

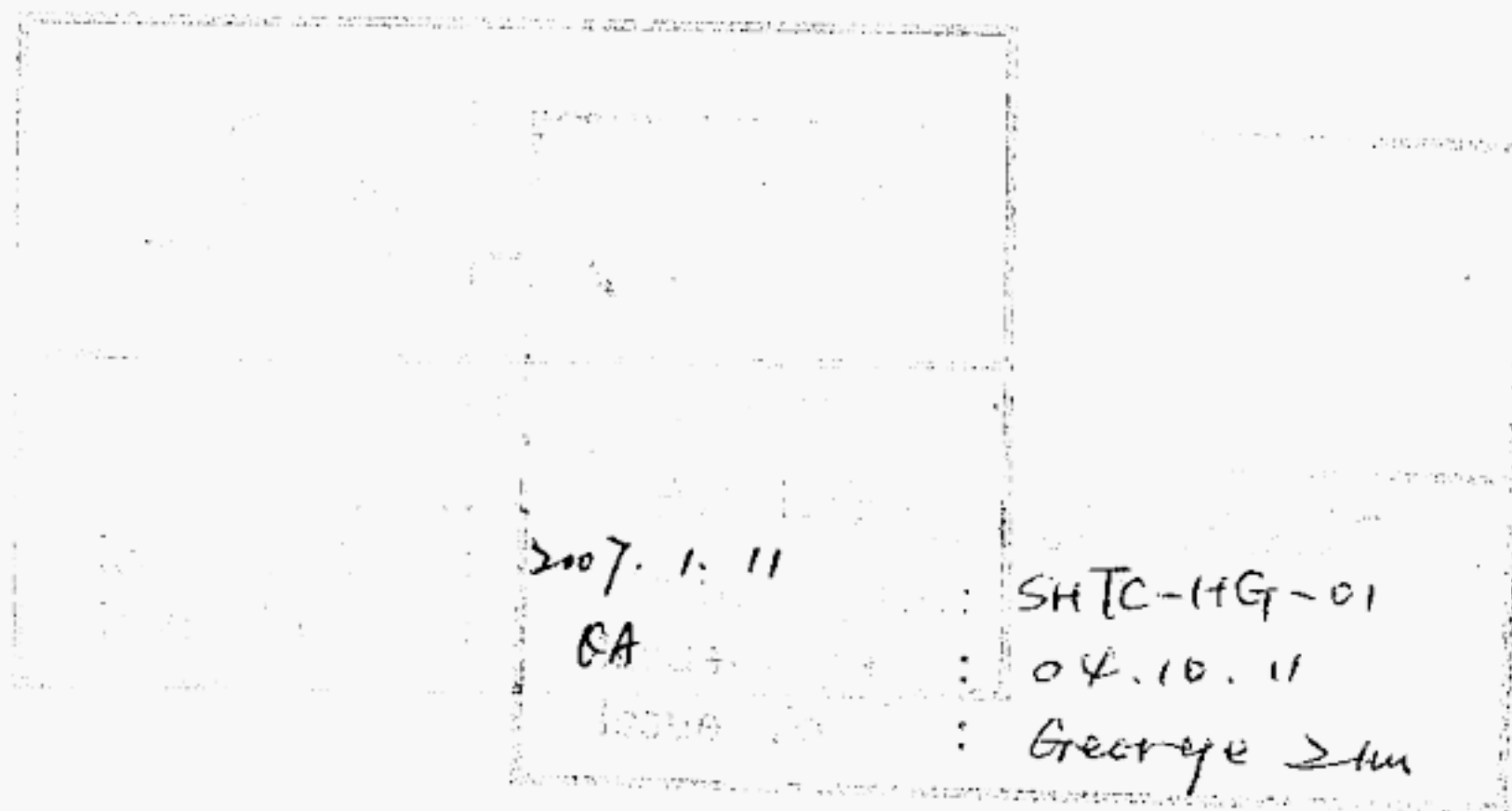


The American Society of
Mechanical Engineers

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A N A M E R I C A N N A T I O N A L S T A N D A R D

FLAT TIP SCREWDRIVERS



ASME B107.15-2002
(Revision of ASME B107.15-1993)

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FOREWORD

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

The purposes of this Standard are to define general and dimensional data and safety considerations specifically applicable to flat tip screwdrivers and to specify test methods to evaluate performance relating to the defined requirements.

This Standard is a revision of ASME B107.15-1993 Flat Tip and Phillips Screwdrivers. Principal changes in this Standard are the exclusion of Phillips screwdrivers (which can now be found in ASME B107.30-2002 Cross Tip Screwdrivers) and the addition of safety considerations.

The format of this Standard is in accordance with *The ASME Codes and Standards Writing Guide 2000*. Requests for interpretations of the technical requirements of this Standard should be expressed in writing to the Secretary, B107 Committee, at the address below.

Suggestions for the improvement of this Standard are welcome. They should be addressed to The American Society of Mechanical Engineers, Secretary, B107 Standards Committee, Three Park Avenue, New York, NY 10016-5990.

The requirements of this Standard become effective at the time of publication. This revision was approved as an American National Standard on May 13, 2002.

ASME STANDARDS COMMITTEE B107

Hand Tools and Accessories

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

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CORRESPONDENCE WITH THE B107 COMMITTEE

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

Secretary, B107 Standards Committee
The American Society of Mechanical Engineers
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New York, NY 10016-5990

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

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

Interpretations. Upon request, the B107 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.

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

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

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

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

Attending Committee Meetings. The B107 Standards Committee regularly holds meetings, which are open to the public. Persons wishing to attend any meeting should contact the Secretary of the B107 Standards Committee.

FLAT TIP SCREWDRIVERS

1 SCOPE

This Standard covers straight handle-type screwdrivers of flat tip design intended for manual operation in driving or removing screws with slotted recesses. The screwdrivers are of the types normally used by cabinet-makers, carpenters, sheet metal workers, production workers, mechanics, etc. The intention is to specify performance rather than design detail.

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

Using a screwdriver as a pry bar or striking it with a hammer are clearly misuses of the tool, and nothing in this Standard shall be interpreted as condoning any tool misuse. Further information about proper use of screwdrivers is contained in the Guide to Hand Tools - Selection, Safety Tips, Proper Use and Care.

2 CLASSIFICATION

For flat tip screwdrivers:

Type I Cabinet, Straight Sides

- Class 1: plain
- Class 2: bolster
- Class 3: stubby
- Class 4: pocket

Type II General Purpose, Flared Sides

- Class 1: plain
- Class 2: bolster
- Class 3: stubby
- Class 4: pocket

3 NORMATIVE REFERENCES

The following documents form a part of this Standard to the extent specified herein. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent editions of the documents indicated below.

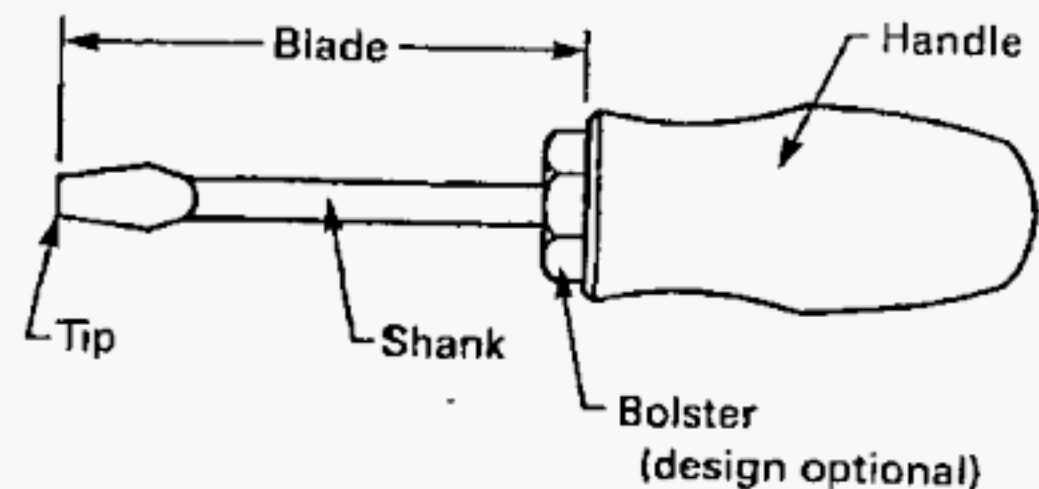


FIG. 1 DESCRIPTIONS

ASTM D 2240-97, Standard Test Method for Rubber Property — Durometer Hardness

ASTM E 18-94, Standard Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials

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

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

Publisher: Hand Tools Institute (HTI), 25 North Broadway, Tarrytown, NY 10591

SAE J1703-JAN95, Motor Vehicle Brake Fluid

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

4 DEFINITIONS (SEE FIG. 1)

assembly: the blade plus the handle.

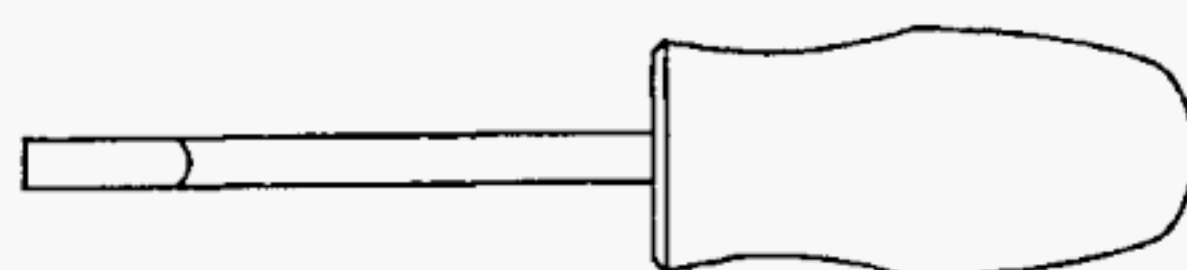
blade: the shank plus the tip.

bolster: an increase in the cross sectional area of the shank at the junction of the handle.

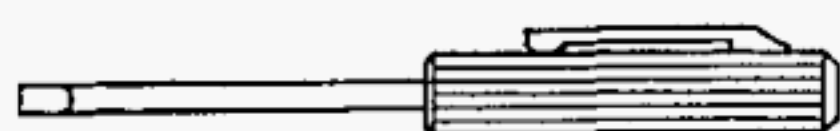
handle: that portion of the screwdriver that is gripped with the hand.

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

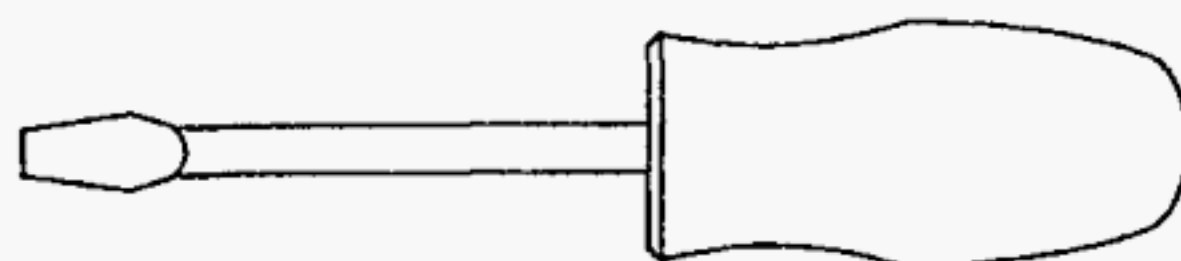
tip: the portion of the blade that engages the screw recess.



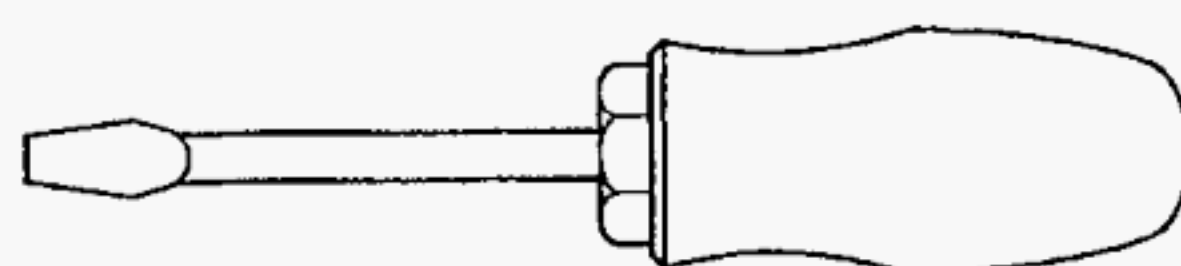
Type I Class 1: Plain, Straight Sides



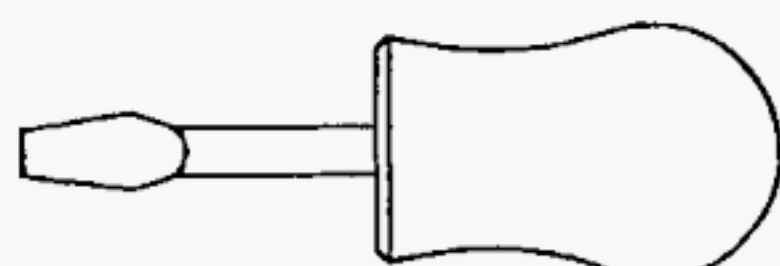
Type I Class 4: Pocket, Straight Sides



Type II Class 1: Plain, Flared Sides



Type II Class 2: Bolster, Flared Sides



Type II Class 3: Stubby, Flared Sides

FIG. 2 TYPICAL APPEARANCES

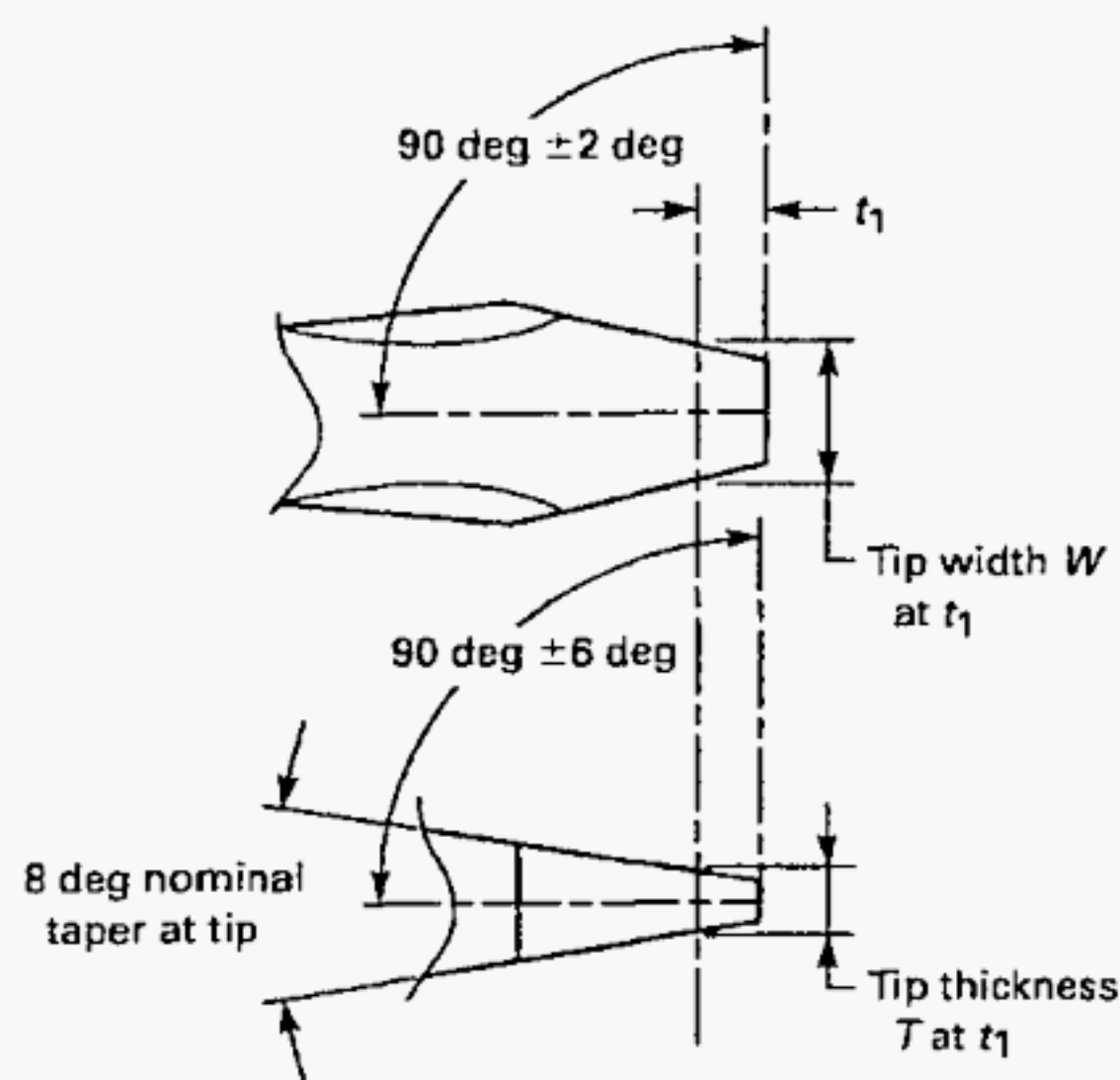
5 REQUIREMENTS

5.1 General Requirements

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

5.1.1 Type I. Flat tip straight sided cabinet screwdrivers are for driving and removing slotted screws. The entire length of the blade shall be capable of entering a round hole no larger than the maximum allowable tip width dimension plus 0.031 in. (0.79 mm). Figure 2 illustrates typical appearances for Class 1 plain and Class 4 pocket with the pocket clip optional.

FLAT TIP SCREWDRIVERS



GENERAL NOTE: For tip dimensions at t_1 , see Table 1.

FIG. 3 FLAT TIP SCREWDRIVER NOMENCLATURE AT t_1

Screwdrivers shall conform to the dimensional and performance characteristics specified in Tables 1 and 2.

5.1.2 Type II. Flat tip flared sided general purpose screwdrivers are for driving and removing slotted screws. Figure 2 illustrates typical appearances for Class 1 plain, Class 2 bolster, and Class 3 stubby. Screwdrivers shall conform to the dimensional and performance characteristics specified in Tables 1 and 2.

5.2 Materials

The materials used in the manufacture of a screwdriver shall be such as to produce products conforming to the performance requirements specified herein.

5.3 Markings

Each screwdriver shall be marked in a legible manner with the manufacturer's name or identification, country of manufacture, and product number. The method of marking shall be such that it will remain legible under normal usage over an extended period.

5.4 Blade

5.4.1 General Requirements. Blades made of steel shall be properly heat treated to meet the performance specified herein. The blade shall be held securely in the handle. The blade shall be essentially free from

TABLE 1 DIMENSIONAL CHARACTERISTICS OF FLAT TIP SCREWDRIVERS

Blade (See Fig. 3)				Handle	
Nominal Tip Thickness and Width at Tip, in. (mm) (Ref.)	Tip Thickness T at t_1 , in. (mm)	Tip Width W at t_1 , $+0.031 / -0.016$ ($+0.79 / -0.41$), in. (mm)	t_1 , in. (mm)	Diameter or Distance Across Corners (Minimum), in. (mm)	Length (Minimum), in. (mm) [Note (1)]
0.011 (0.28) \times 0.058 (1.47)	0.012 \pm 0.001 (0.30 \pm 0.03)	0.058 (1.47)	0.006 (0.15)	0.31 (7.9)	1.50 (38.1)
0.015 (0.38) \times $\frac{3}{32}$ (2.38)	0.016 \pm 0.002 (0.41 \pm 0.05)	0.094 (2.39)	0.008 (0.20)	0.50 (12.7)	1.75 (44.5)
0.020 (0.51) \times $\frac{1}{8}$ (3.18)	0.022 \pm 0.003 (0.56 \pm 0.08)	0.125 (3.18)	0.012 (0.30)	0.56 (14.2)	2.37 (60.2)
0.020 (0.51) \times $\frac{9}{64}$ (3.57)	0.022 \pm 0.003 (0.56 \pm 0.08)	0.144 (3.66)	0.012 (0.30)	0.75 (19.1)	2.37 (60.2)
0.025 (0.64) \times $\frac{5}{32}$ (3.97)	0.027 \pm 0.004 (0.69 \pm 0.10)	0.156 (3.96)	0.016 (0.41)	0.75 (19.1)	2.37 (60.2)
0.030 (0.76) \times $\frac{3}{16}$ (4.76)	0.033 \pm 0.004 (0.84 \pm 0.10)	0.187 (4.75)	0.020 (0.51)	0.87 (22.1)	2.93 (74.4)
0.032 (0.81) \times $\frac{7}{32}$ (5.56)	0.035 \pm 0.004 (0.89 \pm 0.10)	0.219 (5.56)	0.020 (0.51)	1.00 (25.4)	3.37 (85.6)
0.037 (0.94) \times $\frac{1}{4}$ (6.35)	0.040 \pm 0.004 (1.02 \pm 0.10)	0.250 (6.35)	0.024 (0.61)	1.00 (25.4)	3.37 (85.6)
0.042 (1.07) \times $\frac{5}{16}$ (7.94)	0.046 \pm 0.004 (1.17 \pm 0.10)	0.312 (7.92)	0.028 (0.71)	1.06 (26.9)	3.87 (98.3)
0.046 (1.17) \times $\frac{5}{16}$ (7.94)	0.050 \pm 0.004 (1.27 \pm 0.10)	0.312 (7.92)	0.031 (0.79)	1.12 (28.4)	3.87 (98.3)
0.050 (1.27) \times $\frac{3}{8}$ (9.53)	0.055 \pm 0.004 (1.40 \pm 0.10)	0.375 (9.53)	0.034 (0.86)	1.18 (30.0)	4.37 (111.0)
0.060 (1.52) \times $\frac{3}{8}$ (9.53)	0.066 \pm 0.004 (1.68 \pm 0.10)	0.375 (9.53)	0.039 (0.99)	1.25 (31.8)	5.00 (127.0)
0.070 (1.78) \times $\frac{7}{16}$ (11.11)	0.077 \pm 0.004 (1.96 \pm 0.10)	0.437 (11.10)	0.047 (1.19)	1.25 (31.8)	5.00 (127.0)
0.091 (2.31) \times $\frac{1}{2}$ (12.70)	0.099 \pm 0.004 (2.51 \pm 0.10)	0.500 (12.70)	0.059 (1.50)	1.25 (31.8)	5.00 (127.0)

NOTE:

(1) Handle length dimensions do not apply to stubby and pocket screwdrivers.

scale, seams, laps, and cracks, which may adversely affect durability or serviceability of the tool.

5.4.2 Finish. The blade 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.

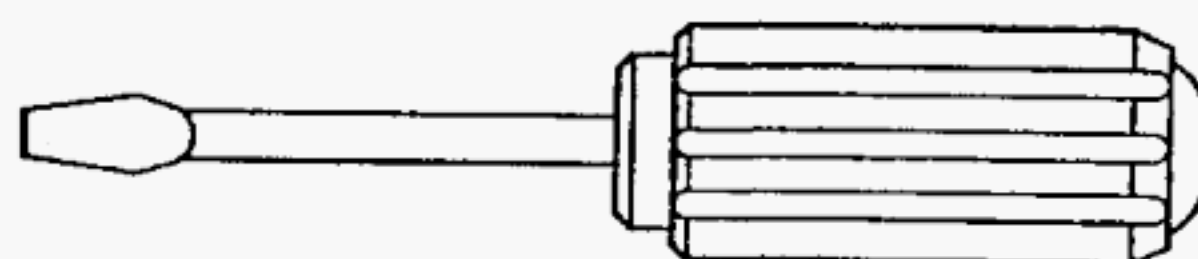
5.4.3 Hardness. The tip portion of the screwdrivers or the entire blade shall be hardened to not less than 48 HRC (para. 6.2).

5.4.4 Symmetry. See Fig. 3. The tip width shall be perpendicular to the shank axis within 2 deg. The tip thickness shall be perpendicular to the shank axis within 6 deg. Taper at the tip shall be centered within 5 deg of the shank axis.

5.5 HANDLE

5.5.1 General Requirements. The handle shall be of a material capable of withstanding the applicable test requirements as specified herein. 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.

5.5.2 Cushion Grip. When specified, the handle shall be furnished with a cushion grip, and the screwdriver shall typically resemble that shown in Fig. 4. The grip material shall be capable of meeting the tests

**FIG. 4 TYPICAL APPEARANCE OF A CUSHION GRIP SCREWDRIVER**

of paras. 6.7 and 6.8. The durometer hardness shall be a maximum of Shore A 75 (para. 6.2). The cushion grip length shall be at least 60% of the handle length, and there shall be no detectable slippage between the handle and the cushion grip under normal usage. A handle with a cushion grip shall meet the dimensional requirements for the corresponding conventional type handle for each type and design (see Table 1).

5.6 WORKMANSHIP

The screwdriver shall be free from conditions which may impair its serviceability, durability or comfort.

6 TEST PROCEDURES

Many tests required herein are inherently hazardous, and adequate safeguards for personnel and property shall be employed in conducting such tests. The follow-

TABLE 2 PERFORMANCE CHARACTERISTICS OF FLAT TIP SCREWDRIVERS

Nominal Tip Thickness and Width at Tip, in. (mm) (Ref.)	Test Block Slot (See Fig. 5A)		Tip Width W at t_1		Bending Moment Min., in.-lb, (N · m)
	W ± 0.0005 (± 0.013), in. (mm)	D ± 0.0028 (± 0.071), in. (mm)	Assembly Min., in.-lb (N · m)	Blade Tip Min., in.-lb, (N · m)	
0.011 (0.28) \times 0.058 (1.47)	0.0140 (0.360)	0.0284 (0.721)	1.2 (0.14)	1.2 (0.14)	None
0.015 (0.38) \times $\frac{3}{32}$ (2.38)	0.0190 (0.480)	0.0304 (0.772)	2.6 (0.29)	3.5 (0.40)	None
0.020 (0.51) \times $\frac{1}{8}$ (3.18)	0.0260 (0.660)	0.0344 (0.874)	6 (0.68)	9 (1.02)	None
0.020 (0.51) \times $\frac{9}{64}$ (3.57)	0.0260 (0.660)	0.0344 (0.874)	8 (0.90)	10 (1.13)	40 (4.52)
0.025 (0.64) \times $\frac{5}{32}$ (3.97)	0.0320 (0.813)	0.0384 (0.975)	13 (1.47)	17 (1.92)	60 (6.78)
0.030 (0.76) \times $\frac{3}{16}$ (4.76)	0.0380 (0.965)	0.0424 (1.077)	25 (2.83)	30 (3.39)	100 (11.30)
0.032 (0.81) \times $\frac{7}{32}$ (5.56)	0.0400 (1.016)	0.0424 (1.077)	30 (3.39)	39 (4.41)	175 (19.78)
0.037 (0.94) \times $\frac{1}{4}$ (6.35)	0.0450 (1.143)	0.0464 (1.179)	40 (4.52)	58 (6.55)	350 (39.55)
0.042 (1.07) \times $\frac{5}{16}$ (7.94)	0.0510 (1.295)	0.0504 (1.280)	60 (6.78)	96 (10.85)	700 (79.10)
0.046 (1.17) \times $\frac{5}{16}$ (7.94)	0.0550 (1.397)	0.0534 (1.356)	80 (9.04)	113 (12.77)	700 (79.10)
0.050 (1.27) \times $\frac{3}{8}$ (9.53)	0.0600 (1.524)	0.0564 (1.433)	140 (15.82)	165 (18.65)	1000 (113.00)
0.060 (1.52) \times $\frac{3}{8}$ (9.53)	0.0710 (1.803)	0.0614 (1.560)	170 (19.21)	237 (26.78)	1000 (113.00)
0.070 (1.78) \times $\frac{7}{16}$ (11.11)	0.0820 (2.083)	0.0694 (1.763)	200 (22.60)	376 (42.49)	1000 (113.00)
0.091 (2.31) \times $\frac{1}{2}$ (12.70)	0.1040 (2.642)	0.0814 (2.068)	225 (25.43)	711 (80.34)	1000 (113.00)

GENERAL NOTES:

(a) Formula for calculating torsional test loads for blade tips:

(1) For inch, $L = 145,000WT^2$, where L = torsional test load (in.-lb) and W and T are dimensions in inches at t_1 (see Fig. 3 and Table 1);(2) For metric, $L = WT^2$, where L = torsional test load (N · m) and W and T are dimensions in millimeters at t_1 (see Fig. 3 and Table 1).(b) See Table 1 for W , T , and t_1 (definitions).

(c) Formula for calculating test block slot dimensions (see Fig. 5A):

(1) For inch, width = (max. tip thickness at $t_1 + 0.0010$) \pm 0.0005, depth = ($t_1 + 0.0224$) \pm 0.0028;(2) For metric, width = (max. tip thickness at $t_1 + 0.025$) \pm 0.013, depth = ($t_1 + 0.571$) \pm 0.071.

ing tests are intended to ensure conformance with the performance requirements of this Standard.

6.1 Visual Examination

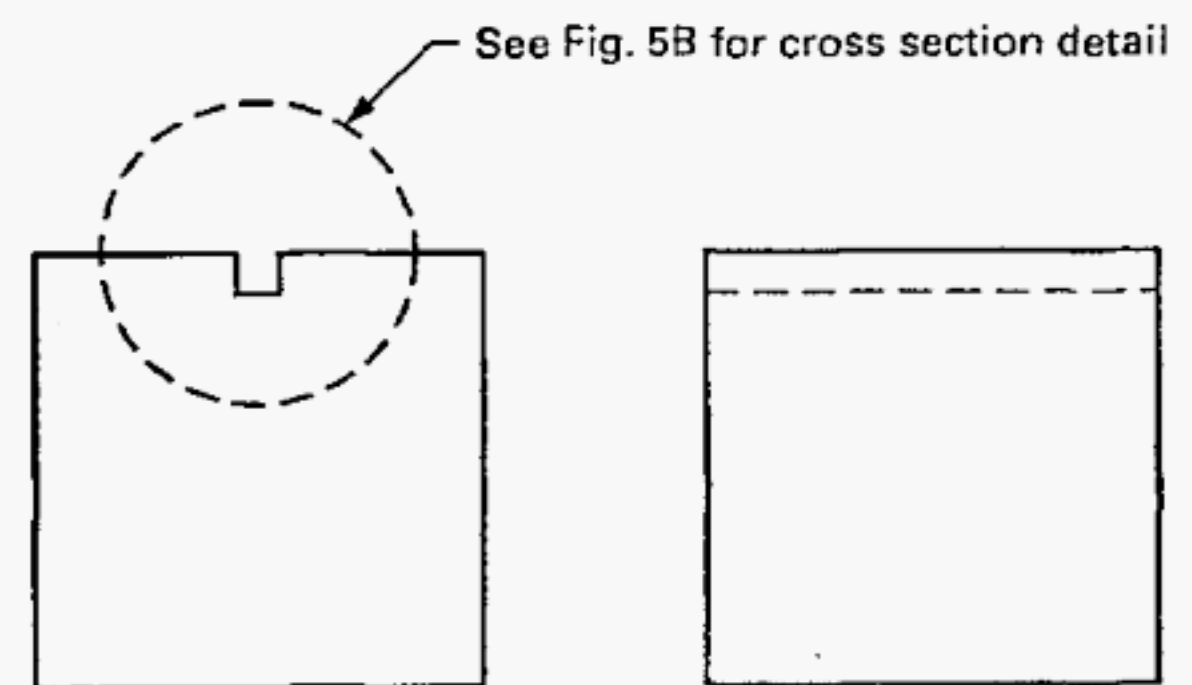
Conformance with marking and other requirements not established by test shall be verified by visual examination.

6.2 Hardness Test

The Rockwell hardness test shall be conducted in accordance with ASTM E 18. The Shore durometer test shall be conducted in accordance with ASTM D 2240.

6.3 Tip Torsional Test

The tip of each sample under test shall be located in a test block of applicable dimensions shown in the performance section of Table 2 and Figs. 5A and 5B. When tested to the minimum tip torque value specified in Table 2 neither the shank nor the tip shall show visible permanent deformation. The torque shall be



GENERAL NOTE: See Table 2 for torsional test block dimensions.

FIG. 5A TYPICAL TORSIONAL TEST BLOCK

applied by forces acting perpendicular to the axis with the tip held securely in the test block. It is permissible to support the blade in a suitable position for test. The blade shall be restricted from endwise movement during testing.

TABLE 3 IMPACT TEST DATA

Blade Diameter (Nominal Stock Size), in. (mm)	Height of Drop of 15 lb (6.8 kg) Weight for Impact Tests, in. (mm)	Blade Penetration (Max.), in. (mm)	Impact Energy, ft-lb (N · m)
0.12 (3.0)	1.50 (38.1)	0.75 (19.1)	1.88 (2.54)
0.16 (4.1)	4.00 (101.6)	0.75 (19.1)	5.00 (6.78)
0.19 (4.8)	6.00 (152.4)	0.75 (19.1)	7.50 (10.17)
0.22 (5.6)	8.00 (203.2)	0.62 (15.7)	10.00 (13.56)
0.25 (6.4)	10.00 (254.0)	0.62 (15.7)	12.50 (16.95)
0.28 (7.1)	12.00 (304.8)	0.62 (15.7)	15.00 (20.34)
0.31 (7.9)	15.00 (381.0)	0.62 (15.7)	18.75 (25.42)
0.34 (8.6)	17.00 (431.8)	0.62 (15.7)	21.25 (28.81)
0.37 and over (9.4 and over)	20.00 (508.0)	0.62 (15.7)	25.00 (33.90)

6.4 Assembly Torsional Test

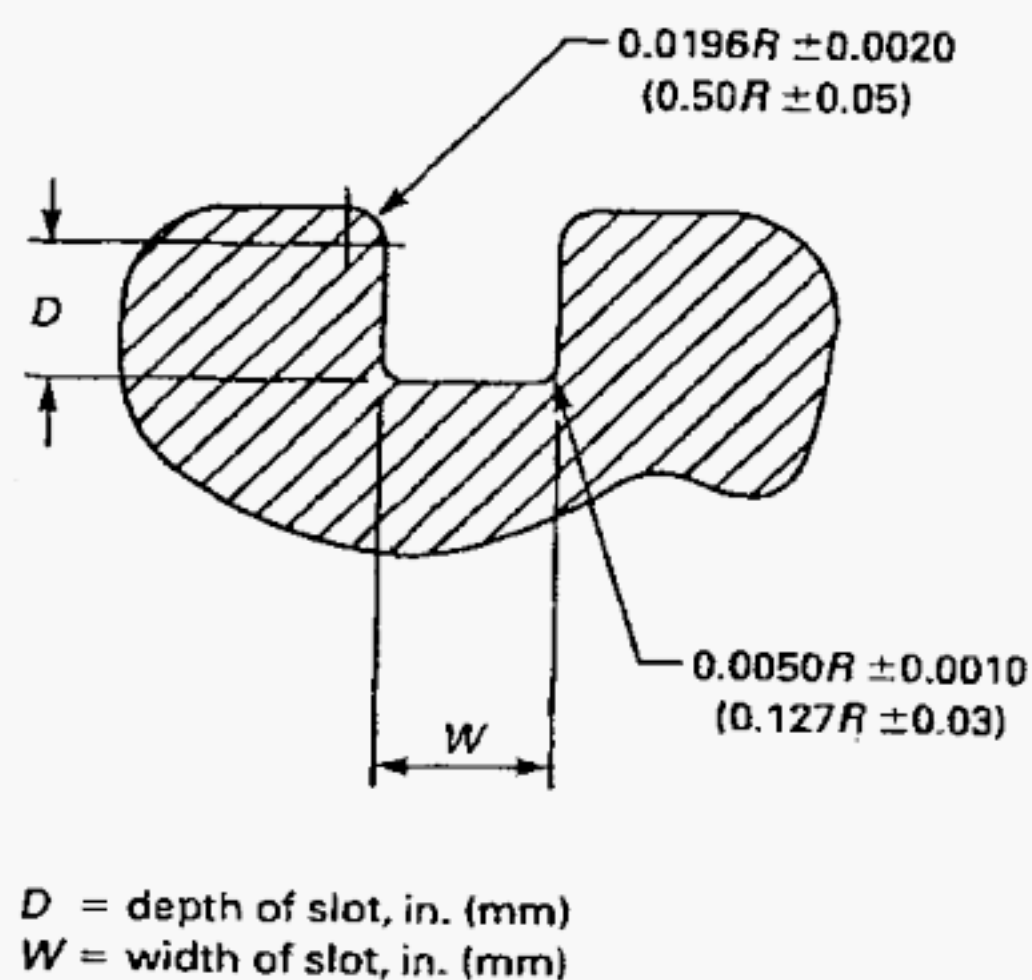
The test shall be conducted after preheating the entire tool to a uniform temperature of $125^{\circ}\text{F} \pm 5^{\circ}\text{F}$ ($51.7^{\circ}\text{C} \pm 2.8^{\circ}\text{C}$). The torque shall be applied within 1 min after removing the tool from the heating medium. The torque shall be applied by forces acting at or near the middle of the natural grip of the handle perpendicular to the axis 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 2, the assembly shall not show a permanent slippage between the shank and handle.

6.5 Tip Toughness Test

The tip shall be tested as in the torsion test described in para. 6.3 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.

6.6 Bending Moment Test

The bending moment test for flat tip screwdrivers shall be conducted in a manner similar to that shown in Fig. 6. 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 (see Fig. 6). 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



GENERAL NOTES:

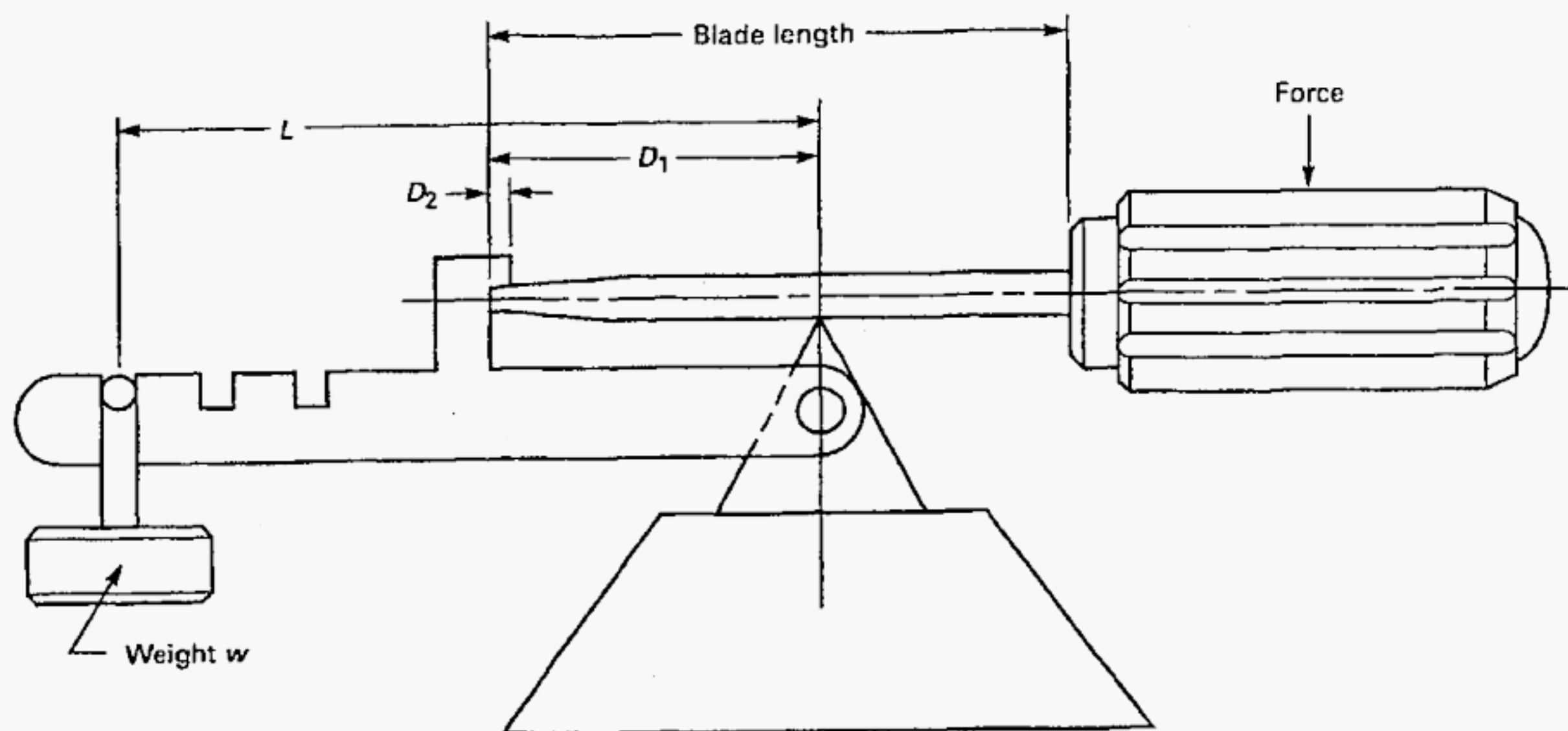
- The test block shall have a hardness of not less than 60 HRC or equivalent. The hardness shall be tested using procedures as outlined in ASTM E 18.
- See Table 2 for D and W test block slot dimensions and performance characteristics.
- For nominal tip thickness smaller than 0.025 in. (0.64 mm), use $0.004R$ in. (0.10 mm) max.

FIG. 5B CROSS SECTION OF SLOT FOR TYPICAL TORSIONAL TEST BLOCK

in Table 2, the assembly shall not fracture, the blade shall not show any visible permanent deformation, and the handle shall not loosen.

6.7 Solvent Resistance Test

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



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

- (a) bending moment = Lw , in.-lbf (N·m), dimensions are in inches (meters), 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. 3 and Table 1).

NOTE:

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

FIG. 6 BENDING MOMENT TEST, TYPICAL SETUP

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. 6.4 and 6.8. After testing, the hardness of the cushion grip, if furnished, shall not be greater than durometer Shore A 80.

6.8 Handle Impact Test

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 required ft-lb (N·m) is satisfied.

The blade shall not penetrate into the handle more than specified in Table 3 when the weight has been dropped ten times from the applicable height shown in Table 3. The first drop ensures that the blade is seated in the handle. The difference in length after the first and after the tenth drop 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.

7 DESIGNATIONS

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

- type
- class
- flat tip width and thickness
- exposed blade length
- options as applicable