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ASME B107.10M-1996

[Revision of ANSI B107.10M-1982 (R1988)]

HANDLES AND ATTACHMENTS FOR HAND SOCKET WRENCHES — INCH AND METRIC SERIES

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

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The American Society of Mechanical Engineers

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HANDLES AND ATTACHMENTS FOR HAND SOCKET WRENCHES — INCH AND METRIC SERIES

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FOREWORD

(This Foreword is not part of ASME B107.10M-1996.)

The American National Standards Committee B107, Socket Wrenches and Drives, under sponsorship by the American Society of Mechanical Engineers, held its organizational meeting on June 28, 1967. Subcommittees were subsequently organized to handle the expanded need of both inch and metric series American National Standards dealing with wrenches, handles, and attachments. This Standard is one of a series of such standards.

Members of the Hand Tools Institute have been major contributors to the development of these standards in their committee work, their knowledge of the products, and their active efforts in the promotion of adoption of the standards.

This revision was approved as an American National Standard on February 7, 1996.

Suggestions for improvement of this Standard will be welcome and should be sent to the following address:

Secretary
B107 Committee
The American Society of Mechanical Engineers
345 East 47th Street
New York, NY 10017

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Hand Tools and Accessories

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HANDLES AND ATTACHMENTS FOR HAND SOCKET WRENCHES (Inch and Metric Series)

1 SCOPE AND CLASSIFICATION

1.1 Scope

This Standard covers the more generally used handles and attachments utilized by mechanics in repair and maintenance of vehicles, machinery, and other items.

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.

1.2 Classification

Handles and attachments for socket wrenches shall be of the following Types, Classes, and Styles, as specified.

Type 1 Handles
- Class 1 — Hinged
- Class 2 — Ratchet, Reversible
- Class 3 — Speeder
  - Style 1 — Brace Type, Single
  - Style 2 — Spin Type, Screwdriver Grip
- Class 4 — Tee, Sliding

Type 2 Attachments
- Class 1 — Universal Joint
- Class 2 — Bar, Extension
  - Style 1 — Solid
  - Style 2 — Flexible
- Class 3 — Adapter
  - Style 1 — Socket Wrench
  - Style 2 — Ratchet, Adapter

2 NORMATIVE REFERENCES

American National Standards Institute (*ANSI*)

B46.1-1985, Surface Texture

B107.4-1982 (R1988), Driving and Spindle Ends for Portable Hand, Air, and Electric Tools

American Society for Testing and Materials (*ASTM*)

E18-1994, Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials, Standard Test Methods for

3 REQUIREMENTS

3.1 Illustrations

The illustrations herein are descriptive and not intended to preclude the purchase of handles which are otherwise in accordance with this Standard.

3.2 Marking

Handles and attachments shall be marked in a permanent manner with the manufacturer's name, or with a trademark of such known character that source of manufacture and country of origin may be readily determined.

3.3 Manufacture and Design

3.3.1 Drive End Dimensions. Male and female drive end dimensions shall conform to ANSI B107.4.

3.3.2 Edges and Corners. All edges and corners capable of causing injury, not otherwise covered herein, shall be rounded, chamfered, or have sharp edges removed.

3.4 Hardness

Unless otherwise specified, drive tangs of handles and attachments shall be hardened throughout to a Rockwell Hardness of not less than 38 nor more than 60 on the "C" scale. The tang need not be hardened over more than the dimension "C_m" (see Table 9 of ANSI B107.4).

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3.5 Test Loads

When tested as specified in para. 4.2.1, tools shall withstand the test loads specified in the applicable tables without permanent deformation which might affect the durability or performance of the tools.

3.6 Finish

3.6.1 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 completely removed to blend smoothly with adjacent surfaces. Maximum surface roughness values shall be determined by microinch 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 and provided with a coating finish of chromium (para. 3.6.2.1), shall have a uniform bright finish with a maximum surface roughness conforming to Table 1. Measurement shall be made with a surface measuring instrument using a 0.030 in. (0.76 mm) roughness width cutoff. All surface roughness values shall be rated as the arithmetical average, except that surface roughness for items oxide or phosphate coated or other manufacturer's standard coating shall not exceed 200 μin. (5.08 μm). Definitions and nomenclature used herein can be found in ANSI B46.1.

3.6.2 Coatings. The coatings shall be tightly adherent, smooth, continuous, and free from pits, blisters, nodules, and any other defects which would interfere with their protective value and serviceability.

3.6.2.1 Chrome Plate. The coatings shall be electrodeposited metals consisting of nickel followed by chromium. The minimum thickness shall be 0.00015 in. (0.0038 mm) for nickel or iron-nickel, and 0.000003 in. (0.00076 mm) for chromium.

3.6.2.2 Oxide Coating or Phosphate Coating. Coating shall consist of a chemically produced oxide or phosphate, followed with a coating of preservative.

3.6.2.3 All tools shall be chrome plated, oxide or phosphate coated in accordance with para. 3.6.2.1 or 3.6.2.2, or manufacturer's standard coating. The consumer may specify the coating required.

3.7 Type 1, Handles

3.7.1 Class 1, Hinged. The Class 1 hinged handle shall consist of a steel handle having a hinged socket holder permanently attached to a fork. The handle shall be integral with or detachable from the fork and provided with a comfortable and adequate hand grip. The hinged socket holder shall be suitable for operation at an angle within a range of 90 deg. from either side of the longitudinal axis of the handle. The handle shall be provided with a friction type tension device which will hold the socket holder in any position set with a force adequate to hold the socket holder against gravity. This device shall be compensating for wear by means of spring action, but shall not be the pivot pin for the socket holder. The free end of the handle may have a transverse hole suitable for accommodating a slide rod. The hinge pin shall not extend beyond the periphery (or flat of the fork) by more than $^1/_{32}$ in. (0.79 mm). If the hinge pin extends beyond the fork, it shall not interfere with the normal operation of the head handle. If a rivet is used, it shall not project more than $^1/_{16}$ in. max. (1.58 mm) beyond the periphery of the fork. The portion of the pin head that does extend beyond the fork shall not have any sharp edges. The Class 1 handle shall be similar to Fig. 1 and shall conform to Tables 2 and 2A for the drive and length specified.

3.7.2 Type 1, Class 2, Handle, Ratchet, Reversible. The Class 2 ratchet handle shall be either gear head or clutch type and shall consist of a handle, a head for housing the ratchet mechanism, a ratchet mechanism, and a drive tang. The handle shall be integral with or detachable from the head and provided with a comfortable and adequate handgrip. The head shall be designed to provide a suitable housing for the ratchet mechanism and shall provide a shoulder completely around the cavity of the head for seating the plate or plates enclosing the ratchet mechanism. Means shall be provided in the housing design so that the horizontal or side movement and vertical or up and down movement of the tang shall be held within the limits of Tables 3 and 3A. The plate or plates shall be secured to the head in a manner which will preclude their loosening under hard usage. When screws are used for this purpose, they shall not loosen in service but shall be capable of being readily removed without destroying the threads, for servicing or cleaning the housing or ratchet mechanism. The housing plate shall not distort when the housing screws are tightened. Ratcheting action shall be attained by means of a completely enclosed gear having hardened teeth engaging a hardened pawl or pawls, or by means of a completely enclosed clutch mechanism. Ratcheting action shall be reversible by manual movement of a shifting lever, button, or knob that permits ratch-

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TABLE 1 SPECIFIC AREAS OF FINISH FOR ALL DRIVE SIZES

Fig. No.	Minimum Areas of Finish
1 Hinged Handle	Any two parallel surfaces of the fork shall be bright with 30 μin. maximum (0.76 μm). These two surfaces may be parallel to or perpendicular to the device securing the drive tang. The remaining surfaces, except where knurled or grooved, shall be 200 μin. maximum (5.08 μm).
2 Ratchet Handle	At least 180 deg. of the periphery of the head shall be bright with 30 μin. maximum (0.76 μm). The remaining surfaces, except where knurled or grooved, shall be 150 μin. maximum (3.80 μm). ¾ in. (20 mm) and 1 in. (25 mm) drive shall be 200 μin. maximum (5.08 μm).
3,4 Speeder, Brace Spinner	Surfaces other than knurled shall be 150 μin. maximum (3.80 μm).
5 Handle, Tee	¼ in. (6.3 mm), ⅜ in. (10 mm) and ½ in. (12.5 mm) drive sizes. Surfaces other than knurled shall be 150 μin. maximum (2.54 μm). ¾ in. (20 mm) and 1 in. (25 mm) drive sizes. Surfaces other than knurled shall be 200 μin. maximum (5.08 μm).
6 through 10 Universal Joint Bar Extension Flexible Extension Adaptor Ratchet Adaptor	Outer longitudinal surfaces or major diameter thereof shall be bright with 32 μin. maximum (0.81 μm), except where knurled or grooved. The remaining exterior longitudinal surface shall be 150 μin. maximum (3.80 μm).

eting operation of the drive tang in either direction of rotation. The ratcheting mechanism shall provide ease of operation and withstand the reverse torque test of Tables 3 and 3A, and the drop test of para. 4.10. The shifting lever, knob, or button shall not accidentally come off during use. The ratchet handle shall withstand the test loads specified without permanent angular distortion of more than 5 deg. and shall show no indication of damage or adverse effects on the ratcheting mechanism and the handle after removal of the test load. If an opening is provided for lubricating the ratchet mechanism, it shall be so constructed as to prevent dirt from entering. The Class 2 ratchet handle shall be similar to Fig. 2 and shall conform to Tables 3 and 3A.

3.7.3 Type 1, Class 3, Speeders

3.7.3.1 Type 1, Class 3, Style 1, Brace. Style 1 handles shall have a square male tang at one end, and a permanently rotatable metal handgrip or knob at the other end. Grips or knobs shall be constructed so that they will rotate freely without binding after being subjected to the thrust loads and pull tests specified in Tables 4 and 4A. The shank shall not extend through the end of the handgrip or knob. Handles shall be similar to Fig. 3, and shall conform to Tables 4 and 4A for the drive specified. The drive tang hardness shall be manufacturer's standard practice.

3.7.3.2 Type 1, Class 3, Style 2, Spin Type, Screwdriver Grip. Style 2 handles shall consist of a steel shank having a square drive tang at one end and a handgrip at the other end. The handle grip shall be shaped so as to afford a comfortable grip and shall be secured to the shank in such a manner that separation will not occur under the pulling load specified in Tables 5 and 5A. The handle grip shall be made of a durable nonmetallic composition. No round handle shall have more than six nor less than four flutes. The handle shall be chemically polished or suitably finished to provide a comfortable grip, and be free from rough edges, sharp corners, or tool marks that affect the appearance of the tool. The tang of the shank shall be firmly fixed into the handle grip. Style 2 handles shall be similar to Fig. 4 and shall conform to Tables 5 and 5A. The drive tang hardness shall be in accordance with manufacturer's standard practice.

3.7.4 Class 4, Tee, Sliding Handle. Sliding tee handles shall consist of a socket holder and a steel rod. The socket holder shall have a transverse tool to accommodate the rod and form a "T" or "L" handled tool as required. The socket holder shall have a spring loaded steel ball or plunger detent, except that the socket holder for the ¼ in. (6.3 mm) drive may have a durable, permanently secured steel spring. The detent or spring shall retain the socket holder at any desired point on the rod. Each end of the rod shall have a steel ball staked in place, or other means of

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TABLE 2 TYPE 1, CLASS 1, HANDLES, HINGED — INCH

Drive, in.	Overall Length, in. [Note (2)]		Dimension Across Hinge, in.	Handgrip		Test Load, in.-lb.	Shank Handle [Note (1)] (Cross Section or Diameter), in.	Force Required Removal of Hinge Pins, lb.
				Length, in.	Diameter or Width, in.			
	Min.	Max.	Max.	Min.	Min.	Min.	Max.	Min.
1/4	4.875	6.00	0.625	1.50	0.375	400	0.562	80
3/8	7.000	10.00	0.875	2.25	0.500	1,200	0.781	250
1/2	9.000	13.50	1.187	3.00	0.687	4,000	0.906	400
1/2	14.500	19.00	1.187	3.00	0.687	4,000	0.906	400
3/4	17.750	23.00	1.781	3.50	0.750	9,000	1.250	1000
1	22.000	...	2.250	3.50	0.812	15,000	1.250	1500

NOTES:
(1) This measurement shall be taken at the midpoint of the handle's overall length.
(2) This measurement shall be taken with tang perpendicular to the handle (see Fig. 1).

TABLE 2A TYPE 1, CLASS 1, HANDLES, HINGED — METRIC

Drive		Overall Length, mm [Note (2)]		Dimension Across Hinge, mm	Handgrip		Test Load, N·m	Shank Handle [Note (1)] (Cross Section or Diameter), mm	Force Required Removal of Hinge Pins, N
					Length, mm	Diameter or Width, mm			
in.	mm	Min.	Max.	Max.	Min.	Min.	Min.	Max.	Min.
1/4	6.30	123.8	152.4	15.9	38.1	9.5	45	14.3	356
3/8	10.0	177.8	254.0	22.2	57.2	12.7	136	19.8	1112
1/2	12.5	228.6	342.9	30.2	76.2	17.5	452	23.0	1779
1/2	12.5	368.3	482.6	30.2	76.2	17.5	452	23.0	1779
3/4	20.0	450.8	584.2	45.2	88.9	19.1	1017	31.8	4449
1	25.0	558.8	...	57.2	88.9	20.6	1695	31.8	6672

NOTES:
(1) This measurement shall be taken at the midpoint of the handle's overall length.
(2) This measurement shall be taken with tang perpendicular to the handle (see Fig. 1).

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TABLE 3 TYPE 1, CLASS 2, HANDLES, RATCHET, REVERSIBLE — INCH

Drive, in.	Overall Length, in.	Head Dimensions		Handgrip	Gearhead	Horizontal or Side Movement of Tang in Handle, in.	Vertical or Up and Down Movement of Tang in Handle, in.	Reverse Torque Ratcheting Starting (Torsional Moment for Each Tooth of Gear), in.-oz.	Test Load, in.-lb.	Shank Handle (Diameter or Cross Section) [Note (1)]
		Width, in.	Head Thickness Less Tang and Reverse Lever, in.	Thickness or Diameter, in.	Number of Teeth in Gear					
	Min.	Max.	Max.	Min.	Min.	Max.	Max.	Max.	Min.	Max.
1/4	4.375	1.125	0.593	0.281	18	0.012	0.020	10	450	0.562
3/8	5.750	1.875	0.875	0.500	18	0.014	0.020	25	1,800	0.781
1/2	9.500	1.937	1.000	0.500	24	0.014	0.028	50	4,500	0.906
3/4	17.00	2.875	1.375	0.750	24	0.014	0.034	200	12,000	1.562
1	20.00	3.875	1.750	0.750	24	0.014	0.034	300	22,000	1.687

NOTE:
(1) This measurement shall be taken at the midpoint of the handle's overall length.

TABLE 3A TYPE 1, CLASS 2, HANDLES, RATCHET, REVERSIBLE — METRIC

Drive		Overall Length, mm	Head Dimensions		Handgrip	Gearhead	Horizontal or Side Movement of Tang in Handle, mm	Vertical or Up and Down Movement of Tang in Handle, mm	Reverse Torque Ratcheting Starting (Torsional Moment for Each Tooth of Gear), N·m	Test Load, N·m	Shank Handle (Diameter or Cross Section) [Note (1)]
			Width, mm	Head Thickness Less Tang and Reverse Lever, mm	Thickness or Diameter, mm	Number of Teeth in Gear					
in.	mm	Min.	Max.	Max.	Min.	Min.	Max.	Max.	Max.	Min.	Max.
1/4	6.3	111.1	28.6	15.1	7.1	18	0.30	0.50	0.07	51	14.3
3/8	10.0	146.1	47.6	22.2	12.7	18	0.35	0.50	0.18	203	19.8
1/2	12.5	241.3	49.2	25.4	12.7	24	0.35	0.70	0.35	508	23.0
3/4	20.0	431.8	73.0	34.9	19.1	24	0.35	0.90	1.41	1356	39.7
1	25.0	508.0	98.4	44.5	19.1	24	0.35	0.90	2.12	2486	42.9

NOTE:
(1) This measurement shall be taken at the midpoint of the handle's overall length.

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TABLE 4 TYPE 1, CLASS 3, STYLE 1, HANDLE, SPEEDER, BRACE TYPE — INCH

Drive, in.	Diameter of Rod, in.	Overall Length, in.		Radius of Crank Sweep "C", in.	Length Extension, "A", in.	Thrust Load End Grip, lb.	Test Load Offset Handle Rotating Direction, in.-lb.	End Grip Removal Pull Test, lb.	Grip Length, "B", in.
	Max.	Min.	Max.	Min.	Min.	Min.	Min.	Min.	Min.
¼	0.437	12	16.5	2.500	5.0	50	140	50	2.50
⅜	0.500	14	18.0	2.875	5.0	100	475	50	2.50
½	0.562	16	20.0	3.375	5.5	125	700	50	3.25

TABLE 4A TYPE 1, CLASS 3, STYLE 1, HANDLE, SPEEDER, BRACE TYPE — METRIC

Drive		Diameter of Rod, mm	Overall Length, mm		Radius of Crank Sweep "C", mm	Length Extension, "A", mm	Thrust Load End Grip, N·s	Test Load Offset Handle Rotating Direction, N·m	End Grip Removal Pull Test, N	Grip Length, "B", mm
in.	mm	Max.	Min.	Max.	Min.	Min.	Min.	Min.	Min.	Min.
¼	6.3	11.1	304.8	419.1	63.5	127.0	222	16	222	63.5
⅜	10.0	12.7	355.6	457.2	73.0	127.0	445	54	222	63.5
½	12.5	14.3	406.4	508.0	85.7	139.7	556	79	222	82.5

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TABLE 5 TYPE 1, CLASS 3, STYLE 2, HANDLES, SPIN-TYPE, SCREWDRIVER GRIP — INCH

Drive, in.	Length of Shank Beyond Handle Minimum, in.	Handle Length, in.		Handle Diameter, in.		Test Loads, Min.	
		Min.	Max.	Min.	Max.	Pull Load on Shank, lb.	Torque Load, in.-lb.
1/4	2	2.625	4	0.875	1.270	50	90

TABLE 5A TYPE 1, CLASS 3, STYLE 2, HANDLES, SPIN-TYPE, SCREWDRIVER GRIP — METRIC

Drive		Length of Shank Beyond Handle Minimum, mm	Handle Length, mm		Handle Diameter, mm		Test Loads, Min.	
in.	mm		Min.	Max.	Min.	Max.	Pull Load on Shank, N	Torque Load, N·m
1/4	6.3	50.8	66.6	101.6	22.2	32.3	222	10

TABLE 6 TYPE 1, CLASS 4, HANDLES, TEE, SLIDING — INCH

Drive, in.	Sliding Rod				Socket Holder	Test Load, in.-lb.
	Diameter, in.		Length, in.		Overall Length, in.	
	Min.	Max.	Min.	Max.	Max.	Min.
1/4	0.230	0.313	4	5	1.093	400
3/8	0.355	0.438	6	8	1.375	1,000
1/2	0.480	0.625	9	13	1.750	2,500
3/4	0.730	0.875	17	20	2.500	9,000
1	0.855	1.125	20	32	3.500	15,000

TABLE 6A TYPE 1, CLASS 4, HANDLES, TEE, SLIDING — METRIC

Drive		Sliding Rod				Socket Holder	Test Load, N·m
		Diameter, mm		Length, mm		Overall Length, mm	
in.	mm	Min.	Max.	Min.	Max.	Max.	Min.
1/4	6.3	5.8	8.0	101.6	127.0	27.8	45
3/8	10.0	9.0	11.1	152.4	203.2	34.9	113
1/2	12.5	12.2	15.9	228.6	330.2	44.5	282
3/4	20.0	18.5	22.2	431.8	508.0	63.5	1017
1	25.0	21.7	28.5	508.0	812.8	88.9	1695

preventing the socket holder from sliding off, except that this shall not be accomplished by flattening or crimping the ends of the bar. Sliding rod on 3/4 in. (20 mm) and 1 in. (25 mm) may have the retaining feature on one end only. Sliding tee handles shall be similar to Fig. 5 and shall conform to Tables 6 and 6A for the drive specified.

3.8 Type 2, Attachments

3.8.1 Class 1, Universal Joint. The Class 1 attachment shall consist of a square male tang and a square female socket, each permanently attached to an intermediate member in a manner so as to form a universal type of joint. The universal joint shall be provided with a friction type tension device which will hold the drive end and socket end in any set position with a force adequate to hold the universal joint against gravity. It shall be capable of rotation in a complete arc when the angular deviation of either end member from the common centerline is 40 deg. Hinge pins shall not extend beyond the periphery of the universal joint for more than 1/32 in. (0.79 mm). If the hinge pin extends beyond the periphery, it shall

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TABLE 7 TYPE 2, CLASS 1, UNIVERSAL JOINT — INCH

Drive, in.	Overall Length, in.	Diameter, in.	Test Load, in.-lb.	Force Required for Removal of Hinge Pins, lb.
	Max.	Max.	Min.	Min.
1/4	1.500	0.593	250	80
3/8	2.250	0.790	750	250
1/2	2.875	1.010	1.750	400
3/4	4.250	1.625	4,000	1,000

TABLE 7A TYPE 2, CLASS 1, UNIVERSAL JOINT — METRIC

Drive		Overall Length, mm	Diameter, mm	Test Load, N·m	Force Required for Removal of Hinge Pins, N
in.	mm	Max.	Max.	Min.	Min.
1/4	6.3	38.1	15.1	28	356
3/8	10.0	57.2	20.0	85	1112
1/2	12.5	73.1	25.7	198	1779
3/4	20.0	107.9	41.3	452	4448

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. Class 1 universal joint attachments shall be similar to Fig. 6 and shall conform to Tables 7 and 7A for the drive specified.

3.8.2 Class 2, Bar Extension. Class 2 bar extension shall have a square female socket at one end and a male drive tang at the opposite end.

3.8.2.1 Style 1, Solid. Style 1 extension bar shall conform to Tables 8 and 8A for the drive size specified and shall be similar to Fig. 7.

3.8.2.2 Style 2, Flexible. Style 2 extension shall be capable of bending 90 deg. and returning to within 5 deg. of its original alignment when released. Style 2 extension shall be capable of meeting the test load (without permanent deformation) in both clockwise and counterclockwise directions. Style 2 extension shall conform to Tables 9 and 9A for the drive length specified and shall be similar to Fig. 8. The drive tang hardness shall be in accordance with the manufacturer's standard practice.

3.8.3 Class 3, Adapter

3.8.3.1 Style 1, Socket Wrench. Style 1 shall have a male square drive tang at one end and a female square socket at the other end. Style 1 shall conform to Tables 10 and 10A for the drive sizes specified and shall be similar to Fig. 9.

3.8.2.2 Style 2, Ratchet, Adapter. Style 2 ratchet adapter shall have a square male drive tang at one end and a square female socket on the other end. The ratchet mechanism shall be the reversible type permitting ratcheting operation of the drive tang in either direction or rotation. The ratchet mechanism shall be completely enclosed and shall withstand the torque test of Style 2 ratchet adapter; it shall conform to Tables 11 and 11A for the drive specified and shall be similar to Fig. 10.

4 TEST PROCEDURES

4.1 Hardness

Handles and attachments for which hardness requirements are specified shall be tested on a Rockwell Tester using the procedure outlined in ASTM E18.

4.2 Load Test

Load tests shall be conducted to determine conformance with the applicable test load requirements as specified.

4.2.1 Application of Test Loads. The load shall be applied with a suitable torque-producing machine.

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TABLE 8 TYPE 2, CLASS 2, STYLE 1, BAR, EXTENSION, SOLID — INCH

Drive and Nominal Length, in.	Diameter Shank, in.	Overall Length, in.		Test Load, in.-lb.
	Max.	Min.	Max.	Min.
1/4 in. drive:				
1 in.	0.343	1.00	1.50	500
2 in.	0.343	1.50	2.50	500
3 in.	0.343	2.50	3.50	500
4 in.	0.343	3.50	4.50	500
6 in.	0.343	5.50	6.50	500
10 in.	0.343	9.50	10.50	500
14 in.	0.343	13.50	14.50	500
17 in.	0.343	16.50	17.50	500
3/8 in. drive:				
1 in.	0.500	1.00	1.50	1,200
2 in.	0.500	1.50	2.50	1,200
3 in.	0.500	2.50	3.50	1,200
5 in.	0.500	4.50	5.50	1,200
6 in.	0.500	5.50	6.50	1,200
8 in.	0.500	7.50	8.50	1,200
9 in.	0.500	8.50	9.50	1,200
10 in.	0.500	9.50	10.50	1,200
11 in.	0.500	10.50	11.50	1,200
12 in.	0.500	11.50	12.50	1,200
18 in.	0.500	17.00	19.00	1,200
20 in.	0.500	19.00	21.00	1,200
24 in.	0.500	23.00	25.00	1,200
34 in.	0.500	33.00	35.00	1,200
1/2 in. drive:				
2 in.	0.656	1.50	3.00	3,500
3 in.	0.656	2.50	3.50	3,500
5 in.	0.656	4.50	6.00	3,500
6 in.	0.656	5.50	6.50	3,500
10 in.	0.656	9.50	10.50	3,500
15 in.	0.656	14.50	15.50	3,500
20 in.	0.656	19.00	21.00	3,500
24 in.	0.656	23.00	25.00	3,500
30 in.	0.656	29.00	31.00	3,500
34 in.	0.656	33.00	35.00	3,500
36 in.	0.656	35.00	37.00	3,500
48 in.	0.656	46.00	50.00	3,500
3/4 in. drive:				
3 in.	1.000	2.50	3.50	9,000
5 in.	1.000	4.50	5.50	9,000
8 in.	1.000	7.50	8.50	9,000
16 in.	1.000	15.00	17.00	9,000
1 in. drive:				
8 in.	1.375	7.50	8.50	15,000
17 in.	1.375	16.00	18.00	15,000

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TABLE 8A TYPE 2, CLASS 2, STYLE 1, BAR, EXTENSION, SOLID — METRIC

Drive and Nominal Length, mm		Diameter Shank, mm	Overall Length, mm		Test Load, N·m
		Max.	Min.	Max.	Min.
6.3 mm drive:	(¼ in.)				
25 mm	(1 in.)	8.7	25.4	38.1	57
51 mm	(2 in.)	8.7	38.1	63.5	57
76 mm	(3 in.)	8.7	63.5	88.9	57
102 mm	(4 in.)	8.7	88.9	114.3	57
152 mm	(6 in.)	8.7	139.7	165.1	57
254 mm	(10 in.)	8.7	241.3	266.7	57
356 mm	(14 in.)	8.7	342.9	368.3	57
432 mm	(17 in.)	8.7	419.1	444.5	57
10 mm drive:	(⅜ in.)				
25 mm	(1 in.)	12.7	25.4	38.1	136
51 mm	(2 in.)	12.7	38.1	63.5	136
76 mm	(3 in.)	12.7	63.5	88.9	136
127 mm	(5 in.)	12.7	114.3	139.7	136
152 mm	(6 in.)	12.7	139.7	165.1	136
203 mm	(8 in.)	12.7	190.5	215.9	136
229 mm	(9 in.)	12.7	215.9	241.3	136
254 mm	(10 in.)	12.7	241.3	266.7	136
279 mm	(11 in.)	12.7	266.7	292.1	136
305 mm	(12 in.)	12.7	292.1	317.5	136
457 mm	(18 in.)	12.7	431.8	482.6	136
508 mm	(20 in.)	12.7	482.6	533.4	136
610 mm	(24 in.)	12.7	584.2	635.0	136
864 mm	(34 in.)	12.7	838.2	889.0	136
12.5 mm drive:	(½ in.)				
51 mm	(2 in.)	16.7	38.1	63.5	395
76 mm	(3 in.)	16.7	63.5	88.9	395
127 mm	(5 in.)	16.7	114.3	139.7	395
152 mm	(6 in.)	16.7	139.7	165.1	395
254 mm	(10 in.)	16.7	241.3	266.7	395
381 mm	(15 in.)	16.7	368.3	393.7	395
508 mm	(20 in.)	16.7	482.6	533.4	395
610 mm	(24 in.)	16.7	584.2	635.0	395
762 mm	(30 in.)	16.7	736.6	787.4	395
864 mm	(34 in.)	16.7	838.2	889.0	395
914 mm	(36 in.)	16.7	889.0	939.8	395
1219 mm	(48 in.)	16.7	1168.4	1270.0	395
20 mm drive:	(¾ in.)				
76 mm	(3 in.)	25.4	63.5	88.9	1017
127 mm	(5 in.)	25.4	114.3	139.7	1017
203 mm	(8 in.)	25.4	190.5	215.9	1017
406 mm	(16 in.)	25.4	381.0	431.8	1017
25 mm drive:	(1 in.)				
203 mm	(8 in.)	34.9	190.5	215.9	1695
432 mm	(17 in.)	34.9	406.4	457.2	1695

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TABLE 9 TYPE 2, CLASS 2, STYLE 2, EXTENSION BAR, FLEXIBLE — INCH

Drive Size, in.	Overall Length, in.		Test Load, in.-lb.
	Min.	Max.	Min.
1/4	3.5	4.5	25
1/4	5.5	6.5	25
3/8	7.5	8.5	35

TABLE 9A TYPE 2, CLASS 2, STYLE 2, EXTENSION BAR, FLEXIBLE — METRIC

Drive Size		Overall Length, mm		Test Load, N·m
in.	mm	Min.	Max.	Min.
1/4	6.3	88.9	114.3	3
1/4	6.3	139.7	165.1	3
3/8	10.0	190.5	215.9	4

TABLE 10 TYPE 2, CLASS 3, STYLE 1, ADAPTER — INCH

Drive Size		Overall Length, in.		Outside Diameter, in.	Test Load, in.-lb.
Male Drive Tang	Female Drive Tang	Min.	Max.	Max.	Min.
3/8	1/4	0.625	1.00	0.625	450
1/4	3/8	0.625	1.125	0.687	450
1/2	3/8	1.093	1.500	0.875	2,000
3/8	1/2	1.250	1.500	1.00	2,000
3/4	1/2	1.500	1.937	1.125	4,500
1/2	3/4	1.687	2.125	1.500	4,500
3/4	1	2.250	2.875	2.00	14,000
1	3/4	2.00	2.625	1.500	14,000

TABLE 10A TYPE 2, CLASS 3, STYLE 1, ADAPTER — METRIC

Drive Size				Overall Length, mm		Outside Diameter, mm	Test Load, N·m
Male Drive Tang		Female Drive Tang					
mm	in.	mm	in.	Min.	Max.	Max.	Min.
10.0	3/8	6.3	1/4	15.9	25.4	15.9	51
6.3	1/4	10.0	3/8	15.9	28.6	17.5	51
12.5	1/2	10.0	3/8	27.8	38.1	22.2	226
10.0	3/8	12.5	1/2	31.8	38.1	25.4	226
20.0	3/4	12.5	1/2	38.1	49.2	28.6	508
12.5	1/2	20.0	3/4	42.9	54.0	38.1	508
20.0	3/4	25.4	1	57.2	73.0	50.8	1582
25.4	1	20.0	3/4	50.8	66.7	38.1	1582

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TABLE 11 TYPE 2, CLASS 3, STYLE 2, ADAPTER, RATCHET — INCH

Drive Size, in.	Outside Diameter Socket End, in. Max.	Overall Length, in. Max.	Number of Teeth in Gear Min.	Reverse Torque Ratcheting Starting (Torsional Moment for Each Tooth of Gear), in.-oz. Max.	Test Load, in.-lb. Min.
1/4	1.125	2.000	18	10	450
3/8	1.437	2.125	18	25	1,500
1/2	1.750	3.000	18	60	4,000
3/4	2.625	4.000	18	120	7,500
1	3.500	5.125	18	300	15,000

TABLE 11A TYPE 2, CLASS 3, STYLE 2, ADAPTER, RATCHET — METRIC

Drive Size		Outside Diameter Socket End, mm	Overall Length, mm	Number of Teeth in Gear	Reverse Torque Ratcheting Starting (Torsional Moment for Each Tooth of Gear), N·m	Test Load, N·m
in.	mm	Max.	Max.	Min.	Max.	Min.
1/4	6.3	31.8	50.8	18	0.07	45
3/8	10.0	36.5	54.0	18	0.18	170
1/2	12.5	44.5	76.2	18	0.42	452
3/4	20.0	66.7	101.6	18	0.85	847
1	25.4	88.9	130.2	18	2.12	1695

The load shall be applied for 10 sec and then removed. Male and female test adapters will conform to ANSI B107.4.

4.2.2 Coatings — After Test Load. The coatings shall be tightly adherent, smooth, continuous, and free from pits, blisters, nodules, and any other defects which would interfere with their protective value and serviceability.

4.3 Adapters

Adapter tests shall be made in the same manner as specified in para. 4.2.1, except that the male drive tang shall be inserted in a female socket and secured in a mandrel.

4.4 Extensions — Rigid Extensions

Tests shall be made in the manner specified in para. 4.2.1, with the addition that the extension shall be protected from loading across its axis.

4.5 Sliding T-Handles and Ratchets

The male tang shall be inserted into a female mandrel. The pawl of the ratchet shall be engaged with the teeth of the gear by a normal rotation of the handle, without the need of manual adjustment of the ratcheting mechanism for seating. The load shall be applied near the free end of the handle after a stop has been set at the outer end of the driving head to prevent slippage of the driving tang endwise from the socket. The T-handle shall be tested with the male tang at one end of the bar.

4.6 Speeders

Brace type speeders shall be tested by inserting the male drive tang into the female mandrel, and sup-

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porting the end handle in line with the drive end. The load shall be applied to the crank centrally between the throws. The lever arm shall be the throw of the crank as measured by the distance between the center of the offset and the center of the body of the tool. The load in pounds that is applied shall be calculated from the throw so as to produce the required test load. Spin type speeders shall be tested in a manner similar to that specified in para. 4.5 with the handle gripped in the jaws of a chuck to which the test load shall be applied.

4.7 Hinged Handles

Torque tests shall be made at 90 deg. as specified in para. 4.5. Pin removal shall be tested in a device capable of loading force on the pins according to the drive sizes, as listed in Tables 2 and 2A.

4.8 Universal Joints

Tests shall be made in the same manner as specified in para. 4.3, except that the male drive tang shall be inserted into a female mandrel. In addition, means shall be provided to keep the parts of the universal joint assembly in the axis about which the load is applied. Pin removal shall be tested in a device capable of loading force on the pins, according to the drive sizes listed in Tables 7 and 7A.

4.9 Reverse Torque, Ratcheting, Type 1, Class 2 Handle, Ratchet, Reversible, and Type 2, Class 3, Style 2, Attachment, Adapter, Ratchet, Socket Wrench

A test shall be applied to ratchet handles and adapters to determine conformance with the reverse torque ratcheting torsional moment requirement of the applicable drive size of Tables 3 and 3A, and Tables 11 and 11A, respectively. Before applying the test on handles and adapters, the ratchet mechanism should be revolved several times by hand.

4.10 Drop Test, Type 1, Class 2, Ratchet, Reversible

The ratchet handle shall be dropped on concrete from a height of 6 ft (1.8 m), a minimum of twelve times in a random position. The ratchet reverse shifter shall strike first on concrete at least twice after this test, all component parts shall remain properly assembled and the ratchet mechanism shall work satisfactorily.

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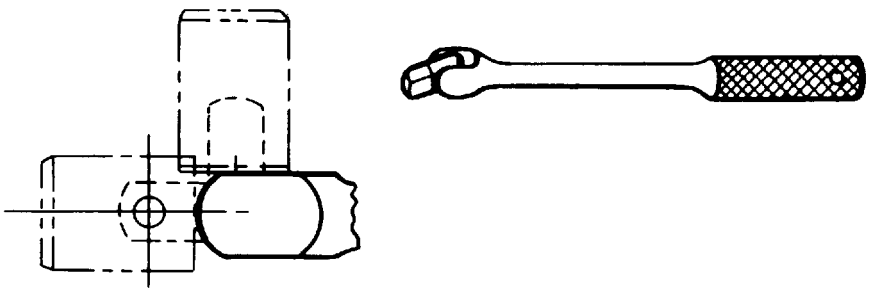

FIG. 1 TYPE 1, CLASS 1, HANDLES, HINGED

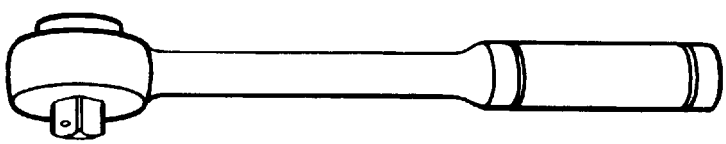

FIG. 2 TYPE 1, CLASS 2, HANDLES, RATCHET, REVERSIBLE

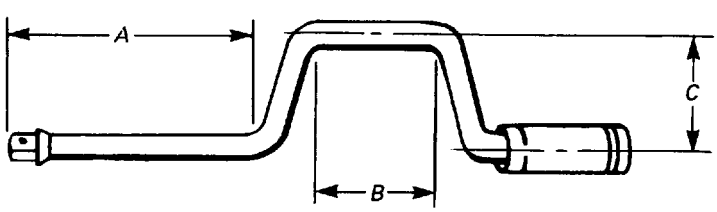

FIG. 3 TYPE 1, CLASS 3, STYLE 1, HANDLE, SPEEDER, BRACE TYPE, SINGLE REVOLVING HANDGRIP

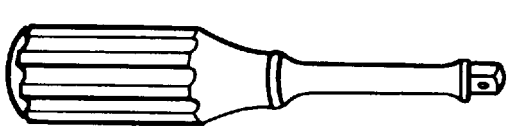

FIG. 4 TYPE 1, CLASS 3, STYLE 2, HANDLE, SPIN TYPE, SCREWDRIVER GRIP

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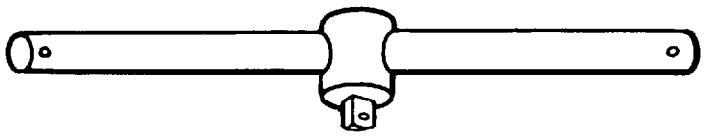

FIG. 5 TYPE 1, CLASS 4, HANDLES, TEE, SLIDING



FIG. 6 TYPE 2, CLASS 1, UNIVERSAL JOINT ATTACHMENTS

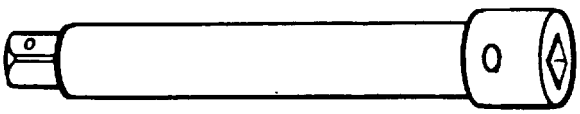

FIG. 7 TYPE 2, CLASS 2, STYLE 1, ATTACHMENTS, BAR, EXTENSION, SOLID

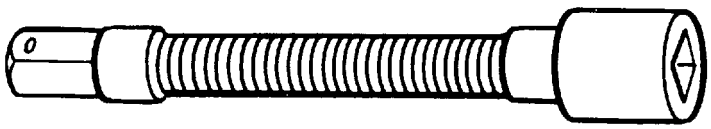

FIG. 8 TYPE 2, CLASS 2, STYLE 2, ATTACHMENTS, BAR, EXTENSION, FLEXIBLE

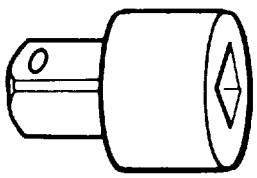

FIG. 9 TYPE 2, CLASS 3, STYLE 1, ATTACHMENTS, ADAPTER, SOCKET WRENCH

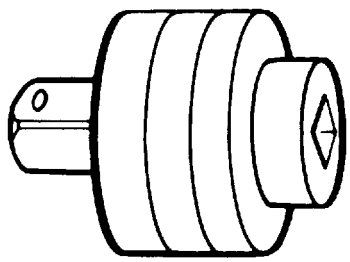

FIG. 10 TYPE 2, CLASS 3, STYLE 2, ATTACHMENTS, ADAPTER, RATCHET, SOCKET WRENCH

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