ASME B107.12-2004
(Revision of ASME B107.12-1997)

Nutdrivers

AN AMERICAN NATIONAL STANDARD



The American Society of Mechanical Engineers

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

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

Not for Resale

ASME B107.12-2004

(Revision of ASME B107.12-1997)

Nutdrivers

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

Three Park Avenue • New York, NY 10016

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

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

Not for Resale

Date of Issuance: May 4, 2005

This Standard will be revised when the Society approves the issuance of a new edition. There will be no addenda or written interpretations of the requirements of this Standard issued to this edition.

ASME is the registered trademark of The American Society of Mechanical Engineers.

This code or standard was developed under procedures accredited as meeting the criteria for American National Standards. The Standards Committee that approved the code or standard was balanced to assure that individuals from competent and concerned interests have had an opportunity to participate. The proposed code or standard was made available for public review and comment that provides an opportunity for additional public input from industry, academia, regulatory agencies, and the public-at-large.

ASME does not "approve," "rate," or "endorse" any item, construction, proprietary device, or activity.

ASME does not take any position with respect to the validity of any patent rights asserted in connection with any items mentioned in this document, and does not undertake to insure anyone utilizing a standard against liability for infringement of any applicable letters patent, nor assumes any such liability. Users of a code or standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

Participation by federal agency representative(s) or person(s) affiliated with industry is not to be interpreted as government or industry endorsement of this code or standard.

ASME accepts responsibility for only those interpretations of this document issued in accordance with the established ASME procedures and policies, which precludes the issuance of interpretations by individuals.

No part of this document may be reproduced in any form,
in an electronic retrieval system or otherwise,
without the prior written permission of the publisher.

The American Society of Mechanical Engineers
Three Park Avenue, New York, NY 10016-5990

Copyright © 2005 by
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
All rights reserved
Printed in U.S.A.

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

Not for Resale

CONTENTS

Foreword iv
Committee Roster v
Correspondence With the B107 Committee vi

1 Scope 1

2 Classification 1

3 References 1

4 Requirements 1

5 Test Procedures 5

6 Safety Requirements and Limitations of Use 6

7 Designations 6

Figures

1 Type I, Class 1, Styles A and B: Conventional Length Nutdriver With Solid Shaft 2
2 Type I, Class 2, Styles A and B: Conventional Length Nutdriver With Hollow Shaft 3
3 Type II, Styles A and B: Stubby Length Nutdriver 7
4 Type III: Miniature Handle Nutdriver 8
5 Torsional Moment Test 9
6 Bending Moment Test 11

Tables

1 Type I, Class 1, Styles A and B: Conventional Length Nutdriver with Solid Shaft 2
1M Type I, Class 1, Styles A and B: Conventional Length Nutdriver with Solid Shaft (SI Units) 2
2 Type I, Class 2, Styles A and B: Conventional Length Nutdriver with Hollow Shaft 3
2M Type I, Class 2, Styles A and B: Conventional Length Nutdriver with Hollow Shaft (SI Units) 3
3 Type II, Styles A and B: Stubby Length Nutdriver 7
3M Type II, Styles A and B: Stubby Length Nutdriver (SI Units) 7
4 Type III: Miniature Handle Nutdriver 8
4M Type III: Miniature Handle Nutdriver (SI Units) 8
5 Torsional Moment Test: Hexagonal Mandrel Dimensions and Maximum Depth of Mandrel Insertion 10
5M Torsional Moment Test: Hexagonal Mandrel Dimensions and Maximum Depth of Mandrel Insertion (SI Units) 10
6 Bending Moment Test: Hexagonal Mandrel Dimensions and Maximum Depth of Mandrel Insertion 12
6M Bending Moment Test: Hexagonal Mandrel Dimensions and Maximum Depth of Mandrel Insertion (SI Units) 12

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

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 include safety considerations.

The purposes of this Standard are to define dimensional, performance, and safety requirements specifically applicable to spin type screwdriver grip nutdrivers, and to specify test methods to evaluate performance relating to the defined requirements.

This Standard is a revision of B107.12-1997, Nutdrivers (Spin Type, Screwdriver Grip) (Inch Series). A principal change in this edition of the Standard is the inclusion of metric information, previously contained in B107.35M-1997. Updated references, finish requirements, and dimensional data are included.

The format of this Standard is in accordance with *The ASME Codes and Standards Writing Guide 2000.* Requests for interpretations of the technical requirements, and suggestions for the improvement of this Standard, 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 and supersede B107.35M-1997 at the time of publication.

This revision was approved as an American National Standard on July 14, 2004.

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

ASME B107 STANDARDS COMMITTEE
Hand Tools and Accessories

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

OFFICERS

G. E. Olson, *Chair*
W. T. Pagac, *Vice Chair*
J. D. Wendler, *Secretary*

COMMITTEE PERSONNEL

J. D. Davidson, Sears, Roebuck and Co.
P. A. Desmarais, Danaher Tool Group
J. S. Foote, Trade Association Management, Inc.
A. Garg, Stanley Works
R. A. Goldman II, Klein Tools
A. Herskovitz, Consultant
D. S. McKittrick, Western Forge Corp.
G. E. Olson, Gene Olson Engineering Consultant, Ltd.
W. T. Pagac, Snap-on, Inc.
D. M. Eggert, *Alternate,* Snap-on, Inc
J. Ster, Federal Supply Service Hardware Super Store
L. W. Fahlstrom, *Alternate,* Federal Supply Service Hardware Super Store
J. D. Wendler, The American Society of Mechanical Engineers
R. B. Wright, Wright Tool Co.
W. C. Snyder, *Alternate,* Wright Tool Co.

SUBCOMMITTEE 1/2 — WRENCHES

P. A. Desmaris, *Chair,* Danaher Tool Group
W. C. Snyder, *Vice Chair,* Wright tool Co.
J. D. Davidson, Sears, Roebuck and Co.
R. A. Goldman II, Klein Tools
W. T. Pagac, Snap-on, Inc.

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

CORRESPONDENCE WITH THE 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
Three Park Avenue
New York, NY 10016-5990

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

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

Interpretations. Upon request, the 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.

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

NUTDRIVERS

1 SCOPE

This Standard provides performance and safety requirements for nutdrivers with an integral socket and shaft that utilize a screwdriver-type handgrip. Inclusion of dimensional and functional data in this Standard is not intended to imply that all products described herein are stock production sizes. Consumers are requested to consult with manufacturers concerning lists of stock production sizes.

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.

2 CLASSIFICATION

Type I: Conventional length
Class 1: Solid shaft
Style A: Conventional handle
Style B: Cushion grip handle
Class 2: Hollow shaft
Style A: Conventional handle
Style B: Cushion grip handle
Type II: Stubby length
Style A: Conventional handle
Style B: Cushion grip handle
Type III: Miniature handle

3 REFERENCES

The following is a list of publications referenced in this Standard.

ASME B46.1-1995 Surface Texture, Surface Roughness, Waviness, and Lay

ASME B107.4M-1995 Driving and Spindle Ends for Portable Hand, Impact, Air, and Electric Tools (Percussion Tools Excluded)

ASME B107.17M-1997 Gages, Wrench Openings, Reference

Publisher: The American Society of Mechanical Engineers, Three Park Avenue, New York, NY 10016-5990; Order Department: 22 Law Drive, Box 2300, Fairfield, NJ 07007-2300

ASTM B 117-97 Standard Practice for Operating Salt Spray (Fog) Apparatus

ASTM B 537-70(1997) Standard Practice for Rating of Electroplated Panels Subjected to Atmospheric Exposure

ASTM B 571-97 Standard Test Methods for Qualitative Adhesion Testing of Metallic Materials

ASTM D 968-93 Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive

ASTM D 1735-99 Standard Practice for Testing Water Resistance of Coatings Using Water Fog Apparatus

ASTM D 2240-1997 Standard Test Methods for Rubber Property - Durometer Hardness

ASTM E 18-00, Standard Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials

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

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

Publisher: Hand Tools Institute (HTI), 25 North Broadway, Tarrytown, NY 10591-3201

4 REQUIREMENTS

The illustrations shown herein are descriptive and not restrictive, and are not intended to preclude the manufacture of nutdrivers that are otherwise in accordance with this Standard.

4.1 Design

4.1.1 Type I, Class 1: Conventional Length — Solid Shaft. Type I, Class 1 nutdrivers shall consist of a round steel solid shaft with a socket at one end and a handle at the other end. The nutdrivers shall be similar to Fig. 1 and conform to Table 1 or 1M for the size specified. Style A nutdrivers shall be provided with a conventional color-coded handle and/or shaft. Style B nutdrivers shall be provided with a cushion grip handle and need not be color-coded.

4.1.2 Type I, Class 2: Conventional Length — Hollow Shaft. Type I, Class 2 nutdrivers shall consist of a round steel hollow shaft with a socket at one end and a handle at the other end. The nutdrivers shall be similar to Fig. 2 and conform to Table 2 or 2M for the size specified. Style A nutdrivers shall be provided with a conventional

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

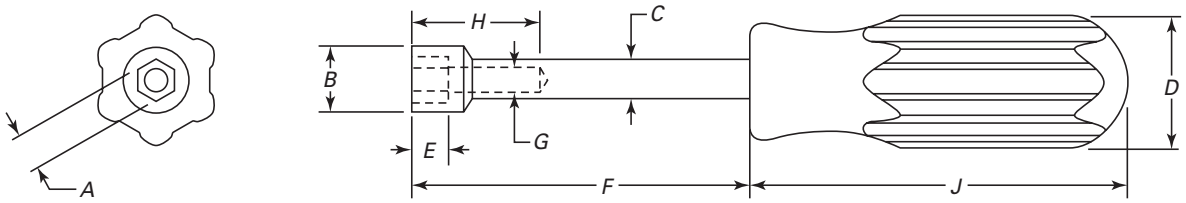


Fig. 1 Type I, Class 1, Styles A and B: Conventional Length Nutdriver With Solid Shaft

Table 1 Type I, Class 1, Styles A and B: Conventional Length Nutdriver With Solid Shaft

Nominal Socket Opening, *A*, in.	Maximum Socket Outside Diameter, *B*, in.	Maximum Shaft Diameter, *C*, in.	Minimum Handle Outside Diameter, *D*, in.	Minimum Hex Depth, *E*, in.	Minimum Shaft Length, *F*, in.	Minimum Hole Diameter, *G*, in.	Minimum Depth of Hole, *H*, in.	Minimum Handle Length, *J*, in.	Minimum Proof Torque, lbf-in.	Minimum Bending Moment Test Load, lbf-in.
5/32	0.335	0.32	0.87	0.18	2.81	0.100	1.00	3.12	50	45
3/16	0.385	0.32	0.87	0.18	2.81	0.105	1.00	3.12	75	60
7/32	0.400	0.32	0.87	0.18	2.81	0.115	1.00	3.12	75	60
1/4	0.450	0.38	0.87	0.18	2.81	0.118	1.00	3.12	100	90
9/32	0.475	0.38	0.87	0.18	2.81	0.129	1.00	3.12	100	90
5/16	0.510	0.38	0.87	0.21	2.81	0.141	1.00	3.12	125	105
11/32	0.545	0.38	0.87	0.25	2.81	0.170	1.00	3.12	125	105
3/8	0.585	0.45	0.87	0.25	2.81	0.196	1.00	3.12	150	120
7/16	0.660	0.45	1.00	0.28	2.81	0.265	1.00	3.50	150	145
1/2	0.720	0.51	1.00	0.31	2.81	0.321	1.00	3.50	175	175
9/16	0.814	0.57	1.06	0.43	2.87	0.386	1.00	3.62	175	260
5/8	0.892	0.63	1.06	0.43	2.87	0.445	1.00	3.62	200	300
11/16	0.952	0.70	1.12	0.43	3.87	0.445	1.00	3.62	250	375
3/4	1.054	0.70	1.12	0.43	3.87	0.505	1.00	4.00	250	375
13/16	1.108	0.70	1.12	0.43	3.87	0.567	1.00	4.00	250	375
7/8	1.201	0.70	1.12	0.43	3.87	0.567	1.00	4.00	250	375

Table 1M Type I, Class 1, Styles A and B: Conventional Length Nutdriver With Solid Shaft (SI Units)

Nominal Socket Opening, *A*, mm	Maximum Socket Outside Diameter, *B*, mm	Maximum Shaft Diameter, *C*, mm	Minimum Handle Outside Diameter, *D*, mm	Minimum Hex Depth, *E*, mm	Minimum Shaft Length, *F*, mm	Minimum Hole Diameter, *G*, mm	Minimum Depth of Hole, *H*, mm	Minimum Handle Length, *J*, mm	Minimum Proof Torque, N·m	Minimum Bending Moment Test Load, N·m
4	8.5	8.1	22	2.4	70	2.2	25	79	8	7
4.5	9.7	8.1	22	2.6	70	2.5	25	79	8	8
5	9.7	9.5	22	2.8	70	2.9	25	79	9	8
5.5	10.2	9.5	22	2.8	70	3.3	25	79	11	9
6	10.8	9.5	22	3.1	70	3.6	25	79	11	11
7	12.1	9.5	22	3.6	70	4.2	25	79	11	12
8	13.0	10.2	22	3.6	70	5.2	25	79	11	14
9	13.8	11.8	22	4.1	70	5.3	25	79	13	15
10	15.6	11.8	25	4.6	70	6.3	25	88	16	18
11	16.8	13.4	25	5.5	70	7.3	25	88	20	22
12	17.5	15	25	6.1	70	8.3	25	88	23	26
13	18.5	15	25	6.1	70	8.3	25	88	24	32
14	20.6	16.8	27	6.1	70	10.1	25	92	25	39
16	22.7	16.8	27	7.0	70	11.1	25	92	26	45
17	23.6	16.8	27	8.0	70	11.7	25	92	31	49
18	24.5	16.8	27	9.0	70	12.2	25	92	34	56

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

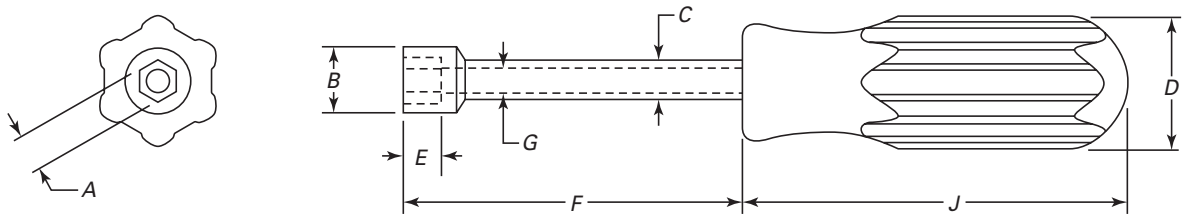


Fig. 2 Type I, Class 2, Styles A and B: Conventional Length Nutdriver With Hollow Shaft

Table 2 Type I, Class 2, Styles A and B: Conventional Length Nutdriver With Hollow Shaft

Nominal Socket Opening, *A*, in.	Maximum Socket Diameter Outside, *B*, in.	Maximum Shaft Diameter, *C*, in.	Minimum Handle Outside Diameter, *D*, in.	Minimum Hex Depth, *E*, in.	Minimum Shaft Length, *F*, in.	Minimum Hole Diameter, *G*, in.	Minimum Handle Length, *J*, in.	Minimum Proof Torque, lbf-in.	Minimum Bending Moment Test Load, lbf-in.
5/32	0.335	0.32	0.87	0.18	2.81	0.100	3.12	50	45
3/16	0.385	0.32	0.87	0.18	2.81	0.105	3.12	55	50
7/32	0.400	0.32	0.87	0.18	2.81	0.115	3.12	75	60
1/4	0.450	0.38	0.87	0.18	2.81	0.118	3.12	75	75
9/32	0.475	0.38	0.87	0.18	2.81	0.129	3.12	75	80
5/16	0.510	0.38	0.87	0.21	2.81	0.141	3.12	75	90
11/32	0.545	0.38	0.87	0.25	2.81	0.170	3.12	85	95
3/8	0.585	0.45	0.87	0.25	2.81	0.196	3.12	95	110
7/16	0.660	0.45	1.00	0.28	2.81	0.265	3.50	135	145
1/2	0.720	0.51	1.00	0.31	2.81	0.321	3.50	150	200
9/16	0.814	0.57	1.06	0.43	2.87	0.386	3.62	160	260
5/8	0.892	0.63	1.06	0.43	2.87	0.445	3.62	175	300
11/16	0.952	0.70	1.12	0.43	3.87	0.445	3.62	225	375
3/4	1.054	0.70	1.12	0.43	3.87	0.505	4.00	225	375
13/16	1.108	0.70	1.12	0.43	3.87	0.567	4.00	225	375
7/8	1.201	0.70	1.12	0.43	3.87	0.567	4.00	225	375

Table 2M Type I, Class 2, Styles A and B: Conventional Length Nutdriver With Hollow Shaft (SI Units)

Nominal Socket Opening, *A*, mm	Maximum Socket Outside Diameter, *B*, mm	Maximum Shaft Diameter, *C*, mm	Minimum Handle Outside Diameter, *D*, mm	Minimum Hex Depth, *E*, mm	Minimum Shaft Length, *F*, mm	Minimum Hole Diameter, *G*, mm	Minimum Handle Length, *J*, mm	Minimum Proof Torque, N·m	Minimum Bending Moment Test Load, N·m
4	8.5	8.1	22	2.4	70	2.2	79	8	7
4.5	9.7	8.1	22	2.6	70	2.5	79	8	8
5	9.7	9.5	22	2.8	70	2.9	79	9	8
5.5	10.2	9.5	22	2.8	70	3.3	79	11	9
6	10.8	9.5	22	3.1	70	3.6	79	11	11
7	12.1	9.5	22	3.6	70	4.2	79	11	12
8	13.0	10.2	22	3.6	70	5.2	79	11	14
9	13.8	11.8	22	4.1	70	5.3	79	13	15
10	15.6	11.8	25	4.6	70	6.3	88	16	18
11	16.8	13.4	25	5.5	70	7.3	88	20	22
12	17.5	15.0	25	6.1	70	8.3	88	23	26
13	18.5	15.0	25	6.1	70	8.3	88	24	32
14	20.6	16.8	27	6.1	70	10.1	92	25	39
16	22.7	16.8	27	7.0	70	11.1	92	26	45
17	23.6	16.8	27	8.0	70	11.7	92	31	49
18	24.5	16.8	27	9.0	70	12.2	92	34	56

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

color-coded handle and/or shaft. Style B nutdrivers shall be provided with a cushion grip handle and need not be color-coded.

4.1.3 Type II: Stubby Length. Type II nutdrivers shall consist of round steel shaft with socket at one end and a handle at the other end. A bolt clearance hole shall be provided in the shaft of the socket end. The nutdriver shall be similar to Fig. 3 and conform to Table 3 or 3M for the size specified. Style A nutdrivers shall be provided with a conventional color-coded handle and/or shaft. Style B nutdrivers shall be provided with a cushion grip handle and need not be color-coded.

4.1.4 Type III: Miniature Handle. Type III nutdrivers shall consist of a round steel shaft with a socket at one end and a handle at the other end. A bolt clearance hole shall be provided in the shaft socket end. The nutdriver shall be similar to Fig. 4 and conform to the Table 4 or 4M for the size specified. Handle and/or shaft shall be color-coded.

4.2 Materials

The materials used in the manufacture of nutdrivers shall be such as to produce tools conforming to the requirements specified herein.

4.3 Marking

Nutdrivers shall be marked in a plain and permanent manner with manufacturer's name or with a trademark of such known character that the manufacturer shall be readily determined. Marking shall include the product number and nominal socket opening size. Marking shall be as permanent as the normal life expectancy of the nutdriver 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.

4.4 Hardness

The socket shall be hardened to not less than 35 HRC, or case-hardened 0.005 in. (0.127 mm) deep (minimum) to a hardness not less than 89 HR15n when tested in accordance with ASTM E 18. When surface preparation is necessary, the amount of material removed in the area contacted by the indenter shall not exceed 0.007 in. (0.178 mm).

4.5 Tests

Nutdrivers shall pass the tests specified in paras. 5.1 and 5.2 and the applicable tables without failure or permanent deformation (set) that might affect durability or serviceability.

4.6 Socket Opening

Socket openings shall be 6-point and conform to the gaging requirements of ASME B107.17M. Manufacturing process or pilot holes, if present in the socket openings, shall not exceed the minimum allowable across flats dimension times 1.04.

4.7 Shaft Finish

4.7.1 Surface Finish. Socket and shaft surfaces shall have a rust preventive treatment and be essentially free from pits, nodules, burrs, cracks, and other conditions that would adversely affect the performance or safety of the tool. When provided, coatings shall be adherent, smooth, continuous, and free from any conditions that would interfere with their protective value, safety, and function. The socket and shaft shall have a maximum of 125 μin. (3.18 μm) [arithmetic average] finish when tested in accordance with ASME B46.1. All edges and corners shall be smooth.

4.7.2 Coatings. The sockets, shafts, and internal drivers shall be coated with one (or a combination) of the following coatings:

(a) Nickel-Chromium Coating. The coating shall be a bright, protective, decorative nickel-chromium plating, and shall pass the surface adhesion test as specified in the file, grind-saw, or heat quench test of ASTM B 571. Nutdrivers shall either pass the Alternative Coating Test (para. 5.4) or have minimum coating thicknesses of 0.0002 in. (0.0051 mm) for nickel or nickel-iron and 0.000005 in. (0.00013 mm) for chromium.

(b) Oxide or Phosphate Coating. The coating shall consist of a chemically-produced oxide or phosphate, followed by a coating of rust preventative.

(c) Zinc. The coating shall be a protective electrodeposited zinc of 0.0003 in. (0.0076 mm) minimum thickness and shall have a chemical or electromechanical chromating. The zinc coating shall pass the corrosion test specified in para. 5.4.5.

(d) Alternative Coatings. Alternative coatings may be used in lieu of nickel-chromium plating and shall be subjected to, and shall pass, the Alternative Coating Test, as specified in para. 5.4.

4.8 Handles

4.8.1 Color Coding. Style A Nutdrivers shall have handles and/or shafts color-coded in accordance with the following:

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

Socket Opening Nominal Size, in.	Color
5/64	Amber or yellow
3/32	Blue
7/64	Brown
1/8	Red
5/32	Amber or yellow
3/16	Black
7/32	Brown
1/4	Red
9/32	Orange
5/16	Amber or yellow
11/32	Green
3/8	Blue
7/16	Brown
1/2	Red
9/16 and larger	Optional

Socket Opening Nominal Size, mm	Color
2	Amber or yellow
3	Blue
3.2	Brown
4	Red
4.5	Amber or yellow
5	Black
5.5	Brown
6	Red
7	Orange
8	Amber or yellow
9	Green
10	Blue
11	Brown
12	Red
13 and larger	Optional

4.8.2 Handle Shape and Finish. Handles shall be suitably shaped and finished to provide a comfortable grip. They shall be free from rough edges, sharp corners, or tool marks that affect the appearance and comfort of the tool. They shall meet the dimensional requirements specified in the applicable tables.

4.8.3 Handle With Internal Drive. When specified, handles shall be provided with a 1/4 in. (6.3 mm) or 3/8 in. (10 mm) square internal drive opening. Square drive dimensions and tolerances shall be in accordance with ASME B107.4M. The drive shall be flush with the butt end of the handle. The drive shall be capable of meeting the same torsional load requirements as set forth for the socket end contained herein. A square external drive tang in accordance with ASME B107.4M shall be used for the test mandrel.

4.8.4 Cushion Grip. Style B nutdriver handles shall be furnished with cushion grips. The grip material shall be capable of meeting the handle solvent test as specified in para. 5.3. The length of the cushion grip 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. The original hardness shall be Shore A50 to A75 when tested in accordance with ASTM D 2240 and the hardness after the solvent test shall not be greater than Shore A80.

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

5 TEST PROCEDURES

Many of the tests herein are inherently hazardous; adequate safeguards for personnel and property shall be employed in conducting these tests.

5.1 Torsional Moment Test

Test shall be conducted in a manner similar to that shown in Fig. 5. Test mandrels shall conform to the dimensions in Table 5 or 5M and shall be hardened to not less than 55 HRC. The socket openings shall be gaged prior to testing. The tests shall be conducted after preheating the entire tool to a uniform temperature of 125°F (57.7°C), and the torque specified in the applicable table shall be applied within 1 min after removing the tool from the heating medium. The socket of the tool shall be inserted over the mandrel to the depth specified. The torque shall be applied and sustained for a minimum of 10 sec. The handle may be gripped in the area beyond the insertion distance of the socket shaft by suitable means. It shall be permissible to support the handle in order to maintain the tool in a suitable position for testing, provided the supporting means does not exert pressure end-wise during testing. Any cracking, failure of the socket opening to conform to the gaging requirement, or failure to sustain the proof torque for the prescribed time shall constitute failure.

When tested to the minimum assembly torque value specified, the assembly shall not show a permanent slippage between the shaft and handle.

5.2 Bending Moment Test

Test shall be conducted in a manner similar to that shown in Fig. 6. Test mandrels shall conform to the dimensions in Table 6 or 6M and shall be hardened to not less than 55 HRC. A force of such magnitude to create the bending moment specified in the applicable table shall be applied at or near the middle of the natural grip of the handle for a minimum of 10 sec. The force is to act perpendicular to the axis of the tool. The tool shall not crack, break, or show any signs of visible permanent set or looseness in the handle. The test shall be conducted at room temperature.

5.3 Solvent Tests

Nutdrivers shall be capable of meeting the following test requirements. 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, wiped off, and allowed to stand for 24 hr. A

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

new assembly shall be used for each of the test liquids. There shall be no permanent swelling, surface attack (except for manufacturer's identification or paint removal), or degradation of the applicable performance requirements contained herein. The handle hardness after testing shall not be greater than Shore A80 when tested in accordance with ASTM D 2240.

5.4 Alternative Coating Test

This test consists of an adhesion, abrasion, and corrosion test specified in paras. 5.4.2, 5.4.3, and 5.4.4.

5.4.1 Test Preparation. The quantity and condition of the nutdrivers used for the following testing shall be per the manufacturer's standard practice or as mutually agreed to by the manufacturer and the customer. If the nutdriver does not have sufficient surface area to conduct the tests, a 4 × 6 in. panel(s) per ASTM B 537/ ASTM D 968 Method A shall be used.

5.4.2 Adhesion Test. The coated surfaces shall pass the file or grind-saw test of ASTM B 571.

5.4.3 Abrasion Test. The coated surfaces shall have no base material exposed after being subjected to 100 L of falling sand per ASTM D 968 Method A.

5.4.4 Corrosion Test. The coated surfaces shall be tested for corrosion resistance by exposure to a 48 hr salt spray test as specified in ASTM B 117 without falling below the ASTM B 537 rating of 6.

5.4.5 Zinc Corrosion Test. Zinc-coated surfaces shall be tested for corrosion resistance by exposure to a 48 hr water fog test as specified in ASTM D 1735, without falling below the ASTM B 537 rating of 6.

6 SAFETY REQUIREMENTS AND LIMITATIONS OF USE

Instructors and employers shall stress proper and safe use of nutdrivers; information about this can be found in the HTI publication, *Guide to Hand Tools – Selection, Safety Tips, Proper Use and Care*.

7 DESIGNATIONS

Nutdrivers shall be designated by the following data in the sequence: ASME B107.12 Nutdriver (spin type, screwdriver grip) type, class, style, socket-opening size, color-coding, and options.

EXAMPLE: ASME B107.12 Nutdriver Type I, Class 2, Style B, $\frac{1}{4}$ in. opening, color-coded shaft, handle with internal drive.

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

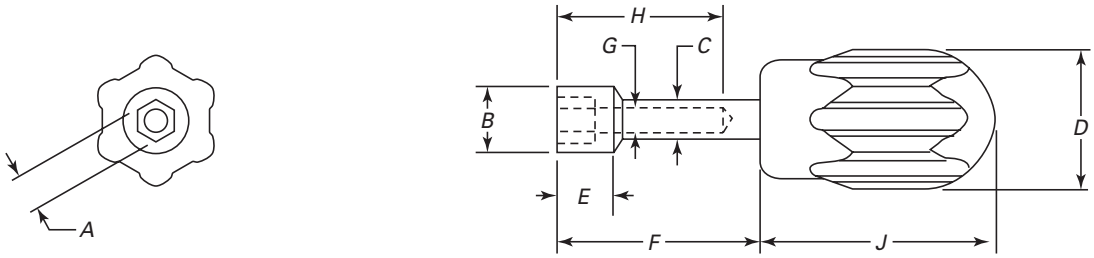


Fig. 3 Type II, Styles A and B: Stubby Length Nutdriver

Table 3 Type II, Styles A and B: Stubby Length Nutdriver

Nominal Socket Opening, *A*, in.	Maximum Socket Outside Diameter, *B*, in.	Maximum Shaft Diameter, *C*, in.	Minimum Handle Outside Diameter, *D*, in.	Minimum Hex Depth, *E*, in.	Minimum Shaft Length, *F*, in.	Minimum Hole Diameter, *G*, in.	Minimum Depth of Hole, *H*, in.	Minimum Handle Length, *J*, in.	Minimum Proof Torque, lbf-in.	Minimum Bending Moment Test Load, lbf-in.
5/32	0.335	0.32	1.06	0.18	1.12	0.100	0.87	1.62	50	45
3/16	0.385	0.32	1.06	0.18	1.12	0.105	0.87	1.62	75	60
7/32	0.400	0.32	1.06	0.18	1.12	0.115	0.87	1.62	75	60
1/4	0.450	0.38	1.06	0.18	1.12	0.118	0.87	1.62	100	90
9/32	0.475	0.38	1.06	0.18	1.12	0.129	0.87	1.62	100	90
5/16	0.510	0.38	1.06	0.21	1.12	0.141	0.87	1.62	125	105
11/32	0.545	0.38	1.06	0.25	1.12	0.170	0.87	1.62	125	105
3/8	0.585	0.45	1.06	0.25	1.12	0.196	0.87	1.62	150	120
7/16	0.660	0.45	1.06	0.28	1.12	0.265	0.87	1.62	150	145
1/2	0.720	0.51	1.06	0.31	1.12	0.321	0.87	1.62	175	175
9/16	0.814	0.57	1.06	0.43	1.12	0.386	0.87	1.62	175	260
5/8	0.892	0.63	1.06	0.43	1.12	0.445	0.87	1.62	200	300

Table 3M Type II, Styles A and B: Stubby Length Nutdriver (SI Units)

Nominal Socket Opening, *A*, mm	Maximum Socket Outside Diameter, *B*, mm	Maximum Shaft Diameter, *C*, mm	Minimum Handle Outside Diameter, *D*, mm	Minimum Hex Depth, *E*, mm	Minimum Shaft Length, *F*, mm	Minimum Hole Diameter, *G*, mm	Minimum Depth of Hole, *H*, mm	Minimum Handle Length, *J*, mm	Minimum Proof Torque, N·m	Minimum Bending Moment Test Load, N·m
4	8.5	8.1	27	2.4	28	2.2	22	41	8	7
4.5	9.7	8.1	27	2.6	28	2.5	22	41	8	8
5	9.7	9.5	27	2.8	28	2.9	22	41	9	8
5.5	10.2	9.5	27	2.8	28	3.3	22	41	11	9
6	10.8	9.5	27	3.1	28	3.6	22	41	11	11
7	12.1	9.5	27	3.6	28	4.2	22	41	11	12
8	13.0	10.2	27	3.6	28	5.2	22	41	11	14
9	13.8	11.8	27	4.1	28	5.3	22	41	13	15
10	15.6	11.8	27	4.6	28	6.3	22	41	16	18

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

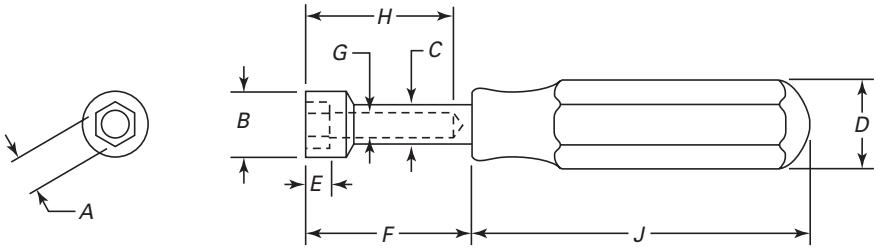


Fig. 4 Type III: Miniature Handle Nutdriver

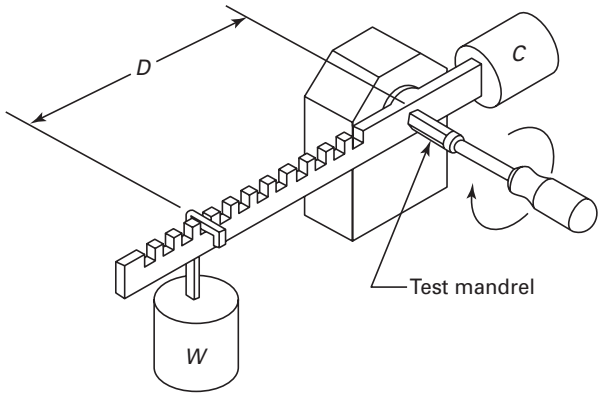
Table 4 Type III: Miniature Handle Nutdriver

Nominal Socket Opening, *A*, in.	Maximum Socket Outside Diameter, *B*, in.	Maximum Shaft Diameter, *C*, in.	Minimum Handle Outside Diameter, *D*, in.	Minimum Hex Depth, *E*, in.	Minimum Shaft Length, *F*, in.	Minimum Hole Diameter, *G*, in.	Minimum Depth of Hole, *H*, in.	Minimum Handle Length, *J*, in.	Minimum Proof Torque, lbf-in.
5/64	0.193	0.20	0.50	0.07	1.18	0.050	0.25	2.18	6
3/32	0.193	0.20	0.50	0.09	1.18	0.063	0.28	2.18	8
7/64	0.255	0.26	0.50	0.10	1.18	0.075	0.31	2.18	10
1/8	0.255	0.26	0.50	0.12	1.18	0.097	0.34	2.18	20
5/32	0.335	0.32	0.50	0.15	1.18	0.100	0.78	2.18	30
3/16	0.385	0.32	0.50	0.18	1.18	0.100	0.78	2.18	40
7/32	0.400	0.32	0.50	0.18	1.18	0.115	0.78	2.18	40
1/4	0.450	0.38	0.50	0.18	1.18	0.118	0.78	2.18	40
9/32	0.475	0.38	0.50	0.18	1.18	0.129	0.78	2.18	40
5/16	0.510	0.38	0.50	0.21	1.18	0.141	0.78	2.18	40
11/32	0.545	0.38	0.50	0.25	1.18	0.170	0.78	2.18	40
3/8	0.585	0.45	0.50	0.25	1.18	0.196	0.78	2.18	40
7/16	0.660	0.45	0.50	0.28	1.18	0.265	0.78	2.18	40
1/2	0.720	0.51	0.50	0.31	1.18	0.321	0.78	2.18	40
9/16	0.814	0.57	0.50	0.43	1.18	0.386	0.78	2.18	40
5/8	0.892	0.63	0.50	0.43	1.18	0.445	0.78	2.18	40

Table 4M Type III: Miniature Handle Nutdriver (SI Units)

Nominal Socket Opening, *A*, mm	Maximum Socket Outside Diameter, *B*, mm	Maximum Shaft Diameter, *C*, mm	Minimum Handle Outside Diameter, *D*, mm	Minimum Hex Depth, *E*, mm	Minimum Shaft Length, *F*, mm	Minimum Hole Diameter, *G*, mm	Minimum Depth of Hole, *H*, mm	Minimum Handle Length, *J*, mm	Minimum Proof Torque, N·m
2	5.0	5.0	12	1.6	30	1.5	6	55	1
3	5.0	5.0	12	1.8	30	2.0	8	55	2
3.2	7.5	7.5	12	2.0	30	2.2	9	55	3
4	8.5	8.1	12	2.4	30	2.2	20	55	5
4.5	9.7	8.1	12	2.6	30	2.5	20	55	5
5	9.7	9.5	12	2.8	30	2.9	20	55	6
5.5	10.2	9.5	12	2.8	30	3.3	20	55	6
6	10.8	9.5	12	3.1	30	3.6	20	55	6
7	12.1	9.5	12	3.6	30	4.2	20	55	6
8	13.0	10.2	12	3.6	30	5.2	20	55	6
9	13.8	11.8	12	4.1	30	5.3	20	55	6
10	15.6	11.8	12	4.6	30	6.3	20	55	6

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



D = distance, in. (mm)
W = weight, lb (N)
C = a counterweight used to balance beam
$D \times W$ = in.-lb (N·m)

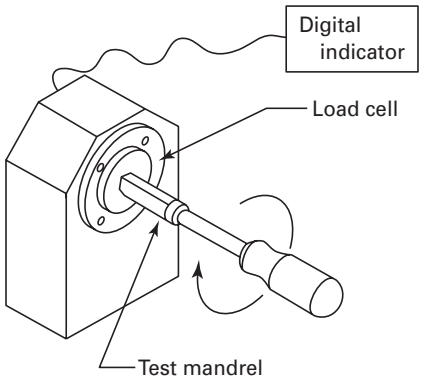


Fig. 5 Torsional Moment Test

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

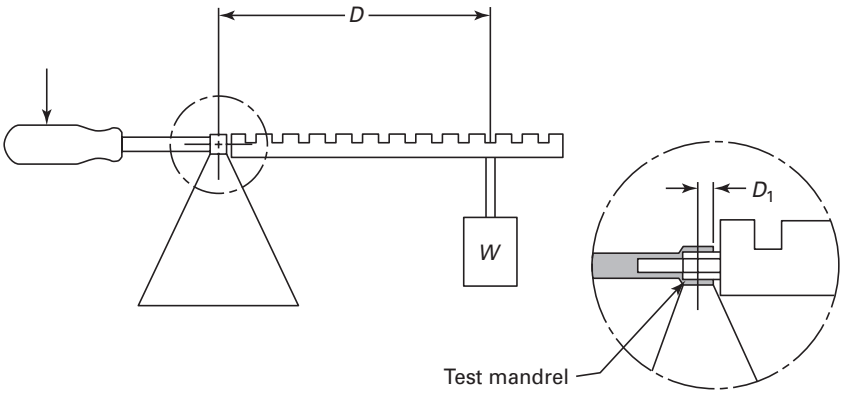
Table 5 Torsional Moment Test: Hexagonal Mandrel Dimensions and Maximum Depth of Mandrel Insertion

Nominal Size of Wrench Opening, in.	Across Flats Dimension	Across Flats Tolerance		Minimum Across Corners, in.	Maximum Depth of Mandrel Insertion, in.
		Plus (+)	Minus (–)		
5/64	0.078	0.001	0.002	0.0889	0.078
3/32	0.094	0.001	0.002	0.1061	0.094
7/64	0.109	0.001	0.002	0.1233	0.094
1/8	0.125	0.001	0.002	0.1405	0.094
5/32	0.156	0.001	0.002	0.1745	0.094
3/16	0.188	0.001	0.002	0.2095	0.094
7/32	0.219	0.001	0.002	0.2440	0.109
1/4	0.250	0.001	0.002	0.2780	0.125
9/32	0.281	0.001	0.002	0.3133	0.141
5/16	0.313	0.001	0.002	0.3495	0.141
11/32	0.344	0.001	0.002	0.3860	0.156
3/8	0.375	0.001	0.002	0.4225	0.156
7/16	0.438	0.001	0.002	0.4935	0.218
1/2	0.500	0.001	0.003	0.5635	0.265
9/16	0.563	0.001	0.003	0.6339	0.328
5/8	0.625	0.001	0.003	0.7055	0.375
11/16	0.688	0.001	0.003	0.7769	0.375
3/4	0.750	0.001	0.003	0.8485	0.437
13/16	0.813	0.001	0.003	0.9201	0.453
7/8	0.875	0.001	0.003	0.9917	0.500

Table 5M Torsional Moment Test: Hexagonal Mandrel Dimensions and Maximum Depth of Mandrel Insertion (SI Units)

Nominal Size of Wrench Opening, mm	Across Flats Dimension	Across Flats Tolerance		Minimum Across Corners, mm	Maximum Depth of Mandrel Insertion, mm
		Plus (+)	Minus (–)		
2	2.00	0.025	0.050	2.22	2.4
3	3.00	0.025	0.050	3.34	2.4
3.2	3.20	0.025	0.050	3.57	2.4
4	4.00	0.025	0.050	4.46	2.4
4.5	4.50	0.025	0.050	5.10	2.4
5	5.00	0.025	0.050	5.58	2.6
5.5	5.50	0.025	0.050	6.13	2.8
6	6.00	0.025	0.050	6.68	3.0
7	7.00	0.025	0.050	7.79	3.6
8	8.00	0.025	0.050	8.95	3.8
9	9.00	0.025	0.050	10.11	4.0
10	10.00	0.025	0.050	11.27	5.0
11	11.00	0.025	0.050	12.40	5.7
12	12.00	0.025	0.050	13.53	6.4
13	13.00	0.025	0.076	14.67	7.1
14	14.00	0.025	0.076	15.80	9.5
16	16.00	0.025	0.076	18.06	9.6
17	17.00	0.025	0.076	19.20	9.6
18	18.00	0.025	0.076	20.35	10.5

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



D = distance, in. (mm)
W = weight, lb (N)
D_1 = a stop point for the socket face equal to $^1/_2$ the mandrel insertion depth
$D \times W$ = in.-lb (N·m)

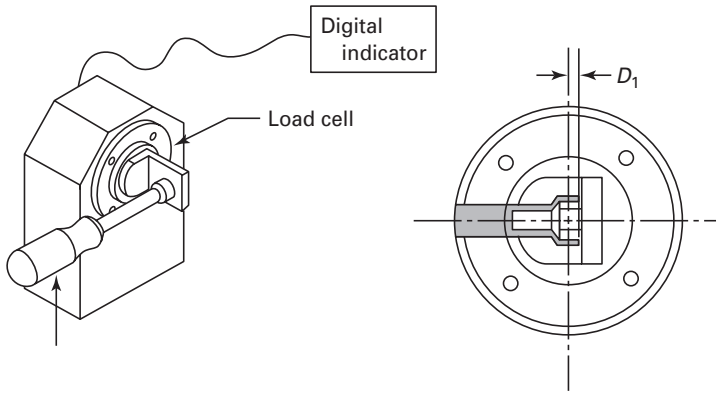


Fig. 6 Bending Moment Test

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

Table 6 Bending Moment Test: Hexagonal Mandrel Dimensions and Maximum Depth of Mandrel Insertion

Nominal Size of Wrench Opening, in.	Across Flats Dimension	Across Flats Tolerance		Minimum Across Corners, in.	Maximum Depth of Mandrel Insertion, in.
		Plus (+)	Minus (–)		
5/64	0.078	0.001	0.002	0.0889	0.078
3/32	0.094	0.001	0.002	0.1061	0.094
7/64	0.109	0.001	0.002	0.1233	0.109
1/8	0.125	0.001	0.002	0.1405	0.125
5/32	0.156	0.001	0.002	0.1745	0.188
3/16	0.188	0.001	0.002	0.2095	0.188
7/32	0.219	0.001	0.002	0.2440	0.188
1/4	0.250	0.001	0.002	0.2780	0.188
9/32	0.281	0.001	0.002	0.3133	0.188
5/16	0.313	0.001	0.002	0.3495	0.219
11/32	0.344	0.001	0.002	0.3860	0.250
3/8	0.375	0.001	0.002	0.4225	0.250
7/16	0.438	0.001	0.002	0.4935	0.281
1/2	0.500	0.001	0.003	0.5535	0.313
9/16	0.563	0.001	0.003	0.6339	0.438
5/8	0.625	0.001	0.003	0.7055	0.438
11/16	0.688	0.001	0.003	0.7769	0.438
3/4	0.750	0.001	0.003	0.8485	0.438
13/16	0.813	0.001	0.003	0.9201	0.438
7/8	0.875	0.001	0.003	0.9917	0.438

Table 6M Bending Moment Test: Hexagonal Mandrel Dimensions and Maximum Depth of Mandrel Insertion (SI Units)

Nominal Size of Wrench Opening, mm	Across Flats Dimension	Across Flats Tolerance		Minimum Across Corners, mm	Maximum Depth of Mandrel Insertion, mm
		Plus (+)	Minus (–)		
2	2.00	0.025	0.050	2.22	3.0
3	3.00	0.025	0.050	3.34	3.0
3.2	3.20	0.025	0.050	3.57	4.3
4	4.00	0.025	0.050	4.46	5.0
4.5	4.50	0.025	0.050	5.10	5.0
5	5.00	0.025	0.050	5.58	5.0
5.5	5.50	0.025	0.050	6.13	5.0
6	6.00	0.025	0.050	6.68	5.0
7	7.00	0.025	0.050	7.79	5.0
8	8.00	0.025	0.050	8.95	5.7
9	9.00	0.025	0.050	10.11	6.5
10	10.00	0.025	0.050	11.27	6.8
11	11.00	0.025	0.050	12.40	7.3
12	12.00	0.025	0.050	13.53	7.5
13	13.00	0.025	0.076	14.67	8.3
14	14.00	0.025	0.076	15.80	11.3
16	16.00	0.025	0.076	18.06	11.3
17	17.00	0.025	0.076	19.20	11.3
18	18.00	0.025	0.076	20.35	11.3

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

AMERICAN NATIONAL STANDARDS FOR HAND TOOLS

Socket Wrenches, Hand (Inch Series) B107.1-2002
Socket Wrenches, Extensions, Adaptors, and Universal Joints, Power Drive (Impact) (Inch Series) B107.2-2002
Driving and Spindle Ends for Portable Hand, Impact, Air, and Electric Tools (Percussion Tools Excluded) B107.4M-1995
Socket Wrenches, Hand (Metric Series) B107.5M-2002
Adjustable Wrenches B107.8-2003
Handles and Attachments for Hand Socket Wrenches — Inch and Metric Series B107.10M-1996
Pliers: Diagonal Cutting and End Cutting B107.11-2002
Nutdrivers B107.12-2004
Pliers: Long Nose, Long Reach B107.13-2003
Hand Torque Tools B107.14M-1994
Flat Tip Screwdrivers B107.15-2002
Shears (Metal Cutting, Hand) B107.16M-1998 (R2004)
Gages, Wrench Openings, Reference B107.17M-1997
Pliers: Wire Twister B107.18-2003
Pliers, Retaining Ring B107.19-2004
Pliers: Lineman's, Iron Worker's, Gas, Glass, Fence, and Battery B107.20-2004
Wrench, Crowfoot Attachments B107.21-1998
Electronic Cutters B107.22M-1998
Pliers: Multiple Position, Adjustable B107.23-2004
Locking Pliers B107.24-2002
Pliers: Performance Test Methods B107.25-2002
Pliers: Multiple Position, Electrical Connector B107.27-2003
Electronic Torque Instruments B107.28M-1997
Electronic Tester, Hand Torque Tools B107.29M-1998
Cross Tip Screwdrivers B107.30-2002
Screwdrivers, Cross Tip Gaging B107.31M-1997
Socket Wrenches, Impact (Metric Series) B107.33M-2002
Socket Wrenches for Spark Plugs B107.34-2003
Pliers: Locking, Clamp, and Tubing Pinch-Off B107.36-2002
Pliers: Wire Cutters/Strippers B107.37-2003
Electronic Pliers B107.38M-1998
Nail Hammers: Safety Requirements B107.41-2004
Hatchets: Safety Requirements B107.42M-1997 (R2004)
Wood-Splitting Wedges B107.43-2002
Glaziers' Chisels and Wood Chisels B107.44-2002
Ripping Chisels and Flooring/Electricians' Chisels B107.45-2002
Stud, Screw, and Pipe Extractors: Safety Requirements B107.46-2004
Metal Chisels: Safety Requirements B107.47M-1998
Metal Punches and Drift Pins: Safety Requirements B107.48M-1998
Nail Sets: Safety Requirements B107.49M-1998
Brick Chisels and Brick Sets: Safety Requirements B107.50M-1998
Star Drills: Safety Requirements B107.51-2001
Nail-Puller Bars: Safety Requirements B107.52M-1998
Ball Peen Hammers: Safety Requirements B107.53-2004
Heavy Striking Tools: Safety Requirements B107.54-2001
Axes: Safety Requirements B107.55M-2002
Body Repair Hammers and Dolly Blocks:Safety Requirements B107.56-1999
Bricklayers' Hammers and Prospecting Picks: Safety Requirements B107.57-2001
Riveting, Scaling, and Tinner's Setting Hammers: Safety Requirements B107.58M-1998
Slugging and Striking Wrenches B107.59-2002
Pry Bars B107.60-2004
Wrenches B107.100-2002

The ASME Publications Catalog shows a complete list of all the Standards published by the Society. For a complimentary catalog, or the latest information about our publications, call 1-800-THE-ASME (1-800-843-2763).

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

ASME Services

ASME is committed to developing and delivering technical information. At ASME's Information Central, we make every effort to answer your questions and expedite your orders. Our representatives are ready to assist you in the following areas:

ASME Press
Codes & Standards
Credit Card Orders
IMechE Publications
Meetings & Conferences
Member Dues Status
Member Services & Benefits
Other ASME Programs
Payment Inquiries
Professional Development
Short Courses
Publications
Public Information
Self-Study Courses
Shipping Information
Subscriptions/Journals/Magazines
Symposia Volumes
Technical Papers

How can you reach us? It's easier than ever!

There are four options for making inquiries* or placing orders. Simply mail, phone, fax, or E-mail us and an Information Central representative will handle your request.

Mail
ASME
22 Law Drive, Box 2900
Fairfield, New Jersey
07007-2900

Call Toll Free
US & Canada: 800-THE-ASME
(800-843-2763)
Mexico: 95-800-THE-ASME
(95-800-843-2763)
Universal: 973-882-1167

Fax—24 hours
973-882-1717
973-882-5155

E-Mail—24 hours
Infocentral@asme.org

* Information Central staff are not permitted to answer inquiries about the technical content of this code or standard. Information as to whether or not technical inquiries are issued to this code or standard is shown on the copyright page. All technical inquiries must be submitted in writing to the staff secretary. Additional procedures for inquiries may be listed within.

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

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

Not for Resale

ASME B107.12-2004

ISBN 0-7918-2932-4





N10704

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

Not for Resale