

ASME B107.23-2004
(Revision of ASME B107.23M-1997)

Pliers: Multiple Position, Adjustable

AN AMERICAN NATIONAL STANDARD



**The American Society of
Mechanical Engineers**

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Three Park Avenue • New York, NY 10016

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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 Test Procedures | 8 |
| 7 Safety Requirements and Limitations of Use | 8 |
| 8 Designations | 8 |

Figures

| | |
|--|---|
| 1 Type I, Class 1, Style A: Adjustable Joint, Angle Nose, Multiple Grooves, Tongue, Straight, Serrated Jaws | 3 |
| 2 Type I, Class 1, Style B: Adjustable Joint, Angle Nose, Multiple Grooves, Tongue, Curved, Serrated Jaws | 3 |
| 3 Type I, Class 1, Style C: Adjustable Joint, Angle Nose, Multiple Grooves, Tongue, Parrot-Nosed Jaws | 4 |
| 4 Type I, Class 1, Style D: Adjustable Joint, Angle Nose, Multiple Grooves, Tongue, Straight, Smooth Jaws | 4 |
| 5 Type I, Class 2: Adjustable Joint, Angle Nose, Multiple Holes | 5 |
| 6 Type II, Class 1, Style A: Slip Joint, Combination Jaw, Straight Nose, Regular | 6 |
| 7 Type II, Class 1, Style B: Slip Joint, Combination Jaw, Straight Nose, Thin | 7 |
| 8 Type II, Class 2: Slip Joint, Combination Jaw, Bent Nose | 7 |

Tables

| | |
|--|---|
| 1 Type I, Class 1, Styles A, B, and D: Adjustable Joint, Angle Nose, Multiple Grooves, Tongue | 2 |
| 2 Type I, Class 1, Style C: Adjustable Joint, Angle Nose, Multiple Grooves, Tongue . . . | 2 |
| 3 Type I, Class 2: Adjustable Joint, Angle Nose, Multiple Holes | 5 |
| 4 Type II, Class 1, Style A: Slip Joint, Combination Jaw, Straight Nose, Regular | 6 |
| 5 Type II, Class 1, Style B: Slip Joint, Combination Jaw, Straight Nose, Thin | 6 |
| 6 Type II, Class 2: Slip Joint, Combination Jaw, Bent Nose | 7 |
| 7 Test Parameters | 8 |
| 8 Steel Wire Sizes for Wire Cut Test | 8 |

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 define general and dimensional data and safety considerations specifically applicable to multiple position pliers and to specify test methods to evaluate performance relating to the defined requirements.

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

This Standard is a revision of ASME B107.23-1997, Pliers, Multiple Position, Adjustable. Principal changes in this edition of the Standard are the elimination of unused metric dimensioning, improved representation of dimension axes, and updated references.

The format of this Standard is in accordance with *The ASME Codes & Standards Writing Guide 2000*. Requests for interpretations of technical requirements, 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 B107.23-2004 was approved as an American National Standard on February 19, 2004.

ASME B107 STANDARDS COMMITTEE

Hand Tools and Accessories

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

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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:

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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.

Interpretations. Upon request, the B107 Committee will render an interpretation of any requirement of the Standard. Interpretations can only be rendered in response to a written request sent to the Secretary of the B107 Standards Committee.

The request for interpretation should be clear and unambiguous. It is further recommended that the inquirer submit his/her request in the following format:

| | |
|-----------|--|
| Subject: | Cite the applicable paragraph number(s) and the topic of the inquiry. |
| Edition: | Cite the applicable edition of the Standard for which the interpretation is being requested. |
| Question: | Phrase the question as a request for an interpretation of a specific requirement suitable for general understanding and use, not as a request for an approval of a proprietary design or situation. The inquirer may also include any plans or drawings, which are necessary to explain the question; however, they should not contain proprietary names or information. |

Requests that are not in this format may be rewritten in the appropriate format by the Committee prior to being answered, which may inadvertently change the intent of the original request.

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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.

PLIERS: MULTIPLE POSITION, ADJUSTABLE

1 SCOPE

This Standard provides performance and safety requirements for adjustable joint and slip joint pliers. Inclusion of dimensional data in this Standard does not mean that all pliers described herein are stock production sizes. Consumers should consult with manufacturers concerning lists of stock production sizes.

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 covered tools.

2 CLASSIFICATION

- Type I:** Adjustable joint, angle nose
Class 1: Multiple grooves and tongue
 Style A: Straight, serrated jaws
 Style B: Curved, serrated jaws
 Style C: Parrot-nose jaws
 Style D: Straight, smooth jaws
Class 2: Multiple hole
Type II: Slip Joint, combination jaw
Class 1: Straight nose
 Style A: Regular
 Style B: Thin
Class 2: Bent nose

3 REFERENCES

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

ASME B107.25M-1996, Pliers — Performance Test Methods

Publisher: The American Society of Mechanical Engineers (ASME), Three Park Avenue, New York, NY, 10016-5990; Order Department: 22 Law Drive, 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

Definitions of terms used within this Standard may be found in ASME B107.25M.

5 REQUIREMENTS

Illustrations shown herein are descriptive, not restrictive, and are not intended to preclude the manufacture of pliers that otherwise comply with this Standard. All figures are shown without comfort grips. Dimensions in tables are without comfort grips. Table values are in inches unless otherwise specified.

5.1 Design

Pliers shall be similar to the figure to which reference is made and shall be proportioned in all parts so as to be strong, durable, and easy to operate. Pliers shall withstand applicable test procedures without cracking or breaking.

5.1.1 Type I: Adjustable Joint, Angle Nose. Type I Pliers shall have jaws offset 37 deg to 56 deg as measured between the centerline of the jaws and the centerline of the handles. The gripping surfaces shall have sharp, crosswise grooves the full length of the jaws, except for Style D pliers, which shall have smooth gripping surfaces. With the jaws parallel in any of the operating positions, the maximum distance between the outsides of the handles at their point of widest separation shall not exceed the values in Table 1 or 2. With the jaws parallel in the outermost operating position, the work capacity of the jaws shall not be less than the minimum work capacity specified in Table 1 or 2. Handles shall not contact each other when the jaws are parallel in any of the operating positions.

5.1.1.1 Class 1: Multiple Grooves, Tongue. Pliers shall have a number of curved grooves on one pliers half and a curved tongue on the other pliers half. The two pliers halves shall be held together by a joining member (i.e., fastener, rivet, or other). Changes in jaw capacity shall be made by sliding the joining member in a centrally located slot in the grooved pliers half.

(a) *Style A: Straight, Serrated Jaws.* Pliers shall conform to the requirements shown in Table 1 and be similar to Fig. 1.

(b) *Style B: Curved, Serrated Jaws.* Pliers shall conform to the requirements shown in Table 1 and be similar to Fig. 2.

Table 1 Type I, Class 1, Styles A, B, and D: Adjustable Joint, Angle Nose, Multiple Grooves, Tongue

| Nominal Size | Overall Length, <i>A</i> | | Jaw Length, <i>B</i> | | Jaw Thickness, <i>C</i> [Note (1)] | | Max. Distance Between Outside of Handles With Jaw Parallel, <i>D</i> | Min. Work Capacity With Jaws Parallel | Min. Number of Adjustment Positions |
|--------------------------------|--------------------------|------|----------------------|------|---------------------------------------|------|--|---------------------------------------|-------------------------------------|
| | Min. | Max. | Min. | Max. | Min. | Max. | | | |
| 4 ¹ / ₂ | 4.0 | 5.3 | 0.31 | 0.56 | 0.12 | 0.25 | 3.2 | 0.5 | 3 |
| 6 ¹ / ₂ | 6.0 | 7.2 | 0.69 | 0.88 | 0.25 | 0.41 | 3.2 | 0.7 | 4 |
| 8 | 7.5 | 8.5 | 0.87 | 1.06 | 0.25 | 0.41 | 3.2 | 1.0 | 4 |
| 9 ¹ / ₂ | 9.0 | 10.0 | 1.00 | 1.31 | 0.25 | 0.44 | 3.2 | 1.2 | 4 |
| 10 | 9.5 | 10.5 | 1.06 | 1.38 | 0.25 | 0.44 | 3.2 | 1.7 | 5 |
| 12 | 11.0 | 13.0 | 1.44 | 1.88 | 0.31 | 0.63 | 4.3 | 2.1 | 5 |
| 13 | 12.0 | 14.0 | 1.56 | 1.88 | 0.45 | 0.64 | 4.3 | 2.6 | 5 |
| 14 | 13.0 | 15.0 | 1.50 | 1.75 | 0.41 | 0.66 | 4.3 | 1.7 | 6 |
| 14 ¹ / ₂ | 13.5 | 15.5 | 1.63 | 2.00 | 0.47 | 0.63 | 4.3 | 2.8 | 7 |
| 16 | 15.0 | 17.0 | 2.12 | 2.50 | 0.44 | 0.63 | 5.5 | 3.7 | 8 |
| 20 | 19.0 | 21.0 | 2.87 | 3.25 | 0.44 | 0.63 | 5.5 | 5.3 | 10 |

NOTE:

(1) Measured 0.25 in. from the tip of jaw to provide for acceptance of tapered jaw.

Table 2 Type I, Class 1, Style C: Adjustable Joint, Angle Nose, Multiple Grooves, Tongue

| Nominal Size | Overall Length, <i>A</i> | | Jaw Length, <i>B</i> | | Jaw Thickness, <i>C</i> [Note (1)] | | Distance Between Handles, <i>D</i> | Minimum Work Capacity With Jaws Parallel | Number of Adjustment Positions |
|--------------|--------------------------|------|----------------------|------|---------------------------------------|------|------------------------------------|--|--------------------------------|
| | Min. | Max. | Min. | Max. | Min. | Max. | | | |
| 10 | 9.5 | 10.5 | 1.0 | 1.4 | 0.31 | 0.56 | 4.3 | 1.0 | 4 |
| 14 | 13.0 | 15.0 | 1.5 | 1.8 | 0.41 | 0.66 | 4.3 | 1.7 | 6 |

NOTE:

(1) Measured 0.25 in. from the tip of jaw to provide for acceptance of tapered jaw.

(c) *Style C: Parrot-Nose Jaws.* Pliers shall conform to the requirements shown in Table 2 and be similar to Fig. 3.

(d) *Style D: Straight, Smooth Jaws.* Pliers shall conform to the requirements shown in Table 1 and be similar to Fig. 4.

5.1.1.2 Class 2: Multiple Holes. Pliers shall have a number of holes on one pliers half, and a stationary joining member (i.e., fastener, rivet, or other) on the other pliers half. The joining member shall permit adjustment of the two halves of the pliers and shall not disengage under load. Changes in jaw capacity shall be made by sliding the multiple hole side of the pliers on the joining member. Pliers shall conform to the requirements shown in Table 3 and shall be similar to Fig. 5.

5.1.2 Type II: Slip Joint, Combination Jaw. Pliers shall have two holes on one pliers half, and a stationary joining member (i.e., fastener, rivet, or other) on the other pliers half. They may have a wire cutter. Changes in jaw position shall be made by slipping the

double-hole side of the pliers on the joining member. Combination jaws shall have straight serrated gripping surfaces at the outer end of the jaws and curved serrated gripping surfaces behind the outer gripping surfaces.

5.1.2.1 Class 1: Straight Nose. Pliers shall have a straight nose.

(a) *Style A: Regular.* Pliers shall conform to the requirements shown in Table 4 and shall be similar to Fig. 6.

(b) *Style B: Thin.* Pliers shall conform to the requirements shown in Table 5 and shall be similar to Fig. 7.

5.1.2.2 Class 2: Bent Nose. Pliers shall have a nose bent to an angle of 20 deg to 30 deg. The pliers shall conform to the requirements shown in Table 6 and be similar to Fig. 8.

5.2 Materials

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

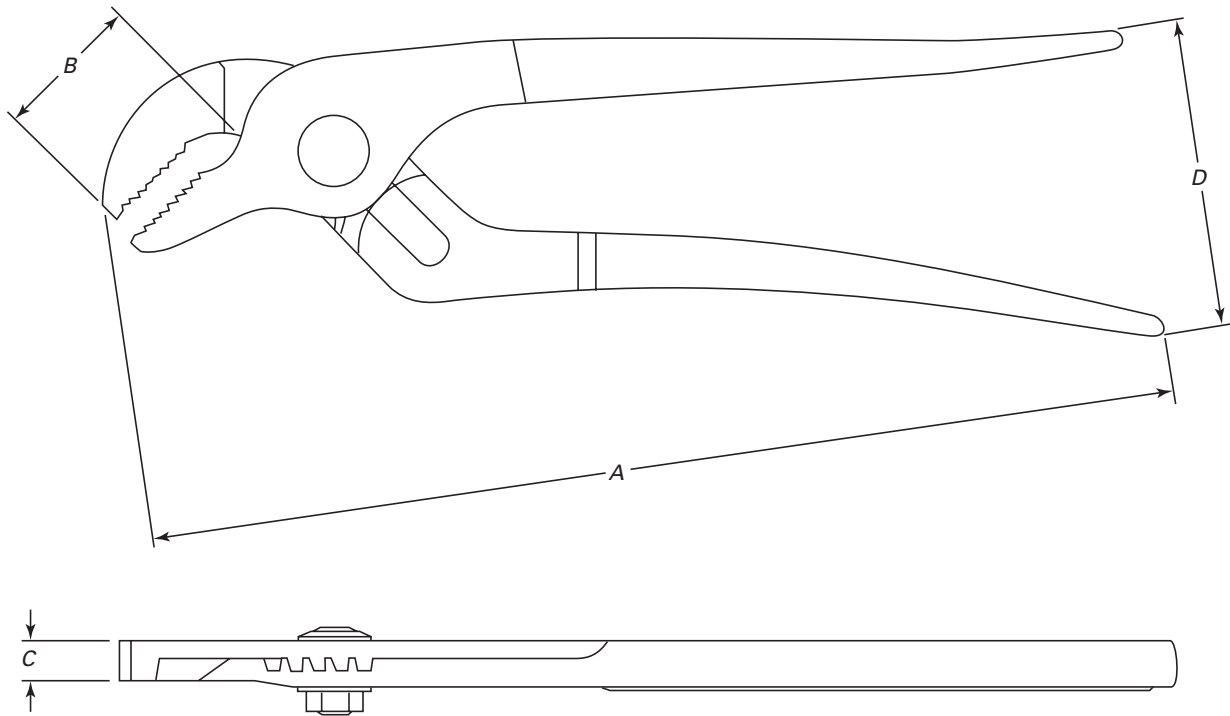


Fig. 1 Type I, Class 1, Style A: Adjustable Joint, Angle Nose, Multiple Grooves, Tongue, Straight, Serrated Jaws

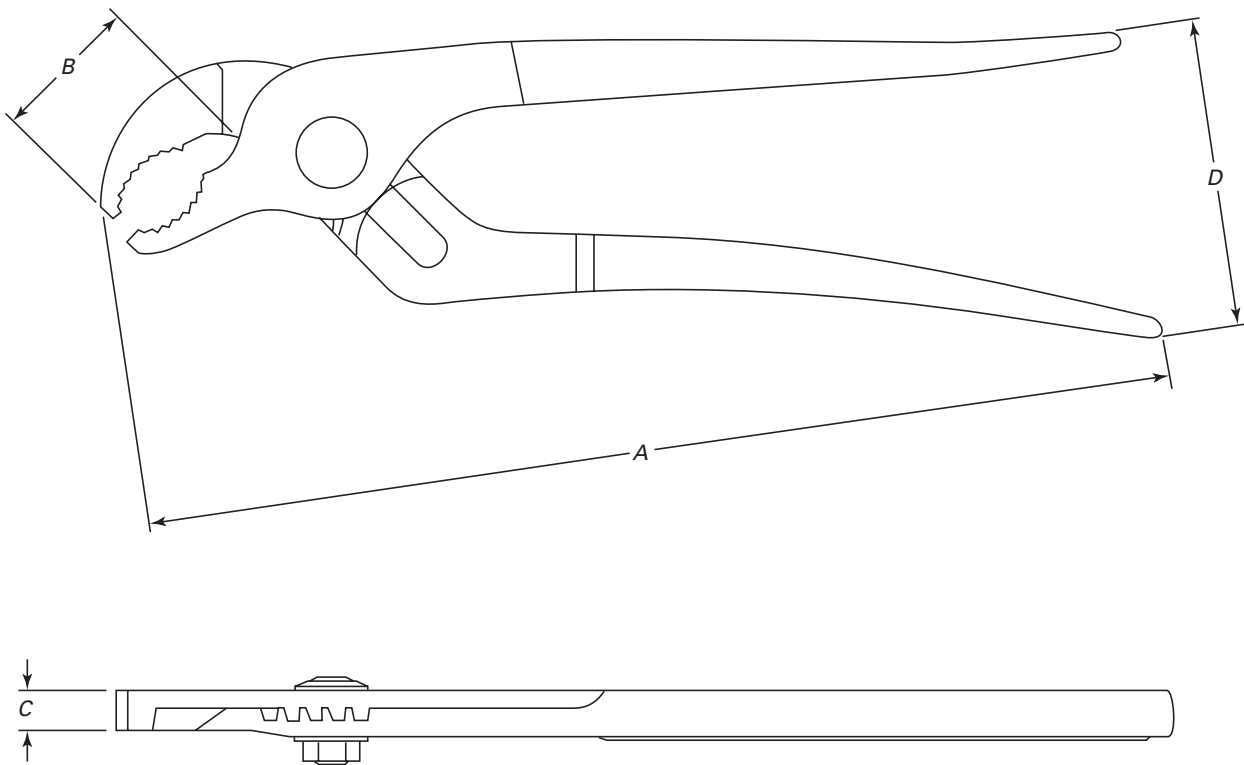


Fig. 2 Type I, Class 1, Style B: Adjustable Joint, Angle Nose, Multiple Grooves, Tongue, Curved, Serrated Jaws

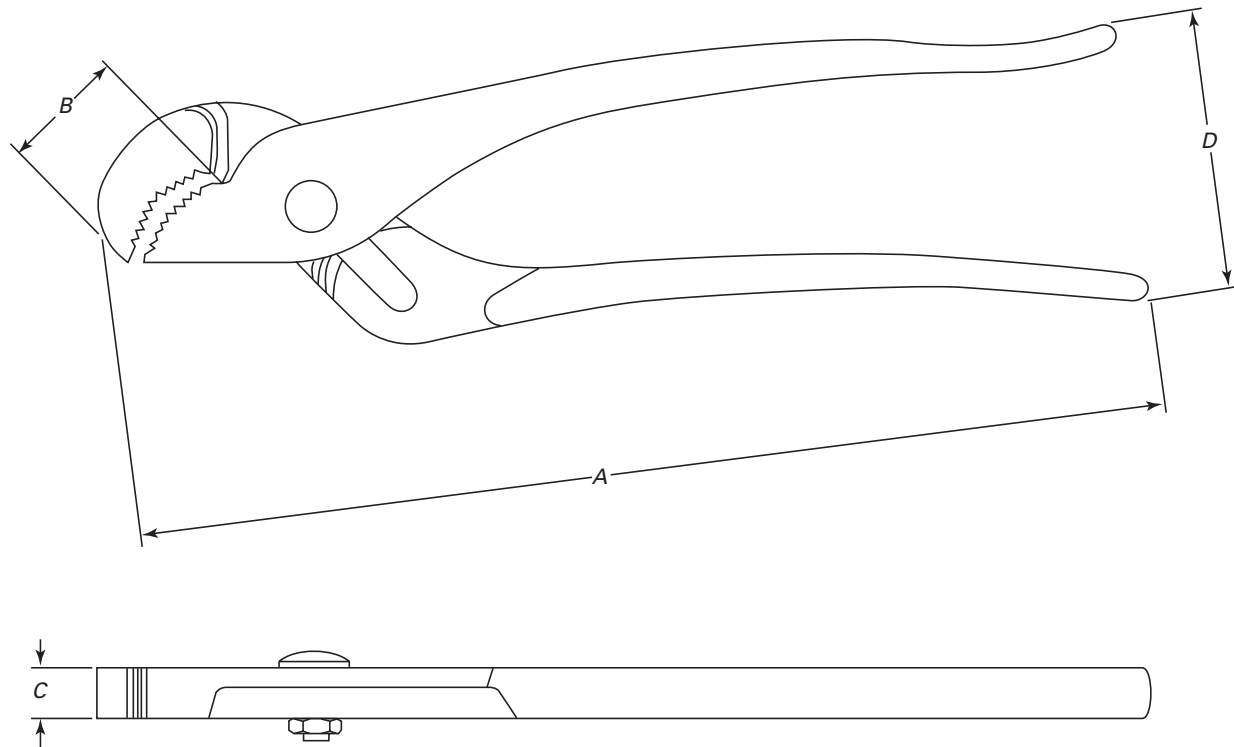


Fig. 3 Type I, Class 1, Style C: Adjustable Joint, Angle Nose, Multiple Grooves, Tongue, Parrot-Nosed Jaws

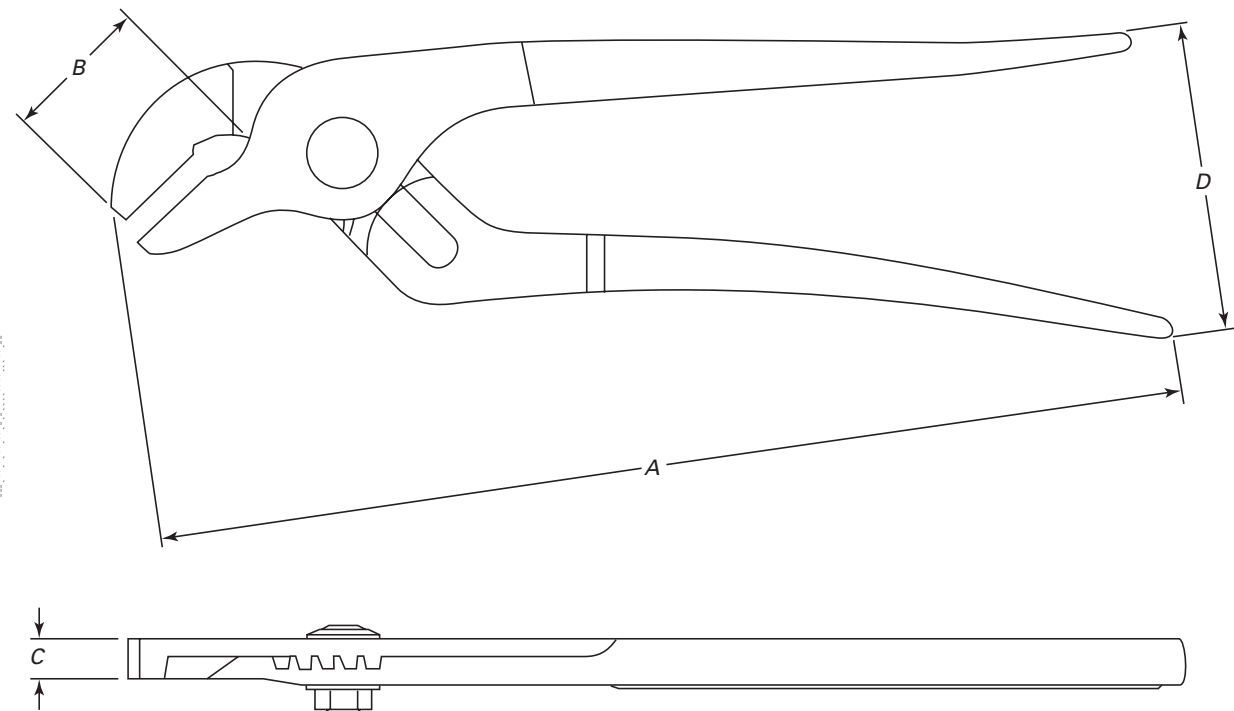


Fig. 4 Type I, Class 1, Style D: Adjustable Joint, Angle Nose, Multiple Grooves, Tongue, Straight, Smooth Jaws

Table 3 Type I, Class 2: Adjustable Joint, Angle Nose, Multiple Holes

| Nominal Size | Overall Length, A | | Jaw Length, B | | Jaw Thickness, C | | Maximum Distance Between Handles With Jaws Parallel, D | Minimum Work Capacity | Minimum Number of Adjustment Positions |
|--------------|-------------------|------|---------------|------|------------------|------|--|-----------------------|--|
| | Min. | Max. | Min. | Max. | Min. | Max. | | | |
| 5 | 4.5 | 5.5 | 0.3 | 1.0 | 0.06 | 0.25 | 3.2 | 0.37 | 2 |
| 7 | 6.5 | 7.5 | 0.6 | 1.0 | 0.28 | 0.50 | 3.2 | 0.63 | 3 |
| 8 | 7.8 | 8.5 | 1.0 | 1.5 | 0.28 | 0.50 | 3.2 | 1.00 | 4 |
| 10 | 9.0 | 11.0 | 1.2 | 2.0 | 0.25 | 0.44 | 3.2 | 1.37 | 4 |

GENERAL NOTE: For plain handles without comfort grips.

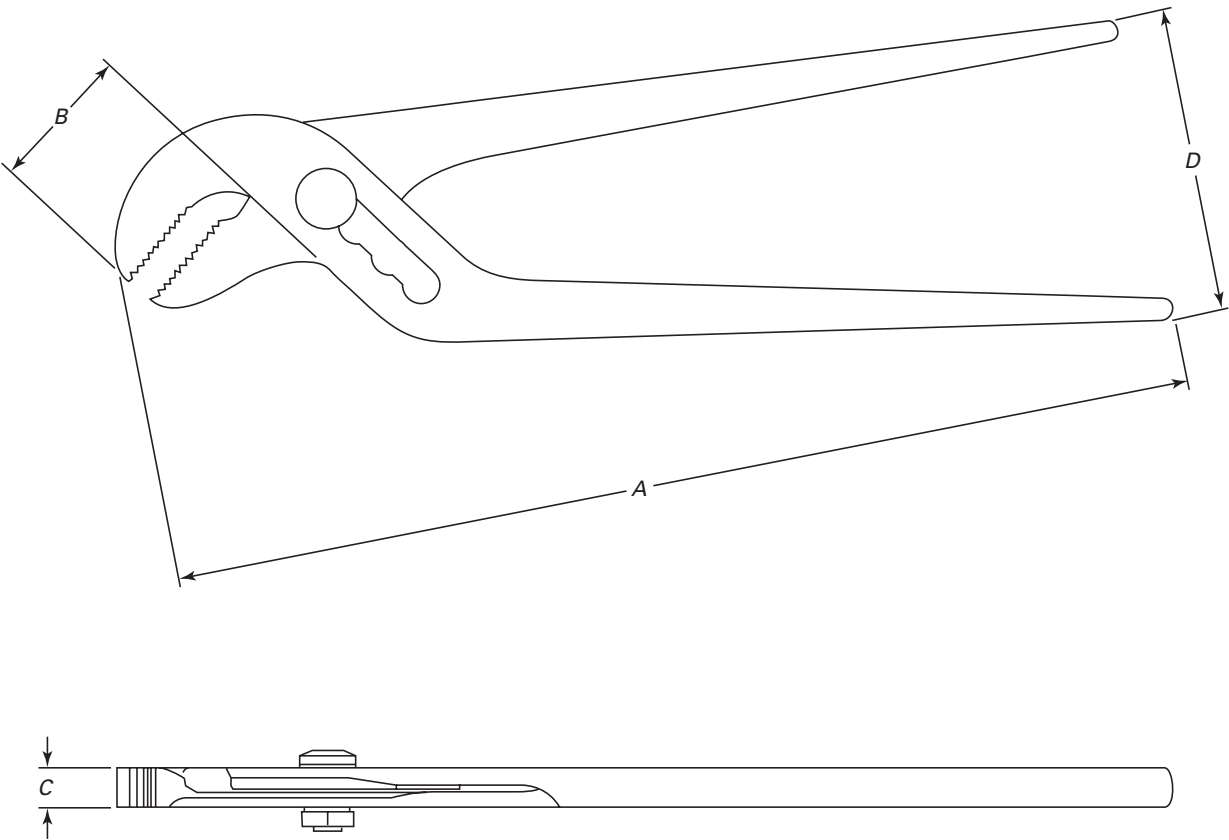


Fig. 5 Type I, Class 2: Adjustable Joint, Angle Nose, Multiple Holes

5.3 Finish

Surfaces shall have a rust-preventive treatment and be essentially free from pits, nodules, burrs, cracks, and other conditions that would adversely affect the performance or safety of the tool. When provided, coatings shall be adherent, smooth, continuous, and free from any conditions that would interfere with their protective value, safety, and function.

5.4 Marking

Pliers shall be marked in a plain and permanent manner with the manufacturer's name or with a trademark of such known character that the source of manufacture and country of origin may be readily determined. The marking shall be as permanent as the pliers to which it is applied (provided the surface to which it was applied has not been subjected to a fretting or abrading action)

Table 4 Type II, Class 1, Style A: Slip Joint, Combination Jaw, Straight Nose, Regular

| Nominal Size | Overall Length, <i>A</i> | | Jaw Length, <i>B</i> | | Jaw Thickness, <i>C</i> | | Handle Width, <i>D</i> | |
|--------------|--------------------------|------|----------------------|------|-------------------------|------|------------------------|------|
| | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. |
| 4 | 3.0 | 5.0 | 1.0 | 1.5 | 0.22 | 0.41 | 1.1 | 1.8 |
| 6 | 5.0 | 7.0 | 1.5 | 2.0 | 0.28 | 0.50 | 1.3 | 2.2 |
| 8 | 7.0 | 9.0 | 1.5 | 2.2 | 0.28 | 0.50 | 1.5 | 2.3 |
| 10 | 9.0 | 11.0 | 2.0 | 2.7 | 0.28 | 0.66 | 1.7 | 2.5 |

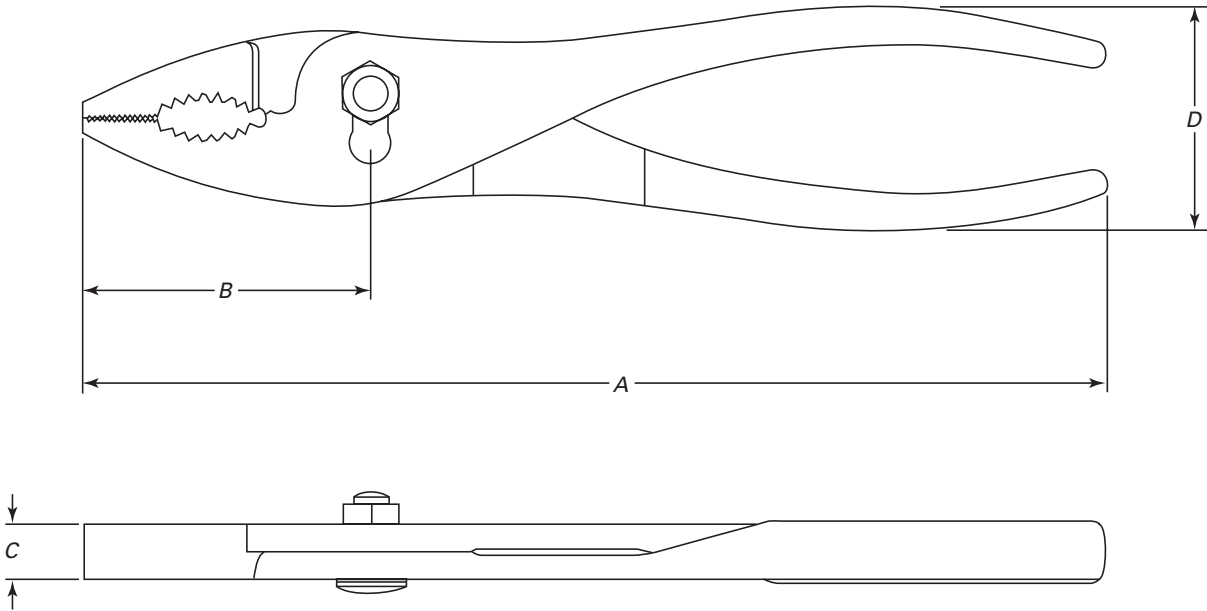


Fig. 6 Type II, Class 1, Style A: Slip Joint, Combination Jaw, Straight Nose, Regular

Table 5 Type II, Class 1, Style B: Slip Joint, Combination Jaw, Straight Nose, Thin

| Nominal Size | Overall Length, <i>A</i> | | Jaw Length, <i>B</i> | | Nose Thickness, <i>C</i> | | Handle Thickness, <i>D</i> | | Handle Width, <i>E</i> | |
|--------------|--------------------------|------|----------------------|------|--------------------------|------|----------------------------|------|------------------------|------|
| | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. |
| 6 | 5.7 | 6.8 | 1.5 | 2.0 | 0.16 | 0.25 | 0.31 | 0.56 | 1.3 | 2.2 |
| 8 | 7.7 | 8.8 | 1.6 | 2.2 | 0.16 | 0.25 | 0.31 | 0.66 | 1.5 | 2.3 |

and be capable of withstanding the cleaning procedures normally experienced during its intended use.

5.5 Handles

5.5.1 Characteristics. Handles shall be shaped to afford a comfortable grip. Handle surfaces shall be free from rough edges and sharp corners. Handles shall have a hardness from 35 HRC to 60 HRC or equivalent. Han-

dle surfaces shall be smooth, knurled, impressed, or furnished with comfort grips.

5.5.2 Set. Permanent set of handles shall not exceed the maximum distance specified in Table 7 when pliers are subjected to the handle load test specified in para. 6.2.

5.5.3 Comfort Grips. When comfort grips are furnished on handles, they shall be made of a polymer of rubber, plastic, or other suitable material capable of

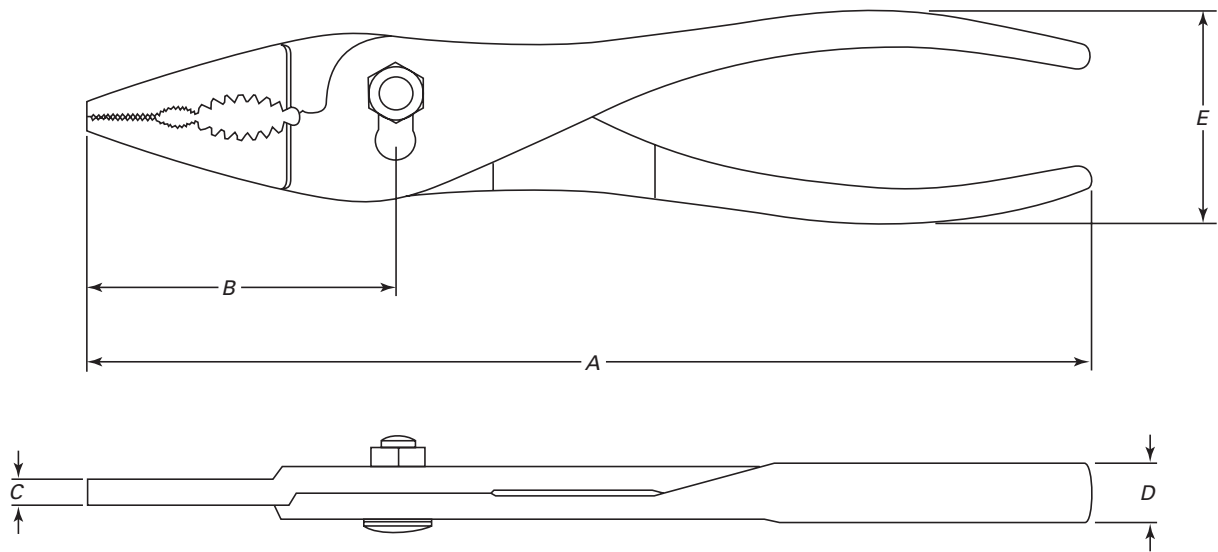


Fig. 7 Type II, Class 1, Style B: Slip Joint, Combination Jaw, Straight Nose, Thin

Table 6 Type II, Class 2: Slip Joint, Combination Jaw, Bent Nose

| Nominal Size | Overall Length, A | | Jaw Length, B | | Nose Thickness, C | | Handle Thickness, D | | Handle Width, E | |
|--------------|-------------------|------|---------------|------|-------------------|------|---------------------|------|-----------------|------|
| | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. |
| 6 | 5.7 | 6.8 | 1.4 | 2.0 | 0.16 | 0.25 | 0.31 | 0.56 | 1.3 | 2.2 |
| 8 | 7.7 | 8.8 | 1.5 | 2.1 | 0.16 | 0.25 | 0.31 | 0.66 | 1.5 | 2.3 |

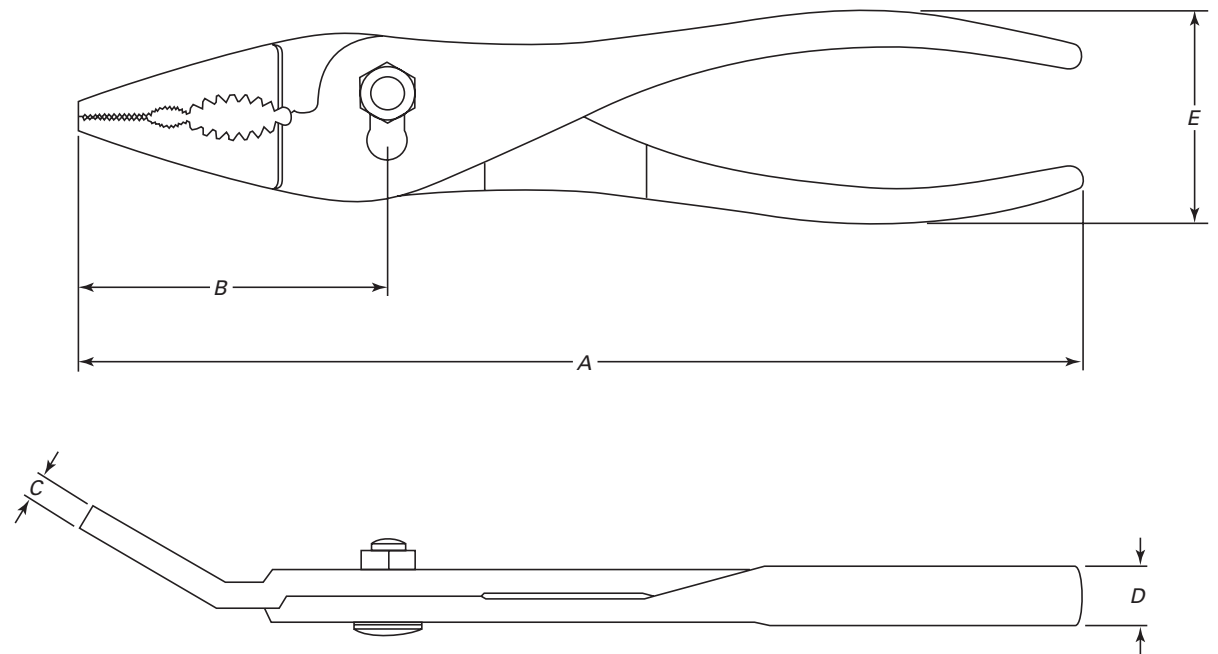


Fig. 8 Type II, Class 2: Slip Joint, Combination Jaw, Bent Nose

withstanding long, hard usage without deterioration or rubbing off, and meet the solvent resistance test specified in para. 6.4. Comfort grips shall remain permanently attached under normal use.

WARNING: Comfort grips are not intended to give any degree of protection against electric shock and shall *not* be used on or near live electric circuits.

5.6 Joint

Pliers halves shall be joined in a permanent manner using a fastener, rivet, or other suitable means. The joint shall operate without binding in all positions, and shall not disengage under load. The joint shall not require adjustment. The joint shall pass the test specified in para. 6.2. Fastener hardness shall be from 25 HRC to 50 HRC except when case-hardened; a maximum hardness equivalent to 60 HRC shall be permitted.

5.7 Jaws

5.7.1 Jaw Openings. Jaws shall open to the respective work capacity specified herein for individual type, class, style, and size pliers.

5.7.2 Jaw Hardness. Jaw hardness within 0.06 in. of the root of the groove form and wire cutter, as applicable, shall be 45 HRC to 60 HRC.

6 TEST PROCEDURES

Many tests required herein are inherently dangerous. Adequate safeguards for personnel and property shall be used when conducting such tests.

6.1 Pliers Hardness Test

Pliers hardness tests shall be conducted per ASME B107.25M, para. 5.3.

6.2 Handle Load Test

Handle load test shall be conducted per ASME B107.25M, para. 5.1 and Table 7 herein.

The pliers shall be tested with the comfort grips removed. The loads shall be applied at the point of maximum handle curvature. The jaws of the pliers at their outermost end shall grip approximately 0.13 in. of a flat steel insert of sufficient thickness to prevent the handles from contacting each other during the test. The permanent set of the handles shall not exceed the applicable values shown in Table 7.

6.3 Wire Cut Test

Type II pliers with cutting edges shall complete three cuts of uncoated, single strand steel wire having a minimum tensile strength of 150,000 psi (1 033 MPa). There shall be no visible deformation or damage to the cutter. Wire sizes appear in Table 8.

Table 7 Test Parameters

| Type | Nominal Size | Test Torque, lbf-in. | Maximum Permanent Set |
|------|--------------------------------|----------------------|-----------------------|
| I | 4 ¹ / ₂ | 250 | 0.03 |
| I | 5 | 250 | 0.03 |
| I | 6 ¹ / ₂ | 250 | 0.03 |
| I | 7 | 450 | 0.03 |
| I | 8 | 450 | 0.03 |
| I | 9 ¹ / ₂ | 750 | 0.03 |
| I | 10 | 750 | 0.03 |
| I | 12 | 850 | 0.03 |
| I | 13 | 850 | 0.03 |
| I | 14 | 850 | 0.03 |
| I | 14 ¹ / ₂ | 850 | 0.03 |
| I | 16 | 950 | 0.03 |
| I | 20 | 1,050 | 0.03 |
| II | 4 | 100 | 0.03 |
| II | 6 | 675 | 0.03 |
| II | 8 | 1,000 | 0.06 |
| II | 10 | 1,450 | 0.13 |

Table 8 Steel Wire Sizes for Wire Cut Test

| Nominal Pliers Size | Wire Diameter |
|---------------------|---------------|
| 4 | 0.033–0.037 |
| 6 | 0.083–0.087 |
| 8 | 0.096–0.100 |
| 10 | 0.112–0.116 |

6.4 Solvent Resistance Test

Solvent resistance tests shall be conducted in accordance with ASME B107.25M, para. 5.5.1.

7 SAFETY REQUIREMENTS AND LIMITATIONS OF USE

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

8 DESIGNATIONS

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

- (a) type
- (b) class
- (c) nominal size
- (d) style

AMERICAN NATIONAL STANDARDS FOR HAND TOOLS

| | |
|---|-----------------------|
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| Locking Pliers | B107.24-2002 |
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| Screwdrivers, Cross Tip Gaging | B107.31M-1997 |
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| Nut Drivers (Spin Type, Screwdriver Grip) (Metric Series) | B107.35M-1997 |
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| Pliers: Wire Cutters/Strippers | B107.37-2003 |
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