

ASME B107.5M-2002  
(Revision of ASME B107.5M-1994)

# SOCKET WRENCHES, HAND (METRIC SERIES)

AN AMERICAN NATIONAL STANDARD



The American Society of  
Mechanical Engineers



The American Society of  
Mechanical Engineers

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

# SOCKET WRENCHES, HAND (METRIC SERIES)

**ASME B107.5M-2002**  
(Revision of ASME B107.5M-1994)

Date of Issuance: December 20, 2002

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.

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 assume 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 © 2002 by  
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS  
All Rights Reserved  
Printed in U.S.A.

# CONTENTS

Foreword .....	iv
Committee Roster .....	v
Correspondence With the B107 Committee .....	vi
<b>1 Scope .....</b>	<b>1</b>
<b>2 Classification .....</b>	<b>1</b>
<b>3 Normative References .....</b>	<b>1</b>
<b>4 Requirements .....</b>	<b>1</b>
<b>5 Test Procedures .....</b>	<b>5</b>
<b>6 Designations .....</b>	<b>7</b>
<b>7 Safety Requirements and Limitations of Use .....</b>	<b>8</b>
<b>Figures</b>	
1 Type I Sockets .....	2
2 Type II Universal Sockets, Block Type .....	8
<b>Tables</b>	
1 Type I, Classes 1, 2, and 3 Socket, Single and Double Hexagon, Regular, Long, and Mid Length, 6.3 mm Drive .....	3
2 Type I, Classes 1, 2, and 3 Socket, Single and Double Hexagon, Regular, Long, and Mid Length, 10 mm Drive .....	4
3 Type I, Classes 1 and 2 Socket, Single and Double Hexagon, Regular and Long Length, 12.5 mm Drive .....	5
4 Type I, Classes 1 and 2 Socket, Single and Double Hexagon, Regular and Long Length, 20 mm Drive .....	6
5 Type I, Class 1 Socket Single and Double Hexagon, Regular Length, 25 mm Drive .....	7
6 Type II Socket, Universal, Single and Double Hexagon, 6.3 mm Drive .....	9
7 Type II Socket, Universal, Single and Double Hexagon, 10 mm Drive .....	9
8 Type II Socket, Universal, Single and Double Hexagon, 12.5 mm Drive .....	10
9 Hexagon Mandrel Dimensions and Maximum Depth of Mandrel Insertion .....	11

## 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.

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 B107.5M-1994, Socket Wrenches, Hand (Metric 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 2000*. Requests for interpretations of 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 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.)

### **OFFICERS**

**R. R. McCullough**, *Chair*  
**G. E. Olson**, *Vice Chair*  
**J. R. Bird**, *Secretary*

### **COMMITTEE PERSONNEL**

**J. R. Bird**, The American Society of Mechanical Engineers  
**J. Davidson**, Sears Roebuck and Co.  
**J. S. Foote**, Trade Association Management, Inc.  
**A. Herskovitz**, Consultant  
**H. Kimball**, Naval Air Warfare Center  
**R. R. McCullough**, Consultant  
**D. S. McKittrick**, Western Forge  
**G. E. Olson**, Gene Olson Engineering Consultant, Ltd.  
**W. T. Pagac**, Snap-on  
**D. M. Eggert**, *Alternate*, Snap-on  
**J. M. Ster**, General Services Administration  
**I. I. Harding**, *Alternate*, General Services Administration  
**R. B. Wright**, Wright Tool Co.  
**W. C. Snyder**, *Alternate*, Wright Tool Co.

### **SUBCOMMITTEE 1 — SOCKETS AND ATTACHMENTS**

**R. B. Wright**, *Chair*, Wright Tool Co.  
**J. Davidson**, Sears Roebuck and Co.

## 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 will be rewritten in this 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 (METRIC SERIES)

## 1 SCOPE

This Standard provides 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:** Universal sockets, single (6-point) and double (12-point) hexagon, block type (see Fig. 2 and Tables 6 through 8)

## 3 NORMATIVE REFERENCES

The following standards form a part of this Standard to the extent specified herein. All standards are subject to change, and parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent edition of the documents indicated below.

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

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

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

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

Publisher: The American Society of Mechanical Engineers (ASME), Three Park Avenue, New York, NY 10016-5990

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

ASTM B 537-70 (1992) e1, 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 18-00, 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

## 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.

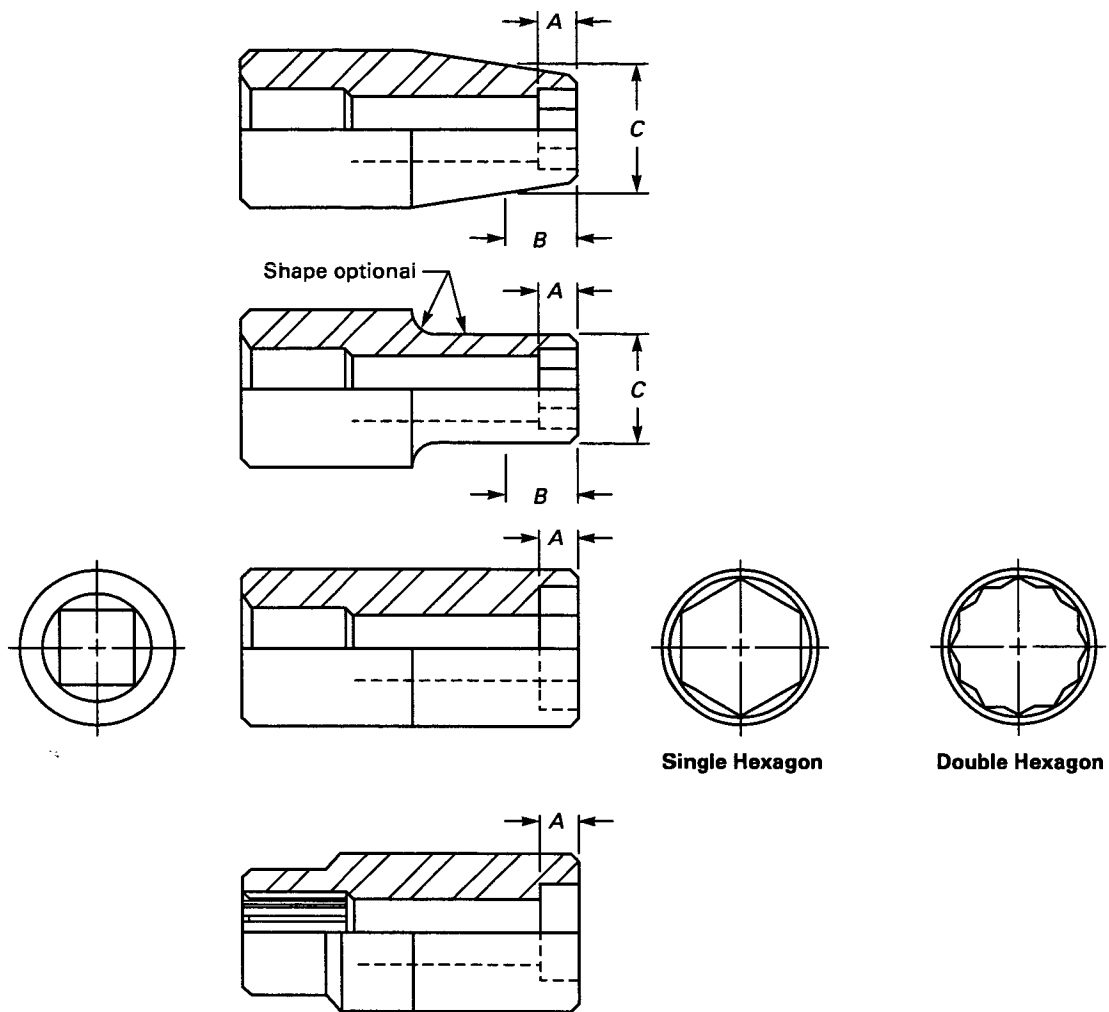
### 4.2 Materials

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

### 4.3 Marking

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 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.



**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 SOCKETS****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 gauged 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

**TABLE 1 TYPE I, CLASSES 1, 2, AND 3 SOCKET, SINGLE AND DOUBLE HEXAGON, REGULAR, LONG, AND MID LENGTH, 6.3 mm DRIVE**

Nominal Opening, mm	Overall Length, mm				Outside Diameter, mm		Opening Depth, Nut End, mm, Min.	Bolt Clearance Hole Diameter, mm, Min.	Proof Torque Min., N·m
	Class 1 Regular Length, Max.	Class 2 Long Length, Min.	Class 3						
			Mid Length						
			Min.	Max.	Nut End, Max.	Drive End, Max.			
3.2	26	49	26.25	48.75	6.10	12.95	1.60	1.98	7
4	26	49	26.25	48.75	7.10	12.95	2.40	2.35	8
4.5	26	49	26.25	48.75	7.60	12.95	2.60	2.97	9
5	26	49	26.25	48.75	8.15	12.95	2.80	3.18	10
5.5	26	49	26.25	48.75	8.90	12.95	2.80	3.56	14
6	26	49	26.25	48.75	9.90	12.95	3.05	3.56	16
6.3	26	49	26.25	48.75	9.90	12.95	3.15	3.95	21
7	26	49	26.25	48.75	10.90	12.95	3.55	4.32	27
8	26	49	26.25	48.75	12.20	12.95	3.55	5.33	38
9	26	49	26.25	48.75	13.45	13.45	4.05	5.33	49
10	26	49	26.25	48.75	14.75	14.75	4.60	6.60	63
11	26	49	26.25	48.75	16.00	16.00	5.45	7.62	68
12	26	49	26.25	48.75	17.30	17.30	6.10	8.33	68
13	26	49	26.25	48.75	18.55	18.55	6.75	8.33	68
14	26	49	26.25	48.75	19.80	19.80	8.35	10.35	68
15	26	49	26.25	48.75	21.50	21.50	8.35	11.35	68
16	26	49	26.25	48.75	22.00	22.00	8.75	12.35	68

surfaces. Maximum surface roughness values shall be determined by micrometer ( $\mu\text{m}$ ) values. Determination of  $\mu\text{m}$  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 micrometers using a 0.76 mm (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 0.76  $\mu\text{m}$  (30  $\mu\text{in.}$ ) maximum, except for oxide or phosphate coated sockets. Except where knurled or grooved, the remaining exterior longitudinal socket surface shall be 3.81  $\mu\text{m}$  (150  $\mu\text{in.}$ ) maximum. Oxide or phosphate coated sockets shall have a maximum roughness of 3.81  $\mu\text{m}$  (150  $\mu\text{in.}$ ). 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 that would interfere with their protective value and serviceability.

The sockets shall be coated with one or a combination of the coatings in accordance with paras. 4.7.2(a), (b), or (c). The customer may specify the type of coating required.

*(a) Nickel-Chromium*

*(1) Coating.* The coating shall be a protective bright decorative nickel-chromium plating. The minimum thickness of the nickel-iron shall be 0.005 mm (0.0002 in.). The minimum thickness of the chromium shall be 0.00013 mm (0.000005 in.).

*(2) Adhesion.* The sockets shall pass the surface adhesion test as specified in the file, grind-saw, or heat-quench test of ASTM B 571.

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

*(c) 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.

**TABLE 2 TYPE I, CLASSES 1, 2, AND 3 SOCKET, SINGLE AND DOUBLE HEXAGON, REGULAR, LONG, AND MID LENGTH, 10 mm DRIVE**

Nominal Opening, mm	Overall Length, mm				Outside Diameter, mm		Opening Depth, Nut End, mm, Min.	Bolt Clearance Hole Diameter, mm, Min.	Proof Torque Min., N·m
	Class 1 Regular Length, Max.	Class 2 Long Length, Min.	Class 3						
			Mid Length						
			Min.	Max.	Nut End, Max.	Drive End, Max.			
5.5	32	44	32.25	43.75	10.10	17.60	2.80	3.56	14
6	32	44	32.25	43.75	10.10	17.60	3.05	3.56	25
6.3	32	44	32.25	43.75	10.10	17.60	3.15	3.95	29
7	32	44	32.25	43.75	11.05	17.60	3.56	4.32	37
8	32	44	32.25	43.75	12.20	17.60	3.56	5.33	52
9	32	44	32.25	43.75	13.60	17.60	4.05	5.33	66
10	32	44	32.25	43.75	15.00	17.60	4.60	6.60	82
11	32	44	32.25	43.75	16.75	17.60	5.45	7.62	112
12	32	44	32.25	43.75	17.80	22.40	6.10	8.33	124
13	32	44	32.25	43.75	18.80	22.40	6.75	8.33	147
14	32	47	32.25	46.75	20.00	22.40	8.35	10.35	175
15	32	47	32.25	46.75	22.40	22.40	8.35	10.35	203
16	32	50	32.25	49.75	22.50	22.50	9.55	11.68	237
17	32	50	32.25	49.75	23.80	23.80	9.55	12.35	249
18	32	54	32.25	53.75	24.60	24.60	10.15	12.35	249
19	32	54	32.25	53.75	25.70	25.70	11.10	14.30	249
20	32	54	32.25	53.75	27.76	27.76	11.10	14.30	249
21	34	63	34.25	62.75	28.80	28.80	11.60	15.10	249
22	34	63	34.25	62.75	30.00	30.00	12.35	16.66	249
23	35	64	35.25	63.75	31.30	31.30	12.35	17.60	249
24	36	65	36.25	64.75	32.50	32.50	12.75	18.50	249
25	38	67	38.25	66.75	33.00	33.00	13.25	19.45	249
26	38	67	38.25	66.75	35.00	35.00	13.75	20.40	249

#### 4.8 Bolt Clearance Hole

A space shall be provided for bolt clearance in all sockets except Type II universal sockets (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.

**TABLE 3 TYPE I, CLASSES 1 AND 2 SOCKET, SINGLE AND DOUBLE HEXAGON, REGULAR AND LONG LENGTH, 12.5 mm DRIVE**

Nominal Opening, mm	Overall Length, mm		Outside Diameter, mm		Opening Depth, Nut End, mm, Min.	Bolt Clearance Hole Diameter, mm, Min.	Proof Torque Min., N·m
	Class 1 Regular Length, Max.	Class 2 Long Length, Min.					
			Nut End, Max.	Drive End, Max.			
8	39	76	14.00	23.87	3.75	4.75	80
9	39	76	15.10	23.87	4.05	5.33	110
10	39	76	16.80	23.87	4.60	6.60	153
11	39	76	18.20	23.87	5.45	7.62	170
12	39	76	18.70	23.87	6.10	8.33	203
13	39	76	20.25	23.87	6.75	8.33	249
14	39	76	21.80	23.87	8.35	10.35	282
15	40	76	22.40	23.87	8.35	10.35	339
16	40	76	23.87	23.87	9.50	11.68	407
17	40	76	24.75	24.75	9.50	12.35	475
18	40	76	26.14	26.14	10.15	12.35	542
19	40	76	27.20	27.20	11.10	14.30	565
20	42	76	27.95	27.95	11.50	14.30	570
21	42	76	28.95	28.95	11.70	15.10	570
22	45	76	30.20	30.20	12.45	16.66	570
23	45	76	31.25	31.25	12.70	16.66	570
24	45	76	32.15	32.15	13.85	18.35	570
25	45	76	33.40	33.40	14.00	18.35	570
26	48	76	35.05	35.05	14.60	18.35	570
27	48	76	36.75	36.75	15.80	20.35	570
28	50	76	37.80	37.80	16.25	20.35	570
29	50	76	39.50	39.50	16.65	20.35	570
30	50	76	42.40	42.40	16.65	22.35	570
31	50	76	43.20	43.20	17.80	22.35	570
32	51	76	44.05	44.05	19.00	22.35	570

#### 4.11 Dimensions

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

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

Type II 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 that 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 0.79 mm (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 II universal sockets shall comply with the tables herein (Fig. 2 and Tables 6 through 8).

### 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

**TABLE 4 TYPE I, CLASSES 1 AND 2 SOCKET, SINGLE AND DOUBLE HEXAGON, REGULAR AND LONG LENGTH, 20 mm DRIVE**

Nominal Opening, mm	Overall Length, mm		Outside Diameter, mm		Opening Depth, Nut End, mm, Min.	Bolt Clearance Hole Diameter, mm, Min.	Proof Torque Min., N·m
	Class 1 Regular Length, Max.	Class 2 Long Length, Min.					
	Nut End, Max.	Drive End, Max.					
19	51	85	30.50	33.00	12.45	13.47	780
21	51	85	33.00	33.00	12.45	15.07	930
22	51	85	35.05	38.10	12.45	16.66	972
23	51	85	36.10	39.10	12.70	16.66	1015
24	51	85	37.00	40.00	13.85	18.35	1085
25	52	85	37.85	40.00	14.00	18.35	1160
26	53	85	38.85	40.00	14.60	18.35	1240
27	54	85	41.00	41.00	15.90	18.35	1330
28	57	85	41.00	41.00	16.25	20.35	1420
29	59	85	42.10	42.10	16.65	20.35	1520
30	59	85	43.00	43.00	16.65	22.35	1640
31	60	85	45.10	45.10	17.80	22.35	1730
32	60	85	47.05	47.05	19.05	24.35	1820
34	64	85	49.00	49.00	20.00	24.45	2000
35	67	85	50.40	50.40	20.10	24.45	2030
36	67	85	51.80	51.80	21.45	27.50	2030
38	67	85	54.10	54.10	22.25	27.50	2030
40	70	...	57.65	57.65	22.75	30.50	2030
41	70	...	58.80	58.80	24.90	30.50	2030
42	70	...	58.80	58.80	25.40	31.00	2030
46	83	...	65.40	65.40	28.60	33.50	2030
50	89	...	72.15	72.15	29.75	36.50	2030
54	94	...	78.10	78.10	30.95	39.50	2030
55	95	...	79.10	79.10	33.55	39.50	2030
58	97	...	80.00	80.00	35.00	39.50	2030
60	100	...	84.45	84.45	35.00	39.50	2030

of material removed in the area contacted by the penetrator shall not exceed:

Drive Size, mm	Max. Material Removed
6.3, 10, 12.5	0.18 mm (0.007 in.)
20	0.38 mm (0.015 in.)
25	0.25 mm (0.010 in.) per 25.4 mm (1.0 in.) of diameter

## 5.2 Proof Torque Test

Socket openings shall be gaged prior to application of the proof torque test load. The socket shall be torqued to the proof torque using specified mandrel depths (see Table 9). Following the removal of the

proof torque, the socket shall be regaged and any socket that cracks, fractures, or does not gage after torquing loading 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.

**TABLE 5 TYPE I, CLASS 1 SOCKET, SINGLE AND DOUBLE HEXAGON, REGULAR LENGTH, 25 mm DRIVE**

Nominal Opening, mm	Overall Length, mm, Max.	Outside Diameter, mm		Opening Depth, Nut End, mm, Min.	Bolt Clearance Hole Diameter, mm, Min.	Proof Torque, Min., N-m
		Nut End, Max.	Drive End, Max.			
34	75	57.15	57.15	20.00	26.00	2400
36	75	57.15	57.15	21.45	27.50	2530
38	78	57.40	57.15	22.25	27.50	2640
40	81	59.20	57.55	22.75	30.50	2760
41	83	60.95	59.70	24.90	30.50	2820
46	86	69.85	69.85	28.60	33.50	3160
50	88	74.05	73.00	29.75	36.50	3160
54	93	79.65	73.00	30.95	39.50	3160
55	95	79.65	73.00	33.55	39.50	3160
60	103	85.50	73.00	35.00	39.50	3160
70	116	96.50	84.00	38.00	46.00	3160
74	125	103.00	90.00	40.50	46.00	3160

(b) *Universal Sockets.* Tests shall be made in the same manner as specified in para. 5.2.1(a) except that means shall be provided to keep the parts of the universal socket assembly on a common axis about which the load 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. The size of all mandrels shall conform to tables herein. Mandrels shall be hardened to no 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, if agreed to by the customer, exempts the manufacturer from the Nickel-Chromium Thickness requirement of para. 4.7.2(a)(1) and the Nickel-Chromium Adhesion requirement of para. 4.7.2(a)(2).

Retesting may be required when a significant change occurs in the process, 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.

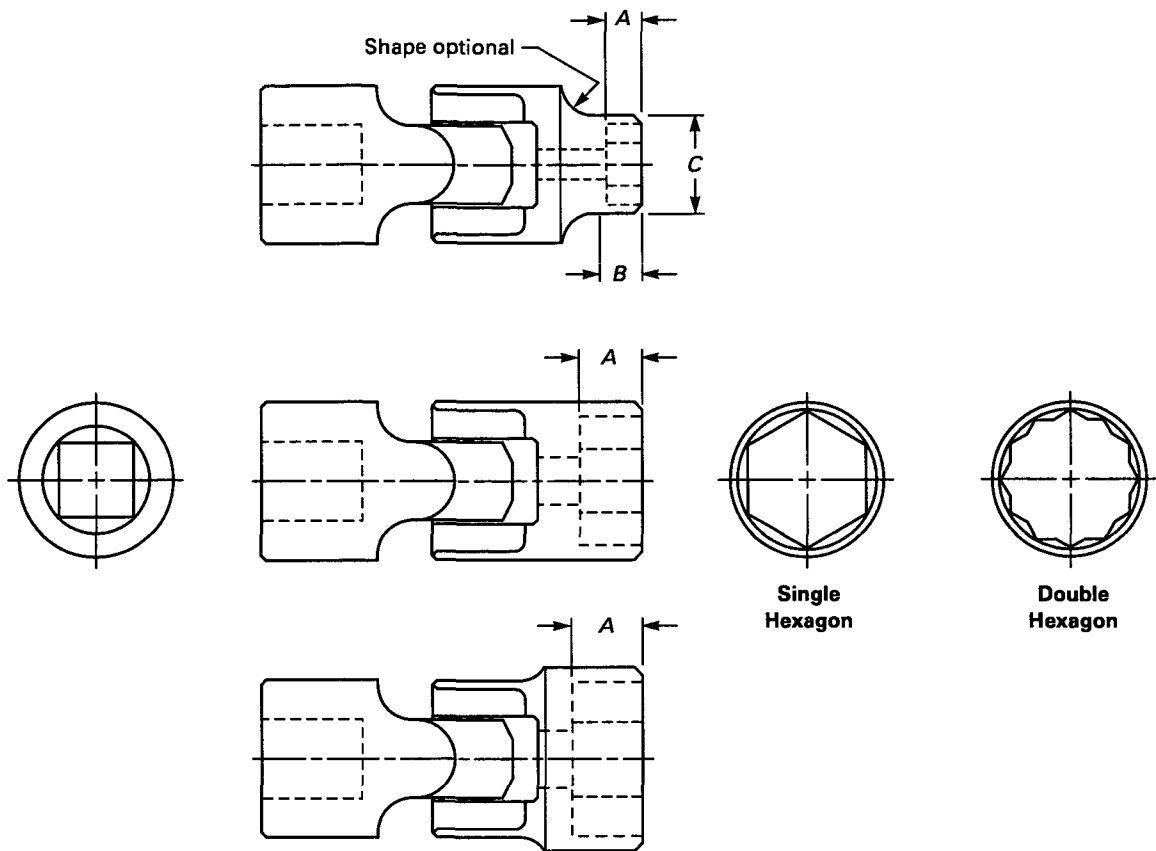
**5.3.4 Coating Process Corrosion Test.** The exterior surfaces of sample sockets shall be tested for corrosion resistance by exposure to a 48-hour salt spray test, as specified in ASTM B 117, without falling below the ASTM B 537 rating of 6.

## 6 DESIGNATIONS

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

- Hand socket
- Drive size
- Type
- Class
- Wrench nominal opening size and configuration

EXAMPLE: Hand socket, 6.3 mm drive size, Type I, Class 1, 10 mm opening, single hexagon.

**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 II UNIVERSAL SOCKETS, BLOCK TYPE****7 SAFETY REQUIREMENTS AND LIMITATION OF USE**

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

**TABLE 6 TYPE II SOCKET, UNIVERSAL, SINGLE AND DOUBLE HEXAGON, 6.3 mm DRIVE**

Nominal Opening, mm	Overall Length, mm, Max.	Outside Diameter, mm		Opening Depth, Nut End, mm, Min.	Proof Torque, Min., N·m
		Nut End, Max.	Drive End, Max.		
3.2	33.0	6.00	14.30	1.60	7
4	33.0	7.00	14.30	2.40	8
5	36.1	8.30	14.30	2.70	10
5.5	36.1	9.00	14.30	2.80	14
6	36.1	9.80	14.30	3.05	16
6.3	36.1	10.00	14.30	3.20	21
7	36.1	10.95	14.30	3.55	27
8	36.1	12.25	14.30	3.55	34
9	37.0	13.45	14.30	4.05	34
10	39.0	15.25	15.60	4.60	34
11	40.0	17.20	17.20	5.45	34
12	41.0	17.60	17.60	6.10	34
13	42.0	18.00	18.00	6.75	34
14	43.0	18.90	19.00	8.05	34

**TABLE 7 TYPE II SOCKET, UNIVERSAL, SINGLE AND DOUBLE HEXAGON, 10 mm DRIVE**

Nominal Opening, mm	Overall Length, mm, Max.	Outside Diameter, mm		Opening Depth, Nut End, mm, Min.	Proof Torque, Min., N·m
		Nut End, Max.	Drive End, Max.		
7	47	11.00	20.00	3.55	29
8	47	12.30	20.00	3.55	37
9	47	14.00	20.00	4.05	52
10	47	18.05	20.05	4.60	57
11	47	19.00	20.05	5.45	69
12	48	19.05	20.05	6.10	77
13	48	19.25	20.80	6.75	82
14	49	19.95	20.80	8.35	84
15	51	22.40	21.56	8.35	85
16	51	23.87	22.50	9.55	85
17	52	24.40	22.50	9.55	85
18	53	26.14	22.50	10.15	85
19	54	27.00	22.50	11.10	85
20	54	28.20	22.85	11.50	85
21	55	29.45	23.25	11.70	85
22	56	30.70	23.70	12.40	85
24	57	33.10	25.00	13.50	85



**TABLE 8 TYPE II SOCKET, UNIVERSAL, SINGLE AND DOUBLE HEXAGON, 12.5 mm DRIVE**

Nominal Opening, mm	Overall Length, mm, Max.	Outside Diameter, mm		Opening Depth, Nut End, mm Min.	Proof Torque, Min., N-m
		Nut End, Max.	Drive End, Max.		
12	61	18.70	25.65	6.10	96
13	62	20.00	25.65	6.75	120
14	63	21.35	25.65	8.35	145
15	64	22.70	25.65	8.35	160
16	65	24.20	25.70	9.55	170
17	67	25.60	26.25	9.55	190
18	68	27.00	27.20	10.15	200
19	73	27.95	28.45	11.10	200
20	74	29.30	28.60	11.50	200
21	75	30.80	28.60	11.70	200
22	75	32.05	28.60	12.45	200

**TABLE 9 HEXAGON MANDREL DIMENSIONS  
AND MAXIMUM DEPTH OF MANDREL INSERTION**

Nominal Size of Wrench Opening, mm <i>N</i>	Hexagon Mandrel Dimensions, mm			Maximum Depth of Mandrel Insertion, mm
	Across Flats Tolerances		Across Corners, Min. [Note (1)]	
	Plus	Minus		
3.2	0.025	0.050	3.57	1.30
4	0.025	0.050	4.46	1.60
4.5	0.025	0.050	5.10	1.80
5	0.025	0.050	5.58	2.00
5.5	0.025	0.050	6.13	2.40
6	0.025	0.050	6.68	2.60
6.3	0.025	0.050	7.02	2.80
7	0.025	0.050	7.79	3.20
8	0.025	0.050	8.95	4.00
9	0.025	0.050	10.11	4.40
10	0.025	0.050	11.27	4.80
11	0.025	0.050	12.40	5.60
12	0.025	0.076	13.53	6.00
13	0.025	0.076	14.67	6.40
14	0.025	0.076	15.80	7.00
15	0.025	0.076	16.92	7.40
16	0.025	0.076	18.06	8.00
17	0.025	0.076	19.20	8.80
18	0.025	0.076	20.35	9.60
19	0.025	0.076	21.49	10.20
20	0.025	0.076	22.64	10.60
21	0.025	0.076	23.78	11.20
22	0.025	0.076	24.93	11.80
23	0.025	0.076	26.07	12.20
24	0.025	0.076	27.20	12.80
25	0.025	0.076	28.27	13.40
26	0.025	0.076	29.38	13.80
27	0.025	0.076	30.53	14.40
28	0.025	0.076	31.67	15.00
29	0.025	0.076	32.81	15.40
30	0.025	0.076	33.96	16.00
31	0.025	0.076	35.10	16.40
32	0.025	0.076	36.25	16.80
33	0.025	0.076	37.38	17.20
34	0.025	0.076	38.52	17.60
35	0.025	0.076	39.68	18.40
36	0.025	0.076	40.83	19.20
38	0.025	0.076	43.11	20.20
40	0.025	0.177	45.32	21.20
41	0.025	0.177	46.45	21.60
42	0.025	0.177	47.59	22.00

*(continued)*

**TABLE 9 HEXAGON MANDREL DIMENSIONS  
AND MAXIMUM DEPTH OF MANDREL INSERTION (CONT'D)**

Nominal Size of Wrench Opening, mm <i>N</i>	Hexagon Mandrel Dimensions, mm			Maximum Depth of Mandrel Insertion, mm
	Across Flats Tolerances		Across Corners, Min. [Note (1)]	
	Plus	Minus		
46	0.025	0.177	52.12	24.00
50	0.025	0.177	56.65	26.40
54	0.025	0.177	61.18	28.40
55	0.025	0.177	62.32	28.80
58	0.025	0.177	65.72	30.20
60	0.025	0.177	67.98	31.20
70	0.025	0.177	79.31	36.00
74	0.025	0.177	83.85	37.92

**NOTE:**

(1) Calculated by  $(N \times 1.155) - (N \times 1.155 \times 0.0190)$ . Applicable to mandrels over 38 mm nominal size.

## 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
Socket Wrenches, Power Drive (Non-Impact) (Inch Series).....	B107.3-1978(R1991)
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 .....	B107.8M-1996
Handles and Attachments for Hand Socket Wrenches — Inch and Metric Series .....	B107.10M-1996
Pliers: Diagonal Cutting and End Cutting .....	B107.11-2002
Nut Drivers (Spin Type, Screwdriver Grip) (Inch Series) .....	B107.12-1997
Pliers — Long Nose, Long Reach .....	B107.13M-1996
Hand Torque Tools .....	B107.14M-1994
Flat Tip and Phillips Screwdrivers.....	B107.15-1993
Shears (Metal Cutting, Hand).....	B107.16M-1998
Gages, Wrench Openings, Reference.....	B107.17M-1997
Pliers (Wire Twister) .....	B107.18M-1996
Pliers, Retaining Ring .....	B107.19-1993(R1998)
Pliers (Lineman's, Iron Worker's, Gas, Glass, Fence, and Battery) .....	B107.20M-1998
Wrench, Crowfoot Attachments.....	B107.21-1998
Electronic Cutters.....	B107.22M-1998
Pliers, Multiple Position, Adjustable.....	B107.23M-1997
Pliers: Performance Test Methods .....	B107.25-2002
Pliers, Multiple Position (Electrical Connector) .....	B107.27-1996
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 for Spark Plugs.....	B107.34M-1997
Nut Drivers (Spin Type, Screwdriver Grip) (Metric Series) .....	B107.35M-1997
Electronic Pliers .....	B107.38M-1998
Nail Hammers — Safety Requirements.....	B107.41M-1997
Hatchets: Safety Requirements .....	B107.42M-1997
Wood-Splitting Wedges: Safety Requirements.....	B107.43M-1997
Glaziers' Chisels and Wood Chisels .....	B107.44-2002
Ripping Chisels and Flooring/Electricians' Chisels.....	B107.45-2002
Stud, Screw, and Pipe Extractors: Safety Requirements .....	B107.46M-1998
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.....	B107.53M-1998
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
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).*

## 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.

ISBN 0-7918-2783-6



9 780791 827833



N08202