ASME B107.29-2005
(Revision of ASME B107.29M-1998)

Electronic Tester, Hand Torque Tools

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

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Date of Issuance: August 5, 2005

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CONTENTS

Foreword iv
Committee Roster v
Correspondence With the B107 Committee vi

1 Scope 1

2 Classification 1

3 References 1

4 Definitions 1

5 Requirements 1

6 Tests 2

7 Safety Requirements and Limitations of Use 3

8 Designation 3

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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, its scope was expanded to address safety considerations.

The purposes of this Standard are to provide performance and safety considerations specifically applicable to electronic torque testers for hand torque instruments and specify test methods to evaluate performance relating to the defined requirements.

Members of the Hand Tools Institute Torque Instruments Standards Committee have been major contributors to the development of this Standard in their committee work, knowledge of the products, and active efforts in the promotion of the adoption of this Standard.

This Standard is a revision of ASME B107.29M-1998, *Electronic Tester, Hand Torque Tools*. Type designations for different accuracy ratings have been added.

The format of this Standard is in accordance with *The ASME Codes & Standards Writing Guide 2000*. Requests for interpretations, and suggestions for the improvement of this Standard, should be addressed to The American Society of Mechanical Engineers, Secretary, B107 Standards Committee, Three Park Avenue, New York, NY 10016-5990.

The requirements of this Standard become effective at the time of publication. ASME B107.29-2005 was approved as an American National Standard on March 16, 2005.

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Hand Tools and Accessories

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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.

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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 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.

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ELECTRONIC TESTER, HAND TORQUE TOOLS

1 SCOPE

This Standard provides performance and safety requirements for electronic torque testers used for checking manually operated hand-held torque wrenches and screwdrivers.

2 CLASSIFICATION

Type I: Torque tester with torque-generating unit
- *Class 1:* Precision accuracy ±0.25% of indicated value
- *Class 2:* Moderate accuracy ±0.50% of indicated value
- *Class 3:* Standard accuracy ±1% of indicated value

Type II: Torque tester with hand actuation
- *Class 1:* Precision accuracy ±0.25% of indicated value
- *Class 2:* Moderate accuracy ±0.50% of indicated value
- *Class 3:* Standard accuracy ±1% of indicated value

3 REFERENCES

The following documents are referenced in this Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent editions of the documents indicated below.

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

ASME B107.14M-1994, Hand Torque Tools

ASME B107.28M-1997, Electronic Torque Instruments

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

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

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

4 DEFINITIONS

accuracy: the difference between a known applied torque and the torque displayed on the electronic indicator measured in percentage of the known applied torque.

first peak: the maximum torque value just prior to the torque drop-off, which, on Type II torque wrenches, occurs as the wrench begins its momentary reduction in torque.

peak: the maximum torque value reached during the process of applying the load to the wrench.

rated capacity: the maximum intended torque the user shall measure or apply.

resolution: the precision of a torque reading.

track: continuous readout of torque applied at any moment.

usable range of the transducer: the range to which the accuracy requirements of para. 5.2 are applied.

5 REQUIREMENTS

5.1 Design

The tester shall be designed for checking clockwise and counterclockwise hand torque tools conforming to ASME B107.14M and ASME B107.28M.

The tester shall consist of the following components:

5.1.1 Electronic Torque Indicator. The tester shall have an electronic digital indicator. The digital indicator must be easily viewed and accessed by the operator. Indications shall be provided on the panel of the digital indicator to indicate, at a minimum, the following conditions:
- *(a)* power on
- *(b)* torque units of measure
- *(c)* operating modes
  - *(1)* first peak
  - *(2)* peak
  - *(3)* track
- *(d)* clockwise or counterclockwise operation

5.1.2 Controls. All controls shall be readily accessible and clearly identified.

5.1.3 Overload Indication. A visual and/or audible overload indication shall be provided.

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5.1.4 Calibration Adjustment. A means shall be provided to calibrate the equipment or change any calibration factor or other correction data stored in the memory of the equipment.

5.1.5 Torque Units of Measure. The tester shall be capable of displaying a minimum of two or more torque units of measure. Selection of the applicable unit shall be via a switch on the front panel.

5.1.6 Torque Transducers. Multiple torque transducers may be used to cover the range of the torque tester. Transducers shall be interchangeable. The usable range of the transducer shall be clearly indicated on the transducer's label. The drives on the transducer and/or adapter shall conform to ASME B107.4M.

5.1.7 Torque-Generating Unit. The Type I tester shall have a torque-generating unit. The torque-generating unit's sensitivity must be commensurate with the resolution of the indicator. During testing, the application of the load on the handle shall be applied in accordance with the test procedure specified in ASME B107.28M and ASME B107.14M.

5.2 Accuracy and Resolution

Accuracy of the measured torque and resolution shall not exceed the values shown below:

Class	Resolution (% of rated capacity)	Accuracy (% of known applied value)
A	0.01	±0.25
B	0.02	±0.50
C	0.05	±1.00

5.3 Accuracy Tests

The tester shall pass the tests in para. 6. The accuracy test shall be conducted at a minimum of three values, including both ends of the usable range.

5.4 Materials

The materials used in the manufacture of torque testers shall be such as to assure compliance with the requirements of this Standard.

5.5 Operating Conditions

The tester shall meet the requirements of the Standard within a temperature of 60°F to 84°F (15°C to 29°C) with relative humidity up to 85% (noncondensing).

5.6 Nonoperating Conditions

The tester shall meet the requirements of the Standard after being stored in an environment of −40°F to 165°F (−40°C to 75°C) with relative humidity up to 95% (noncondensing) and then allowed to stabilize to operating conditions.

5.7 Instructions

Torque testers shall be supplied with instructions covering its accuracy, application, calibration, installation, setup, and safe use.

5.8 Overload

The tester shall be capable of transmitting an amount of torque equal to 125% of the rated capacity in both directions without physical failure.

5.9 Calibration

The tester shall be capable of being calibrated to the specified accuracy by a method traceable to the National Institute of Standards and Technology (NIST).

6 TESTS

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

6.1 Visual Examination

Conformance with requirements not verified by a test shall be established by visual examination. The composition and characteristics of coatings and finishes shall be determined either by appropriate tests or reference to the manufacturer's specifications, drawing, or procurement documents.

6.2 Accuracy Tests

6.2.1 Measuring Equipment. Accuracy testing shall be performed by the use of a deadweight standard. The accuracy of the deadweight standard (weights and calibration arms combined) shall be at least four times better than the accuracy of the tested electronic torque tester.

6.2.2 Test Sequence. Accuracy test readings shall be taken in progression from lower torque values to higher ones. The torque tester shall be loaded three times to maximum capacity in each direction before conducting the test.

(a) The torque tester shall be loaded to rated capacity three times in the direction of test.

(b) The load shall be removed, and the tester shall be zeroed.

(c) Accuracy test readings shall be taken from low to high.

(d) Repeat from step (a) using next direction of test as applicable.

6.3 Overload Test

The torque tester shall be loaded once to 125% of full capacity in each direction. The torque tester shall be capable of transmitting an amount of torque equal to 125% of maximum capacity in each direction without physical failure.

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6.4 Endurance Test

The torque tester shall perform satisfactorily for 5,000 cycles in each direction of operation at maximum capacity without physical failure while maintaining the required level of accuracy. Subsequently, the torque tester shall perform for 50,000 cycles in each direction of operation at 50% of capacity without physical failure. Subsequent to the 50,000 cycles in each direction, the torque tester and generating unit shall be capable of being calibrated within the specified accuracy.

7 SAFETY REQUIREMENTS AND LIMITATIONS OF USE

Instructors and employers shall stress proper use and safety in the use of this special-purpose tool and emphasize the necessity to wear and ensure the use of appropriate eye protection. The publication *Guide to Hand Tools — Selection, Safety Tips, Proper Use, and Care* provides guidelines for safe use of these tools.

The torque tester shall be conveniently and easily operated and not constitute a hazard to the operator under normal operating conditions.

8 DESIGNATION

(a) Type
(b) Class
(c) Style
(d) Usable Range

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B107 AMERICAN NATIONAL STANDARDS FOR HAND TOOLS

Socket Wrenches, Hand (Inch Series) B107.1-2002
Socket Wrenches, Extensions, Adaptors, and Universal Joints, Power Drive (Impact) (Inch Series) B107.2-2002
Driving and Spindle Ends for Portable Hand, Impact, Air, and Electric Tools (Percussion Tools Excluded) B107.4M-2005
Socket Wrenches, Hand (Metric Series) B107.5M-2002
Adjustable Wrenches B107.8-2003
Handles and Attachments for Hand Socket Wrenches — Inch and Metric Series B107.10M-1996
Pliers: Diagonal Cutting and End Cutting B107.11-2002
Nutdrivers B107.12-2004
Pliers: Long Nose, Long Reach B107.13-2003
Hand Torque Tools (Mechanical) B107.14-2004
Flat Tip Screwdrivers B107.15-2002
Shears (Metal Cutting, Hand) B107.16M-1998 (R2004)
Gages, Wrench Openings, Reference B107.17M-1997
Pliers: Wire Twister B107.18-2003
Pliers: Retaining Ring B107.19-2004
Pliers: Lineman's, Iron Worker's, Gas, Glass, Fence, and Battery B107.20-2004
Wrench, Crowfoot B107.21-2005
Electronic Cutters B107.22M-1998 (R2004)
Pliers: Multiple Position, Adjustable B107.23-2004
Locking Pliers B107.24-2002
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Cross Tip Screwdrivers B107.30-2002
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Socket Wrenches for Spark Plugs B107.34-2003
Pliers: Locking, Clamp, and Tubing Pinch-Off B107.36-2002
Pliers: Wire Cutters/Strippers B107.37-2003
Electronic Pliers B107.38M-1998
Nail Hammers: Safety Requirements B107.41-2004
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Wood-Splitting Wedges B107.43-2002
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Brick Chisels and Brick Sets: Safety Requirements B107.50M-1998
Star Drills: Safety Requirements B107.51-2001
Nail-Puller Bars: Safety Requirements B107.52M-1998
Ball Peen Hammers: Safety Requirements B107.53-2004
Heavy Striking Tools: Safety Requirements B107.54-2001
Axes: Safety Requirements B107.55-2002
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
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ISBN 0-7918-2966-9





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