

ASME B107.59-2002

SLUGGING AND STRIKING WRENCHES

AN AMERICAN NATIONAL STANDARD



The American Society of
Mechanical Engineers



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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

SLUGGING AND STRIKING WRENCHES

ASME B107.59-2002

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FOREWORD

The American National Standards Committee B107, Socket Wrenches and Drives, under sponsorship of The American Society of Mechanical Engineers, was reorganized as an ASME Standards Committee and its title was changed to Hand Tools and Accessories. In 1996, the B209 Committee, which had designated a proposed version of this Standard as B209.11, merged with the B107 Committee, and the B107 Committee scope was expanded to include safety considerations.

The purposes of this Standard are to define essential performance and safety considerations specifically applicable to slugging and striking wrenches, to specify test methods to evaluate performance relating to the defined considerations, and to indicate limitations of safe use.

The format of this Standard is in accordance with The ASME Code and Standards Writing Guide 2000. Suggestions for the improvement of this Standards and requests for interpretations of the technical requirements of this Standard should be expressed in writing to The American Society of Mechanical Engineers, Secretary, B107 Main 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.

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Hand Tools and Accessories

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

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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.

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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.

SLUGGING AND STRIKING WRENCHES

1 SCOPE

This Standard provides performance and safety requirements for slugging and striking wrenches that are intended for torquing of fasteners. It is intended to serve as a guide in selecting, testing, and using the hand tools covered herein. It is not the purpose of this Standard to specify the details of manufacturing.

This Standard is also meant to serve as a guide in developing manuals and posters and for training personnel to work safely.

This Standard may be used as a guide by state authorities or other regulatory bodies in the formulation of laws or regulations. It is also intended for voluntary use by establishments that use or manufacture the tools covered. The method employed to ensure compliance with this Standard shall be determined by the proper regulatory or administrative authority.

2 NORMATIVE REFERENCES

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

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

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

ANSI Z87.1-1989 (R1988), Practice for Occupational and Educational Eye and Face Protection; Supplement ANSI Z87.1A-1991.

Publisher: American National Standards Institute (ANSI), 25 West 43rd Street, New York, NY 10036

ASME B107.6-1994, Wrenches—Box, Angled, Open End, Combination, Flare Nut, and Tappet (Inch Series)

ASME B107.9M-1994, Wrenches—Box, Angled, Open End, Combination, Flare Nut, and Tappet (Metric Series)

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

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

ASTM E18-00, Standard Test Method 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

3 DEFINITIONS

box end: portion of wrench that engages axially on a fastener.

chamfer: angled flat surface or equivalent radius encircling the perimeter of the struck face.

equivalent: The word *equivalent* in this Standard shall be interpreted to mean alternative designs or features that will provide an equal degree of performance and safety.

safety message: information imprinted on or affixed to the wrench that is intended to promote safety.

shall and should: Mandatory requirements of this Standard are characterized by the word *shall*. If a provision is of an advisory nature, it is indicated by the word *should* or is stated as a recommendation.

shank: portion of wrench between the box end and struck block.

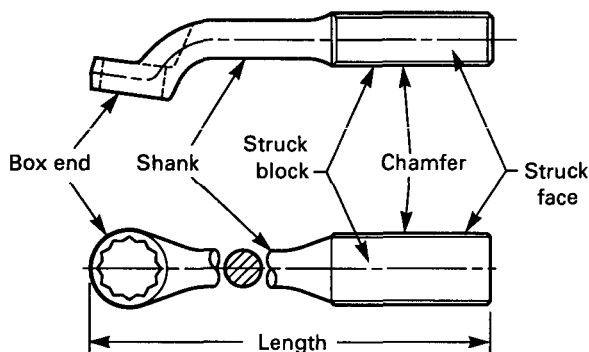
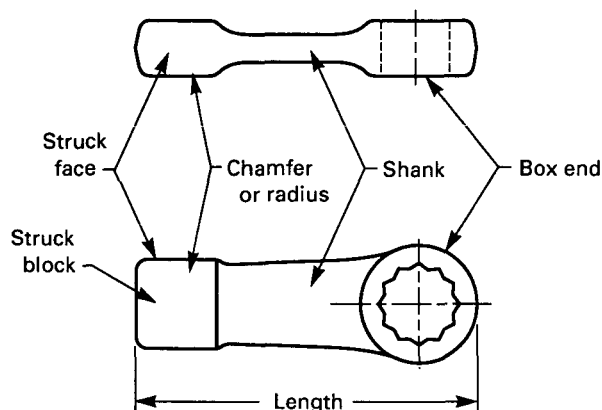
struck block: portion of wrench opposite the box end having a square or rectangular cross section that includes that struck faces.

struck face: surface of struck block exclusive of the chamfer that is intended to be struck with a striking tool while torquing fasteners.

struck face crown: convex shape or radius of the struck face (if provided).

TABLE 1 WRENCH APPLICATIONS

Style	Application
Slugging wrench (offset shank)	Designed for use in applications where heavy shock or impact from a hammer or sledge is required to loosen or set large nuts or fasteners. Should be used when fastener clearance is restricted and the torquing force cannot be applied directly in the plane of the fastener.
Slugging wrench (straight shank)	Designed for use in applications where heavy shock or impact from a hammer or sledge is required to loosen or set large nuts or fasteners. Should be used when the torquing force can be applied directly in the plane of the fastener.
Striking wrench (slightly angled shank and large offset)	Designed for use in applications where shock or impact from a hammer or sledge is needed to tighten or loosen nuts or fasteners. Offset allows use where fastener clearance is restricted. Should be used when the torquing force cannot be applied directly in the plane of the fastener.

**FIG. 1 NOMENCLATURE FOR STRIKING WRENCHES****FIG. 2 NOMENCLATURE FOR SLUGGING WRENCHES**

4 REQUIREMENTS

4.1 Design

Slugging and striking wrenches shall have a box end for turning fasteners and a struck block at the opposite end with struck faces to be struck by a striking tool of the appropriate type and size. The appropriate striking tool, such as a ball peen hammer, blacksmith's hammer, maul, or sledge shall have a striking face diameter not less than 0.375 in. (9.53 mm) larger than the struck face width of the wrench. See Table 1.

Typical styles of slugging and striking wrenches are shown in Figs. 1 and 2. Slugging wrenches generally have thicker cross sections than striking wrenches and are intended for withstanding heavier blows. The styles

covered by this Standard are not limited to those named or illustrated.

(a) The struck faces of slugging and striking wrenches shall have a crowned or a flat surface.

(b) The struck faces of slugging and striking wrenches shall have a chamfer of approximately 45 deg or equivalent radius around the perimeter having a width equal to approximately one-tenth the struck face width (see Fig. 3). For example, if the struck face width is 1.00 in. (25.4 mm), then the chamfer width would be approximately 0.10 in. (2.5 mm).

(c) All slugging and striking wrenches shall be free of nonfunctional sharp edges, points, and surface roughness that could inflict personal injury when handling the tool.

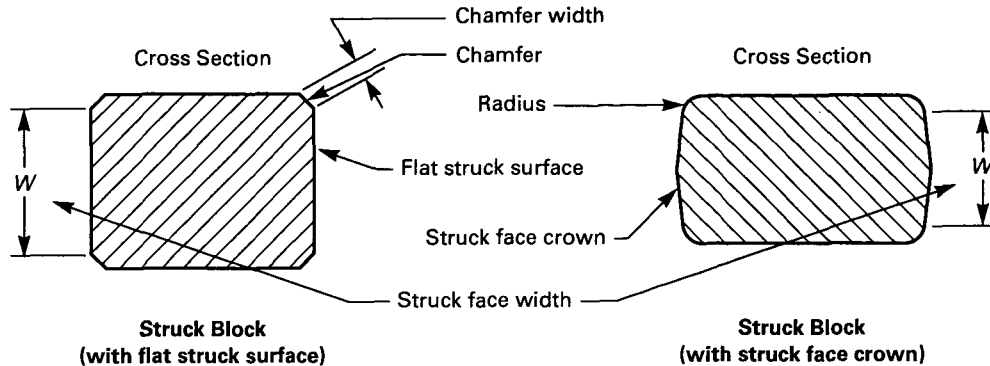


FIG. 3 STRUCK BLOCK CROSS SECTION

They shall conform to the requirements for mechanical properties specified in para. 4.3 and shall withstand the impact test specified in para. 5.2.

4.2 Materials

The materials used in the manufacture of slugging and striking wrenches shall be such as to produce slugging and striking wrenches conforming to the requirements specified herein.

4.3 Mechanical Properties

Slugging and striking wrenches shall be through hardened and tempered to a maximum hardness of 44 HRC or equivalent.

4.4 Markings

Each wrench shall be marked in a plain and permanent manner with the nominal wrench opening and safety message. See para. 6(k).

4.5 Wrench Openings

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

5 TESTS

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

Slugging and striking wrenches shall be capable of meeting the tests specified in paras. 5.1 and 5.2. Separate (new) wrenches shall be used for each test. Failure to meet the requirements of the applicable tests indicates that the wrenches do not comply with this Standard.

5.1 Hardness Determination Test

Hardness determination shall be made in accordance with ASTM E18 or equivalent.

5.2 Impact Test

Sample wrenches shall be subjected to the impact test in para. 5.2.1 or 5.2.2, depending on the style of wrench. The struck block of the wrench shall not crack or chip. There shall be no bending of the shank or twisting of the box end. There shall be no cracks evident on any portion of the wrench. Normal deformation of the struck face and the box end of the wrench is permitted.¹

5.2.1 Slugging Wrench. Three samples of the same style and size slugging wrench shall be mounted on a hexagonal mandrel with the middle wrench offset 30 deg with respect to the other wrenches. The hexagonal mandrel shall meet the requirements of ASME B107.6 or ASME B107.9M as applicable. Steel shims 0.25 in. (6.4 mm) thick shall be placed under the heads of the two wrenches on the ends of the mandrel, and the assembly clamped at each of these heads to a rigidly supported steel block weighing not less than 400 lb (182 kg). The drop weight shall have a striking face hardness of not less than 45 HRC or equivalent nor more than 60 HRC or equivalent and shall be dropped squarely onto the struck face of the middle wrench. The striking face diameter of the drop weight shall be not less than 0.375 in. (9.53 mm) larger than the struck face width of the wrench being struck.

¹ The test is so severe that a degree of permissible deformation such as the denting of the box end wrenching surfaces and the struck face can be anticipated. A much less severe test would avoid this, but it would not provide the level of safety assurance desired.

TABLE 2 IMPACT TEST SPECIFICATIONS

Wrench Style	Nominal Wrench Opening, in. (mm)	Drop Weight, lb (kg)	Drop Height, ft (m)	Impact Energy, lbf-ft (N-m)
Slugging (offset and straight shank)	Less than 2 (51)	10 (4.5)	10 (3.0)	100 (136)
	At least 2 (51), but less than 2 $\frac{3}{4}$ (70)	15 (6.8)	10 (3.0)	150 (203)
	2 $\frac{3}{4}$ (70) or greater	24 (10.9)	15 (4.6)	360 (488)
Striking	Less than 1 $\frac{5}{8}$ (41)	5 (2.3)	5 (1.5)	25 (34)
	At least 1 $\frac{5}{8}$ (41), but less than 2 $\frac{3}{8}$ (60)	10 (4.5)	5 (1.5)	50 (68)
	2 $\frac{3}{8}$ (60) or greater	10 (4.5)	10 (3.0)	100 (136)

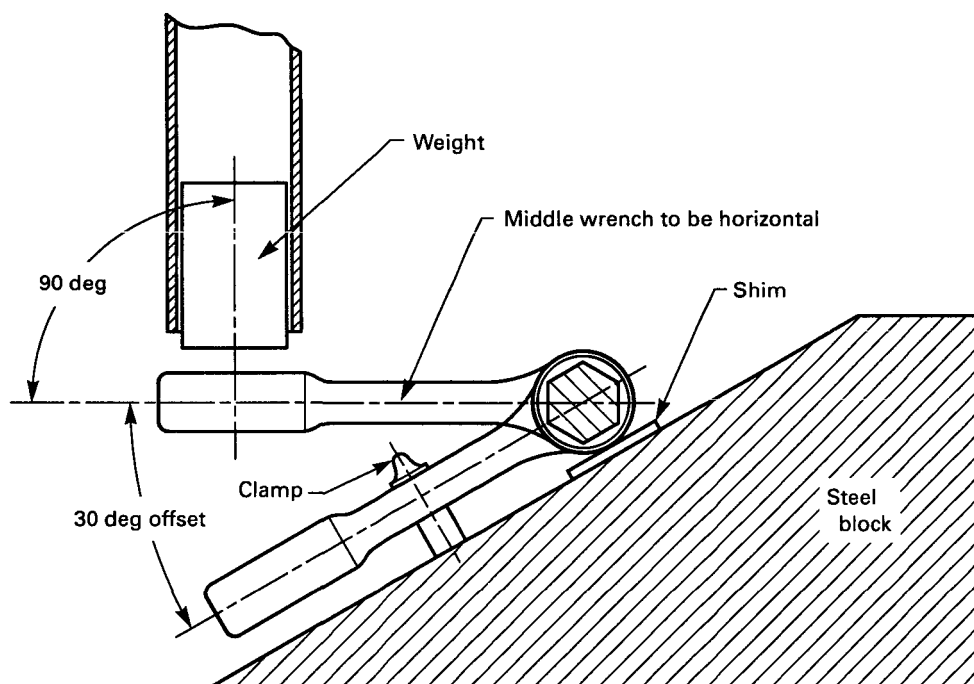


FIG. 4 IMPACT TEST SETUP

Typically, the drop weight is cylindrical and is dropped through a seamless tube slightly larger in diameter. Drop weights and drop heights are listed in Table 2. The drop weight shall be dropped 100 times onto the struck face of the middle wrench (see Fig. 4 for illustration of impact test setup). Alternate methods of striking the wrench may be used if the required impact energy in Table 2 is satisfied.

5.2.2 Striking Wrench. Three samples of the same style and size striking wrench shall be mounted and tested using the same apparatus and method used in para. 5.2.1, except the drop weight shall be dropped 20 times onto the struck face of the middle wrench. Drop weights and drop heights are listed in Table 2. Alternate methods of striking the wrench may be used if the required impact energy in Table 2 is satisfied.

6 SAFETY REQUIREMENTS AND LIMITATIONS OF USE

Instructors and employers shall stress proper use and safety in the use of slugging and striking wrenches and shall emphasize the necessity to wear and ensure the use of safety goggles. The publication, *Guide to Hand Tools—Selection, Safety Tips, Proper Use and Care* provides guidelines for the safe use of hand tools.

(a) Slugging and striking wrenches are special-purpose tools designed and intended only for use with heavy-duty fasteners where shock or impact is needed to fully tighten or loosen.

(b) To avoid possible eye or other bodily injury, slugging and striking wrenches shall be used only for the purpose specified in para. 6(a).

(c) A striking tool should always be used with the striking face parallel to the struck face of the wrench. Glancing blows, overstrikes, and understrikes should be avoided. No surface of the wrench other than the struck face shall be struck. The striking tool of the appropriate size shall have a striking face diameter not less than 0.375 in (9.53 mm) larger than the struck face of the wrench.

(d) To avoid possible eye injury from flying objects, safety goggles or equivalent eye protection conforming to ANSI Z87.1 shall be worn by the user and all persons in the immediate area where any slugging and striking wrench is being used.

(e) Slugging and striking wrenches shall not be used with “cheater” pipes or other means to extend the length of the tool.

(f) Slugging and striking wrenches shall be inspected

prior to each use and their use discontinued at the first sign of bending of the shank or chipping or cracking of the box end or struck block.

(g) Deformation of the wrenching configuration may occur from tool usage. Wrenches shall be inspected prior to each use and their use discontinued at the first sign of significant wrenching surface deterioration.

(h) Except as indicated in para. 6(i), no area, section, or portion of the wrench shall be ground, welded, treated by reheating, or otherwise altered from the original condition as furnished by the manufacturer.

(i) At the first indication of mushrooming, the struck face and struck face chamfer of the wrench shall be redressed to its original contour by the use of a hand file or whetstone.²

(j) Care shall be exercised to prevent the wrench from dislodging from the fastener or nut while being impacted.

(k) Each wrench shall be permanently marked by the manufacturer with the following safety message or equivalent:



**WARNING
WEAR SAFETY GOGGLES
USER AND BYSTANDER**

Pictorials are an acceptable equivalent. This safety message shall be located in a position that will not interfere with the quality or performance of the tool.

² It is understood that industrial users with adequate facilities and properly trained personnel may choose to redress the struck face and struck face chamfer of these tools by other means without altering the metallurgical characteristics of the tools.

AMERICAN NATIONAL STANDARDS FOR HAND TOOLS

Socket Wrenches, Hand (Inch Series)	B107.1-1993
Socket Wrenches, Extensions, Adaptors, and Universal Joints, Power Drive (Impact) (Inch Series)	B107.2-1995
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-1994
Wrenches — Box, Angled, Open End, Combination, Flare Nut, and Tappet (Inch Series)	B107.6-1994
Adjustable Wrenches	B107.8M-1996
Wrenches — Box, Angled, Open End, Combination, Flare Nut, and Tappet (Metric Series)	B107.9M-1994
Handles and Attachments for Hand Socket Wrenches — Inch and Metric Series	B107.10M-1996
Pliers, Diagonal Cutting, and Nippers, End Cutting	B107.11M-1993
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	B107.25M-1996
Pliers, Multiple Position (Electrical Connector)	B107.27-1996
Electronic Torque Instruments	B107.28M-1997
Electronic Tester, Hand Torque Tools	B107.29M-1998
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: Safety Requirements	B107.44M-1998
Ripping Chisels and Flooring/Electricians' Chisels: Safety Requirements	B107.45M-1998
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
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