

ASME B107.600-2016
(Revision of ASME B107.600-2008)

Screwdrivers and Screwdriver Bits

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

The American National Standards Committee B107, Socket Wrenches and Drives, under sponsorship of The American Society of Mechanical Engineers (ASME), was reorganized on June 28, 1967, as an ASME Standards Committee, and its title was changed to Hand Tools and Accessories. In 1996, its scope was expanded to include safety considerations.

In 1999, ASME initiated a project to consolidate hand tool standards by category of tool. The initial implementation included distinct standards within a single publication bearing a three-digit number corresponding to the responsible B107 subcommittee. It was intended that subsequent revisions would integrate the component standards, resulting in a more traditional document. This revision redefines types and classes of screwdrivers and screwdriver bits; designations are provided in Nonmandatory Appendix A.

The purposes of this Standard are to define dimensional, performance, and safety requirements specifically applicable to screwdrivers and screwdriver bits, to specify test and gaging methods to evaluate performance relating to the defined requirements, and to indicate limitations of safe use.

This Standard may be used as a guide by state authorities or other regulatory bodies in the formulation of laws or regulations. It is also intended for voluntary use by establishments that use or manufacture the tools covered.

ASME B107.600-2008 superseded, replaced, and rendered obsolete the following standards:

B107.15, Flat Tip Screwdrivers

B107.26, Screwdriver Bits, Hand Driven

B107.30, Cross Tip Screwdrivers

B107.31, Screwdrivers, Cross Tip Gaging

Members of the Hand Tools Institute (HTI), Screwdriver Standards Committee, through their knowledge and hard work, have been major contributors to the development of B107 standards. Their active efforts in the promotion of these standards are acknowledged and appreciated.

Previously, the dimensional specifications for flat tip screwdrivers were derived from manufacturers' catalogs. Over a period of several years, members of the B107 Committee reviewed and reevaluated the dimensions against the corresponding standards produced by the ASME B18 Committee for the Standardization of Bolts, Nuts, Rivets, Screws, Washers, and Similar Fasteners. Members of the HTI Screwdriver Standards Committee sourced related fasteners to validate that they are being produced in conformance with the applicable standards. These changes will provide for optimum fit when using flat tip screwdrivers built to conform to this Standard.

Suggestions for improvement of this Standard will be welcomed. They should be sent to The American Society of Mechanical Engineers, Secretary, B107 Standards Committee, Two Park Avenue, New York, NY 10016-5990.

This revision was approved as an American National Standard on June 29, 2016.

ASME B107 COMMITTEE

Hand Tools and Accessories

(The following is the roster of the Committee at the time of approval of this Standard.)

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General. ASME Standards are developed and maintained with the intent to represent the consensus of concerned interests. As such, users of this Standard may interact with the Committee by requesting interpretations, proposing revisions or a Case, and attending Committee meetings. Correspondence should be addressed to:

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Proposing Revisions. Revisions are made periodically to the Standard to incorporate changes that appear necessary or desirable, as demonstrated by the experience gained from the application of the Standard. Approved revisions will be published periodically.

The Committee welcomes proposals for revisions to this Standard. Such proposals should be as specific as possible, citing the paragraph number(s), the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent documentation.

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

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

Interpretations. Upon request, the B107 Standards Committee will render an interpretation of any requirement of the Standard. Interpretations can only be rendered in response to a written request sent to the Secretary of the B107 Standards Committee at go.asme.org/Inquiry.

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

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

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

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

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SCREWDRIVERS AND SCREWDRIVER BITS

1 SCOPE

This Standard provides performance and safety requirements for noninsulated, hand-driven screwdrivers and hand-driven, hexagonal shank screwdriver bits intended for manual operation in driving or removing screws. The screwdrivers and bits are of the types normally used by cabinetmakers, carpenters, sheet metal workers, production workers, mechanics, etc.

Inclusion of dimensional data in the Standard is not intended to imply that all of the products described herein are stock production sizes. Manufacturers may make sizes other than those listed. Consumers are requested to consult with manufacturers concerning lists of stock production sizes.

2 DEFINITIONS

See Fig. 1.

assembly: the blade plus the handle.

bit: removable driver comprised of a hexagonal shank plus tip.

blade: the shank plus the tip.

bolster: a change in the geometry of the shank at the junction of the handle.

handle: that portion of the screwdriver that is gripped with the hand.

shank: the portion of the blade between the tip and the handle.

tip: the portion of the blade that engages the screw recess.

3 REFERENCES

The following is a list of publications referenced in this Standard. The latest available edition shall be used.

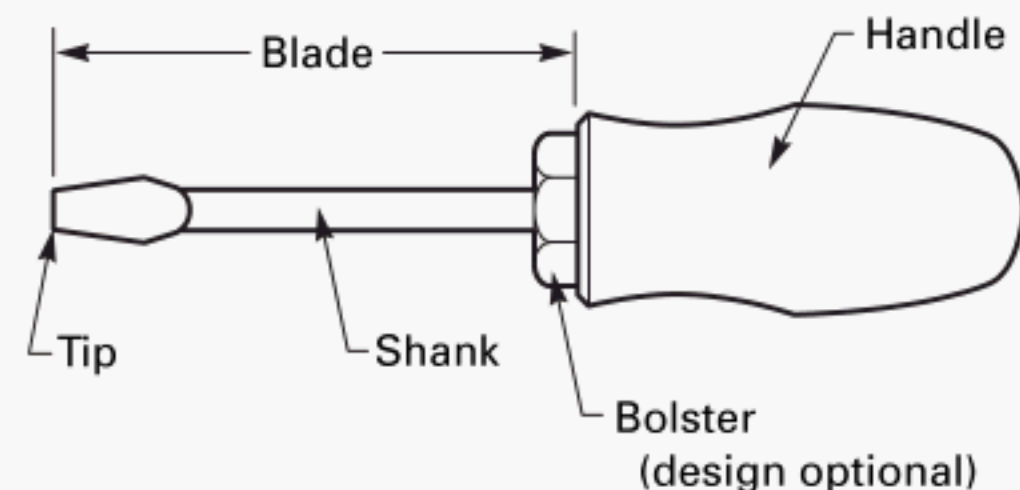
ASTM D2240, Standard Test Method for Rubber Property — Durometer Hardness

ASTM E18, Standard Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials

ASTM F1505, Standard Specification for Insulated and Insulating Hand Tools

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

Fig. 1 Screwdriver Nomenclature



Guide to Hand Tools — Selection, Safety Tips, Proper Use and Care

Publisher: Hand Tools Institute (HTI), 25 North Broadway, Tarrytown, NY 10591 (www.hti.org)

IEC 60900, Live working — Hand tools for use up to 1000 V a.c. and 1500 V d.c.

Publisher: International Electrotechnical Commission (IEC), 3, rue de Varembe, Case Postale 131, CH-1211, Genève 20, Switzerland/Suisse (www.iec.ch)

SAE J1703, Motor Vehicle Brake Fluid

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

4 CLASSIFICATION

Type I: Screwdriver Assembly

Class 1: Flat Tip

Class 2: Cross Tip Phillips¹ (PH)

Class 3: Cross Tip Pozidriv¹ (PZ)

Type II: Screwdriver Bit

Class 1: Flat Tip

Class 2: Cross Tip Phillips (PH)

Class 3: Cross Tip Pozidriv (PZ)

5 PERFORMANCE REQUIREMENTS

The illustrations herein are descriptive, not restrictive, and shall not preclude designs otherwise in accordance with the requirements of this Standard.

Conformance to marking and other requirements not determined by test shall be verified by visual examination.

¹ Phillips and Pozidriv PZI, PZ2, and PZ3 are registered trademarks of the Phillips Screw Co.

Screwdrivers and bits shall conform to the dimensional and performance characteristics specified in applicable tables and shall pass applicable tests in section 6. Table values are in inches unless otherwise indicated.

5.1 Design

Type I Screwdriver Assembly. The blade shall be held securely in the handle.

Type II bit shanks shall meet the following dimensions:

Nominal Size	Width Across Flats	Width Across Corners
$\frac{1}{4}$	0.247–0.250	0.2785–0.2845
$\frac{5}{16}$	0.309–0.313	0.3480–0.3560

Class 1 flat tips are for driving and removing slotted screws and shall conform to the dimensional and performance characteristics specified in Table 1 and Fig. 2. Taper at the tip shall be centered within 5 deg of the shank axis.

Class 2 (PH) tips are for driving or removing screws with Phillips recesses and shall conform to the dimensional and performance characteristics specified in Table 2 and Fig. 3. Tip dimensions shall be gaged in accordance with paras. 6.8 and 6.9.

Class 3 (PZ) tips are for driving or removing screws with Pozidriv recesses and shall conform to the dimensional and performance characteristics specified in Tables 3 and 4 and Fig. 4. Tip dimensions shall be gaged in accordance with paras. 6.8 and 6.9.

5.2 Materials

The materials used in the manufacture of screwdrivers and bits shall be such as to produce products conforming to the requirements of this Standard.

5.3 Markings

Screwdrivers and bits shall be marked in a plain and permanent manner with the manufacturer's name or with a trademark of such known character that the manufacturer shall be readily determined. Marking shall be as permanent as the normal life expectancy of the screwdriver to which it is applied (providing the marked surface has not been subjected to a fretting or abrading action) and be capable of withstanding the cleaning procedures normally experienced during its intended use.

5.4 Finish

Metallic components of screwdrivers and bits shall be essentially free from scale, seams, laps, cracks, or any condition that may adversely affect durability or serviceability of the tool.

Screwdrivers and bits shall be treated in a manner to resist rust or corrosion. There shall be no evidence of peeling or chipping of any coating, where applicable.

5.5 Handle

The handle shall be suitably finished to provide a comfortable grip. The handle shall be free from rough edges, sharp corners, or tool marks that affect comfort while using the tool.

When the handle is furnished with a cushion grip, there shall be no detectable slippage between the handle and cushion grip under normal usage.

5.6 Hardness

Type I screwdrivers' tip portion or the entire blade shall be hardened to not less than 50 HRC. Type II bit tips (for a minimum distance of t_1 or L) shall be hardened to not less than 56 HRC. The rest of the bit shall be hardened to not less than 50 HRC.

6 TESTS

WARNING: Many tests required herein are inherently hazardous, and adequate safeguards for personnel and property shall be employed in conducting such tests. These tests are designed to evaluate the tools and materials and do not condone the use of the tools in an environment, or in a manner, inconsistent with safe use of the tools.

6.1 Hardness Test

The Rockwell hardness test shall be conducted in accordance with ASTM E18.

6.2 Tip Torsional Test

The tip of each sample under test shall be fixtured in a test block of applicable dimensions shown in Table 1 and Fig. 5 (Class 1), Table 2 and Fig. 6 (Class 2), or Table 4 and Fig. 6 (Class 3). The test block shall have a hardness of not less than 60 HRC.

When tested to the minimum tip torque value specified, neither the shank nor the tip shall show visible permanent deformation. The torque shall be applied by forces acting perpendicular to the long axis of the blade/bit with the tip held securely in the test block. It is permissible to support the blade/bit in a suitable position for test. The blade/bit shall be restricted from endwise movement during testing.

6.3 Assembly Torsional Test (Type I)

The test shall be conducted after preheating the entire tool to a uniform temperature of $125^{\circ}\text{F} \pm 5^{\circ}\text{F}$. The torque shall be applied within 1 min after removing the tool from the heating medium. The torque shall be applied by forces acting at or near the middle of the natural grip of the handle perpendicular to the long axis of the grip with the tip held securely in the test block. It is permissible to support the shank at or near the junction of the shank and handle in a suitable position for test. The screwdriver shall be restricted from endwise movement during testing. When tested to the minimum assembly torque value specified in Table 1, 2, or 4, the assembly

Table 1 Dimensional and Performance Characteristics of Flat Tips

Typical Screw Size	Nominal Bit Size	Nominal Bit Hex Stock	Nominal Screwdriver Size	Nominal		Tip Thickness at t_1		Tip Width at t_1		t_1 , in.	Test Block Slot [Note (1)]		Torsional Test			
				Dimensions at t_1 , in. (Ref.)				Greater Than	Less Than or Equal to		Width ± 0.0005 , in.	Depth ± 0.0028 , in.	Minimum L_a Assembly, lbf-in.	Minimum L_b Blade Tip, lbf-in.	Minimum Bit Test Torque, lbf-in.	Minimum Bending Moment, lbf-in.
				Thickness	Width	Min.	Max.	in.	in.		in.	in.	in.	in.		
0	0	$\frac{1}{4}$	0.085	0.014	0.085	0.012	0.015	0.075	0.095	0.008	0.0160	0.0308	1.4	1.9	2.1	None
1	...	...	$\frac{3}{32}$	0.017	0.103	0.015	0.019	0.085	0.120	0.010	0.0200	0.0326	2.5	3.5	4.1	None
2	2	$\frac{1}{4}$	$\frac{1}{8}$	0.020	0.133	0.017	0.023	0.120	0.145	0.012	0.0240	0.0344	4.6	6.3	7.5	None
3	...	...	$\frac{5}{32}$	0.024	0.158	0.021	0.027	0.145	0.170	0.014	0.0280	0.0368	8.1	11.0	...	60
4	4	$\frac{1}{4}$	$\frac{3}{16}$	0.027	0.183	0.023	0.031	0.170	0.195	0.016	0.0320	0.0386	12.0	16.0	19.0	80
6-7	6-7	$\frac{1}{4}$	$\frac{7}{32}$	0.035	0.228	0.031	0.039	0.210	0.245	0.021	0.0400	0.0434	25.0	35.0	41.0	100
8-9	8-9	$\frac{1}{4}$	$\frac{1}{4}$	0.041	0.263	0.037	0.045	0.245	0.280	0.025	0.0460	0.0470	41.0	56.0	67.0	350
10	10	$\frac{5}{16}$	$\frac{5}{16} \times 0.046$	0.046	0.326	0.042	0.050	0.308	0.343	0.028	0.0510	0.0500	65.0	89.0	106.0	700
12	12	$\frac{5}{16}$	$\frac{5}{16} \times 0.052$	0.052	0.363	0.048	0.056	0.345	0.380	0.031	0.0570	0.0536	94.0	128.0	153.0	850
14, $\frac{1}{4}$, 16	...	...	$\frac{3}{8} \times 0.059$	0.059	0.397	0.055	0.063	0.380	0.415	0.035	0.0640	0.0578	134.0	183.0	...	1,000
18, $\frac{5}{16}$, 20	...	...	$\frac{3}{8} \times 0.068$	0.068	0.397	0.064	0.072	0.380	0.415	0.041	0.0730	0.0632	179.0	246.0	...	1,000
24, $\frac{3}{8}$, $\frac{7}{16}$	...	...	$\frac{7}{16}$	0.077	0.448	0.073	0.081	0.428	0.468	0.046	0.0820	0.0686	200.0	357.0	...	1,000
$\frac{1}{2}$	...	...	$\frac{15}{32}$	0.087	0.480	0.083	0.091	0.460	0.500	0.052	0.0920	0.0746	200.0	492.0	...	1,000
$\frac{9}{16}$	...	...	$\frac{1}{2}$	0.098	0.511	0.094	0.102	0.491	0.531	0.059	0.1030	0.0812	225.0	669.0	...	1,000

GENERAL NOTES:

- (a) Formula for calculating test block slot dimensions (see Fig. 5):
width = (maximum tip thickness at $t_1 + 0.0010) \pm 0.0005$; depth = $(t_1 + 0.0224) \pm 0.0028$
- (b) Formula for calculating torsional test loads for blade tips:
 $L_b = 145,000WT^2$, where W and T are the dimensions 25% of the range over the minimum in inches at t_1 (see Fig. 3)
- (c) Formula for calculating torsional test loads for assembly:
 $L_a = 0.73L_b$
- (d) Formula for calculating bit test torque:
Bit test torque = $1.19L_b$

NOTE:

- (1) See Fig. 5.

Fig. 2 Flat Tip Geometry

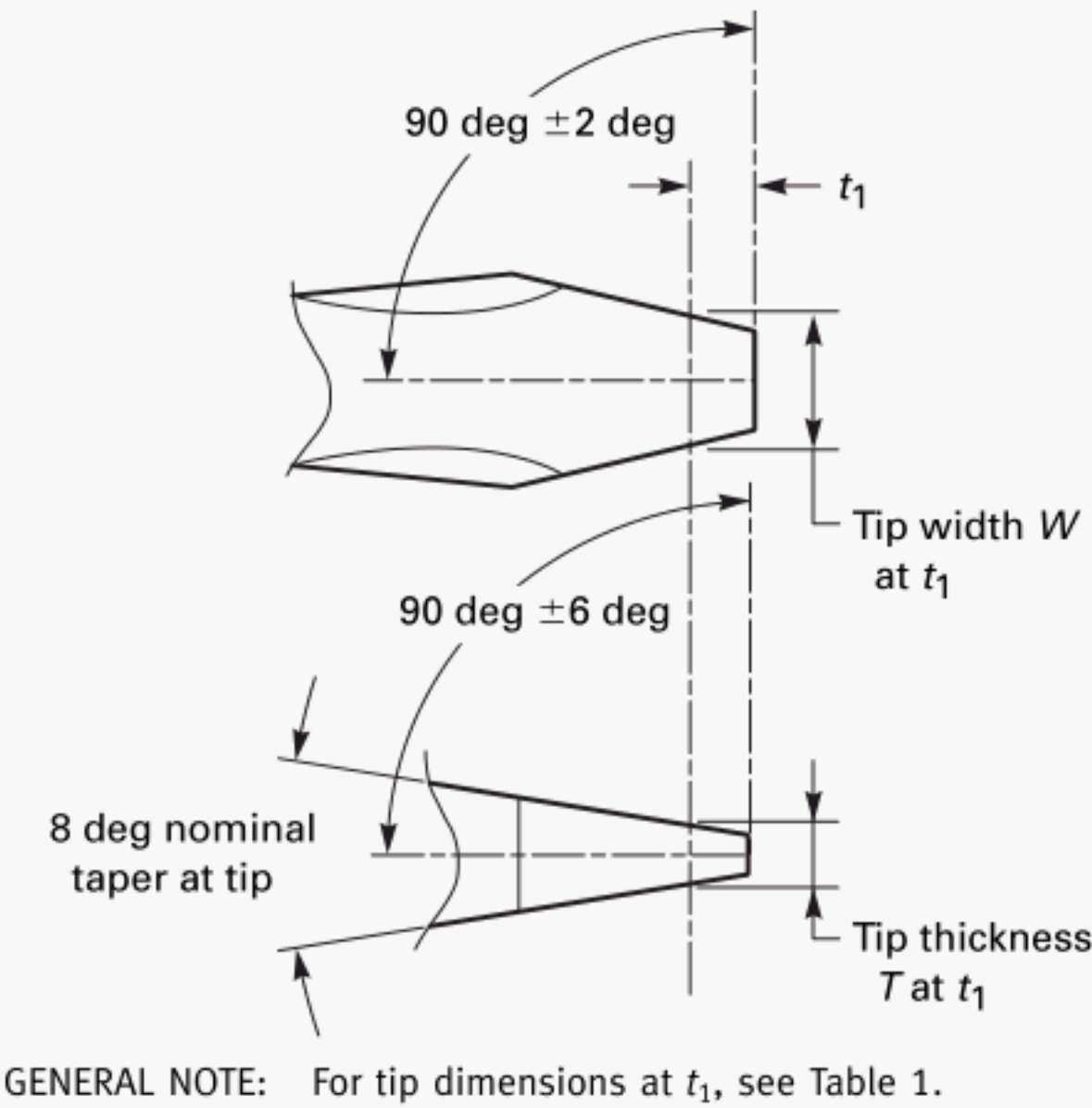


Table 2 Dimensional and Performance Characteristics of PH Tips

Point Size	Blade		<i>B</i> , ±0.0010	<i>O</i> , deg +30/−0 min	<i>G</i> , ±0.001	<i>H</i> , deg +0/−30 min	<i>F</i> [Note (1)]		<i>E</i> , deg +30/−0 min	<i>M</i> , ±0.0010	<i>L</i> , Min.	Test Block		Minimum Torsional Test, lbf-in.	
	Nominal Diameter	Bit Hex Nominal Size					Min.	Max.				<i>S</i> , Major Wing Spread ±0.002	<i>T</i> , Minor Wing Spread ±0.002	Assembly	Tip/Bit
0	1/8	1/4	0.0230	[Note (2)]	0.032	7	0.011	0.012	92	[Note (3)]	0.12	0.090	0.032	6	8.9
1	3/16	1/4	0.0394	138	0.050	7	0.016	0.020	92	0.0202	0.12	0.142	0.050	25	31.0
2	1/4	1/4 or 5/16	0.0606	140	0.090	5 deg, 45 min	0.023	0.028	92	0.0434	0.19	0.233	0.090	60	100.0
3	5/16	5/16	0.0983	146	0.150	5 deg, 45 min	0.027	0.033	92	0.0826	0.28	0.386	0.150	150	220.0
4	3/8	5/16 or 7/16	0.1407	153	0.200	7	0.040	0.045	92	0.1078	0.34	0.486	0.200	200	340.0

- NOTES:
- (1) Resultant dimension.
- (2) For point size 0, dimension is a radius rather than an angle. *O* = 0.0082-in. to 0.0109-in. radius.
- (3) For point size 0, *M* is in the range 0.0114 in. to 0.0151 in.

Fig. 3 PH Tip Geometry

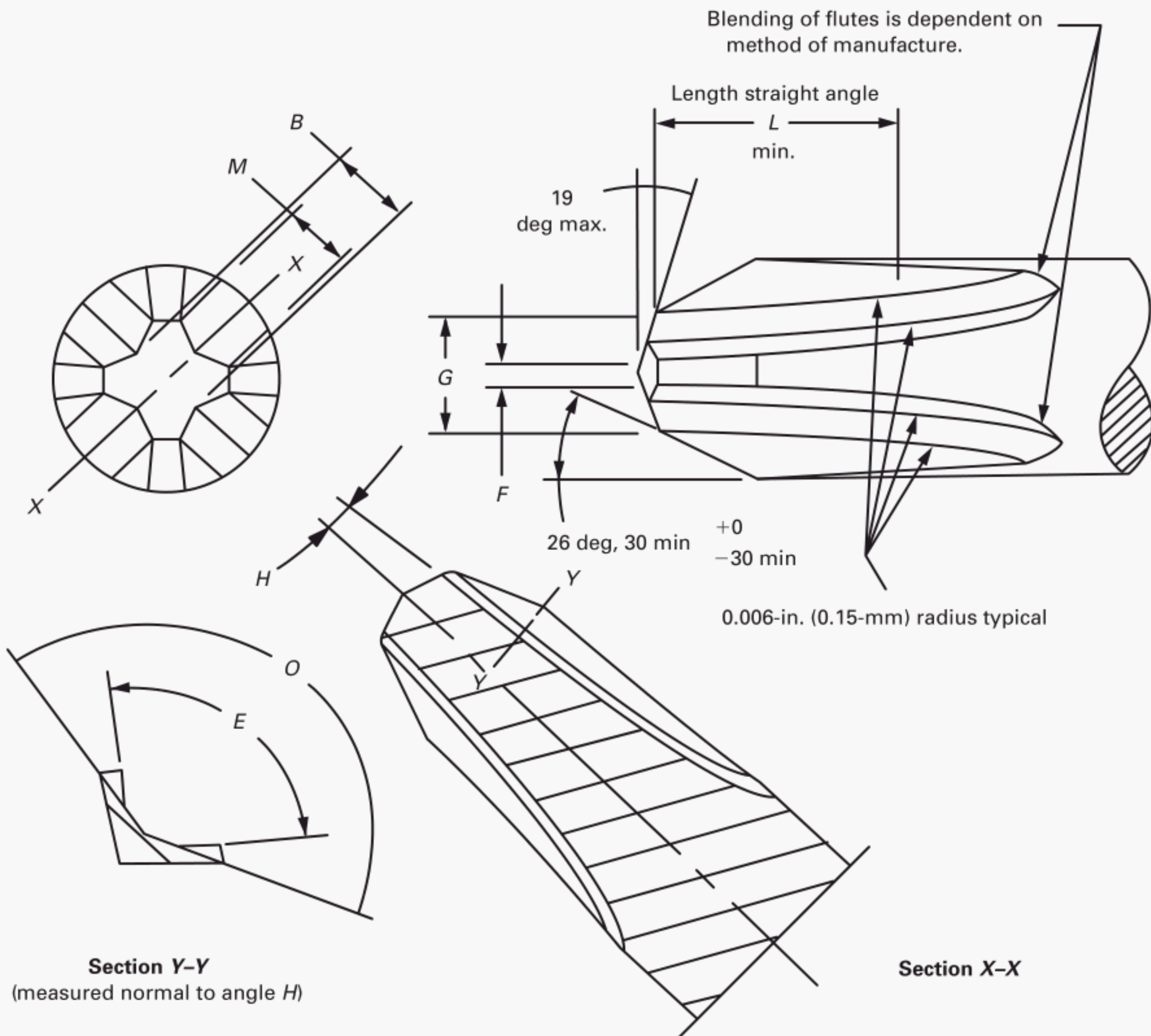


Table 3 Dimensional Characteristics of PZ Tips

Point Size	A, in. ±0.010	B, in.		C, in.		E, deg +7/–0 min	F, in. [Note (1)]		G, in.		H, deg +0/–30 min	L, in. Min.	M, deg +30/–0 min	N, deg +30/–0 min
		Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.				
0	0.125	0.0265	0.0280	0.003	0.004	46	0.0165	0.0175	0.0350	0.0360	7	0.078	4 deg, 23 min	7 deg, 45 min
1	0.188	0.0423	0.0438	0.004	0.005	46	0.0265	0.0275	0.0540	0.0550	7	0.125	4 deg, 23 min	7 deg, 45 min
2	0.250	0.0655	0.0670	0.006	0.012	46	0.0370	0.0390	0.0940	0.0960	5 deg, 45 min	0.188	3 deg	6 deg, 20 min
3	0.313	0.1005	0.1020	0.008	0.014	56 deg, 15 min	0.0530	0.0540	0.1540	0.1560	5 deg, 45 min	0.281	3 deg	6 deg, 20 min
4	0.375	0.1505	0.1520	0.014	0.020	56 deg, 15 min	0.0800	0.0820	0.2020	0.2040	7	0.344	4 deg, 23 min	7 deg, 45 min

NOTE:
(1) Resultant dimension.

Table 4 Performance Characteristics of PZ Tips

Point Size	Blade Nominal Diameter	Bit Hex Nominal Size	Test Block		Torsional Test	
			S, Major Wing Spread	T, Minor Wing Spread	Minimum Assembly, lbf-in.	Minimum Tip/Bit, lbf-in.
			±0.002	±0.0020		
0	1/8	1/4	0.090	0.0355	6	8.9
1	3/16	1/4	0.142	0.0545	25	35.0
2	1/4	1/4 or 5/16	0.233	0.0950	60	100.0
3	5/16	5/16	0.386	0.1550	150	350.0
4	3/8	7/16	0.486	0.2030	200	550.0

Fig. 4 PZ Tip Geometry

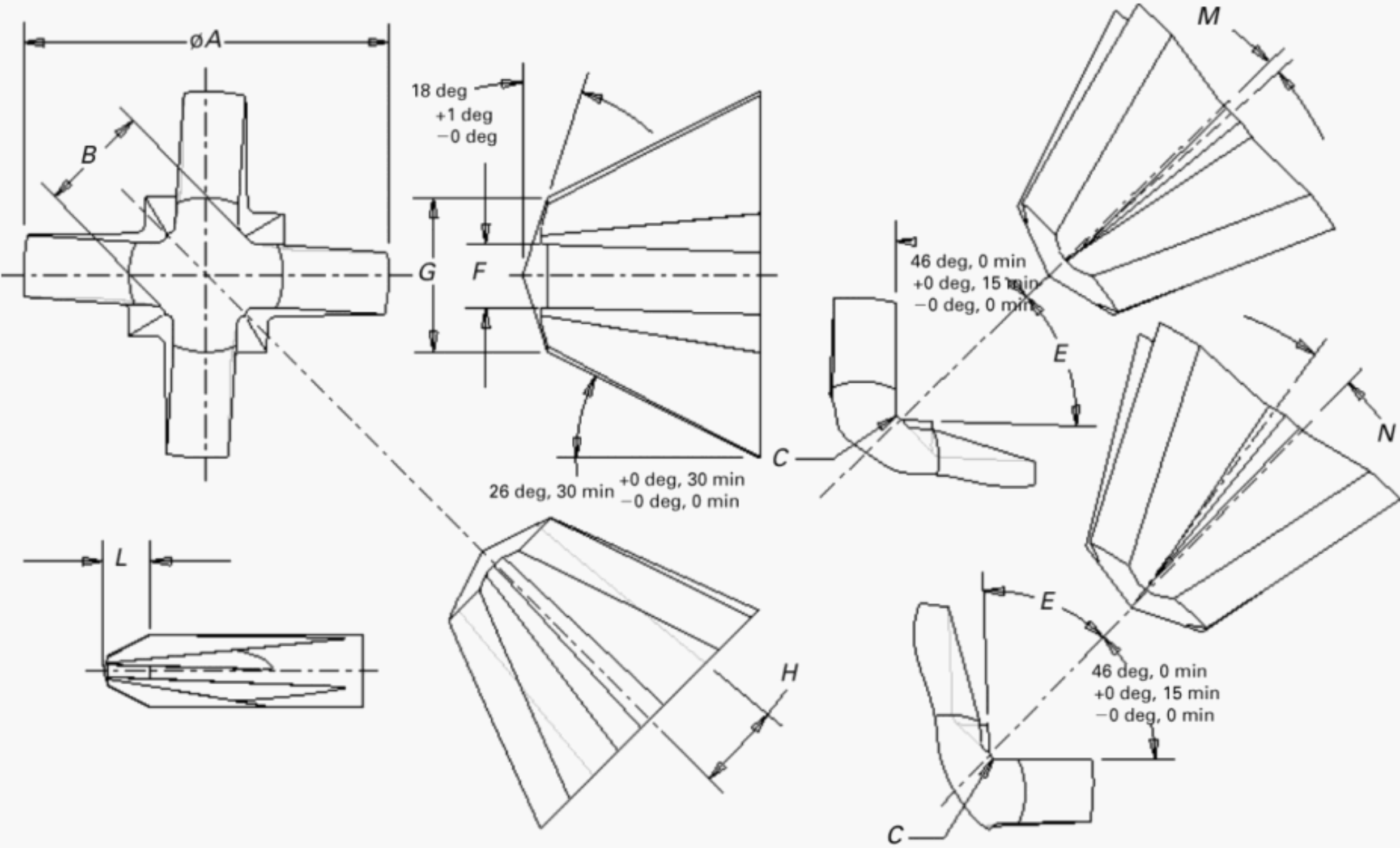
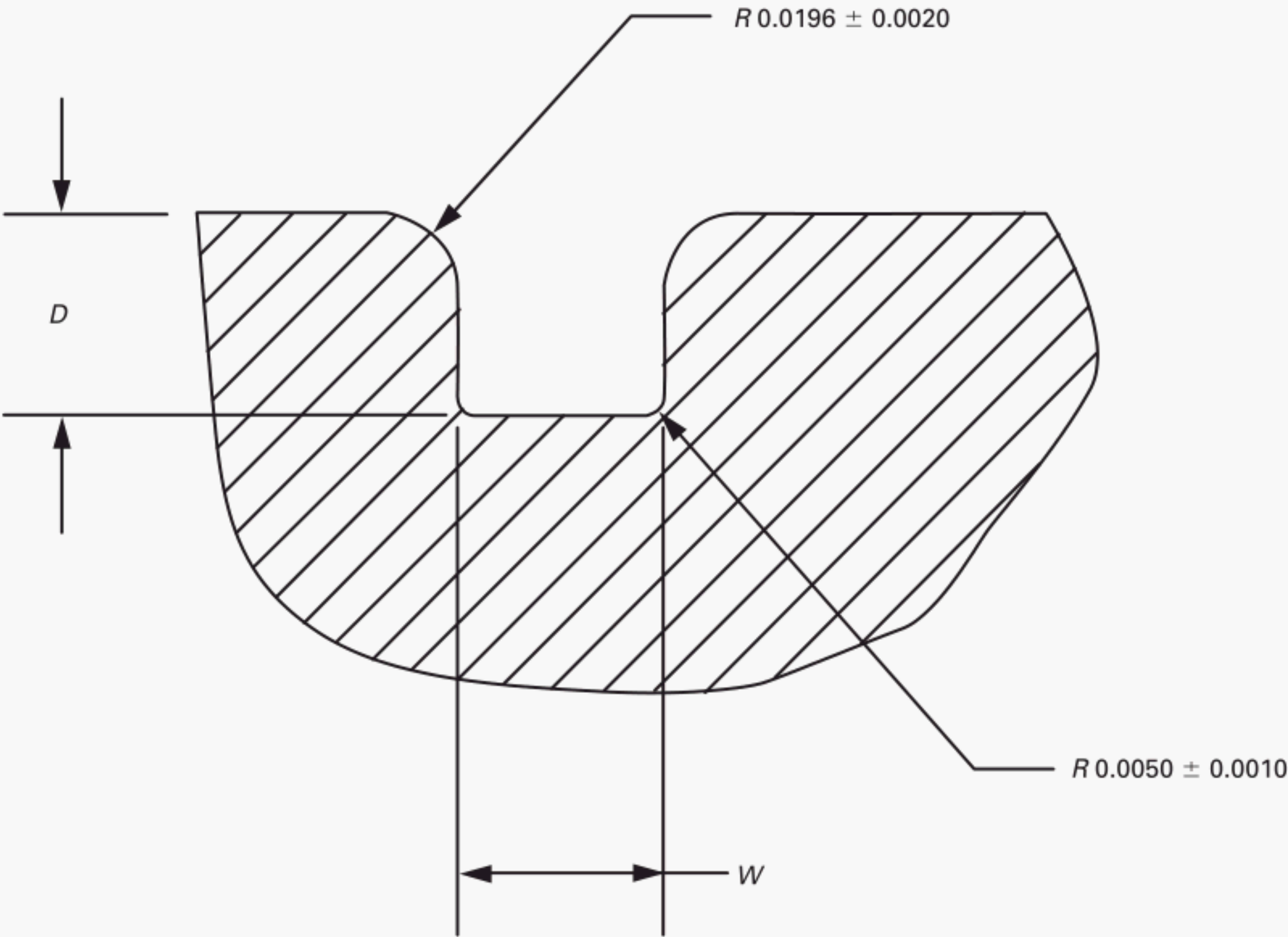


Fig. 5 Flat Tip Test Block Dimensions



GENERAL NOTE: For nominal tip thickness smaller than 0.025 in., use 0.004R in. maximum at the bottom of the groove.

Fig. 6 Cross Tip Test Block Wing Spread

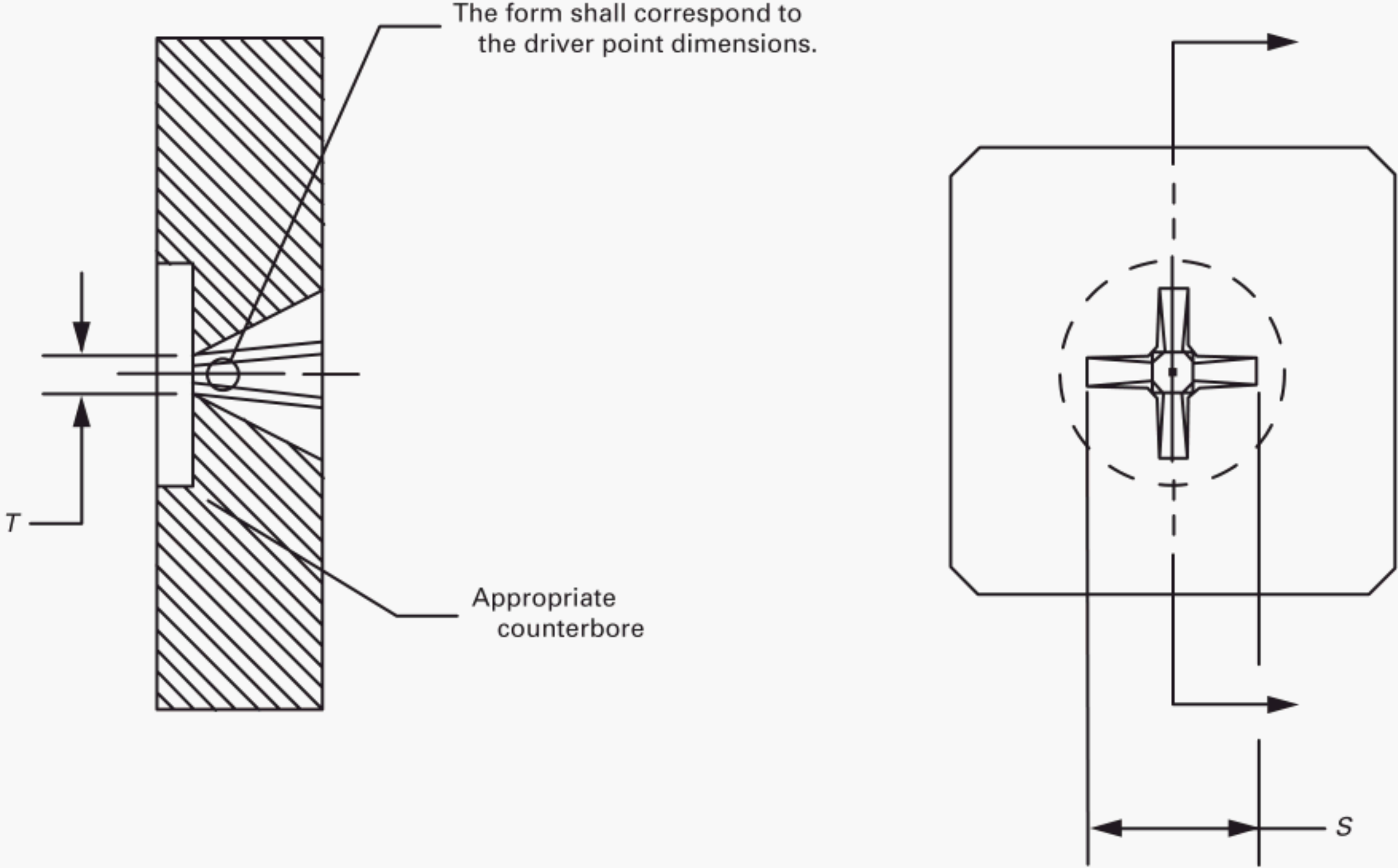
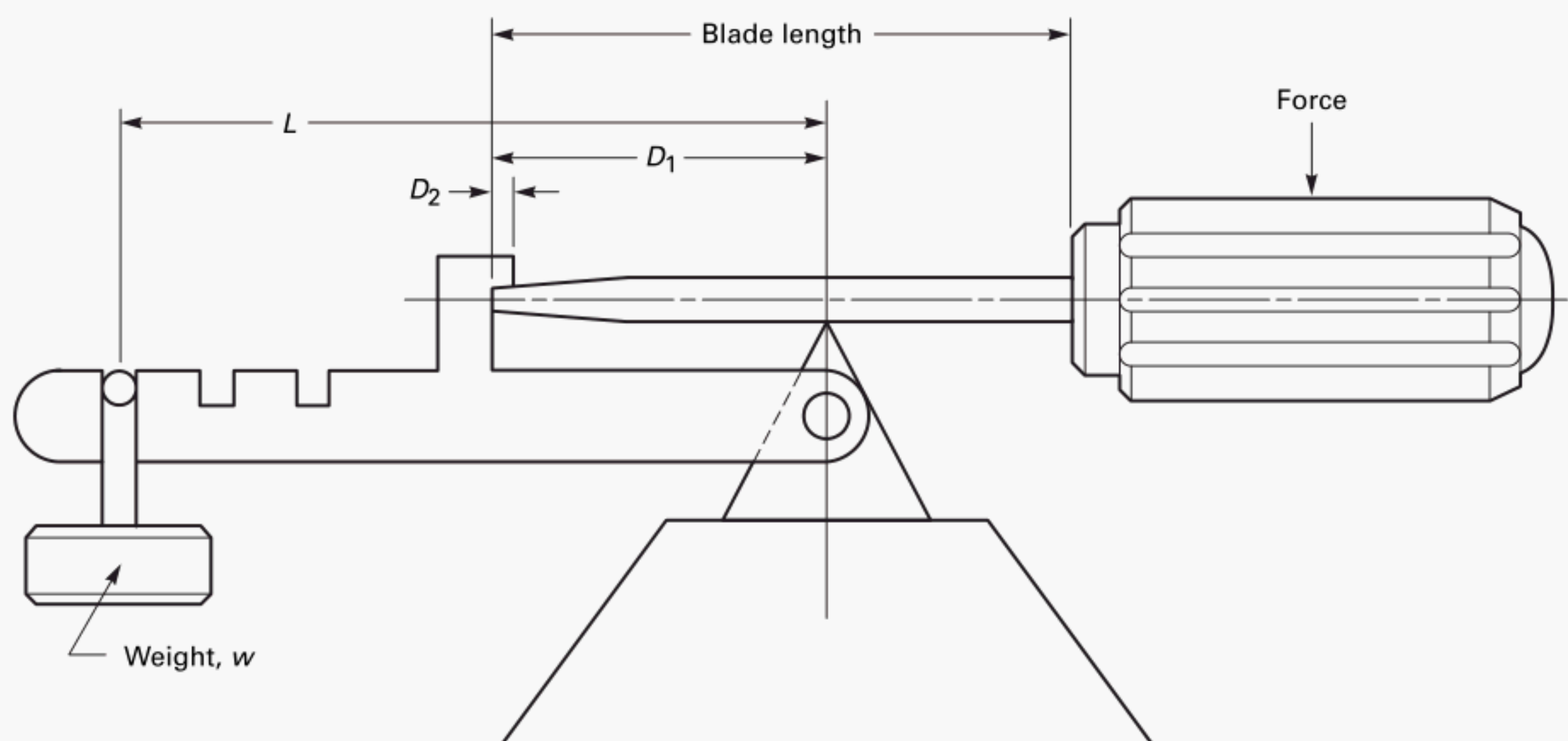


Fig. 7 Bending Moment Test, Typical Setup

GENERAL NOTES: Method for Bending Moment Test [see Note (1)]:

- (a) Bending moment = Lw , lbf-in. (N·m), dimensions are in inches (millimeters); weight, w , is in pounds (newtons).
- (b) A stop for the screwdriver tip is located at a distance, D_1 , which is equal to one-half of the blade length from the bending fulcrum.
- (c) $D_2 = 4 \times$ tip thickness, T (see Fig. 2 and Table 1).

NOTE:

- (1) The above method is not intended to restrict the manner in which the required test shall be made.

shall not show permanent slippage between the shank and handle.

6.4 Tip Toughness Test

The tip shall be tested as in the torsion test described in para. 6.2 except that the torque shall be increased until failure. If a fracture occurs, the pieces shall be refitted, and the tip shall show that permanent deformation had occurred prior to fracture. If the tip fails without exhibiting such deformation, it shall be considered to have failed the tip toughness test.

6.5 Bending Moment Test (Type I, Class 1)

The bending moment test for flat tip screwdrivers shall be conducted in a manner similar to that shown in Fig. 7. In this test, the force shall be applied near the middle of the handle, the force acting at right angles to the axis of the screwdriver to lift weight W . A load-measuring device may be used in lieu of a deadweight in applying the bending load. When tested to the minimum bending moment specified in Table 1, the assembly shall not fracture, the blade shall not show any permanent deformation, and the handle shall not loosen from the shank.

6.6 Solvent Resistance Test (Types I and IV)

Screwdrivers shall be capable of undergoing the following test without specified damage. Handles are to be

fully immersed in motor vehicle brake fluid (SAE J1703), gasoline, ethylene glycol, and ethyl alcohol for 15 min at room temperature, removed, and allowed to stand for 24 hr. A new assembly shall be used for each of the four test liquids. There shall be no permanent swelling, surface attack (except for manufacturer's identification or paint removal), or failure to comply with paras. 6.3 and 6.7.

6.7 Handle Impact Test (Type I)

This test shall be performed at room temperature. The blade of the screwdriver shall be mounted vertically in a fixture affixed to the base of a suitable falling weight impact device. The blade shall rest on a solid surface to ensure that the blade does not move vertically in the fixture. The weight shall be 15 lb (6.8 kg) and shall be dropped unrestricted with some means to ensure that the full force of the falling weight will be acting normal to the striking surface. In conducting this test, care shall be taken that the impact energy will not be expended in flexing of the blade or in driving the screwdriver tip into the surface on which it rests. The blade may be shortened or blunted, if necessary, to ensure a proper test. An equivalent test may be used if the impact energy requirement in Table 5 is met.

The blade shall not penetrate into the handle more than specified in Table 5 when the weight has been

Table 5 Impact Test Data

Blade Diameter (Nominal Stock Size), in.	Height of Drop of 15-lb Weight for Impact Tests, in.	Maximum Blade Penetration, in.	Impact Energy, ft-lb
0.12	1.5	0.75	1.88
0.16	4.0	0.75	5.00
0.19	6.0	0.75	7.50
0.22	8.0	0.62	10.00
0.25	10.0	0.62	12.50
0.28	12.0	0.62	15.00
0.31	15.0	0.62	18.75
0.34	17.0	0.62	21.25
0.37 and over	20.0	0.62	25.00

dropped ten times from the applicable height shown in Table 5. The first drop ensures that the blade is seated in the handle. The difference in length after the first and tenth drops is the blade penetration.

The screwdriver handle shall neither break, crack, nor significantly distort as a result of the above test. "Significantly distort" (for the purpose of this test) means an increase of at least 5% in the handle diameter, either as a uniform or irregular bulge.

6.8 Driver Penetration Gage With Indicator

This method of penetration gaging is a quantitative method of gaging.

This method of inspection of cross tip screwdrivers involves the use of the Penetration Gage Assembly (PGA) indicator gage shown in Fig. 8. The PGA has the ring gage mounted inside. This system provides actual measurements of driver penetration as it relates to a master plug gage. Figures 8 through 15 and Table 6 provide the dimensions for the gage assembly. The ring gage dimensions are found in Tables 7 and 8 for Type PH and Table 9 for Type PZ.

The PGA is used to inspect cross tip drivers as follows:

- (a) A master plug gage is inserted in the ring gage, and sufficient force is applied to fully seat the plug gage.
- (b) The indicator is set to zero.
- (c) The driver to be inspected is seated in the ring gage and the penetration reading shall comply with Table 10.

6.9 GO/NO GO Ring Penetration Gage

The GO/NO GO ring penetration gaging system involves the use of master plug gages and ring gages. The ring gage, also known as a step gage, is to be used as a working gage and checked with a master plug gage periodically. The master plug gages are defined in Tables 11 through 13 and Figs. 16 through 18. Dimensions are given for the ring gages in Tables 14 through 16 and Figs. 19 through 21. The screwdriver and master plug gage shall fit the ring gage so that dimension G in Tables 2, 3, 11, 12, and 13 falls within the step on the face of the ring gage.

7 SAFETY REQUIREMENTS AND LIMITATIONS OF USE

Using a screwdriver as a pry bar or striking it with a hammer are clearly misuses of the tool. Instructors and employers shall stress proper use and safety in the use of screwdrivers, information about which can be found in the HTI publication, Guide to Hand Tools — Selection, Safety Tips, Proper Use and Care.

A hand-driven screwdriver bit shall not be used in a power tool.

WARNING: Comfort or cushion grips on handles are not intended to give any degree of protection against electric shock and shall not be used on or near live electric circuits.²

² Refer to ASTM F1505 and IEC 60900 for information regarding insulated screwdrivers.

Fig. 8 Penetration Gage Assembly for Cross Tip Screwdriver

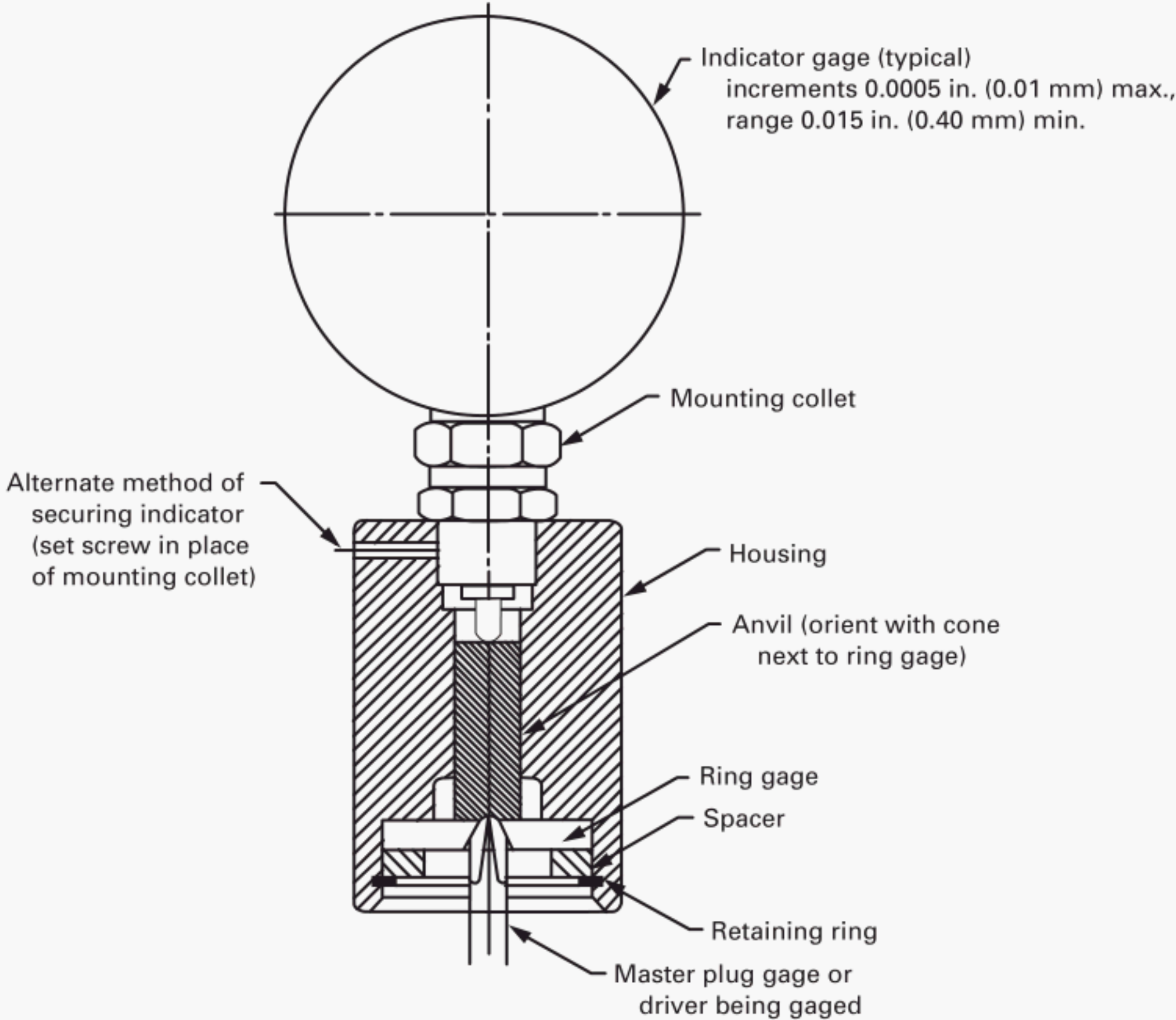
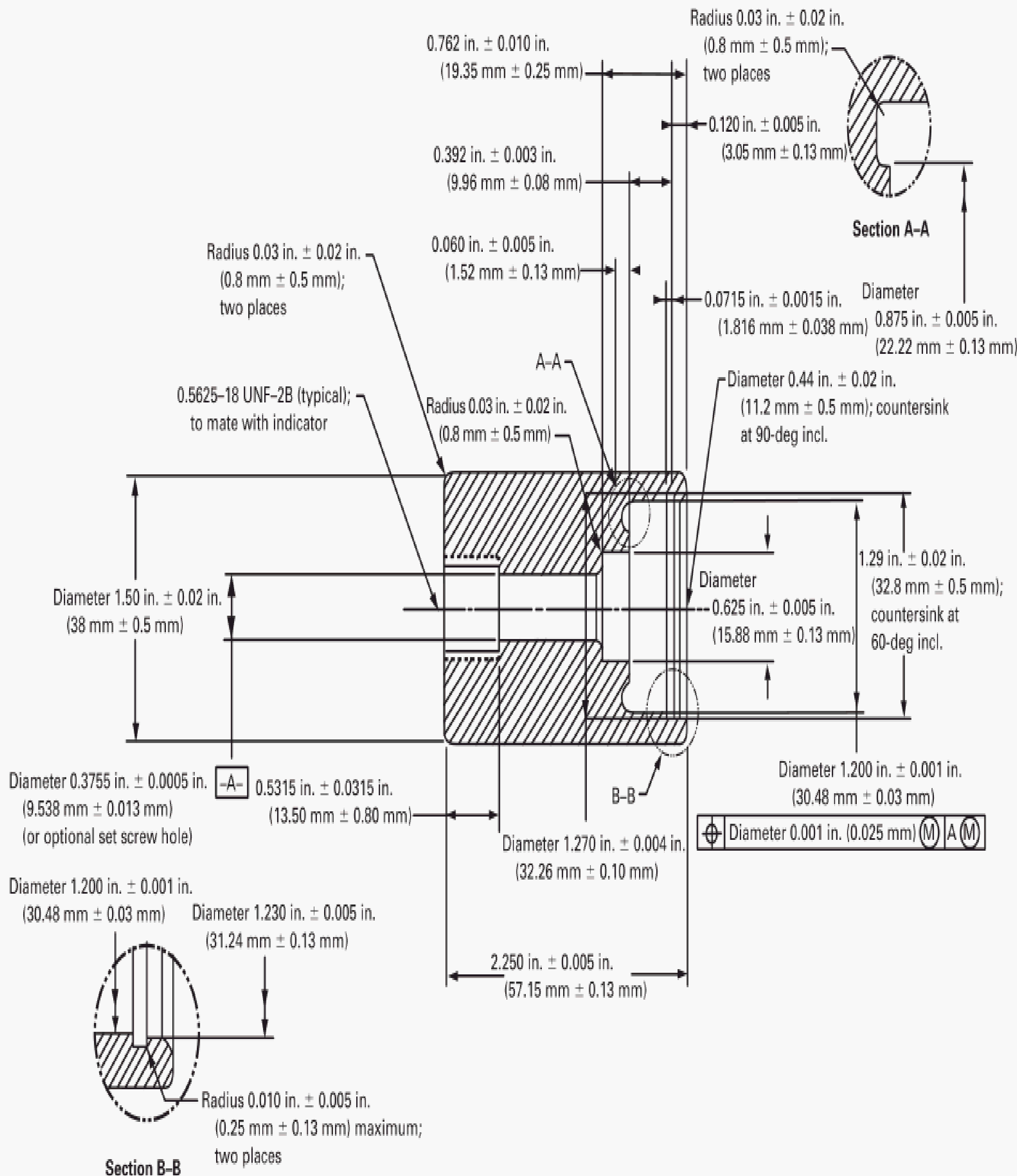
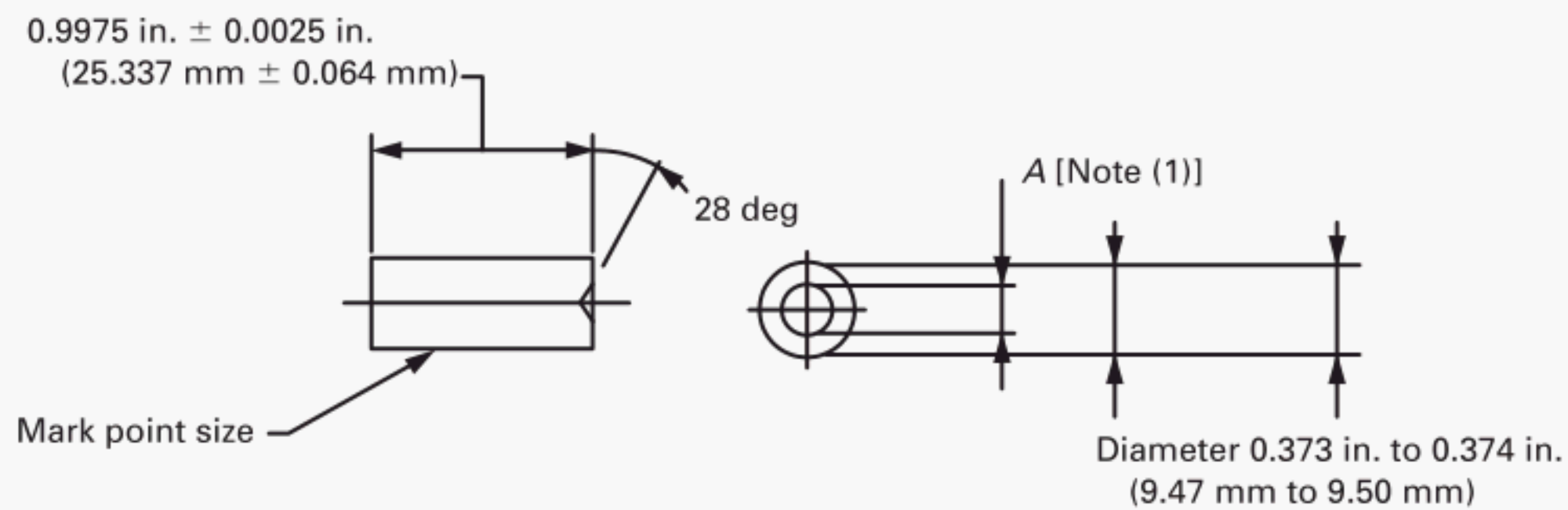


Fig. 9 Housing



GENERAL NOTE: ASTM 1040, 4140, or equivalent material; 40/44 HRC.

Fig. 10 Anvil

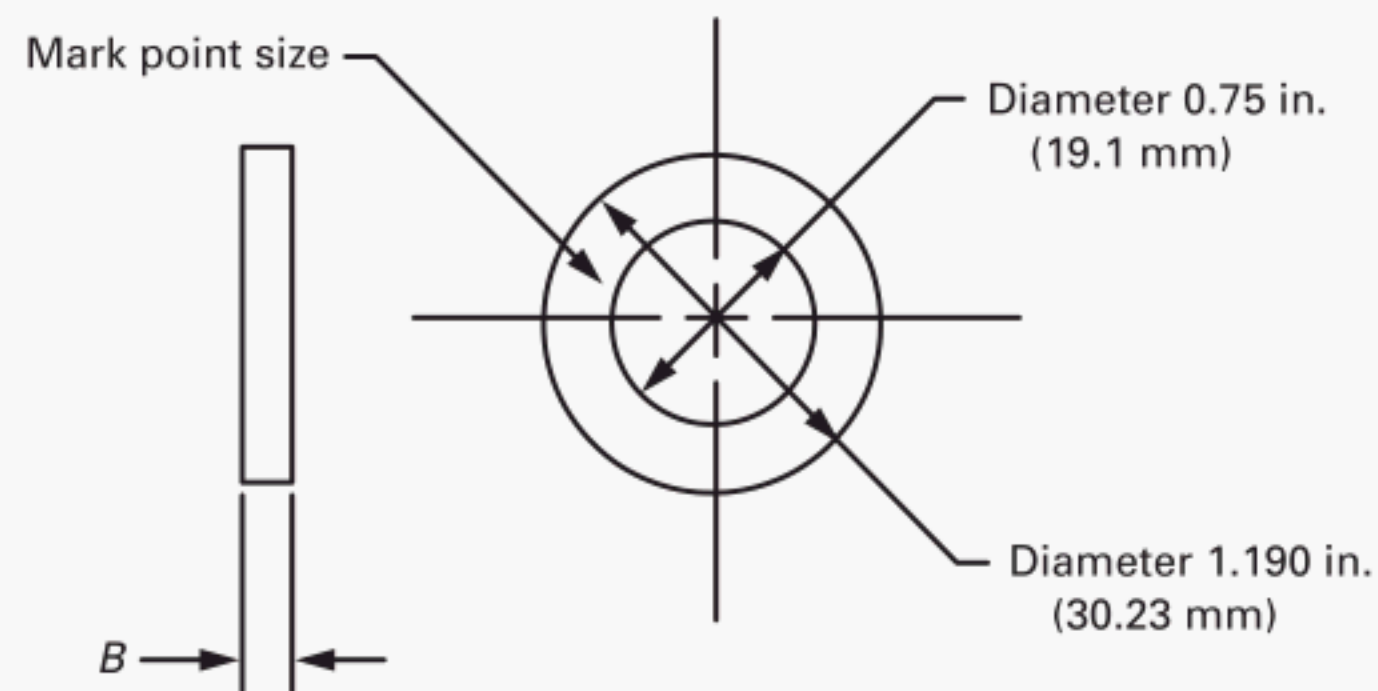


GENERAL NOTE: Tool steel material, 58–66 HRC.

NOTE:

(1) Diameter A to be concentric to O.D. within 0.001 in. (0.025 mm).

Fig. 11 Spacer



GENERAL NOTE: ASTM 1040, 4140, or equivalent material; 40/44 HRC.

Fig. 12 Bowed Retaining Ring

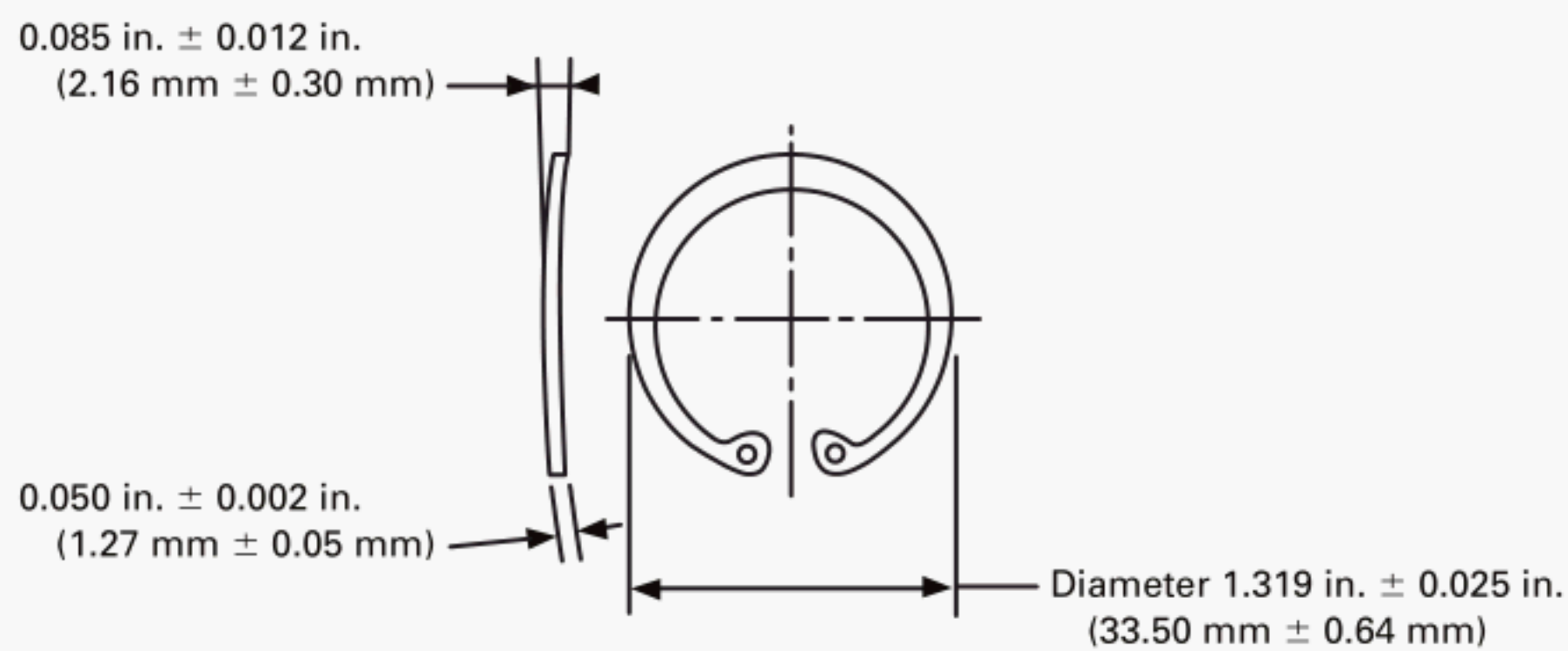
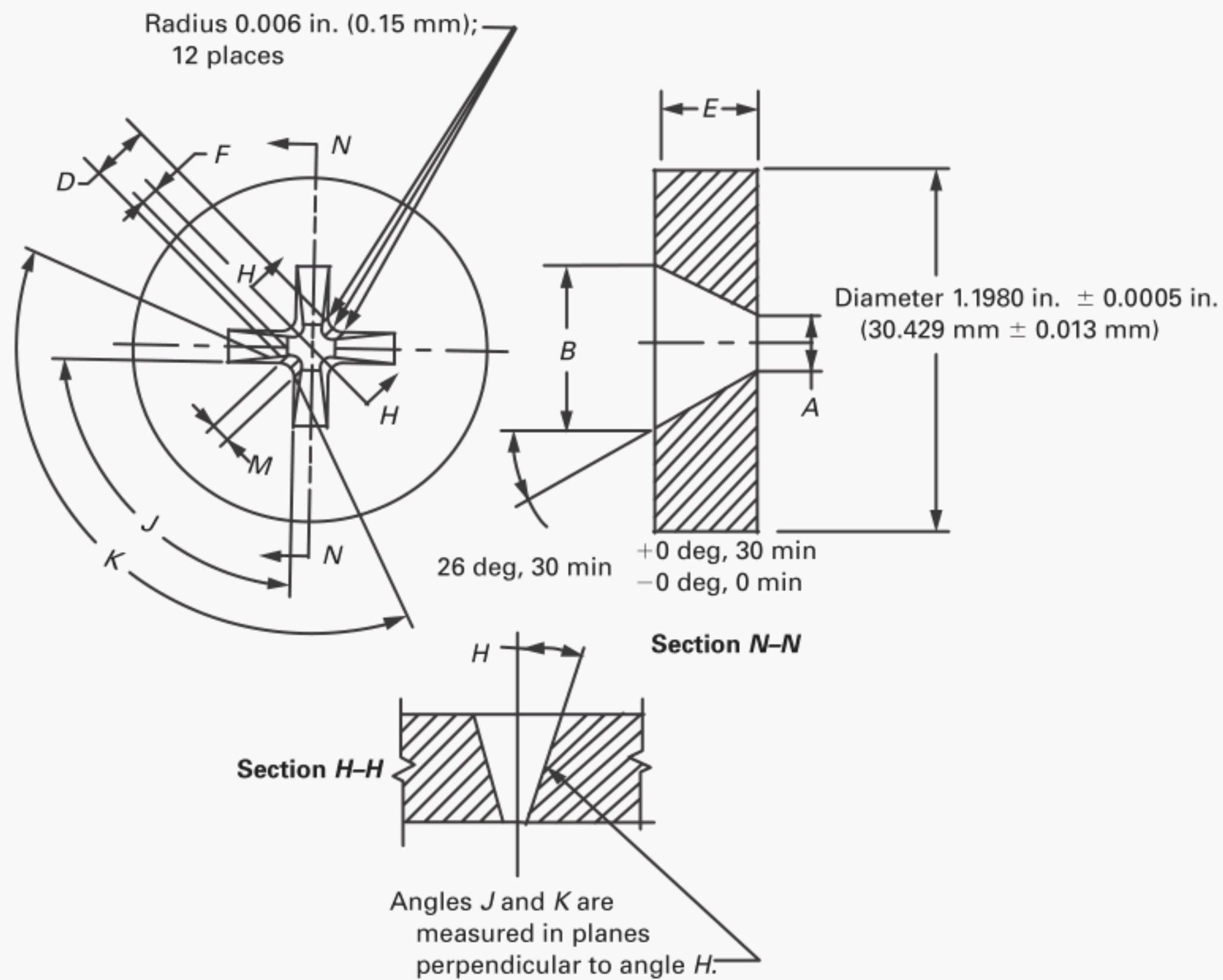


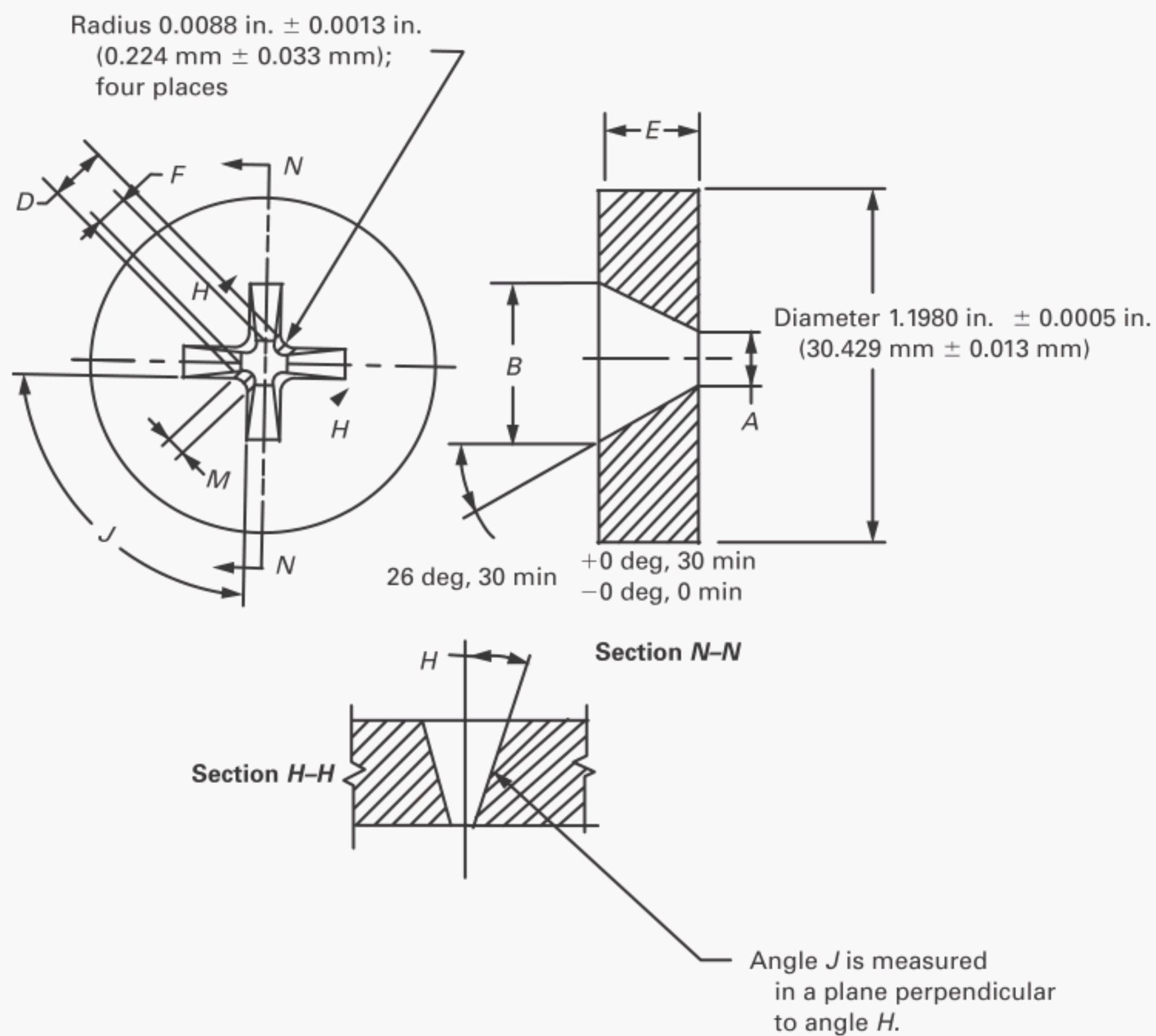
Fig. 13 Style A Ring Gage for Type PH, Sizes 1 Through 4



GENERAL NOTES:

- (a) Tool steel material 62/66 HRC or steel 62/66 HRC equivalent case hardened at 0.010-in. (0.25-mm) minimum depth.
- (b) Form concentric to O.D. within 0.002 in. (0.051 mm).

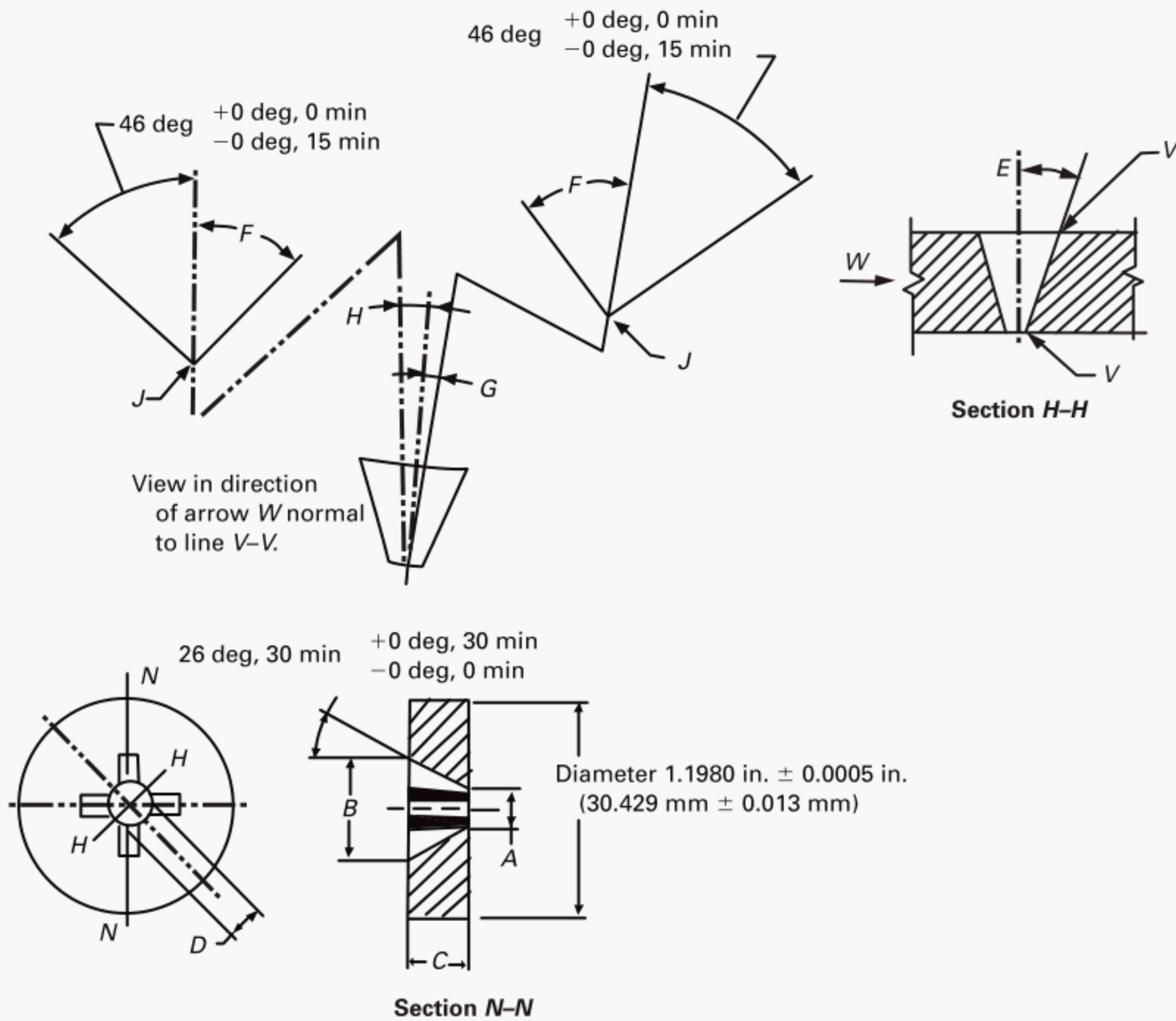
Fig. 14 Style A Ring Gage for Type PH, Size 0



GENERAL NOTES:

- (a) Tool steel material 62/66 HRC or steel 62/66 HRC equivalent case hardened at 0.010-in. (0.25-mm) minimum depth.
- (b) Form concentric to O.D. within 0.002 in. (0.051 mm).

Fig. 15 Style A Ring Gage for Type PZ



GENERAL NOTES:

- Tool steel material 62/66 HRC or steel 62/66 HRC equivalent case hardened at 0.010-in. (0.25-mm) minimum depth.
- Form concentric to O.D. within 0.002 in. (0.051 mm).

Table 6 Anvil and Spacer Dimensions

Point Size		Anvil Cone Diameter, A (See Fig. 10) +0.000 in. (+0.00 mm) −0.001 in. (−0.03 mm)		Spacer Thickness, B (See Fig. 11) ±0.0020 in. (±0.051 mm)	
Phillips	Pozidriv	Phillips, in. (mm)	Pozidriv, in. (mm)	Phillips, in. (mm)	Pozidriv, in. (mm)
P0	PZ0	0.033 (0.84)	0.036 (0.91)	0.2520 (6.401)	0.2890 (7.341)
P1	PZ1	0.051 (1.30)	0.055 (1.40)	0.2200 (5.588)	0.2600 (6.604)
P2	PZ2	0.091 (2.31)	0.096 (2.44)	0.1575 (4.001)	0.2200 (5.588)
P3	PZ3	0.151 (3.84)	0.156 (3.96)	0.0638 (1.621)	0.1900 (4.826)
P4	PZ4	0.201 (5.11)	0.204 (5.18)	NA	0.1357 (3.447)

Table 7 Style A Ring Gage Dimensions for Phillips Screwdriver Tips, Sizes 1 Through 4

Point Size	A, in. (mm) ±0.0004 (±0.010)	B, in. (mm) (Ref.)	D, in. (mm) (Ref.)	E, in. (mm) ±0.002 (±0.051)	F, in. (mm) +0.0008/−0 (+0.020/−0)	H, deg +15/−0 min	J, deg +0/−15 min	K, deg +0/−15 min	M, in. (mm) ±0.001 (±0.025)
1	0.0660 (1.676)	0.176 (4.470)	0.070 (1.778)	0.1100 (2.794)	0.0425 (1.080)	7	92	138	0.017 (0.432)
2	0.1060 (2.692)	0.278 (7.061)	0.098 (2.489)	0.1725 (4.382)	0.0636 (1.615)	5 deg, 45 min	92	140	0.032 (0.813)
3	0.1660 (4.216)	0.432 (10.973)	0.156 (3.962)	0.2662 (6.761)	0.1022 (2.596)	5 deg, 45 min	92	146	0.079 (2.007)
4	0.2160 (5.486)	0.544 (13.818)	0.227 (5.766)	0.3287 (8.349)	0.1459 (3.706)	7	92	153	0.095 (2.413)

Table 8 Style A Ring Gage Dimensions for Phillips Screwdriver Tips, Size 0

Point Size	A, in. (mm) ±0.0004 (±0.010)	B, in. (mm) (Ref.)	D, in. (mm) (Ref.)	E, in. (mm) ±0.002 (±0.051)	F, in. (mm) ±0.0004 (±0.010)	H, deg +15/−0 min	J, deg +0/−15 min.	M, in. (mm) ±0.0018 (±0.046)
0	0.048 (1.219)	0.1230 (3.124)	0.027 (0.686)	0.078 (1.981)	0.0265 (0.673)	7	92	0.0122 (0.310)

Table 9 Style A Ring Gage Dimensions for Pozidriv Screwdriver Tips

Point Size	A, in. (mm) ±0.0004 (±0.010)	B, in. (mm) (Ref.)	C, in. (mm) ±0.002 (±0.051)	D, in. (mm) +0, −0.0010 (+0, −0.025)	E, deg +15/−0 min	F, deg +0/−15 min	G, deg +0/−15 min	H, deg +0/−15 min	J, in. (mm)	
									Max.	Min.
0	0.051 (1.295)	0.074 (1.880)	0.047 (1.194)	0.0310 (0.7874)	7	46	4 deg, 23 min	7 deg, 45 min	0.004 (0.102)	0.003 (0.076)
1	0.065 (1.651)	0.135 (3.429)	0.070 (1.778)	0.0477 (1.2116)	7	46	4 deg, 23 min	7 deg, 45 min	0.005 (0.127)	0.004 (0.102)
2	0.111 (2.819)	0.217 (5.512)	0.110 (2.794)	0.0719 (1.8263)	5 deg, 45 min	46	3	6 deg, 20 min	0.008 (0.203)	0.006 (0.152)
3	0.171 (4.343)	0.312 (7.925)	0.140 (3.556)	0.1078 (2.2381)	5 deg, 45 min	56 deg, 15 min	3	6 deg, 20 min	0.012 (0.305)	0.008 (0.203)
4	0.219 (5.563)	0.413 (10.490)	0.193 (4.902)	0.1587 (4.0310)	7	56 deg, 15 min	4 deg, 23 min	7 deg, 45 min	0.020 (0.508)	0.014 (0.356)

Table 10 Driver Penetration Limits

Phillips and Pozidriv Point Size	Dial Indicator Reading, in. (mm)
0	±0.005 (±0.13)
1	±0.005 (±0.13)
2	±0.005 (±0.13)
3	±0.005 (±0.13)
4	±0.005 (±0.13)

Table 11 Master Plug Gage Dimensions for Phillips Cross Recesses, Sizes 1 Through 4

Point Size	A, in. (mm) ±0.010 (±0.254)	B, in. (mm) +0/−0.001 (+0/−0.025)	C, in. (mm) ±0.06 (±1.52)	D, in. (mm)	E, deg +15/−0 min	F, in. (mm) (Ref.)		
	Max.	Min.						
1	0.18 (4.57)	0.0394 (1.0008)	0.75 (19.05)	0.181 (4.597)	138	0.020 (0.508)	0.018 (0.457)	
2	0.25 (6.35)	0.0606 (1.5392)	0.75 (19.05)	0.181 (4.597)	140	0.025 (0.635)	0.023 (0.584)	
3	0.31 (7.87)	0.0983 (2.4968)	1 (25.4)	0.240 (6.096)	146	0.031 (0.787)	0.029 (0.737)	
4	0.38 (9.65)	0.1407 (3.5738)	1 (25.4)	0.240 (6.096)	153	0.044 (1.118)	0.042 (1.067)	
Point Size	G, in. (mm) +0.001/−0 (+0.025/−0)	H, deg +0/−15 min	J, in. (mm)		K, in. (mm) ±0.06 (±1.52)	L, Min., in. (mm)	M, in. (mm) +0/−0.001 (+0/−0.025)	O, deg +15/−0 min
	Min.	Max.						
1	0.050 (1.270)	7	0.015 (0.381)	0.020 (0.508)	0.88 (22.35)	0.19 (4.83)	0.0202 (0.5131)	92
2	0.090 (2.290)	5 deg, 45 min	0.015 (0.381)	0.020 (0.508)	0.88 (22.35)	0.28 (7.11)	0.0434 (1.1024)	92
3	0.150 (3.810)	5 deg, 45 min	0.015 (0.381)	0.020 (0.508)	1 (25.4)	0.44 (11.18)	0.0826 (2.0980)	92
4	0.200 (5.080)	7	0.015 (0.381)	0.020 (0.508)	1 (25.4)	0.53 (13.46)	0.1078 (2.7381)	92

Table 12 Master Plug Gage Dimensions for Phillips Cross Recesses, Size 0

Point Size	<i>A</i> , in. (mm)	<i>B</i> , in. (mm)	<i>C</i> , in. (mm)	<i>D</i> , in. (mm)	<i>F</i> , in. (mm)	<i>G</i> , in. (mm)	<i>H</i> , deg	<i>K</i> , in. (mm)	<i>L</i> , Min., in. (mm)	<i>M</i> , in. (mm)	<i>O</i> , deg
	±0.010 (±0.254)	±0.0005 (±0.0127)	±0.06 (±1.52)	(Ref.)	±0.001 (±0.025)	+0.001/−0 (+0.025/−0)	+0/−15 min	±0.06 (±1.52)		±0.0013 (±0.0330)	+15 min, −0
0	0.13 (3.30)	0.0235 (0.5969)	0.75 (19.05)	0.181 (4.597)	0.011 (0.279)	0.032 (0.813)	7	0.88 (22.35)	0.19 (4.83)	0.0138 (0.3505)	92

Table 13 Pozidriv Master Plug Gage Dimensions

Point Size	A, in. (mm) ±0.010 (±0.25)	B, in. (mm)		C, in. (mm)		D, in. (mm) +0/-0.001 (+0/-0.025)	E, deg +7/-0 min	F, in. (mm)	
		Min.	Max.	Min.	Max.			Min.	Max.
0	0.125 (3.175)	0.0265 (0.6731)	0.0280 (0.7112)	0.003 (0.076)	0.004 (0.102)	0.181 (4.597)	46	0.0165 (0.4191)	0.0175 (0.4445)
1	0.188 (4.775)	0.0423 (1.0744)	0.0438 (1.1125)	0.004 (0.102)	0.005 (0.127)	0.181 (4.597)	46	0.0265 (0.6731)	0.0275 (0.6985)
2	0.250 (6.350)	0.0655 (1.6637)	0.0670 (1.7018)	0.006 (0.152)	0.008 (0.203)	0.181 (4.597)	46	0.0380 (0.9652)	0.0390 (0.9906)
3	0.313 (7.950)	0.1005 (2.5527)	0.1020 (2.5908)	0.008 (0.203)	0.012 (0.305)	0.240 (6.096)	56 deg, 15 min	0.0530 (1.3462)	0.0540 (1.3716)
4	0.375 (9.525)	0.1505 (3.8227)	0.1520 (3.8608)	0.014 (0.356)	0.020 (0.508)	0.240 (6.096)	56 deg, 15 min	0.0810 (2.0574)	0.0820 (2.0828)

Point Size	G, in. (mm) +0.001/-0 (+0.025/-0)	H, deg +0/-6 min	J, in. (mm) ±0.031 (±0.787)	K, in. (mm) ±0.031 (±0.787)	L, Min., in. (mm)	M, deg +6/-0 min	N, deg +6/-0 min
0	0.0350 (0.889)	7	1.625 (41.275)	0.875 (22.225)	0.078 (1.981)	4 deg, 23 min	7 deg, 45 min
1	0.0540 (1.372)	7	1.750 (44.450)	0.875 (22.225)	0.125 (3.175)	4 deg, 23 min	7 deg, 45 min
2	0.0950 (2.413)	5 deg, 45 min	1.750 (44.450)	0.875 (22.225)	0.188 (4.775)	3	6 deg, 20 min
3	0.1550 (3.937)	5 deg, 45 min	2.000 (50.800)	1.000 (25.400)	0.281 (7.137)	3	6 deg, 20 min
4	0.2030 (5.156)	7	2.000 (50.800)	1.000 (25.400)	0.344 (8.738)	4 deg, 23 min	7 deg, 45 min

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Fig. 16 Master Plug Gage (PH), Sizes 1 Through 4

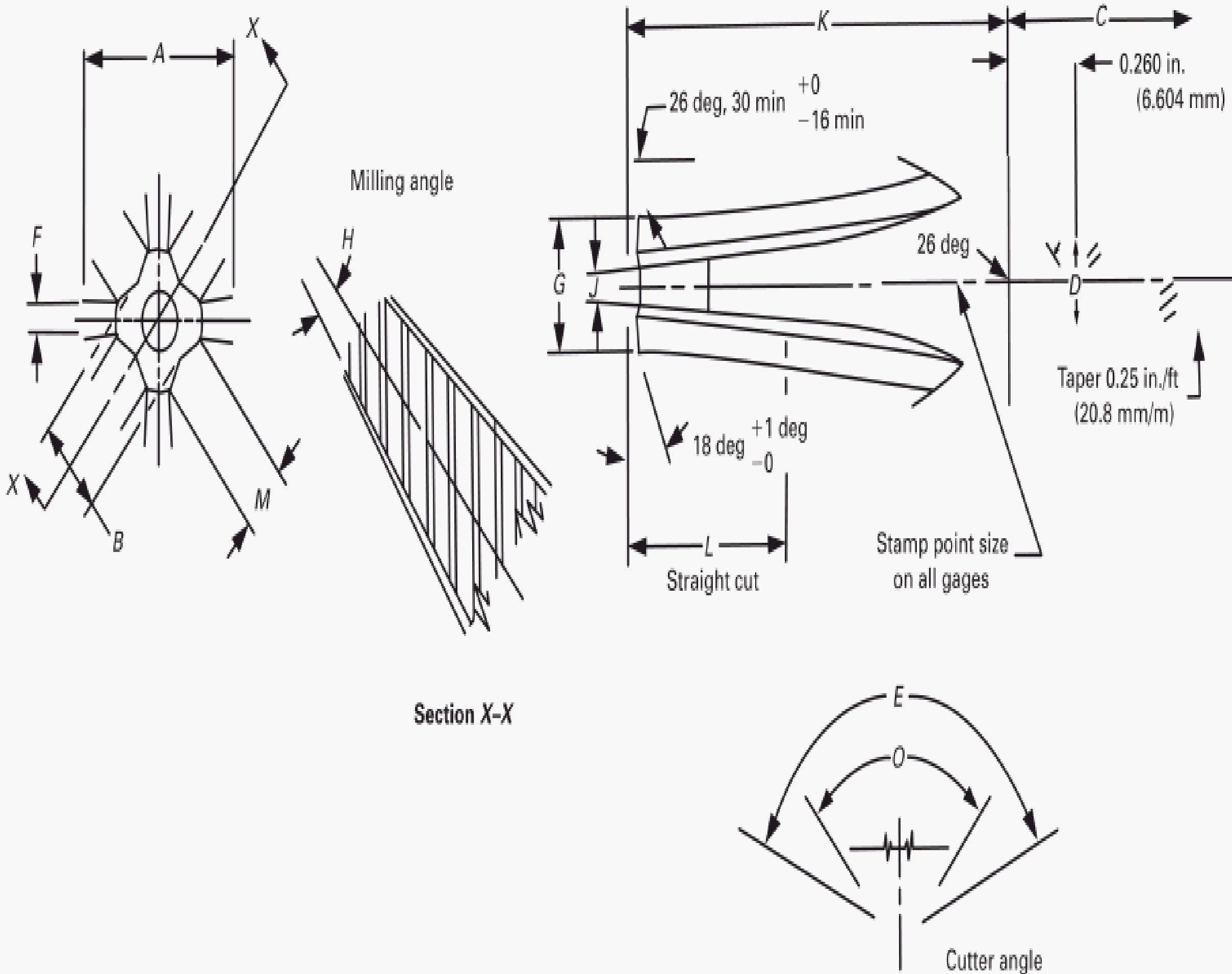


Fig. 17 Master Plug Gage (PH), Size 0

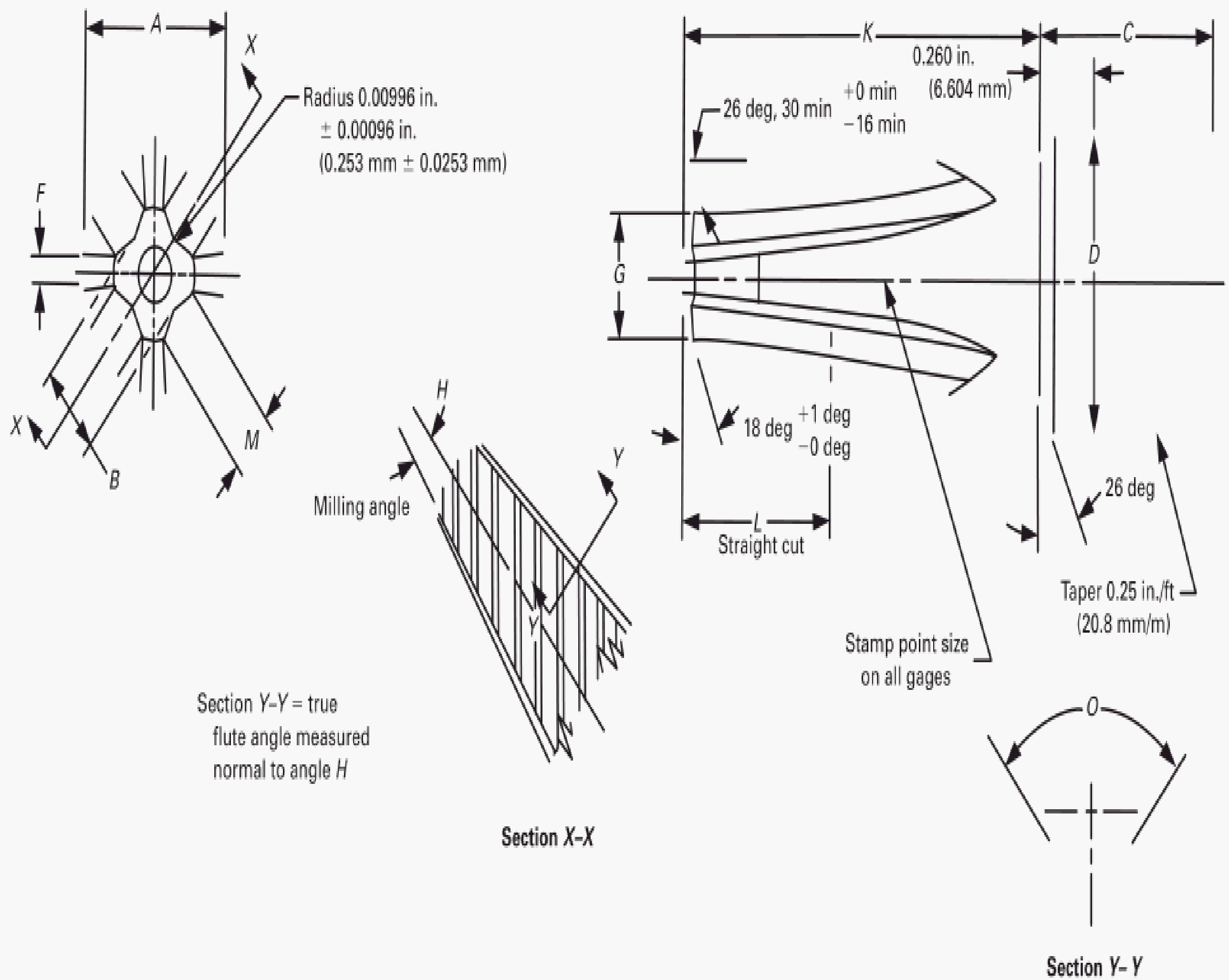
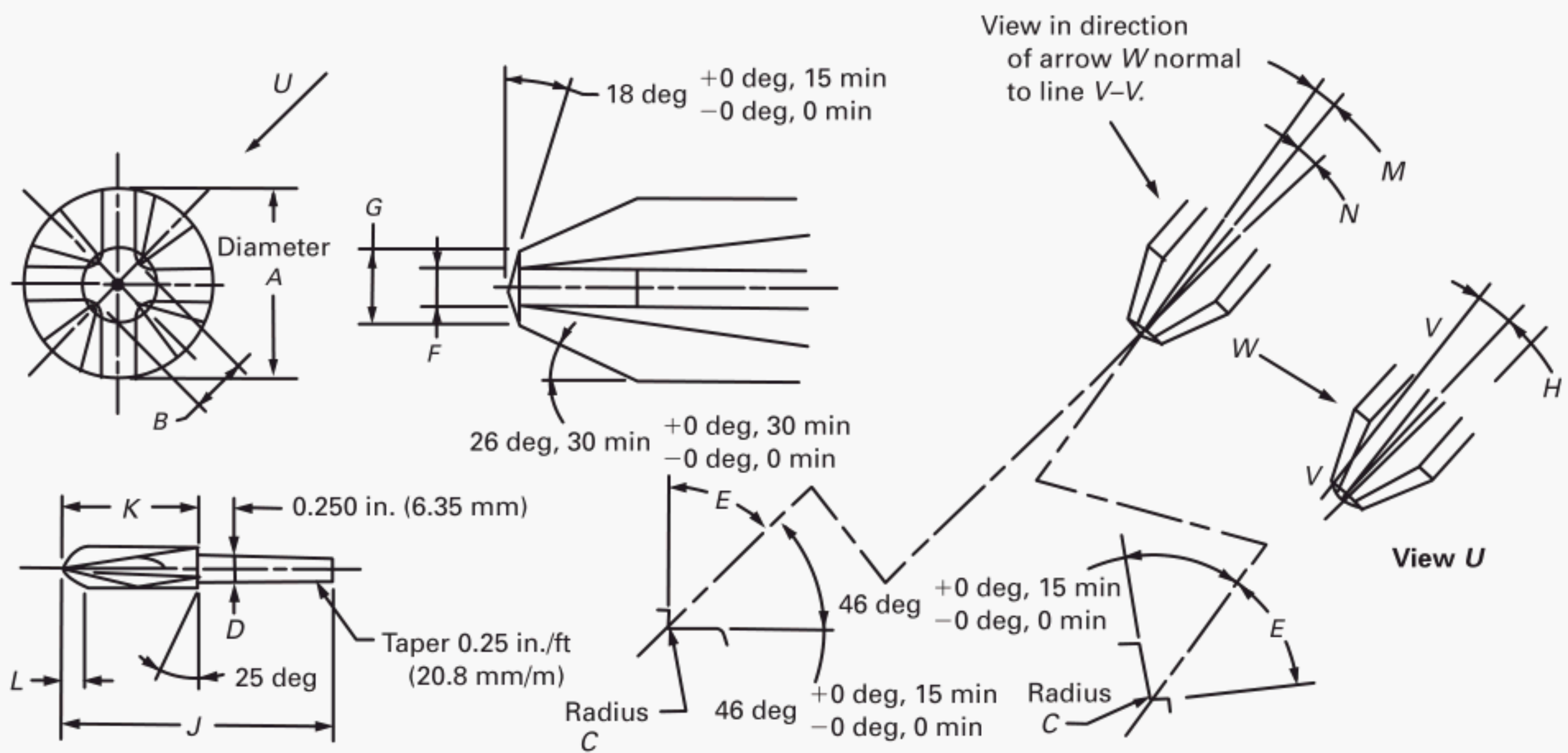


Fig. 18 Master Plug Gage (PZ)



GENERAL NOTE: Tool steel material, 62/66 HRC.

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Table 14 Style B Ring Gage Dimensions for Phillips Screwdriver Tips, Sizes 1 Through 4

Point Size	A, in. (mm) ±0.0002 (±0.005)	B, in. (mm) (Ref.)	C, in. (mm) ±0.001 (±0.025)	D, in. (mm) (Ref.)	E, in. (mm) +0/−0.015 (+0/−0.38)	F, in. (mm) +0.0004/−0 (+0.010/−0)	H, deg +15/−0 min	J, deg +0/−15 min	K, deg +0/−15 min	M, in. (mm) ±0.001 (±0.025)
1	0.0255 (0.6477)	0.176 (4.470)	0.010 (0.254)	0.070 (1.778)	0.125 (3.175)	0.0194 (0.4928)	7	92	138	0.017 (0.432)
2	0.0455 (1.1557)	0.278 (7.061)	0.010 (0.254)	0.098 (2.489)	0.1875 (4.763)	0.0303 (0.7696)	5 deg, 45 min	92	140	0.032 (0.813)
3	0.0755 (1.9177)	0.432 (10.973)	0.010 (0.254)	0.156 (3.962)	0.2812 (7.142)	0.0496 (1.2598)	5 deg, 45 min	92	146	0.079 (2.007)
4	0.1005 (2.5527)	0.544 (13.818)	0.010 (0.254)	0.227 (5.766)	0.3437 (8.730)	0.0711 (1.8059)	7	92	153	0.095 (2.413)

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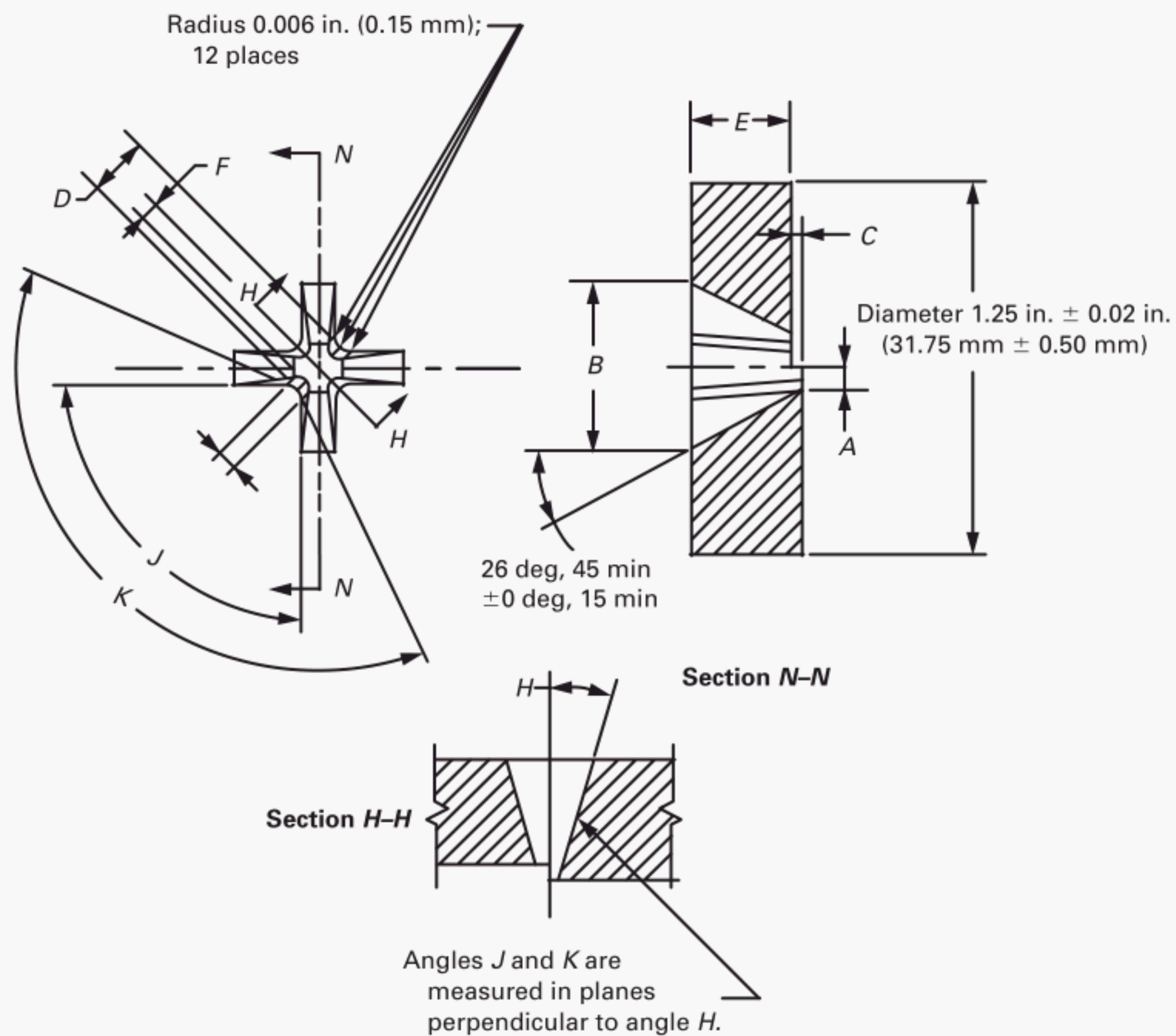
Table 15 Style B Ring Gage Dimensions for Phillips Screwdriver Tips, Size 0

Point Size	<i>A</i> , in. (mm) ±0.0002 (±0.005)	<i>B</i> , in. (mm) (Ref.)	<i>C</i> , in. (mm) ±0.001 (±0.025)	<i>D</i> , in. (mm) (Ref.)	<i>E</i> , in. (mm) +0/−0.015 (+0/−0.38)	<i>F</i> , in. (mm) ±0.0002 (±0.005)	<i>H</i> , deg +15/−0 min	<i>J</i> , deg +0/−15 min	<i>M</i> , in. (mm) ±0.0018 (±0.046)
0	0.0165 (0.419)	0.1530 (3.886)	0.010 (0.254)	0.027 (0.686)	0.094 (2.388)	0.0114 (0.290)	7	92	0.0122 (0.3099)

Table 16 Ring Gage Dimensions for Pozidriv Screwdriver Tips

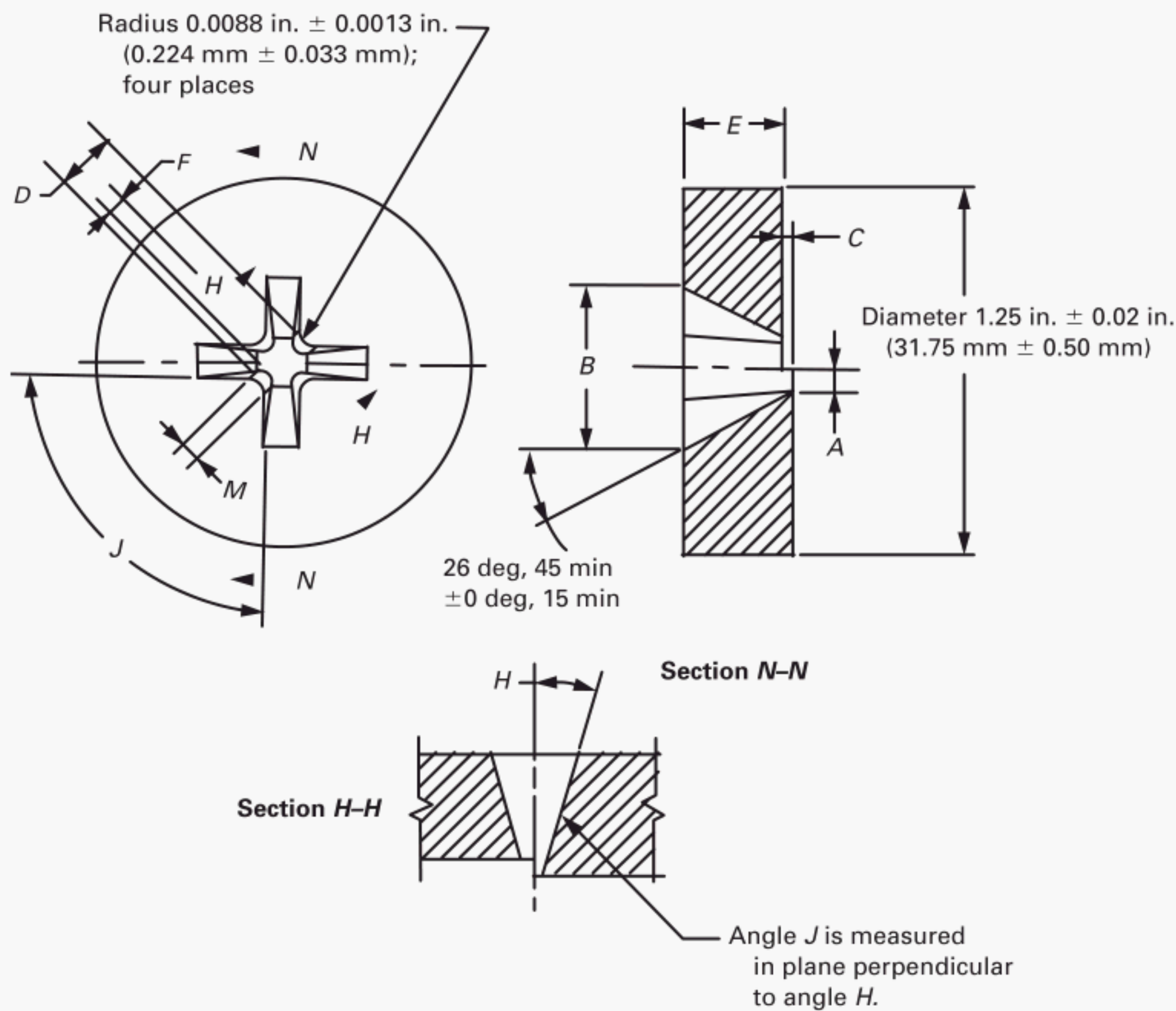
Point Size	A, in. (mm) ±0.0002 (±0.005)	B, in. (mm) +0.0005, -0 (+0.013, -0)	C, in. (mm) ±0.001 (±0.025)	D, in. (mm) (Ref.)	E, in. (mm) ±0.002 (±0.051)	F, in. (mm) +0.0002/-0 (+0.005/-0)	G, deg +15/-0 min	H, deg +15/-0 min	R, in. (mm) Min. Max.		U, deg +15/-0 min	W, deg +15/-0 min
0	0.0175 (0.4445)	0.0275 (0.6985)	0.005 (0.127)	0.093 (2.362)	0.0582 (1.4783)	0.0175 (0.4445)	46	7	0.003 (0.076)	0.004 (0.102)	4 deg, 23 min	7 deg, 45 min
1	0.0270 (0.6858)	0.0440 (1.1176)	0.010 (0.254)	0.141 (3.581)	0.0872 (2.2149)	0.0275 (0.6985)	46	7	0.004 (0.102)	0.005 (0.127)	4 deg, 23 min	7 deg, 45 min
2	0.0470 (1.1938)	0.0674 (1.7120)	0.010 (0.254)	0.231 (5.867)	0.1374 (3.4900)	0.0390 (0.9906)	46	5 deg, 45 min	0.006 (0.152)	0.008 (0.203)	3	6 deg, 20 min
3	0.0770 (1.9558)	0.1028 (2.6111)	0.010 (0.254)	0.357 (9.068)	0.2036 (5.1714)	0.0540 (1.3716)	56 deg, 15 min	5 deg, 45 min	0.008 (0.203)	0.012 (0.305)	3	6 deg, 20 min
4	0.1010 (2.5654)	0.1533 (3.8938)	0.010 (0.254)	0.507 (12.878)	0.3059 (7.7699)	0.0820 (2.0828)	56 deg, 15 min	7	0.014 (0.356)	0.020 (0.508)	4 deg, 23 min	7 deg, 45 min

Fig. 19 Style B GO/NO GO Ring Penetration Gage (PH), Sizes 1 Through 4



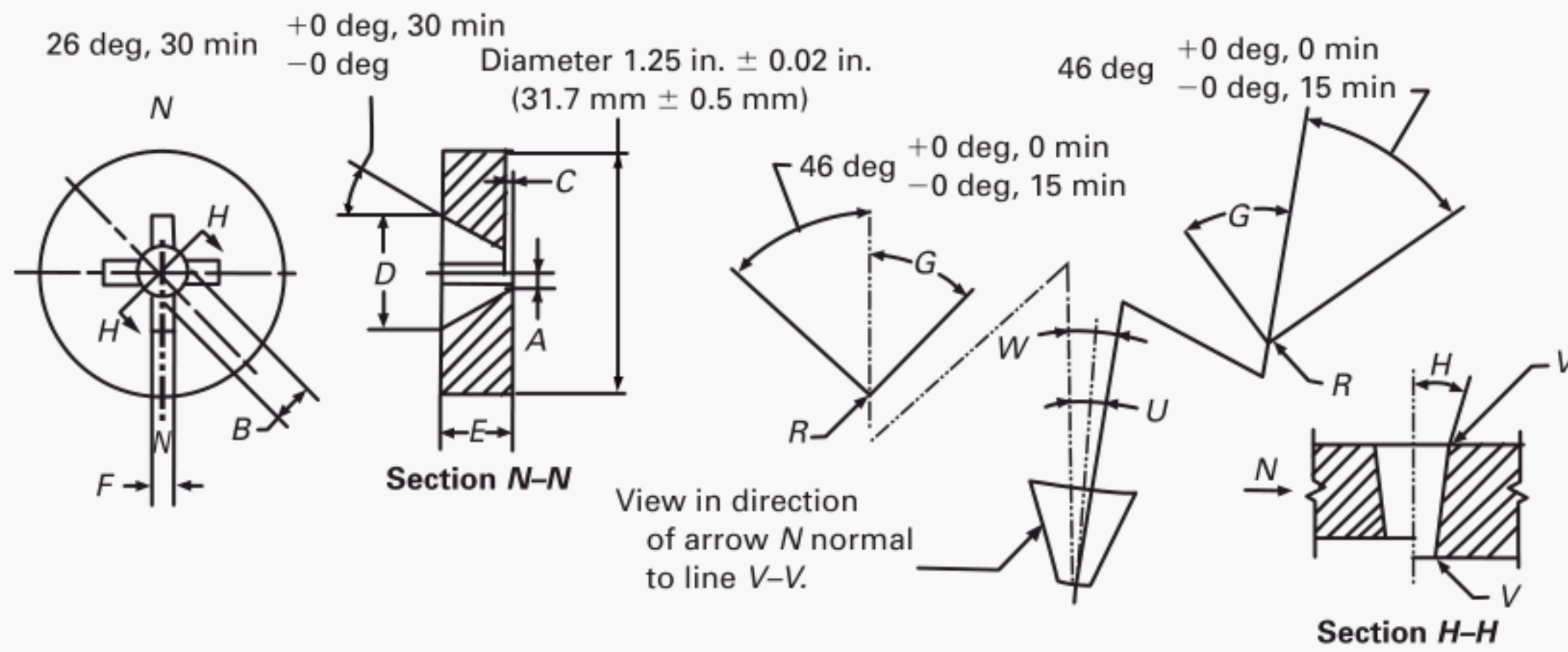
GENERAL NOTE: Tool steel material 62/66 HRC or steel 62/66 HRC equivalent case hardened at 0.010-in. (0.25-mm) minimum depth.

Fig. 20 Style B GO/NO GO Ring Penetration Gage (PH), Size 0



GENERAL NOTE: Tool steel material 62/66 HRC or steel 62/66 HRC equivalent case hardened at 0.010-in. (0.25-mm) minimum depth.

Fig. 21 GO/NO GO Ring Penetration Gage (PZ)



NONMANDATORY APPENDIX A

SUBCLASSIFICATIONS, OPTIONS, AND DESIGNATION

A-1 SUBCLASSIFICATIONS

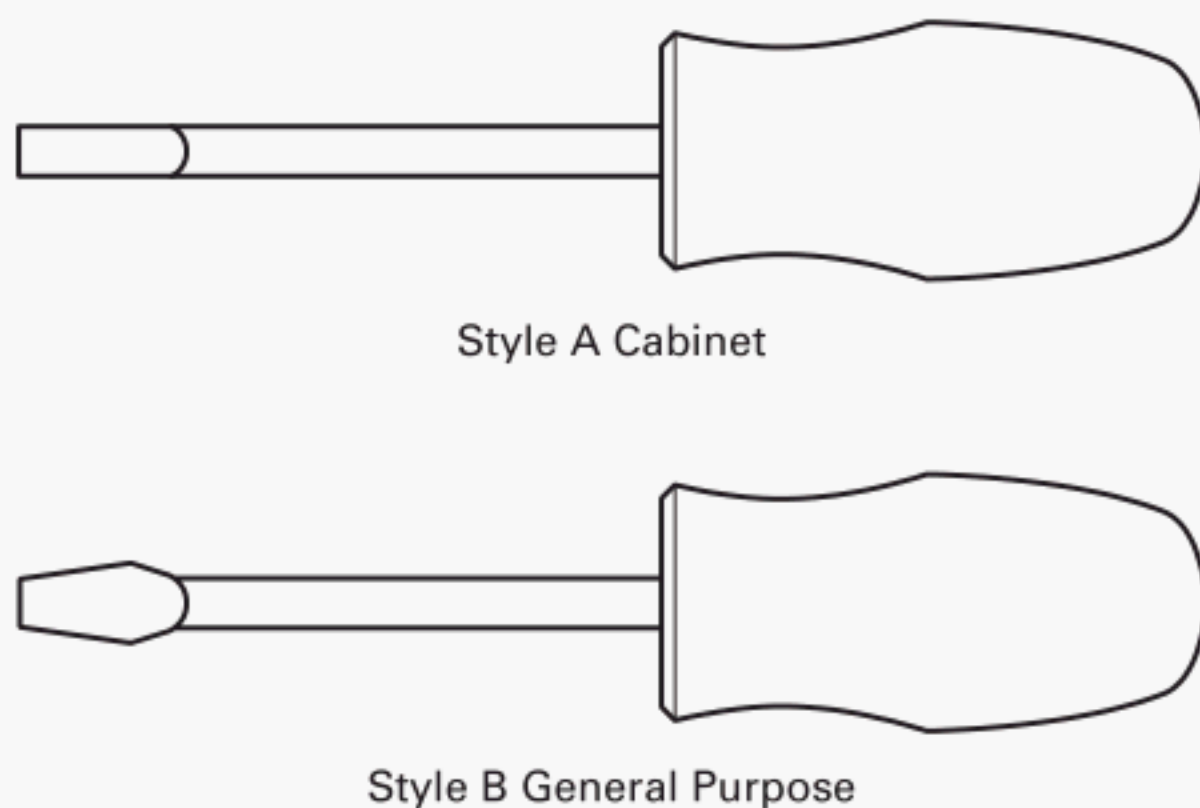
Type I, Class 1, Style A — Cabinet, Straight Sides. Flat tip straight-sided cabinet screwdrivers are for driving and removing slotted screws (see Fig. A-1). The entire length of the blade, excluding the bolster if one is present, shall be capable of entering a round hole no larger than the maximum allowable tip width dimension plus 0.031 in.

Type I, Class 1, Style B — General Purpose, Flared Sides. Flat tip flared-sided screwdrivers are for driving and removing slotted screws when accessibility is not limited (see Fig. A-1).

A-2 OPTIONS

Type I screwdrivers may be supplied with a bolster. Type I screwdrivers may be supplied with a pocket clip. See Fig. A-2.

Fig. A-1 Flat Tip Screwdrivers



Type II retention grooves are optional. The locations and configurations of retention grooves are shown in Fig. A-3.

A-3 DESIGNATION

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

- (a) B107.600 series
- (b) type
- (c) class
- (d) nominal size(s)
- (e) options as applicable

Fig. A-2 Optional Components

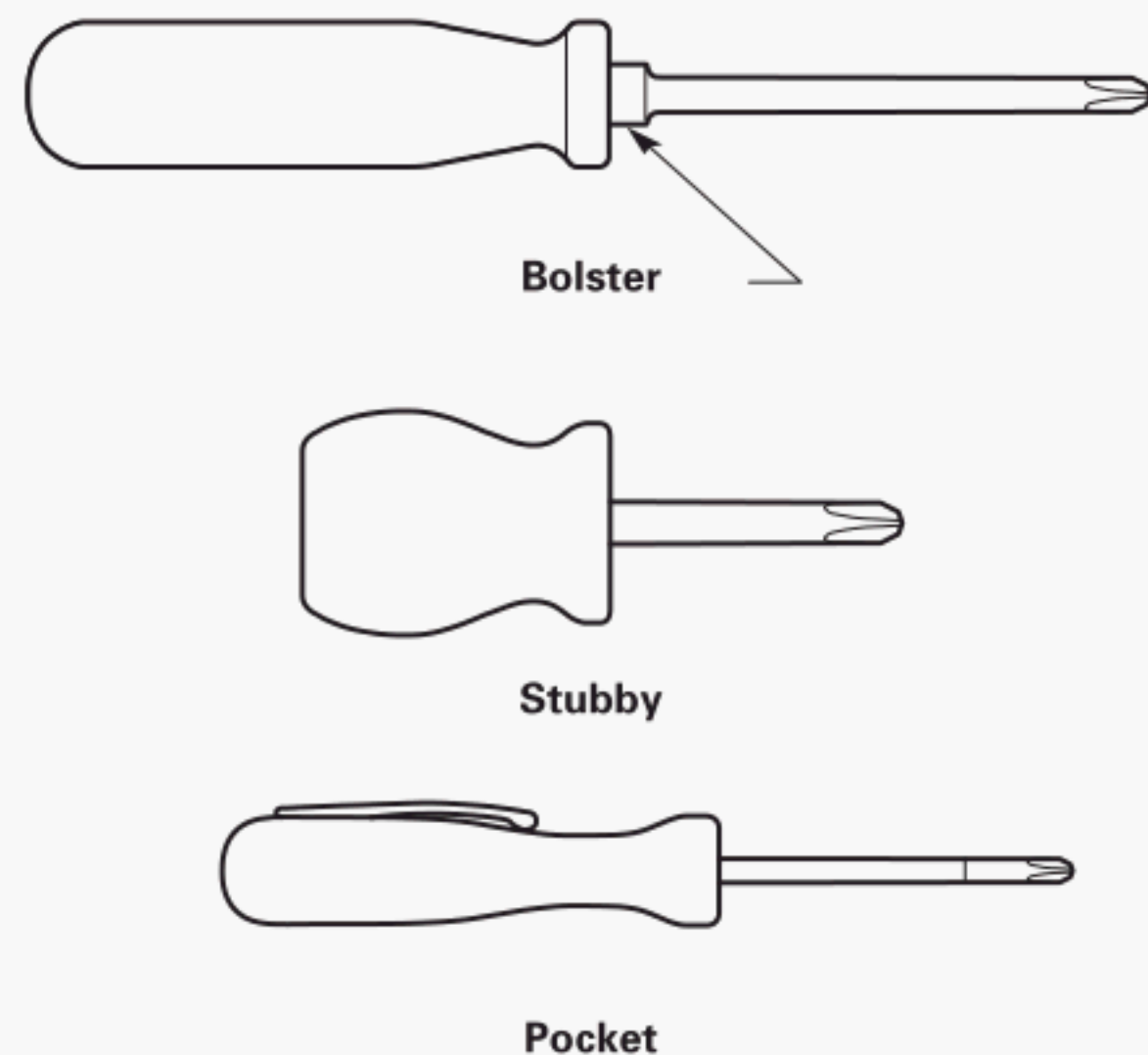
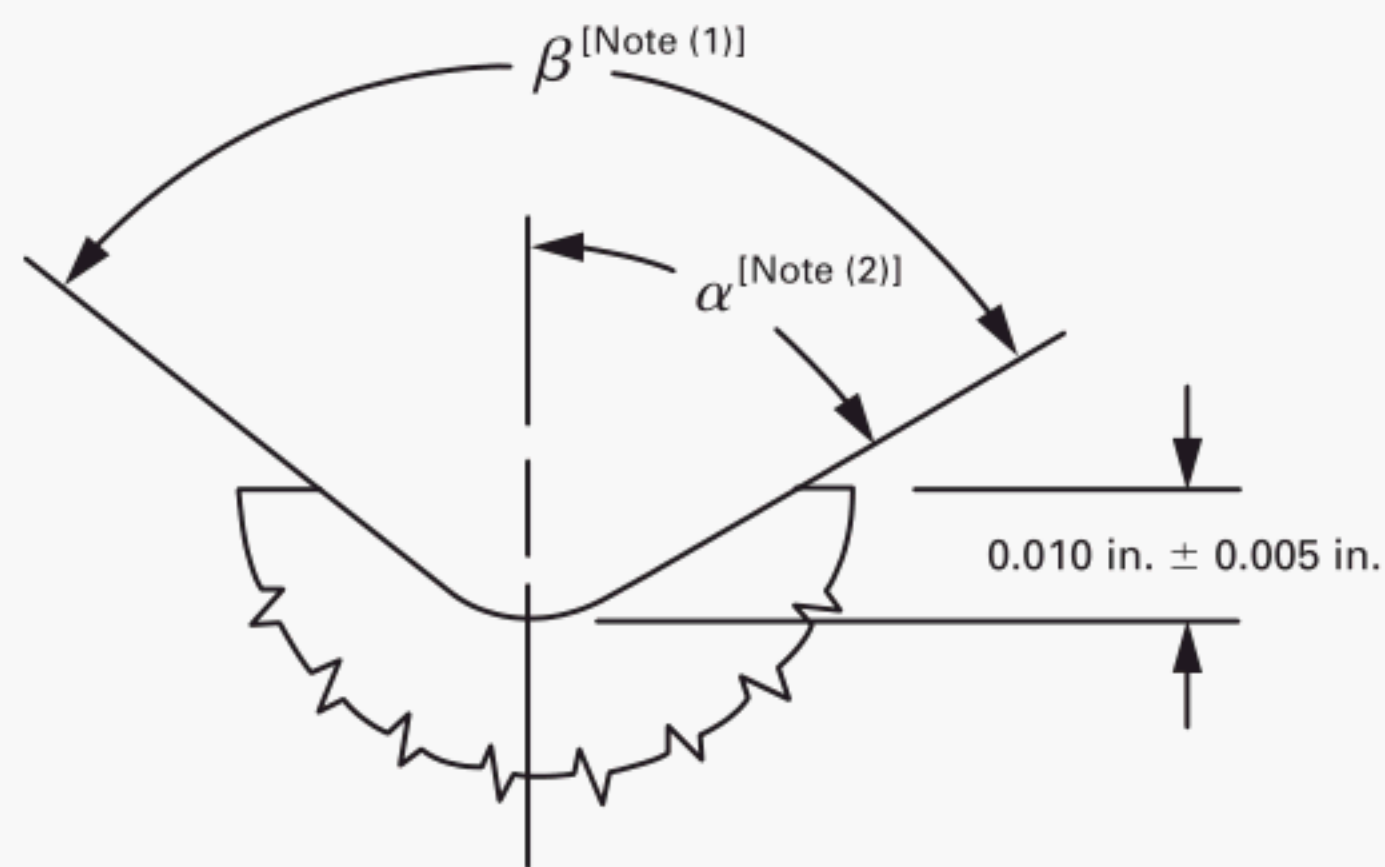
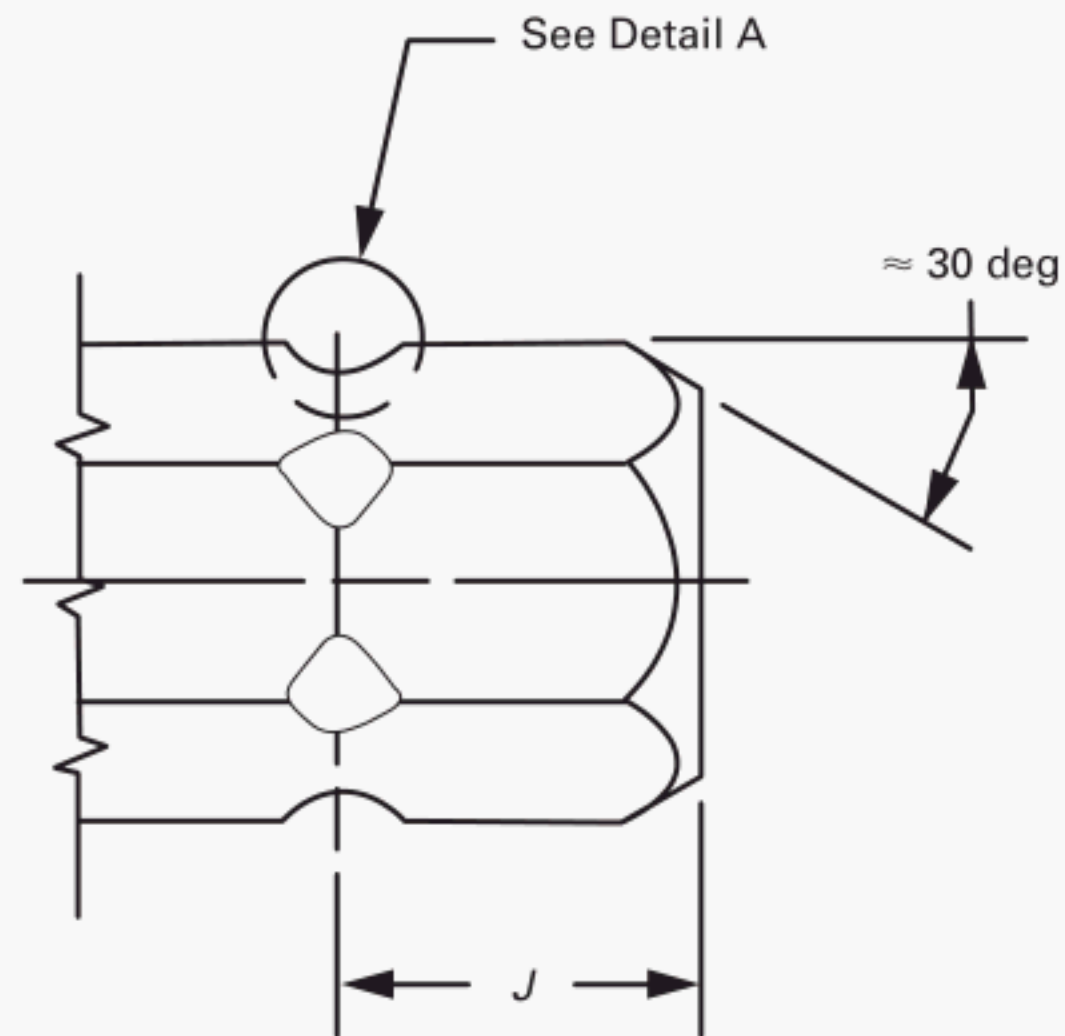


Fig. A-3 Retention Groove Geometry



Detail A

GENERAL NOTE: For $\frac{1}{4}$ hex stock, $J = 0.312 \text{ in.} \pm 0.010 \text{ in.}$; for $\frac{5}{16}$ hex stock, $J = 0.380 \text{ in.} \pm 0.010 \text{ in.}$; for $\frac{7}{16}$ hex stock, $J = 0.516 \text{ in.} \pm 0.010 \text{ in.}$

NOTES:

(1) $60 \text{ deg} \leq \beta \leq 120 \text{ deg}$

(2) $40 \text{ deg} \leq \alpha \leq 80 \text{ deg}$

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Hatchets: Safety Requirements	B107.42M-1997 (R2004)
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Ball Peen Hammers: Safety Requirements	B107.53-2004
Heavy Striking Tools: Safety Requirements	B107.54-2001
Axes: Safety Requirements	B107.55-2002
Body Repair Hammers and Dolly Blocks: Safety Requirements	B107.56-1999 (R2005)
Bricklayers' Hammers and Prospecting Picks: Safety Requirements	B107.57-2001
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