1010	...	...	#35	0.110	...	...	
6	14	0.0770	0.0730	0.1425	0.1385	0.1270	0.1230	#32	0.1160	#32	0.1160	#31	0.1200	1/8	0.1250	#31	0.1200	...	...	#31	0.120	...	...	
7	14	0.0770	0.0730	...	...	...	...	#30	0.1285	#30	0.1285	...	...	...	...	...	...	...	...	...	...	...	...	
8	14	0.0770	0.0730	0.1420	0.1380	0.1905	0.1845	#29	0.1360	#29	0.1360	#27	0.1440	#26	0.1470	#26	0.1470	...	...	#26	0.147	...	...	
10	1/8	0.1270	0.1230	0.1905	0.1845	0.1905	0.1845	#21	0.1590	#21	0.1590	#19	0.1660	11/64	0.1719	#17	0.1730	#16	0.1770	#19	0.166	11/64	0.172	
12	1/8	0.1270	0.1230	0.1905	0.1845	0.1905	0.1845	3/16	0.1875	3/16	0.1875	#11	0.1910	#10	0.1935	#8	0.1990	...	...	#11	0.191	...	...	
14	1/8	0.1270	0.1230	...	...	...	...	5.5 mm	0.2165	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
1/4	3/16	0.1905	0.1845	0.2530	0.2470	0.2540	0.2460	...	...	5.5 mm	0.2165	7/32	0.2188	1	0.2280	1	0.2280	A	0.2340	0	0.219	...	...	
16	3/16	0.1905	0.1845	...	...	...	...	B	0.2380	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
18	3/16	0.1905	0.1845	...	...	...	...	G	0.2610	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
5/16	3/16	0.1905	0.1845	0.3155	0.3095	0.3175	0.3075	...	...	I	0.2720	J	0.2770	L	0.2900	L	0.2900	M	0.2950	J	0.277	...	...	
20	3/16	0.1905	0.1845	...	...	...	...	L	0.2900	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
24	3/16	0.1905	0.1845	...	...	...	...	11/32	0.3438	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
3/8	3/16	0.1905	0.1845	0.3780	0.3720	0.3800	0.3700	...	...	21/64	0.3281	R	0.3390	11/32	0.3438	T	0.3580	T	0.3580	R	0.339	...	...	
7/16	3/16	0.1905	0.1845	...	...	0.4425	0.4325	...	...	13/32	0.4062	...	...	...	...	...	...	...	...	10.0 mm	0.394	...	...	
1/2	3/16	0.1905	0.1845	...	...	0.5050	0.4950	...	...	15/32	0.4688	...	...	...	...	...	...	...	...	...	...	...	0.456	

Table 4.11.2-1
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	...
$\frac{1}{4}$ -20	0.2500	120	10
$\frac{5}{16}$ -18	0.3125	240	20
$\frac{3}{8}$ -16	0.3750	300	25
$\frac{7}{16}$ -14	0.4375	480	40
$\frac{1}{2}$ -13	0.5000	660	55

GENERAL NOTE:

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

Table 4.11.3-1
Torsional Strength Requirements for Tapping Screws

Nominal Screw Size	Minimum Torsional Strength, lb-in.					
	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	...	...	...	...	...
$\frac{1}{4}$	...	142	140	179	156	...
16	152	...	...	...	...	...
18	196	...	...	...	...	...
$\frac{5}{16}$	...	290	306	370	330	...
20	250	...	...	...	...	...
24	492	...	...	...	...	...
$\frac{3}{8}$	...	590	560	710	600	...
$\frac{7}{16}$	...	620	700	820	840	...
$\frac{1}{2}$	...	1,020	1,075	1,285	...	1,080

Figure 4.11.3-1
Typical Torsional Strength Test Fixture

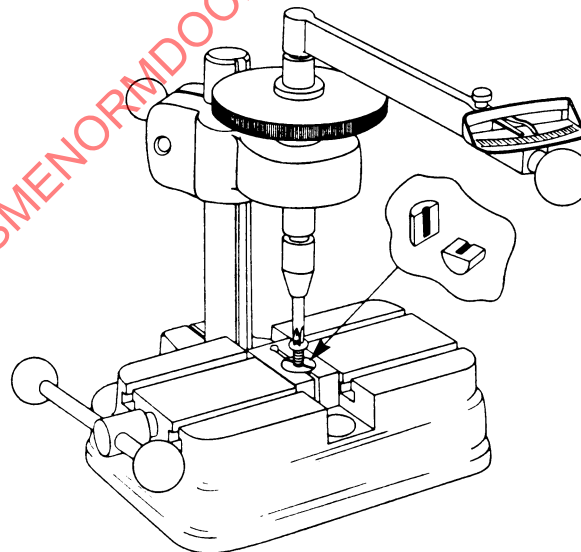
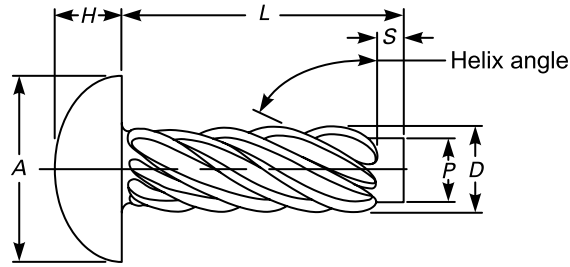


Table 5-1
Dimensions of Round Head Type U Metallic Drive Screws



Nominal Size [Note (1)]	Basic Screw Diameter	Number of Thread Starts	Outside Diameter, D		Head Diameter, A		Head Height, H		Pilot Diameter, P		Drill Size No.	Hole Diameter
			Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.		
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, L				$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	≥ 1 in.
Pilot Length ± 0.015 , S				0.047	0.047	0.047	0.047	0.062	0.062	0.078	0.078	0.125

GENERAL NOTE: For additional requirements, see [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 [Figure 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}

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

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

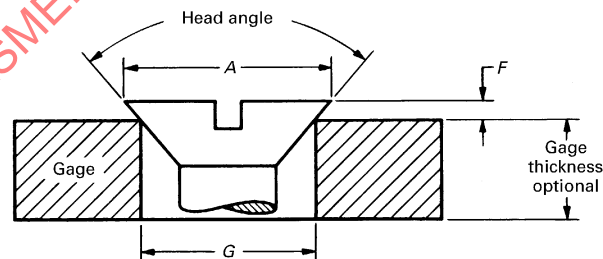
F' = corrected protrusion value

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).

Figure I-1
Protrusion Gage



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](#).

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.

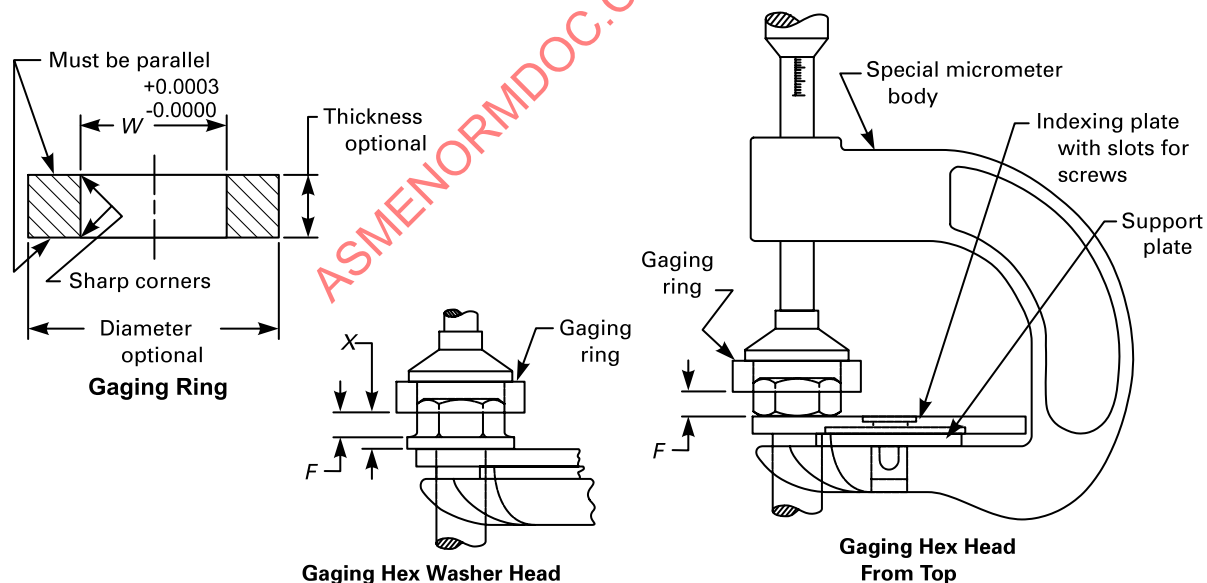
A typical gaging fixture is shown in Figure II-1 with an explanation of its application; however, any equivalent means may be used.

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.

Figure 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. (See [Figure III-1-1](#) 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-1-1](#).

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-1-2](#) through [III-1-5](#) 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 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-1-5](#). 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.

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

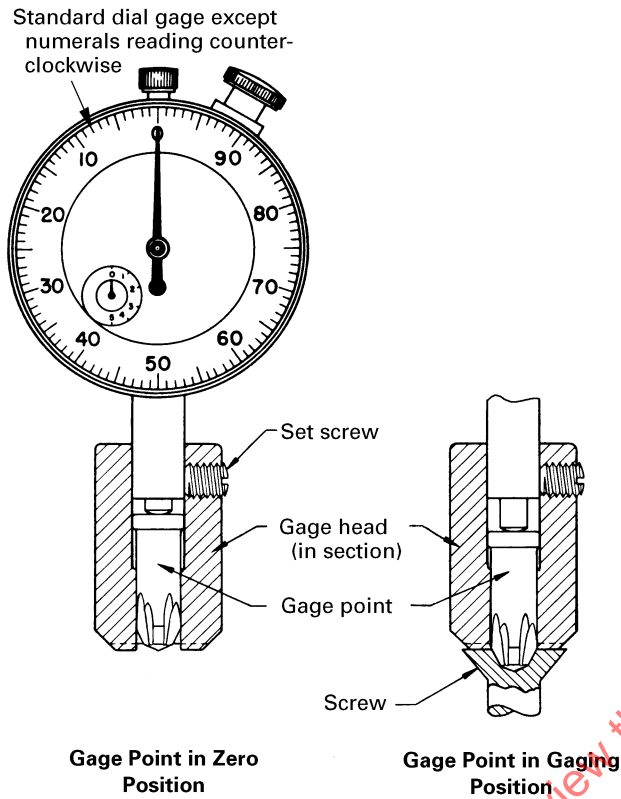
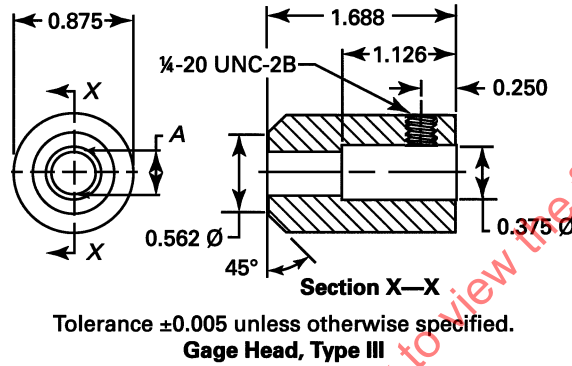
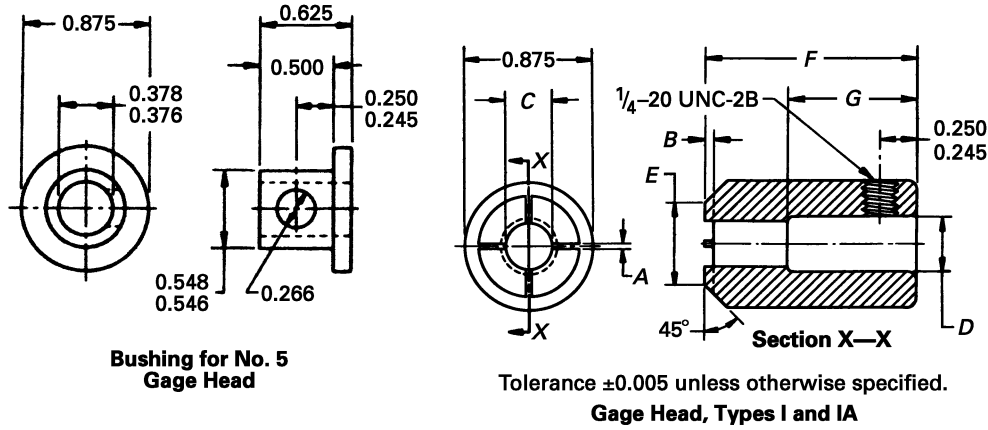
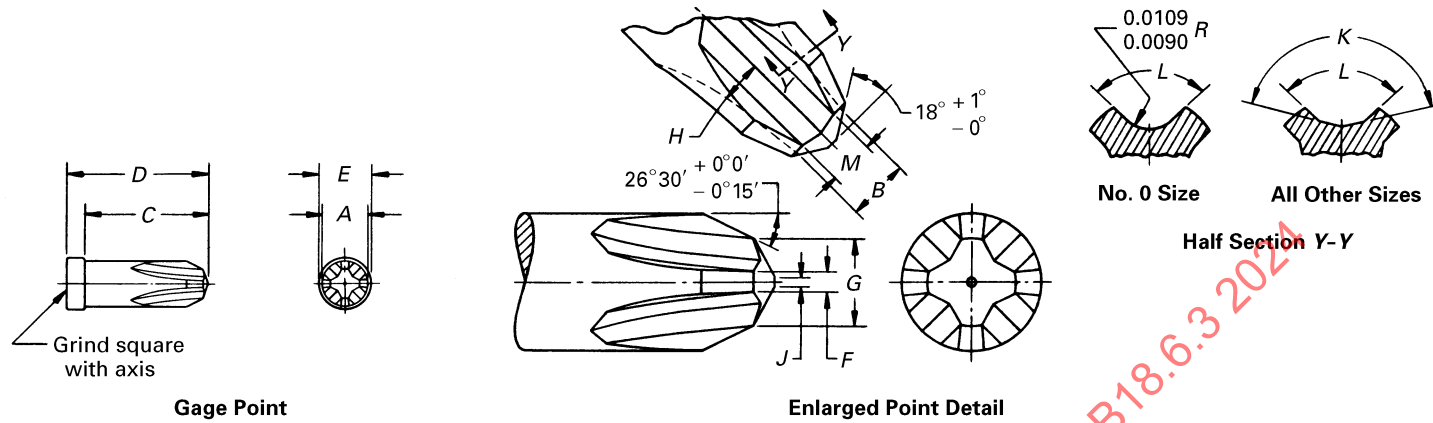


Table III-1-1
Dimensions of Gage Heads for Types I, IA, and III Recesses



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-1-2
Dimensions of Gage Heads for Type I Recess



	Point Dia., A	Point Width, B	Length, C	Length, D	Dia., E	Wing Thickness, F		Point Width, G	Milling Angle, H	Flat on End, J		Base Flute Angle, K	Side Flute Angle, L	Flute Width at Bottom, M
Size of Recess Gage	±0.0002	+0.0000 -0.0010	±0.005	±0.005	±0.005	Max.	Min.	+0.0010 -0.0000	+0°00' -0°15'	Max.	Min.	+0°15' -0°00'	+0°15' -0°00'	+0.0000 -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

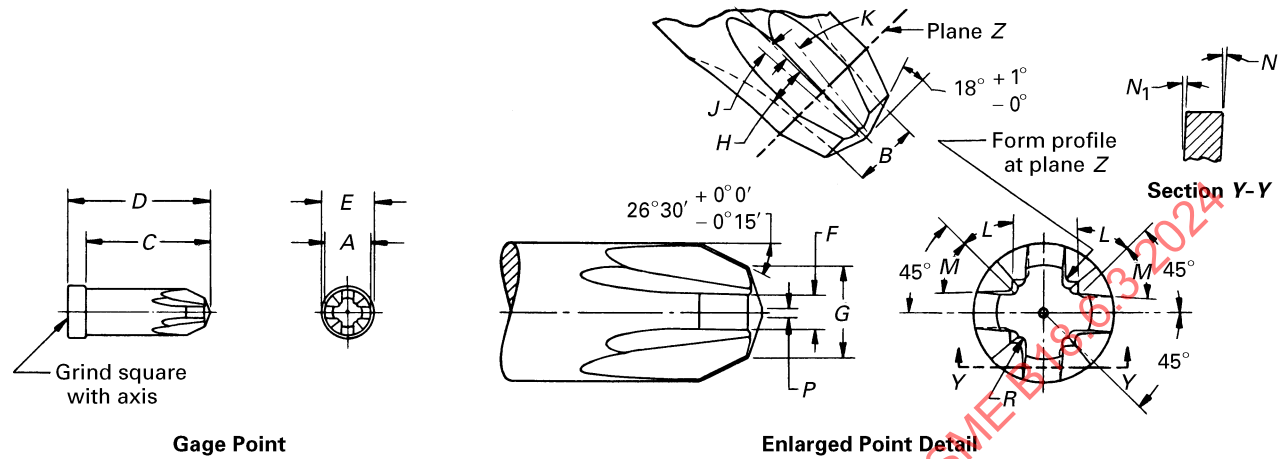
GENERAL NOTE: For additional reference, see [Table III-1-1](#) illustration.

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-1-3
Dimensions of Gage Points for Type IA Recess

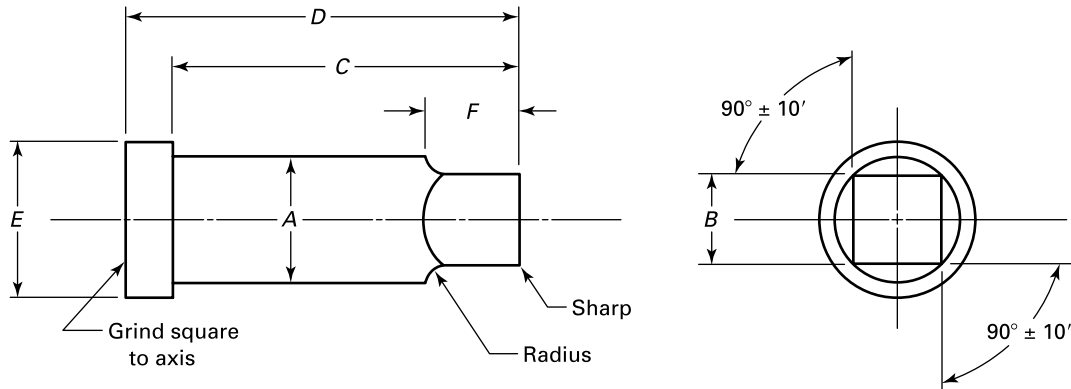


Size of Recess Gage	Point Diameter, A (±0.0002)	Point Width, B (at Base of Radius, R)		Length, C (±0.005)	Length, D (±0.005)	Diameter, E (±0.005)	Wing Thickness, F (+0.0010 -0.0000)	Point Width G (+0.001 -0.000)	
		Max.	Min.					Max.	Min.
No. 0	0.0450	0.0280	0.0265	0.656	0.781	0.094	0.0165	0.035	
No. 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

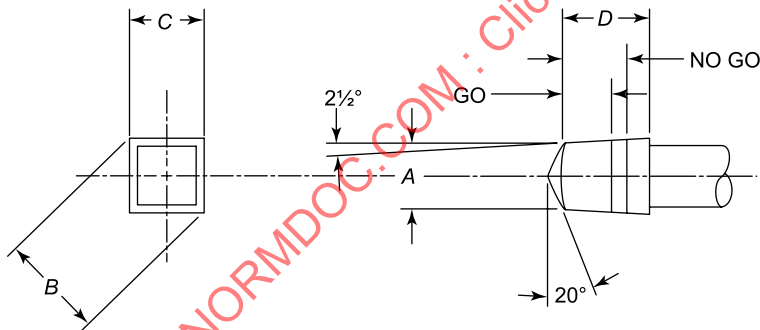
NOTE: (1) These dimensions are measured normal to the milling cut.

Table III-1-4
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-1-5
Dimensions of Type III Square Fit Gage Points



Size of Recess Gage	Across Flats at Point, <i>A</i>		Across Corners, <i>B</i>	Across Flats at Top, <i>C</i>	Length, <i>D</i>		Gaging Lines			
							Regular Socket “R”		Short Socket “S”	
	Max.	Min.			Ref.	Ref.	Max.	Min.	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

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 drive-ability 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 [Figure 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.

(24)

Figure IV-1
Wobble Gaging Fixture

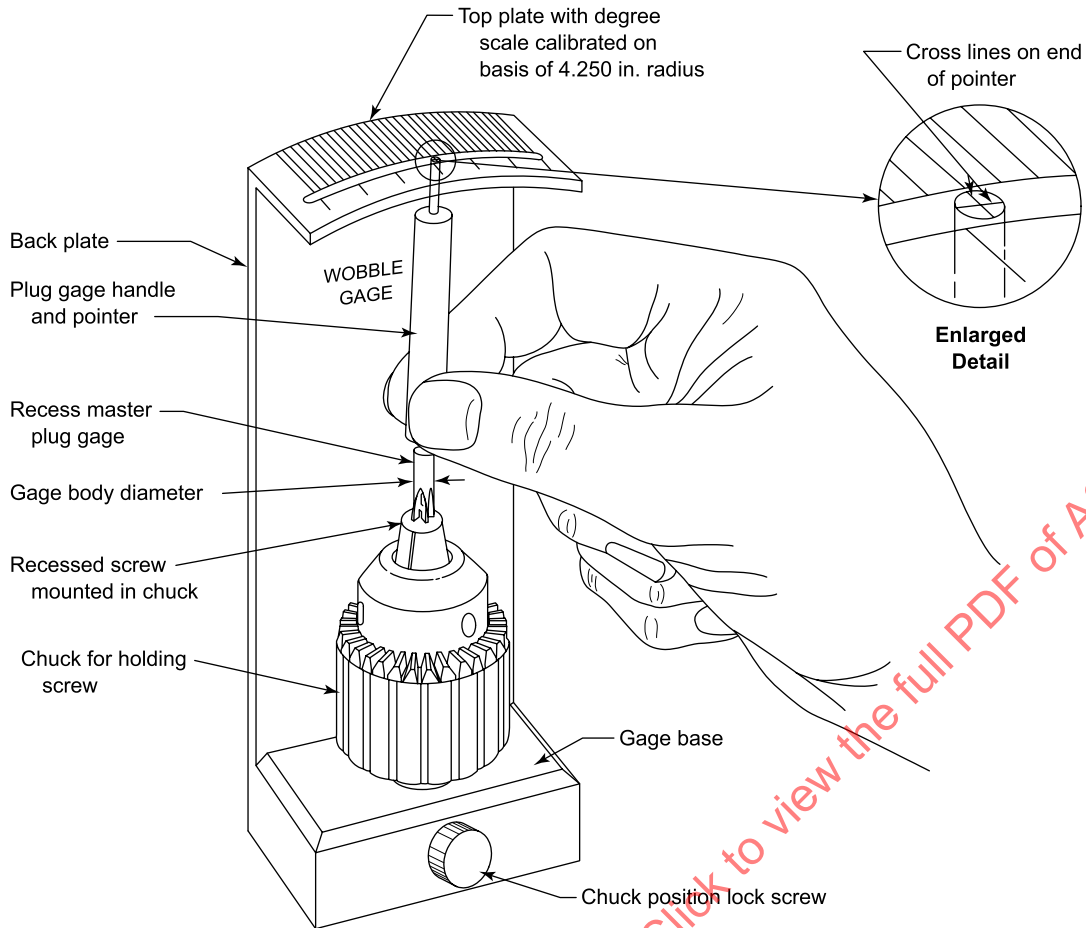


Table IV-1
Gage Body Diameters

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

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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						Minimum Major Diameter
			Minor Diameter [Note (2)]		Pitch Diameter				
			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:

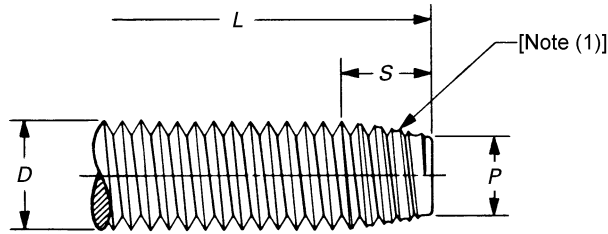
- (1) Where specifying nominal size in decimals, zeros preceding the decimal and in the fourth decimal place shall be omitted.
- (2) The minor diameter limits for internal threads are not specified; they are determined by the amount of thread engagement necessary to satisfy the strength requirements 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)]	Basic Screw Diameter	Threads per inch	Major Diameter, D		Point Diameter, P	Point Taper Length, S [Note (3)]				Determinant Lengths for Point Taper, L [Note (3)]		Minimum Practical Nominal Screw Lengths, L	
			Max.	Min.		For Short Screws		For Long Screws		90-deg Heads	Csk. Heads	90-deg Heads	Csk. Heads
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	$\frac{3}{16}$	$\frac{7}{32}$	$\frac{3}{16}$	$\frac{7}{32}$
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	$\frac{7}{32}$	$\frac{7}{16}$	$\frac{3}{16}$	$\frac{1}{4}$
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	$\frac{11}{32}$	$\frac{15}{32}$	$\frac{5}{16}$	$\frac{5}{32}$
$\frac{3}{8}$	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	$\frac{13}{32}$	$\frac{9}{16}$	$\frac{3}{8}$	$\frac{17}{32}$

GENERAL NOTES:

- (a) For additional requirements, see [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-2-1](#).

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.

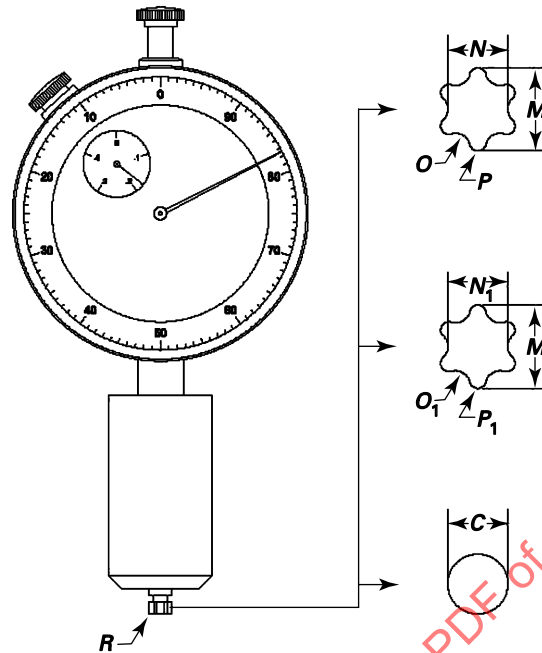
VII-5.3 Lobe Fallaway Depth. The lobular NO GO gage must not enter the recess more than the maximum depth indicated in this Standard.

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-2-1
Dimensions for Type VI Recess Gage Elements



Drive and Gage Size Number	GO Gage Dimensions								Fallaway Gage Dimensions						NO GO Cylindrical		All Elements
	Diameter Over Lobes, M		Width Between Lobes, N		Radius Between Lobes, O		Radius of Lobes, P		Diameter Over Lobes, M_1		Maximum Radius Between Lobes, N_1	Maximum Width Between Lobes, O_1	Radius of Lobes, P_1		Diameter, C		Maximum Gage Point Radius, R
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	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
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	0.0084	0.0080	0.0675	0.0584	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
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	0.0845	0.0744	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
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
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
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
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

**Table VII-2-1
Dimensions for Type VI Recess Gage Elements (Cont'd)**

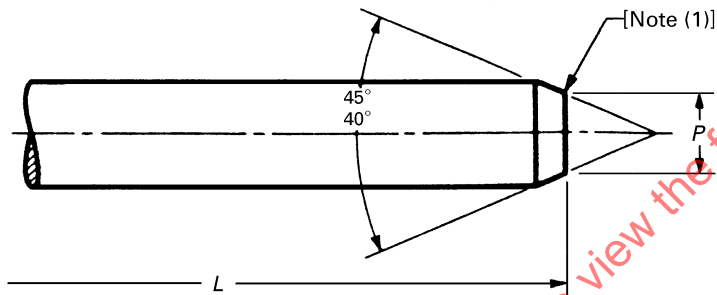
Drive and Gage Size Number	GO Gage Dimensions								Fallaway Gage Dimensions						NO GO Cylindrical		All Elements
	Diameter Over Lobes, M		Width Between Lobes, N		Radius Between Lobes, O		Radius of Lobes, P		Diameter Over Lobes, M_1		Maximum Radius Between Lobes, N_1	Maximum Width Between Lobes, O_1	Radius of Lobes, P_1		Diameter, C		
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.			Max.	Min.	Max.	Min.	
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
40	0.2633	0.2627	0.1882	0.1876	0.0567	0.0557	0.0216	0.0214	0.2683	0.2680	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	0.0682	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	0.0690	0.0334	0.0330	0.2908	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	0.1020	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	0.1100	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	0.1334	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	0.1389	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	0.1714	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	0.1894	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.

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



Nominal Size [Note (2)]	Basic Screw Diameter	Threads per inch	Point Diameter, P		Maximum Nominal Screw Length, L [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	$1\frac{1}{2}$

Table A-1
Dimensions of Header Points for Machine Screws Before Threading (Cont'd)

Nominal Size [Note (2)]	Basic Screw Diameter	Threads per inch	Point Diameter, <i>P</i>		Maximum Nominal Screw Length, <i>L</i> [Note (3)]
			Max.	Min.	
$\frac{3}{8}$	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, see [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

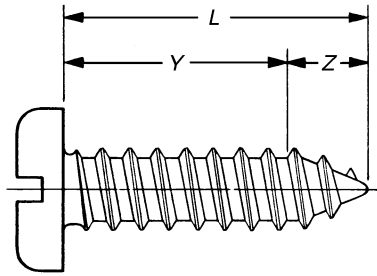
DETERMINATION OF MAXIMUM EFFECTIVE DESIGN GRIP LENGTHS

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

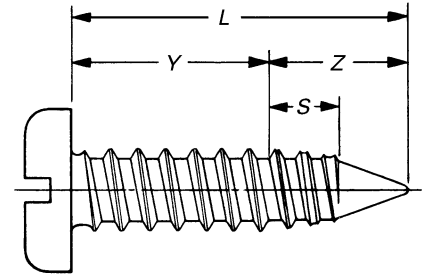


$$Y = L - Z$$

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		Derived From Formula
	$\cot 20^\circ \left(\frac{\text{max. minor diam.}}{2} \right) + 1 \text{ pitch}$		$\cot 16^\circ \left(\frac{\text{max. minor diam.}}{2} \right) + 1 \text{ pitch} + S \text{ max.}$
	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	...
$\frac{1}{4}$	0.335	...	0.478
16	...	0.371	...
18	...	0.409	...
$\frac{5}{16}$	0.418	...	0.592
20	...	0.432	...
24	...	0.511	...
$\frac{3}{8}$	0.508	...	0.706
$\frac{7}{16}$	0.593	...	0.826
$\frac{1}{2}$	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) See Table 4.1.1.2-1 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 applicable tables in this Standard
0 through $\frac{3}{8}$		Max. A (sharp) = $2.040D - 0.003$ ref. [Note (1)] Min. A (sharp) = $1.960D - 0.013$ ref. [Note (1)] Max. A (rounded or flat) = $1.920D - 0.003$ [Note (2)] Min. A (rounded or flat) = $1.820D - 0.013$ [Note (2)] Gaging diameter $G = 1.830D - 0.033$
$\frac{7}{16}$		Max. A (sharp) = $2.000D - 0.063$ ref. [Note (1)] Min. A (sharp) = $1.920D - 0.073$ ref. [Note (1)] Max. A (rounded or flat) = $1.880D - 0.063$ [Note (2)] Min. A (rounded or flat) = $1.800D - 0.073$ [Note (2)] Gaging diameter $G = 1.790D - 0.093$
$\frac{1}{2}$ through $\frac{3}{4}$		Max. A (sharp) = $2.000D - 0.125$ ref. [Note (1)] Min. A (sharp) = $1.920D - 0.135$ ref. [Note (1)] Max. A (rounded or flat) = $1.880D - 0.125$ [Note (2)] Min. A (rounded or flat) = $1.800D - 0.135$ [Note (2)] Gaging diameter $G = 1.790D - 0.155$
Screw Size	Head Height	Slot Depth
0000 through 00	No formulas; see applicable tables in this Standard	No formulas; see applicable tables in this Standard
0 through $\frac{3}{8}$	Max. $H = 0.619D - 0.002$ Min. $H = 0.552D - 0.007$ ref. [Note (1)]	Max. $T = 0.288D - 0.002$ Min. $T = 0.192D - 0.002$
$\frac{7}{16}$	Max. $H = 0.596D - 0.038$ Min. $H = 0.529D - 0.042$ ref. [Note (1)]	Max. $T = 0.274D - 0.017$ Min. $T = 0.184D - 0.015$
$\frac{1}{2}$ through $\frac{3}{4}$	Max. $H = 0.596D - 0.075$ Min. $H = 0.529D - 0.078$ ref. [Note (1)]	Max. $T = 0.274D - 0.034$ Min. $T = 0.184D - 0.027$

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

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

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) = $2.040D - 0.003$ ref. [Note (1)] Min. A (sharp) = $2.000D - 0.009$ ref. [Note (1)] Max. A (rounded or flat) = $1.920D - 0.003$ [Note (2)] Min. A (rounded or flat) = $1.800D - 0.013$ [Note (2)] Gaging diameter $G = 1.790D - 0.033$	Max. $H = 0.444D - 0.001$ Min. $H = 0.396D - 0.005$ ref. [Note (1)]	Max. $T = 0.222D - 0.0005$ Min. $T = 0.184D - 0.004$

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

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

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 applicable tables in this Standard	No formulas; see applicable tables in this Standard	...	No formulas; see applicable tables in this Standard
0 through 12	Max. $A = 1.980D - 0.003$	Max. $H = 0.550D + 0.006$	Max. $H = 0.692D + 0.002$	Max. $T = 0.350D + 0.001$
	Min. $A = 1.940D - 0.012$	Min. $H = 0.520D$	Min. $H = 0.652D - 0.003$	Min. $T = 0.300D - 0.004$
$\frac{1}{4}$ through $\frac{1}{2}$	Max. $A = 1.980D - 0.003$	Max. $H = 0.550D + 0.006$	Max. $H = 0.692D + 0.002$	Max. $T = 0.293D + 0.014$
	Min. $A = 1.940D - 0.012$	Min. $H = 0.520D$	Min. $H = 0.652D - 0.001$	Min. $T = 0.246D + 0.008$
$\frac{9}{16}$ through $\frac{3}{4}$	Max. $A = 2.100D - 0.140$	Max. $H = 0.550D + 0.006$	Max. $H = 0.692D + 0.002$	Max. $T = 0.293D + 0.014$
	Min. $A = 2.000D - 0.125$	Min. $H = 0.520D$	Min. $H = 0.652D - 0.001$	Min. $T = 0.246D + 0.008$

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 applicable tables in this Standard	No formulas; see applicable tables in this Standard	No formulas; see applicable tables in this Standard
0 through 12	Max. $A = 2.440D - 0.015$	Max. $H = 0.620D$	Max. $T = 0.350D + 0.001$
	Min. $A = 2.360D - 0.023$	Min. $H = 0.570D - 0.005$	Min. $T = 0.300D - 0.004$
$\frac{1}{4}$ through $\frac{3}{4}$	Max. $A = 2.000D + 0.073$	Max. $H = 0.520D + 0.020$	Max. $T = 0.293D + 0.014$
	Min. $A = 1.930D + 0.063$	Min. $H = 0.470D + 0.015$	Min. $T = 0.246D + 0.008$

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