ASME B107.1-2002
(Revision of ASME B107.1-1993)

SOCKET WRENCHES, HAND (INCH SERIES)

AN AMERICAN NATIONAL STANDARD

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Date of Issuance: March 31, 2003

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

ASME issues written replies to inquiries concerning interpretations of technical aspects of this Standard. Interpretations are published on the ASME Web site under the Committee Pages at http://www.asme.org/codes/ as they are issued.

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

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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 as an ASME Standards Committee, and its title was changed to Hand Tools and Accessories.

The purpose of this Standard is to define general and dimensional data specifically applicable to detachable socket wrenches and to specify test methods to evaluate performance relating to the defined requirements.

This Standard is a revision of B107.1-1993 Socket Wrenches, Hand (Inch Series). A principal change in this edition of the Standard is the use of Type and Class designations in place of Class and Style designations, in accordance with other B107 Standards. Updated references, finish requirements, and dimensional data are included.

The format of this Standard is in accordance with *The ASME Codes & 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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G. E. Olson, *Vice Chair*
J. R. Bird, *Secretary*

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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
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.

SOCKET WRENCHES, HAND (INCH SERIES)

1 SCOPE

This Standard is intended to cover the complete general and dimensional data for dimensional, performance, and safety requirements for detachable socket wrenches with square drive for hand use. Inclusion of dimensional data in this 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.

2 CLASSIFICATION

Type I: Sockets, single (6-point) and double (12-point) hexagon (see Fig. 1 and Tables 1 through 5)

Class 1: Regular length

Class 2: Long length

Class 3: Mid length

Type II: Sockets, single (4-point) and double (8-point) square (see Fig. 1 and Tables 6 through 8)

Type III: Universal sockets, single (6-point) and double (12-point) hexagon, block type (see Fig. 2 and Tables 9 through 11)

3 NORMATIVE REFERENCES

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

ASME B46.1-1996, 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 (ASME International), Three Park Avenue, New York, NY 10016-5990; Order Department: 22 Law Drive, PO Box 2300, Fairfield, NJ 07007-2300

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

ASTM B 537-70(1992),$^{\epsilon 1}$ Standard Practice for Rating of Electroplated Panels Subjected to Atmospheric Exposure

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

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

ASTM E 18-2000, 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

4 REQUIREMENTS

4.1 Illustrations

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

4.2 Materials

The materials used in the manufacture of the sockets shall be such as to produce tools conforming to requirements in this Standard.

4.3 Markings

Sockets shall be marked in a plain and permanent manner with the manufacturer's name or with a trademark of such known character that the source of manufacture and country of origin may be readily determined. In addition, sockets shall be marked in a plain and permanent manner with the nominal size of the wrench opening (distance across flats) for the nut, bolt, or screw end.

4.4 Hardness

Sockets shall be heat treated to a hardness of 38 HRC to 56 HRC.

4.5 Proof Torque

When tested as specified, tools shall withstand the proof torque specified in the applicable tables without failure or permanent deformation that might affect the durability or performance of the tools.

4.6 Nut End Socket Opening

Nut end socket openings shall be such as to ensure acceptance when gaged with gages conforming to ASME B107.17M.

4.7 Finish

4.7.1 Surface Roughness. All external surfaces shall be free from pits, nodules, forge flash, burrs, cracks, and other detrimental defects. The external forge flash shall be removed to blend smoothly with adjacent surfaces. Maximum surface roughness values shall be determined by microinch (μin.) values. Determination of microinch values shall be taken on a representative surface. Areas that are ground and buffed, or otherwise finished by an equivalent method, shall have a coating finish as specified in para. 4.7.2 and have a uniform surface with a maximum roughness in microinches using a 0.030 in. roughness width cutoff on the surface measuring instrument as stated herein. All surface roughness values shall be rated as the arithmetical average. At least 50% of the outer longitudinal surface or major diameter shall be 30 μin. maximum, except for oxide or phosphate coated sockets. Except where knurled or grooved, the remaining exterior longitudinal socket surface shall be 150 μin. maximum. Oxide or phosphate coated sockets shall have a maximum roughness of 150 μin. Definitions and nomenclature used herein can be found in ASME B46.1.

4.7.2 Coatings. The coatings shall be adherent, smooth, continuous, and free from pits, blisters, nodules, and any other conditions which would interfere with their protective value and serviceability. The sockets shall be coated with one or a combination of the coatings in accordance with (a), (b), (c), or (d) below. The customer may specify the type of coating required.

(a) Nickel-Chromium Coating. The coating shall be a protective bright decorative nickel-chromium plating. The minimum thickness of the nickel-iron shall be 0.0002 in. The minimum thickness of the chromium shall be 0.000005 in.

(b) Nickel-Chromium Adhesion. The nickel-chromium coating shall pass the surface adhesion test as specified in the file, grind-saw, or heat-quench test of ASTM B 571.

(c) Oxide or Phosphate Coating. The coating shall consist of a chemically produced oxide or phosphate, followed with a coating of a rust preventative. The customer may specify the color.

(d) Alternative Coatings. Alternative coatings may be used in lieu of nickel-chromium plating and shall be subjected to the Coating Process Qualification Test as specified in para. 5.3.

4.8 Bolt Clearance Hole

A space shall be provided for bolt clearance in all sockets except Type III, universal sockets (see Fig. 2). The diameter of the bolt clearance hole shall be in accordance with that of the applicable size socket as specified in the respective tables for each class and style. The minimum depth of the bolt clearance hole shall be not less than 1.5 times the minimum depth of the nut opening as set forth in the respective tables for regular length sockets, not less than 50% of the overall length for mid-length sockets, and not less than 60% of the overall length for long sockets, as measured from the face of the nut end. The diameter and depth of the bolt clearance hole may be included in the wrench opening area if size and depth of the wrench opening are adequate to provide the bolt clearance space. When applicable, a through hole between the drive square and the bolt clearance hole is to be provided. The hole shall have a minimum diameter equal to 50% of the square drive size or equal to the bolt clearance hole diameter, whichever is smaller.

4.9 Internal Drive Opening

Internal drive openings shall be manufactured to produce a smooth, well-defined surface. The openings shall conform to ASME B107.4M.

4.10 Countersink of Nut End Socket Opening

The nut end socket opening shall be countersunk with an included angle of 90 deg to 150 deg and a minimum diameter equal to the across-corners dimension of the opening.

4.11 Dimensions

Dimensions shall be in accordance with the applicable table unless otherwise specified.

4.12 Type III — Universal Sockets, Single (6-Point) and Double (12-Point) Hexagon

Type III universal sockets shall consist of a single (6-point) or double (12-point) hexagon socket and an internal drive end. Each member shall be permanently attached to each other or by means of an intermediate member to form a universal joint. The sockets shall be provided with a friction type device which will hold the drive end and socket end in any set position with a force adequate to hold the socket against gravity. They shall be capable of rotation in a complete arc when the angular deviation of either end member from the common centerline is 40 deg. If hinge pins are used, they shall not extend beyond the periphery of the universal joint section for more than 0.031 in. and shall not interfere with the regular operation of the universal joint. The portion of the hinge pin that extends beyond the periphery shall not have sharp edges. Type III universal sockets shall comply with the tables herein (see Fig. 2 and Tables 9 through 11).

5 TEST PROCEDURES

5.1 Hardness

The hardness range specified in para. 4.4 shall be tested on a Rockwell tester using a diamond penetrator and employing a 150 kg load in accordance with ASTM E 18. When surface preparation is necessary, the amount of material removed in the area contacted by the penetrator shall not exceed:

Drive Size, in.	Max. Material Removed
1/4, 3/8, 1/2	0.007 in.
3/4	0.015 in.
1	0.010 in. per 1.0 in. of socket diameter

5.2 Proof Torque Test

Socket openings shall be gaged prior to application of the proof torque. The socket shall be torqued to the proof torque using specified mandrel depth (see Tables 12 and 13). Following the removal of the proof torque, the socket shall be regaged and any socket which cracks, fractures, or does not gage after torquing shall have failed the test.

5.2.1 Application of Proof Torque. The proof torque shall be applied with a suitable torque-producing machine.

(a) Sockets. A drive end test mandrel of suitable strength and complying with the dimensional requirements of the drive tang specified in ASME B107.4M shall be employed. The test plug shall be driven by any suitable manual or mechanical means. The socket shall be engaged on the end of a mandrel to a depth in accordance with tables herein. Means shall be provided to maintain the mandrel insertion depth.

(b) Universal Sockets. Tests shall be made in the same manner as specified in (a) above except that means shall be provided to keep the parts of the universal socket assembly on a common axis about which the torque is applied.

5.2.2 Mandrels for Wrench Openings. Sockets shall be tested on mandrels. Six-point or 12-point hexagonal sockets shall be tested on hexagonal mandrels. Four- or eight-point sockets shall be tested on square mandrels. The size of all mandrels shall conform to the tables herein. Mandrels shall be hardened to not less than 56 HRC.

5.3 Coating Process Qualification Test

The Coating Process Qualification Test for Alternate Coatings shall be performed to certify the manufacturer's production coating process. The Coating Process Qualification Test consists of an adhesion, abrasion, and corrosion test specified in paras. 5.3.2, 5.3.3, and 5.3.4. The Coating Process Qualification Test may also be performed to certify the manufacturer's Nickel-Chromium plating process. Passing the Coating Process Qualification tests, when agreed to by the customer, exempts the manufacturer from the Nickel-Chromium Thickness requirement of para. 4.7.2(a) and the Nickel-Chromium Adhesion requirement of para. 4.7.2(b).

Retesting may be required when a significant change occurs in the process, when there is a change in the materials, or when contractually required by the customer.

5.3.1 Test Preparation. The quantity and condition of the sample sockets used for the following testing shall be per the manufacturer's standard practice or as mutually agreed to by the manufacturer and the customer.

5.3.2 Coating Process Adhesion Test. Sample sockets shall pass the file or grind-saw test of ASTM B 571.

5.3.3 Coating Process Abrasion Test. Sample sockets shall have no base material exposed when subjected to 100 liters of falling sand test of ASTM D 968 Method A.

5.3.4 Coating Process Corrosion Test. The exterior surfaces of sample sockets 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.

6 DESIGNATIONS

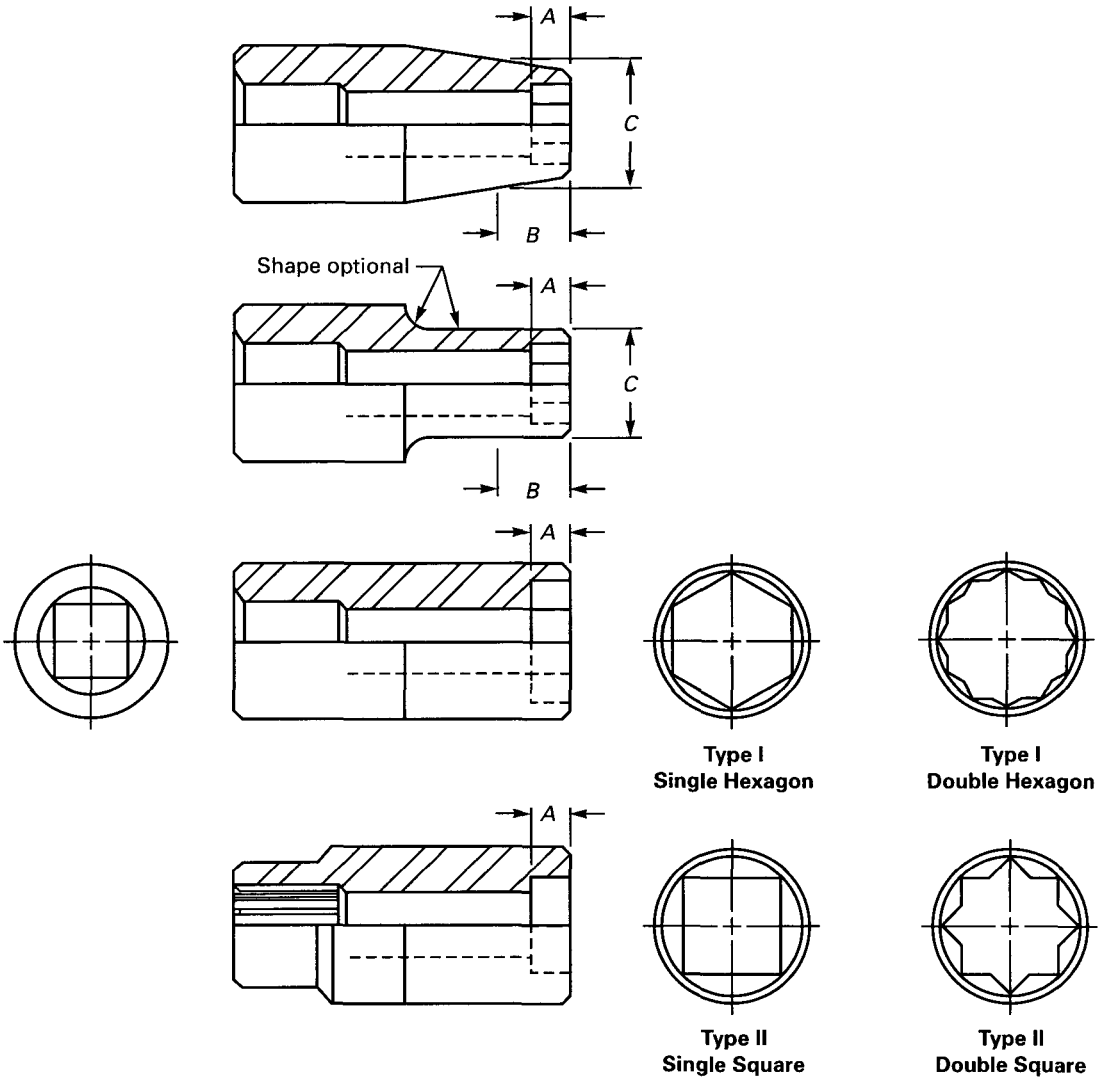
Sockets shall be designated by the following data in the sequence shown:

(a) Hand socket
(b) Drive size
(c) Type
(d) Class
(e) Wrench nominal opening size and configuration

EXAMPLE: Hand socket, $\frac{1}{4}$ in. drive size, Type I, Class 1, $\frac{5}{16}$ in. opening, single hexagon.

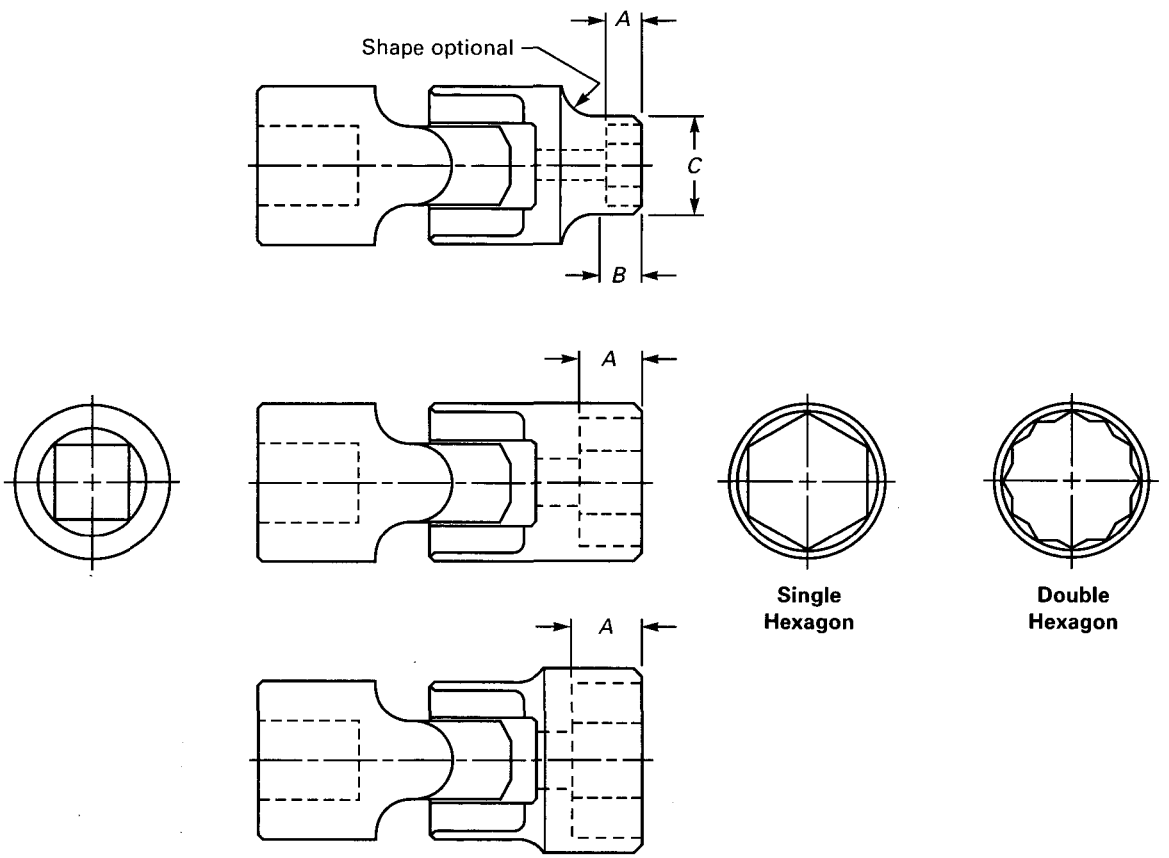
7 SAFETY REQUIREMENTS AND LIMITATIONS OF USE

Instructors and employers shall stress proper use and safety in the use of sockets, information about which can be found in the HTI publication, Guide to Hand Tools — Selection, Safety Tips, Proper Use and Care.



GENERAL NOTES:
(a) *A* shall be equal to or greater than nut opening depth in applicable tables.
(b) Maximum nut end diameter of socket *C* shall not be exceeded for length *B* and shall conform to applicable tables.
(c) *B* length shall be greater than or equal to the minimum nut opening depth in applicable tables.

FIG. 1 TYPE I AND II SOCKETS, CLASS 1, REGULAR LENGTH; CLASS 2, LONG LENGTH; CLASS 3, MID LENGTH



GENERAL NOTES:
(a) *A* shall be greater than or equal to the nut opening depth in applicable tables.
(b) Maximum nut end diameter of socket *C* shall not be exceeded for length *B* and shall conform to applicable tables.
(c) *B* length shall be greater than or equal to the minimum nut opening depth in applicable tables.

FIG. 2 TYPE III, UNIVERSAL SOCKETS, BLOCK TYPE

TABLE 1 TYPE I CLASSES 1, 2, AND 3 SOCKET, SINGLE AND DOUBLE HEXAGON, REGULAR, LONG, AND MID LENGTH, 1/4 in. DRIVE

Nominal Opening, in.	Overall Length, in.				Outside Diameter, in.		Opening Depth, Nut End, in., Min.	Bolt Clearance Hole Diameter, in., Min.	Proof Torque, lbf-in., Min.
	Class 1 Regular Length, Max.	Class 2 Long Length, Min.	Class 3 Mid Length		Nut End, Max.	Drive End, Max.			
			Min.	Max.					
1/8	1.010	1.930	1.020	1.920	0.250	0.510	0.094	0.078	35
5/32	1.010	1.930	1.020	1.920	0.281	0.510	0.094	0.093	60
3/16	1.010	1.930	1.020	1.920	0.338	0.510	0.094	0.125	95
7/32	1.010	1.930	1.020	1.920	0.382	0.510	0.109	0.125	135
1/4	1.010	1.930	1.020	1.920	0.425	0.510	0.125	0.141	190
9/32	1.010	1.930	1.020	1.920	0.457	0.510	0.141	0.172	250
5/16	1.010	1.930	1.020	1.920	0.510	0.510	0.141	0.172	320
11/32	1.010	1.930	1.020	1.920	0.547	0.547	0.156	0.203	400
3/8	1.010	1.930	1.020	1.920	0.597	0.597	0.156	0.281	500
7/16	1.010	1.930	1.020	1.920	0.683	0.683	0.219	0.281	500
1/2	1.010	1.930	1.020	1.920	0.697	0.697	0.266	0.344	500
9/16	1.010	1.930	1.020	1.920	0.778	0.778	0.328	0.406	500

TABLE 2 TYPE I CLASSES 1, 2, AND 3 SOCKET, SINGLE AND DOUBLE HEXAGON, REGULAR, LONG, AND MID LENGTH, 3/8 in. DRIVE

Nominal Opening, in.	Overall Length, in.				Outside Diameter, in.		Opening Depth, Nut End, in., Min.	Bolt Clearance Hole Diameter, in., Min.	Proof Torque, lbf-in., Min.
	Class 1 Regular Length, Max.	Class 2 Long Length, Min.	Class 3 Mid Length		Nut End, Max.	Drive End, Max.			
			Min.	Max.					
1/4	1.260	1.750	1.270	1.740	0.472	0.690	0.125	0.141	270
9/32	1.260	1.750	1.270	1.740	0.496	0.690	0.141	0.156	350
5/16	1.260	1.750	1.270	1.740	0.521	0.690	0.141	0.172	440
11/32	1.260	1.750	1.270	1.740	0.567	0.690	0.156	0.203	550
3/8	1.260	1.750	1.270	1.740	0.613	0.690	0.156	0.281	660
7/16	1.260	1.750	1.270	1.740	0.683	0.690	0.219	0.281	930
1/2	1.260	1.750	1.270	1.740	0.751	0.880	0.266	0.344	1,240
9/16	1.260	1.875	1.270	1.865	0.814	0.880	0.328	0.406	1,610
19/32	1.260	1.938	1.270	1.928	0.852	0.885	0.352	0.438	1,800
5/8	1.260	2.000	1.270	1.990	0.890	0.890	0.375	0.469	2,000
11/16	1.260	2.125	1.270	2.115	0.968	0.968	0.375	0.469	2,200
3/4	1.260	2.125	1.270	2.115	1.110	1.110	0.437	0.531	2,200
13/16	1.406	2.480	1.416	2.470	1.141	1.141	0.453	0.594	2,200
7/8	1.406	2.480	1.416	2.470	1.250	1.250	0.500	0.656	2,200
15/16	1.650	2.480	1.660	2.470	1.310	1.310	0.500	0.717	2,200
1	1.650	2.480	1.660	2.470	1.380	1.380	0.547	0.776	2,200

TABLE 3 TYPE I CLASSES 1, 2, AND 3 SOCKET, SINGLE AND DOUBLE HEXAGON, REGULAR, LONG, AND MID LENGTH, 1/2 in. DRIVE

Nominal Opening, in.	Overall Length, in.				Outside Diameter, in.		Opening Depth, Nut End, in., Min.	Bolt Clearance Hole Diameter, in., Min.	Proof Torque, lbf-in., Min.
	Class 1 Regular Length, Max.	Class 2 Long Length, Min.	Class 3 Mid Length		Nut End, Max.	Drive End, Max.			
			Min.	Max.					
3/8	1.525	3.000	1.520	2.990	0.655	0.940	0.156	0.281	1,100
7/16	1.525	3.000	1.520	2.990	0.730	0.940	0.219	0.281	1,500
1/2	1.525	3.000	1.520	2.990	0.775	0.940	0.266	0.344	2,000
9/16	1.572	3.000	1.582	2.990	0.845	0.940	0.328	0.406	2,600
19/32	1.572	3.000	1.582	2.990	0.920	0.940	0.352	0.428	3,000
5/8	1.572	3.000	1.582	2.990	0.942	0.970	0.375	0.450	3,300
11/16	1.572	3.000	1.582	2.990	1.010	1.010	0.375	0.469	4,100
3/4	1.572	3.000	1.582	2.990	1.080	1.080	0.437	0.531	5,000
13/16	1.635	3.000	1.645	2.990	1.145	1.145	0.453	0.594	5,000
7/8	1.760	3.000	1.770	2.990	1.218	1.218	0.500	0.656	5,000
15/16	1.760	3.000	1.770	2.990	1.300	1.300	0.500	0.656	5,000
1	1.760	3.000	1.770	2.990	1.375	1.375	0.547	0.656	5,000
1 1/16	1.853	3.000	1.863	2.990	1.480	1.480	0.625	0.656	5,000
1 1/8	1.947	3.000	1.957	2.990	1.540	1.540	0.656	0.781	5,000
1 3/16	1.947	3.000	1.957	2.990	1.675	1.675	0.656	0.781	5,000
1 1/4	2.015	3.000	2.025	2.990	1.750	1.750	0.750	0.781	5,000
1 5/16	2.015	3.000	2.025	2.990	1.820	1.820	0.750	0.908	5,000
1 3/8	2.155	3.000	2.145	2.990	1.885	1.885	0.781	0.908	5,000
1 7/16	2.295	3.000	2.285	2.990	1.955	1.955	0.845	0.908	5,000
1 1/2	2.295	3.000	2.285	2.990	2.025	2.025	0.850	0.908	5,000

TABLE 4 TYPE I CLASSES 1 AND 2 SOCKET, SINGLE AND DOUBLE HEXAGON, REGULAR AND LONG LENGTH, 3/4 in. DRIVE

Nominal Opening, in.	Overall Length, in.		Outside Diameter, in.		Opening Depth, Nut End, in., Min.	Bolt Clearance Hole Diameter, in., Min.	Proof Torque, lbf-in., Min.
	Class 1 Regular Length, Max.	Class 2 Long Length, Min.	Nut End, Max.	Drive End, Max.			
3/4	2.000	3.250	1.285	1.450	0.437	0.531	6,000
13/16	2.000	3.250	1.300	1.450	0.453	0.594	6,800
7/8	2.010	3.250	1.385	1.575	0.500	0.656	7,700
15/16	2.010	3.250	1.450	1.575	0.546	0.656	8,700
1	2.072	3.250	1.520	1.575	0.546	0.656	9,700
1 1/16	2.200	3.346	1.595	1.595	0.625	0.656	10,800
1 1/8	2.322	3.346	1.680	1.680	0.656	0.781	11,900
1 3/16	2.322	3.346	1.735	1.735	0.656	0.781	13,000
1 1/4	2.385	3.346	1.870	1.870	0.750	0.781	14,200
1 5/16	2.510	3.346	1.920	1.920	0.765	0.906	15,400
1 3/8	2.635	3.346	1.980	1.980	0.781	0.906	16,700
1 7/16	2.635	3.346	2.075	2.075	0.850	0.906	18,000
1 1/2	2.635	3.346	2.145	2.145	0.850	1.031	18,000
1 9/16	2.760	3.346	2.260	2.260	0.850	1.031	18,000
1 5/8	2.760	3.379	2.325	2.325	1.000	1.031	18,000
1 11/16	3.135	3.379	2.400	2.400	1.000	1.156	18,000
1 3/4	3.135	3.437	2.510	2.510	1.093	1.156	18,000
1 13/16	3.260	3.437	2.575	2.575	1.125	1.156	18,000
1 7/8	3.385	3.437	2.695	2.695	1.125	1.281	18,000
2	3.510	3.500	2.885	2.885	1.218	1.281	18,000
2 1/16	3.697	3.500	3.025	3.025	1.218	1.406	18,000
2 1/8	3.697	3.500	3.075	3.075	1.218	1.406	18,000
2 3/16	3.760	3.500	3.150	3.150	1.375	1.515	18,000
2 1/4	3.885	3.500	3.260	3.260	1.375	1.515	18,000
2 5/16	3.947	3.500	3.300	3.300	1.375	1.531	18,000
2 3/8	4.010	3.500	3.333	3.333	1.375	1.531	18,000

TABLE 5 TYPE I CLASS 1 SOCKET, SINGLE AND DOUBLE HEXAGON, REGULAR LENGTH, 1 in. DRIVE

Nominal Opening, in.	Overall Length, in., Max.	Outside Diameter, in.		Opening Depth, Nut End, in., Min.	Bolt Clearance Hole Diameter, in., Min.	Proof Torque, lbf-in., Min.
		Nut End, Max.	Drive End, Max.			
1 1/16	3.010	1.812	2.188	0.625	0.781	11,700
1 1/8	3.010	2.000	2.188	0.656	0.906	12,800
1 3/16	3.010	2.000	2.188	0.656	0.906	14,100
1 1/4	3.010	2.125	2.188	0.750	0.906	15,400
1 5/16	3.010	2.125	2.250	0.765	0.906	16,700
1 3/8	3.010	2.250	2.250	0.781	0.906	18,000
1 7/16	3.010	2.250	2.250	0.859	0.906	19,500
1 1/2	3.072	2.270	2.250	0.859	1.031	21,000
1 9/16	3.135	2.340	2.250	0.859	1.031	22,000
1 5/8	3.260	2.416	2.375	1.000	1.031	24,000
1 11/16	3.260	2.572	2.500	1.000	1.156	26,000
1 3/4	3.260	2.635	2.625	1.093	1.156	27,000
1 13/16	3.385	2.760	2.750	1.125	1.156	28,000
1 7/8	3.385	2.760	2.875	1.125	1.281	28,000
1 15/16	3.385	2.885	2.875	1.125	1.281	28,000
2	3.510	2.947	2.947	1.218	1.281	28,000
2 1/16	3.510	3.046	3.046	1.218	1.281	28,000
2 1/8	3.635	3.150	3.150	1.218	1.406	28,000
2 3/16	3.760	3.150	3.150	1.375	1.531	28,000
2 1/4	3.885	3.270	3.270	1.375	1.531	28,000
2 5/16	3.947	3.325	3.325	1.375	1.531	28,000
2 3/8	4.010	3.395	3.395	1.375	1.531	28,000
2 7/16	4.135	3.475	3.475	1.375	1.656	28,000
2 1/2	4.385	3.572	3.572	1.375	1.656	28,000
2 9/16	4.447	3.572	3.572	1.375	1.656	28,000
2 5/8	4.635	3.760	3.760	1.500	1.781	28,000
2 3/4	4.885	3.885	3.885	1.750	1.781	28,000
2 13/16	4.885	4.010	4.010	1.750	1.906	28,000
2 15/16	4.885	4.135	4.135	1.750	1.906	28,000
3	5.010	4.135	4.135	2.000	2.031	28,000
3 1/8	5.010	4.385	4.385	2.000	2.031	28,000
3 1/4	5.010	4.510	4.510	2.000	2.281	28,000
3 3/8	5.010	4.635	4.635	2.200	2.281	28,000
3 1/2	5.010	4.760	4.760	2.200	2.281	28,000
3 3/4	5.010	5.135	5.135	2.200	2.531	28,000
3 7/8	5.010	5.260	5.260	2.500	2.531	28,000
4	6.010	5.437	5.437	2.500	2.781	28,000
4 1/8	6.010	5.640	5.640	2.500	2.781	28,000
4 1/4	6.010	5.828	5.828	2.500	3.031	28,000
4 1/2	6.010	6.010	6.010	2.500	3.031	28,000

TABLE 6 TYPE II SOCKET, SQUARE, 4- AND 8-POINT, 1/4 in. DRIVE

Nominal Opening, in.	Overall Length, in., Max.	Outside Diameter, in.		Opening Depth, Nut End, in., Min.	Bolt Clearance Hole Diameter, in., Min.	Proof Torque, lbf-in., Min.
		Nut End, Max.	Drive End, Max.			
3/16	1.000	0.433	0.510	0.093	0.125	125
1/4	1.000	0.510	0.510	0.125	0.141	200
5/16	1.000	0.572	0.572	0.140	0.172	300
3/8	1.000	0.696	0.696	0.156	0.281	550

TABLE 7 TYPE II SOCKET, SQUARE, 4- AND 8-POINT, 3/8 in. DRIVE

Nominal Opening, in.	Overall Length, in., Max.	Outside Diameter, in.		Opening Depth, Nut End, in., Min.	Bolt Clearance Hole Diameter, in., Min.	Proof Torque, lbf-in., Min.
		Nut End, Max.	Drive End, Max.			
1/4	1.250	0.572	0.690	0.125	0.141	250
5/16	1.250	0.625	0.690	0.140	0.172	400
3/8	1.250	0.739	0.937	0.156	0.281	900
7/16	1.250	0.833	1.000	0.218	0.281	1,250
1/2	1.250	0.942	1.135	0.265	0.344	1,450
9/16	1.250	1.051	1.135	0.328	0.406	1,600
5/8	1.250	1.130	1.250	0.375	0.469	2,000
11/16	1.250	1.190	1.310	0.375	0.469	2,000

TABLE 8 TYPE II SOCKET, SQUARE, 4- AND 8-POINT, 1/2 in. DRIVE

Nominal Opening, in.	Overall Length, in., Max.	Outside Diameter, in.		Opening Depth, Nut End, in., Min.	Bolt Clearance Hole Diameter, in., Min.	Proof Torque, lbf-in., Min.
		Nut End, Max.	Drive End, Max.			
3/8	1.562	0.739	0.947	0.156	0.281	1,600
7/16	1.562	0.833	1.010	0.218	0.281	1,700
1/2	1.562	0.942	1.135	0.265	0.344	2,000
9/16	1.562	1.051	1.135	0.328	0.406	2,700
5/8	1.750	1.130	1.260	0.375	0.469	3,600
11/16	1.750	1.225	1.322	0.375	0.469	4,300
3/4	1.750	1.317	1.385	0.437	0.531	5,000
13/16	1.750	1.440	1.447	0.453	0.594	5,000
7/8	1.875	1.523	1.572	0.500	0.656	5,000
15/16	1.875	1.650	1.650	0.546	0.656	5,000
1	2.000	1.760	1.760	0.546	0.656	5,000

TABLE 9 TYPE III SOCKET, UNIVERSAL, SINGLE AND DOUBLE HEXAGON, 1/4 in. DRIVE

Nominal Opening, in.	Overall Length, in., Max.	Outside Diameter, in.		Opening Depth, Nut End, in., Min.	Proof Torque, lbf-in., Min.
		Nut End, Max.	Drive End, Max.		
3/16	1.360	0.315	0.540	0.094	95
7/32	1.360	0.356	0.540	0.109	135
1/4	1.420	0.397	0.540	0.125	190
9/32	1.420	0.438	0.540	0.141	250
5/16	1.520	0.510	0.540	0.141	300
11/32	1.520	0.519	0.540	0.156	300
3/8	1.580	0.580	0.580	0.158	300
7/16	1.640	0.683	0.683	0.219	300
1/2	1.697	0.697	0.697	0.266	300
9/16	1.791	0.812	0.812	0.328	300

TABLE 10 TYPE III SOCKET, UNIVERSAL, SINGLE AND DOUBLE HEXAGON, 3/8 in. DRIVE

Nominal Opening, in.	Overall Length, in., Max.	Outside Diameter, in.		Opening Depth, Nut End, in., Min.	Proof Torque, lbf-in., Min.
		Nut End, Max.	Drive End, Max.		
5/16	1.813	0.510	0.790	0.141	440
3/8	1.938	0.690	0.790	0.156	450
7/16	1.938	0.791	0.790	0.218	625
1/2	2.000	0.791	0.820	0.240	725
9/16	2.000	0.820	0.820	0.312	750
5/8	2.094	0.885	0.885	0.343	750
11/16	2.172	1.070	0.885	0.375	750
3/4	2.234	1.070	0.885	0.406	750
7/8	2.234	1.220	0.937	0.500	750

TABLE 11 TYPE III SOCKET, UNIVERSAL, SINGLE AND DOUBLE HEXAGON, 1/2 in. DRIVE

Nominal Opening, in.	Overall Length, in., Max.	Outside Diameter, in.		Opening Depth, Nut End, in., Min.	Proof Torque, lbf-in., Min.
		Nut End, Max.	Drive End, Max.		
1/2	2.550	0.773	1.010	0.265	1,000
9/16	2.740	0.854	1.010	0.310	1,350
5/8	2.740	0.947	1.010	0.345	1,500
11/16	2.840	1.046	1.060	0.375	1,750
3/4	3.105	1.105	1.150	0.437	1,750
13/16	3.167	1.197	1.150	0.453	1,750
7/8	3.167	1.273	1.150	0.500	1,750
15/16	3.200	1.400	1.150	0.500	1,750

TABLE 12 HEXAGON MANDREL DIMENSIONS AND MAXIMUM DEPTH OF MANDREL INSERTION

Nominal Size of Wrench Opening, in.	Hexagon Mandrel Dimensions, in.			Maximum Depth of Mandrel Insertion, in.
	Across Flats Tolerances		Across Corners, Min.	
	Plus	Minus		
1/8	0.001	0.002	0.1403	0.055
5/32	0.001	0.002	0.1745	0.069
3/16	0.001	0.002	0.2095	0.083
7/32	0.001	0.002	0.2440	0.096
1/4	0.001	0.002	0.2780	0.110
9/32	0.001	0.002	0.3133	0.133
5/16	0.001	0.002	0.3495	0.141
11/32	0.001	0.002	0.3860	0.156
3/8	0.001	0.002	0.4225	0.156
7/16	0.001	0.002	0.4935	0.198
1/2	0.001	0.003	0.5635	0.239
9/16	0.001	0.003	0.6339	0.265
5/8	0.001	0.003	0.7055	0.291
11/16	0.001	0.003	0.7769	0.317
3/4	0.001	0.003	0.8485	0.344
13/16	0.001	0.003	0.9201	0.370
7/8	0.001	0.003	0.9917	0.396
15/16	0.001	0.003	1.0631	0.422
1	0.001	0.003	1.1297	0.479
1 1/16	0.001	0.003	1.2013	0.505
1 1/8	0.001	0.003	1.2728	0.531
1 3/16	0.001	0.003	1.343	0.557
1 1/4	0.001	0.003	1.416	0.583
1 5/16	0.001	0.003	1.487	0.609
1 3/8	0.001	0.003	1.559	0.635
1 7/16	0.001	0.003	1.631	0.661
1 1/2	0.001	0.003	1.702	0.687
1 9/16	0.001	0.007	1.770	0.713
1 5/8	0.001	0.007	1.841	0.739
1 11/16	0.001	0.007	1.912	0.765
1 3/4	0.001	0.007	1.983	0.791
1 13/16	0.001	0.007	2.054	0.817
1 7/8	0.001	0.007	2.124	0.843
1 15/16	0.001	0.007	2.195	0.869
2	0.001	0.007	2.266	0.958
2 1/16	0.001	0.007	2.337	0.984
2 1/8	0.001	0.007	2.408	1.010
2 3/16	0.001	0.007	2.479	1.036
2 1/4	0.001	0.007	2.549	1.063

Continued

TABLE 12 HEXAGON MANDREL DIMENSIONS AND MAXIMUM DEPTH OF MANDREL INSERTION (CONT'D)

Nominal Size of Wrench Opening, in.	Hexagon Mandrel Dimensions, in.			Maximum Depth of Mandrel Insertion, in.
	Across Flats Tolerances		Across Corners, Min.	
	Plus	Minus		
$2\frac{5}{16}$	0.001	0.007	2.621	1.089
$2\frac{3}{8}$	0.001	0.007	2.691	1.115
$2\frac{7}{16}$	0.001	0.007	2.762	1.141
$2\frac{1}{2}$	0.001	0.007	2.833	1.167
$2\frac{9}{16}$	0.001	0.008	2.903	1.193
$2\frac{5}{8}$	0.001	0.008	2.974	1.219
$2\frac{3}{4}$	0.001	0.008	3.116	1.271
$2\frac{13}{16}$	0.001	0.008	3.187	1.297
$2\frac{15}{16}$	0.001	0.008	3.328	1.349
3	0.001	0.008	3.399	1.375
$3\frac{1}{8}$	0.001	0.008	3.541	1.427
$3\frac{1}{4}$	0.001	0.010	3.682	1.479
$3\frac{3}{8}$	0.001	0.010	3.824	1.531
$3\frac{1}{2}$	0.001	0.010	3.966	1.583
$3\frac{3}{4}$	0.001	0.010	4.249	1.688
$3\frac{7}{8}$	0.001	0.010	4.391	1.740
4	0.001	0.010	4.532	1.855
$4\frac{1}{8}$	0.001	0.010	4.674	1.907
$4\frac{1}{4}$	0.001	0.010	4.816	1.959
$4\frac{1}{2}$	0.001	0.010	5.099	2.063

TABLE 13 SQUARE MANDREL DIMENSIONS AND MAXIMUM DEPTH OF MANDREL INSERTION

Nominal Size of Wrench Opening, in.	Square Mandrel Dimensions, in.			Maximum Depth of Mandrel Insertion, in.
	Across Flats Tolerances		Across Corners, Min.	
	Plus	Minus		
3/16	0.001	0.003	0.2577	0.093
7/32	0.001	0.003	0.3006	0.109
1/4	0.001	0.003	0.3436	0.125
5/16	0.001	0.003	0.4294	0.140
3/8	0.001	0.003	0.5153	0.156
7/16	0.001	0.003	0.6012	0.218
1/2	0.001	0.003	0.687	0.265
9/16	0.001	0.003	0.773	0.328
5/8	0.001	0.003	0.859	0.375
11/16	0.001	0.003	0.945	0.375
3/4	0.001	0.003	1.031	0.437
13/16	0.001	0.003	1.117	0.453
7/8	0.001	0.003	1.202	0.500
15/16	0.001	0.003	1.288	0.546
1	0.001	0.003	1.374	0.546

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ISBN 0-7918-2781-X

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N08802