ASME B107.16M-1998
(Revision of ASME B107.16-1992)

SHEARS (METAL CUTTING, HAND)

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

REAFFIRMED 2004

FOR CURRENT COMMITTEE PERSONNEL
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(Revision of ASME B107.16-1992)

Date of Issuance: July 27, 1998

This Standard will be revised when the Society approves the issuance of a new edition. There will be no addenda or written interpretations of the requirements of this Standard issued to this edition.

The American Society of Mechanical Engineers
Three Park Avenue, New York, NY 10016-5990

FOREWORD

(This Foreword is not part of ASME B107.16M-1998.)

The American National Standards Committee B107, Socket Wrenches and Drives, under sponsorship of The American Society of Mechanical Engineers, held its organizational meeting on June 28, 1967. Subsequently, the Committee was reorganized as an ASME Standards Committee and its title was changed to Hand Tools and Accessories. This Standard is a revision of ASME B107.16-1992, Shears (Metal Cutting, Bench and Hand).

Significant changes made to the 1992 edition of this Standard consist of revising the title of the Standard to read "Shears (Metal Cutting, Hand)," removing the Bench Type cutting shears, and revising Classification for the remaining shears.

Suggestions for improvement of this Standard are welcome. They should be sent to The American Society of Mechanical Engineers, Attn: Secretary, ASME B107 Main Committee, Three Park Avenue, New York, NY 10016-5990.

This revision was approved as an American National Standard on April 3, 1998.

ASME STANDARDS COMMITTEE B107
Hand Tools and Accessories

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

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SHEARS (METAL CUTTING, HAND)

1 SCOPE AND CLASSIFICATION

1.1 Scope

This Standard covers hand shears used for cutting metal.

1.2 Classification

The metal cutting shears shall be one of the following types, classes, styles, and designs:

Type I Tinner
- Class 1 Straight Cut
  - Style A Heavy Duty
  - Style B Medium Duty
- Class 2 Circular Cut
  - Style A Heavy Duty
  - Style B Medium Duty
- Class 3 Duckbill (Combination Straight and Circular Cut)

Type II Compound Lever (Aviation)
- Class 1 Straight Cutting
- Class 2 Circular Cutting to the Right
- Class 3 Circular Cutting to the Left
- Class 4 Offset Jaw Straight and Circular Cutting to the Right
- Class 5 Offset Jaw Straight and Circular Cutting to the Left

2 NORMATIVE REFERENCES

The following documents form a part of this Standard to the extent specified herein:

ASME B46.1-1995, Surface Texture (Surface Roughness, Waviness, and Lay)

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

ASTM A 240/A 240M-96, Standard Specification for Heat Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels

ASTM A 366/A 366M-96, Standard Specifications for Steel, Sheet, Carbon, Cold Rolled, Commercial Quality

ASTM E 18-94, Standard Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials

Publisher: The American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428

3 REQUIREMENTS

3.1 Illustrations

The illustrations shown are descriptive and not restrictive. They are not intended to preclude the purchase of metal cutting shears which are otherwise in accordance with this Standard.

3.2 Design

Type I and Type II shears shall be designed for normal hand operation. They shall be capable of meeting the cutting test loads specified in the applicable tables when tested according to the procedures described in section 4. Type I shears shall consist essentially of two cutting blades, two handles, and a fastener. Type II shears shall have essentially the same components, in addition to a series of levers and pins through which the compound leverage is accomplished.

3.2.1 Shears covered by this Standard are intended for use by right-handed operators. Shears for use by left-handed operators may be fabricated in accordance with the specifications, with the exception of the position of the blades and the curve of the circular cut blades. For left-handed operators the lower blade should be on the right-hand side and the curve of circular blades should be to the right.

3.3 Material

The materials used in the manufacture of shears shall produce tools conforming to the requirements specified in this Standard.

3.4 Identification Marking

All shears shall be marked in a plain and permanent manner with the manufacturer's name or with a trademark of such known character that the source of manufacture may be readily determined.

3.5 Finish

Shears may have a painted, lacquered, enameled, plated, black oxide, or natural finish.

3.6 Blades

Except for the cutting edges, all other blade corners and edges shall be smooth and rounded. Blade bearing and mating surfaces shall be ground true and shall be smooth. They shall be of ample width to prevent the blades from twisting or springing open under ordinary cutting loads likely to be encountered in service.

3.6.1 Type I Shears. Blade cutting edges shall be sharp, suitably beveled, and properly hardened and tempered. Cutting edges shall be so designed that the proper cutting angle shall be maintained throughout the full length of cut.

3.6.2 Type II Shears. The blades on Type II shears shall have one or two serrated cutting edges and shall be curved in the cutting (shearing) plane. Serrations shall be of sufficient depth and shaped to ensure that the requirements of para. 4.6.3 are met. The serrations shall be evenly spaced and well-defined throughout the effective length of the cutting blade. Blades shall be designed to divert the sheared portion of the metal away from the handles.

3.6.2.1 Requirements. Blades shall be made from high carbon steel having 0.75% carbon, min. or alloy steel with at least 0.60% carbon content and at least a total of 0.20% alloying elements (excluding manganese). Blades shall have a hardness from 55 to 61 HRC, and matching locations on the blades of any one pair of shears shall be within 4 HRC. Readings shall be taken within 0.12 in. (3.1 mm) from the cutting edge.

3.7 Pivot Fastener and Tensioning Fastener

The center fastener shall serve as a pivot joint holding the blades together and shall provide a means for maintaining blade adjustment. The tensioning fastener may be of a self-locking type or jam type if the pivot fastener is threaded into one blade.

3.7.1 Pivot Fastener Material. The pivot fastener shall be of high shears strength material. The bearing surface finish (shank portion) shall not exceed 63 μin. (1.6μm) when tested in accordance with ASME B46.1.

3.7.1.1 All Type I shears, pivot fasteners, and Type II shears tensioning fasteners shall be made in accordance with one of the following optional requirements:

(1) hardened from 30 to 40 HRC

(2) case hardened from 83 to 90 HR15N with a minimum case depth of 0.007 in. (0.18 mm)

(3) unhardened material having a minimum tensile strength of 80,000 psi (552 MPa)

3.7.1.2 The center pivot fastener of Type II shears shall be material having a minimum tensile strength of 150,000 psi (1035 MPa) and a hardness of 32 to 39 HRC.

3.8 Handles for Type I and Type II

Handles shall be shaped to provide a smooth and comfortable grip for the hand. Handles shall be free from flash and irregular or sharp projections and edges. All shears shall be provided with stops arranged to preclude the possibility of the handles being closed beyond the effective blade cutting point.

3.8.1 Handles for Type II Shears. Handles shall be of either solid or formed construction. If handles of formed construction are furnished, the handles shall be U-shaped or shaped to provide similar comfort and strength to a solid handle. The handles shall be of steel, semi-steel, or other suitable material and shall be of sufficient strength to withstand the test specified in para. 4.6.1. Handles shall also be provided with a suitable mechanism of sufficient strength to return the handles to the open position when the handle pressure is released. A handle locking device shall be provided and designed so that it will not interfere with the operation of the shears. The locking device shall afford a quick, simple method for locking the handles in the closed position.

3.8.1.1 Comfort Grips. Comfort grips shall be made of rubber, plastic, or other suitable material capable of withstanding long, hard usage without deteriorating or rubbing off, and should meet the solvent test specified in para. 4.8. The comfort grips shall remain permanently attached under normal use of the shears.

3.8.1.2 The comfort grips on handles are not intended to give any degree of protection against electric

shock; shears shall not be used on or near live electric circuits.

3.9 Length of Cut

The length of cut specified in tables shall be interpreted as the length of cut that may be made in a single cutting operation in sheet steel of the minimum thickness specified in the applicable table for the respective type and size of shears tested. The shears shall be designed so that the cutting edges need not be opened more than 45 deg (included angle) to obtain the length of cut specified in a single cutting operation.

3.10 Type I Shears

A clearance shall be provided between the handles of the shears when the shears are in a closed position for the protection of the thumb and fingers of the operator.

3.10.1 Class 1, Straight Cut. Shears shall be made with integral blades and handles and shall be of conventional style straight cut tinner's shears and with bow-shaped handles.

3.10.1.1 Style A, Heavy Duty. Style A shears shall be of solid construction and shall be constructed from high carbon steel having 0.75% carbon, min. or alloy steel with at least 0.60% carbon content and at least a total of 0.20% alloying elements (excluding manganese). Blades shall have a hardness from 55 to 61 HRC, and matching locations on the blades of any one pair of shears shall be within 4 HRC. Readings shall be taken within 0.12 in. (3.1 mm) from the cutting edge. Style A shears shall be similar to Fig. 1 and shall comply with Table 1 or 1A.

3.10.1.2 Style B, Medium Duty. Style B shears shall be of solid construction and constructed from material having 0.45% carbon, min. Blades shall have a hardness from 50 to 60 HRC and matching locations on the blades of any one pair of shears shall be within 5 HRC. Readings shall be taken within 0.12 in. (3.1 mm) from the cutting edge. Style B shears shall be similar to Fig. 1 and shall comply with Table 1 or 1A.

3.10.2 Class 2, Circular Cut. Shears shall be made with integral blades and handles and be designed for making circular cuts in sheet metal within the capacity of the tool. The blades shall be curved to the left approximately on a 3.38 in. (85.8 mm) radius perpendicular to the cutting (shearing) plane. Shears shall have bow-shaped handles.

3.10.2.1 Style A, Heavy Duty. Style A shears shall be of solid construction and shall be constructed from high carbon steel having 0.75% carbon, min. or alloy steel with at least 0.60% carbon content and at least a total of 0.20% alloying elements (excluding manganese). Blades shall have a hardness from 55 to 61 HRC, and matching locations on the blades of any one pair of shears shall be within 4 HRC. Readings shall be taken within 0.12 in. (3.1 mm) from the cutting edge. Style A shears shall be similar to Fig. 2 and shall comply with Table 2 or 2A.

3.10.2.2 Style B, Medium Duty. Style B shears shall be of solid construction and constructed from material having 0.45% carbon, min. Blades shall have a hardness from 50 to 60 HRC and matching locations on the blades of any one pair of shears shall be within 5 HRC. Readings shall be taken within 0.12 in. (3.1 mm) from the cutting edge. Style B shears shall be similar to Fig. 2 and shall comply with Table 2 or 2A.

3.10.3 Class 3, Duckbill. Shears shall be made with integral blades and handles and shall be designed for cutting intricate patterns and curves having short radii with a minimum amount of bending of the material being cut. The blades and cutting edges shall be properly curved in the cutting (shearing) plane. Blades shall have a hardness from 50 to 60 HRC and matching locations on the blades of any one pair of shears shall be within 5 HRC. Shears shall have bow-shaped handles, shall be similar to Fig. 3, and shall comply with Table 3 or 3A.

3.11 Type II Shears

Type II shears shall have one or more serrated cutting edges and a compound leverage system to multiply the cutting force applied on the handles. Suitable handles and a handle locking device shall also be provided. All fasteners shall be positioned and set so that the shears will be in proper adjustment. Proper adjustment shall be interpreted as meaning that the blades shall open and close smoothly and easily without binding. The cutting edges at the tips shall overlap up to a maximum of 0.09 in. (2.3 mm) when handles are pressed against the positive stops provided.

3.11.1 Class 1, Straight Cutting. Class 1 shears shall be designed primarily for straight cutting but shall be capable of cutting patterns and curves. They shall be similar to Fig. 4(a) and shall conform to the applicable requirements of Table 4 or 4A.

3.11.2 Class 2, Circular Cutting to the Right. Class 2 shears shall be designed for making circular cuts to the right, shall be similar to Fig. 4(b), and shall conform to the applicable requirements of Table 4 or 4A.

3.11.3 Class 3, Circular Cutting to the Left. Class 3 shears shall be designed for making circular cuts to the left, shall be similar to Fig. 4(c), and shall conform to the applicable requirements of Table 4 or 4A.

3.11.4 Class 4, Offset Jaw Heavy Duty Straight and Circular Cutting to the Right. Class 4 shears shall be designed for both straight and circular cutting to the right. Shears shall be similar to Fig. 4(d) and shall conform to the applicable requirements of Table 4 or 4A.

3.11.5 Class 5, Offset Jaw Heavy Duty Straight and Circular Cutting to the Left. Class 5 shears shall be designed for both straight and circular cutting to the left. Shears shall be similar to Fig. 4(e) and shall conform to the applicable requirements of Table 4 or 4A.

3.12 Workmanship

The requirements within this Standard are intended to describe the best commercial quality shears available. They shall be free from rust, burrs, fins, pits, nodules, or other defects which may impair their serviceability, durability, or appearance, and shall conform to the quality specified by the requirements of this Standard.

4 TEST PROCEDURES

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

4.1 Product Design Tests

These tests are to be used to establish the suitability of the product design described herein and to perform the functions required within the scope of this Standard. These tests are performed initially on all product designs and thereafter when the design is revised. They shall consist of examinations and tests covered in paras. 4.3 through 4.9.

4.2 Quality Qualification Tests

Quality qualification tests shall consist of tests covered in paras. 4.3 through 4.8.

4.3 Hardness

Hardness tests shall be conducted in accordance with ASTM E 18. When grinding is required to prepare the test surface, the amount of material removed must not exceed 0.007 in. (0.18 mm) on the surface contacted by the indentor.

4.4 Material Specifications

The supplier shall furnish, upon request, certification that the tensile and or chemical composition of material used in the end item meets the applicable material requirements.

4.5 Paper Cutting Test

Each shears, both before and after being tested as specified in para. 4.6, shall cut one sheet of 0.003 in. (0.08 mm) thick bond paper (25% min. rag content). At least 11 in. (280 mm) of the paper shall be cut cleanly, without having torn or ragged edges, using the shears' full length of cut.

4.6 Metal Cutting Tests

Type I and Type II shears shall be capable of cutting cold rolled steel in accordance with ASTM A 366/A 366M and AISI 304 or 316 chrome-nickel alloy (annealed) stainless steel in accordance with ASTM A 240/A 240M of the applicable gage, for each Type and Class specified in Tables 1 through 4A.

4.6.1 Load Cutting Test. The first cut shall be made parallel to the 3.0 in. (76 mm) side of a 12 in. (305 mm) long strip, 0.50 in. (12.7 mm) from the end. Each succeeding cut shall be spaced 0.50 in. (12.7 mm) from the preceding cut until 10 cuts have been made in both cold-rolled and stainless steel. The entire length of the cutting edges shall be used in making each individual cut, and the test load required to make these cuts shall not exceed the values specified in the applicable tables. The test load shall be applied by a testing machine or other suitable device on Type II shears; the permanent set of the handles shall not exceed 5% when in closed position (measurements to be taken at the extreme ends of the handles before and after the load cutting test).

4.6.1.1 Strip Cutting Test. Following the load cutting test, each shears shall be operated by hand to make at least five cuts across strips 0.50 in. (12.7 mm) wide of the same material as used in the above test, the cutting being done within 1.0 in. (25 mm) of the outer end of the blades. The shears may be supported

on a bench, vise, or fixture, and the strip supported or held for this test.

4.6.2 Narrow Width Cutting Test, for Type II Shears. Following the strip cutting tests in para. 4.6.1.1, each Type II shears shall make 5 full-length cuts of 28 gage commercial steel strapping. These cuts shall be made parallel to one another, 0.046 in. to 0.078 in. (1.17 mm to 1.98 mm) apart. Shears shall cut the test strip cleanly, and spiral or roll up each sheared metal strip, diverting it from the handle area.

4.6.3 Serration Grip Test for Class II Shears. One full-length cut shall be made in 18 gage cold-rolled steel to determine if the blade serrations are of sufficient depth and sharpness to effectively grip the work while cutting. An examination of the edges of this cut shall be made to determine whether the shears' serration imprints are clearly visible along the effective length of the cut. Serration imprints shall be sharp, clear, and well-defined, with no smeared or black areas evident.

4.6.3.1 Cutting Test for Jaw Tips on Type II Shears. After the serration grip test, two cuts shall be made in a sheet of 18 gage cold-rolled steel with a 90 deg bend made approximately 0.75 in. (19.1 mm) back from the edge. The tip end of one jaw shall be butted against the 90 deg bend of the test sheet. The metal shall be cut cleanly; evidence of tearing or failure to cut any portion from the edge up to the 90 deg bend of the test material shall constitute failure.

4.6.4 Shim Cutting Test for Type II Shears. Upon completion of the metal cutting tests covered in paras. 4.6.1 through 4.6.3.1, the shears shall be capable of clean cutting 0.010 in. (0.25 mm) shim stock for the full length of cutting edges. The test shall be performed with the operator using one hand only on the shears and the shim stock unsupported.

4.6.4.1 In lieu of the shim cutting test, shears shall be capable of cutting a single thickness of clean, bleached, unsized No. 40 through 60 mesh cheesecloth for the full length of cut. This test shall be performed with the operator using one hand only on the shears, and making three separate cuts. The cheesecloth shall be cut cleanly for the full length of each cut.

4.7 Wear Tests for Type II Shears

The shears shall make three full-length cuts in 18 gage cold-rolled steel. The maximum handle pressure reading from these cuts shall be recorded for the shears tested and then 100 additional full-length cuts shall be taken with the shears, but no readings recorded. Three more full-length cuts shall be made with the shears and a second set of maximum handle pressure readings recorded. Second maximum readings shall not exceed the first maximum readings by more than 10%. After the above tests are completed, a full-length cut shall be made to measure the length of cut as follows: Cut in 24 gage cold-rolled steel for the 8 in. (203 mm) size, 18 gage cold-rolled steel for the 10 in. (254 mm) size, and 16 gage cold-rolled steel for the 9 in. and 12 in. (229 mm and 305 mm) sizes.

4.8 Comfort Grips Solvent Test

Shears with comfort grips intact shall be fully immersed in the test fluid specified below. New shears shall be used for each test fluid. The test fluids shall be: Dot 3 brake fluid, gasoline, ethylene glycol, and ethyl alcohol. The shears shall be immersed for 15 minutes at room temperature, removed, and let stand for at least 24 hr. There shall be no significant swelling, surface attack, or degradation of the comfort grips.

4.9 Design Qualification Test

Each Type, Class, and Style of shears shall be capable of making 30,000 cuts of cold-rolled steel strip within the maximum test load specified in the applicable table for the nominal size of shears being tested. The cold-rolled steel strips shall be of the specified gage and be 0.12 in. (3.1 mm) less in width then that specified for minimum length of cut in the applicable tables for that particular shears.

5 DESIGNATIONS

Purchasers should specify the following:

(1) Title, Number, and Date of this Standard;

(2) Type and Class, as applicable;

(3) Nominal Size;

(4) Comfort Grip Handles, if desired, must be specified.

TABLE 1 DIMENSIONS FOR TYPE I, CLASS 1, STYLE A AND B STRAIGHT CUT, in.

Nominal Size	Overall Length		Length of Cut,	Weight, oz		Cutting Capacity		Cutting Test	
	Min.	Max.	Min.	Min.	Max.	Cold-Rolled Steel Gage	Stainless Steel Gage	Point of Application [Note (1)] ± 0.50	Test Load, Min., [Note (1)] lb
7	6.50	7.50	1.62	5	9	24	28	3.50	50
8	7.50	8.50	1.75	7	11	24	28	4.50	46
10	9.50	10.50	2.00	12	18	22	26	5.62	100
12½	12.00	13.00	2.75	20	32	20	22	8.00	120
16	15.75	17.00	2.25	48	72	16	18	11.00	153

NOTE:
(1) Point of load application on handle from center fastener.

TABLE 1A DIMENSIONS FOR TYPE I, CLASS 1, STYLE A AND B STRAIGHT CUT, mm

Nominal Size	Overall Length		Length of Cut,	Weight, g		Cutting Capacity		Cutting Test	
	Min.	Max.	Min.	Min.	Max.	Cold-Rolled Steel Gage	Stainless Steel Gage	Point of Application [Note (1)] ± 12.7	Test Load, Min., [Note (1)] kN
180	165.1	190.5	41.2	142	255	24	28	88.9	222
200	190.5	215.9	44.5	198	312	24	28	114.3	205
250	241.3	266.7	50.8	340	510	22	26	142.8	445
320	304.8	330.2	69.9	567	907	20	22	203.2	534
410	400.1	431.8	57.2	1360	2040	16	18	279.4	681

NOTE:
(1) Point of load application on handle from center fastener.

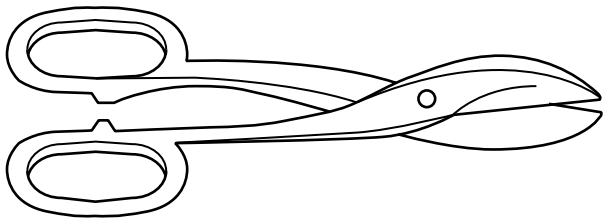


FIG. 1 TYPE I TINNER, CLASS 1 STRAIGHT CUT, STYLE A HEAVY DUTY AND STYLE B MEDIUM DUTY

TABLE 2 DIMENSIONS FOR TYPE I, CLASS 2, STYLE A AND B CIRCULAR CUT, in.

Nominal Size	Overall Length		Length of Cut,	Weight, oz		Cutting Capacity		Cutting Test	
	Min.	Max.	Min.	Min.	Max.	Cold-Rolled Steel Gage	Stainless Steel Gage	Point of Application [Note (1)] ± 0.50	Test Load, Min., [Note (1)] lb
12½	12.00	13.00	2.75	20	32	20	22	8.00	120

NOTE:
(1) Point of load application on handle from center fastener.

TABLE 2A DIMENSIONS FOR TYPE I, CLASS 2, STYLE A AND B CIRCULAR CUT, mm

Nominal Size	Overall Length		Length of Cut,	Weight, g		Cutting Capacity		Cutting Test	
	Min.	Max.	Min.	Min.	Max.	Cold-Rolled Steel Gage	Stainless Steel Gage	Point of Application [Note (1)] ± 12.7	Test Load, Min., [Note (1)] kN
320	304.8	330.2	69.9	567	907	20	22	203.2	534

NOTE:
(1) Point of load application on handle from center fastener.

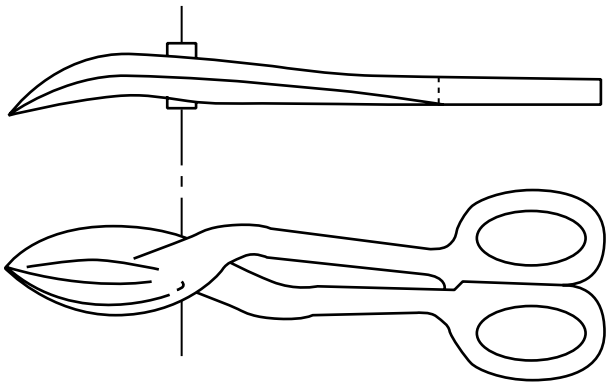


FIG. 2 TYPE I TINNER, CLASS 2 CIRCULAR CUT, STYLE A HEAVY DUTY AND STYLE B MEDIUM DUTY

TABLE 3 DIMENSIONS FOR TYPE I, CLASS 3, DUCKBILL, in.

Nominal Size	Overall Length		Length of Cut,	Weight, oz		Cutting Capacity		Cutting Test	
	Min.	Max.	Min.	Min.	Max.	Cold-Rolled Steel Gage	Stainless Steel Gage	Point of Application [Note (1)] ± 0.50	Test Load, Min., [Note (1)] lb
7	6.75	7.50	1.50	5	9	26	28	3.87	40
10	9.50	10.50	2.00	8	18	24	26	5.62	80
12½	12.00	13.00	2.75	20	32	22	24	7.50	100

NOTE:
(1) Point of load application on handle from center fastener.

TABLE 3A DIMENSIONS FOR TYPE I, CLASS 3, DUCKBILL, mm

Nominal Size	Overall Length		Length of Cut,	Weight, g		Cutting Capacity		Cutting Test	
	Min.	Max.	Min.	Min.	Max.	Cold-Rolled Steel Gage	Stainless Steel Gage	Point of Application [Note (1)] ± 12.7	Test Load, Min., kN
180	171.5	190.5	38.1	142	227	26	28	98.3	178
200	241.3	266.7	50.8	227	510	24	26	142.7	356
320	304.8	330.2	69.9	567	907	22	24	190.5	445

NOTE:
(1) Point of load application on handle from center fastener.

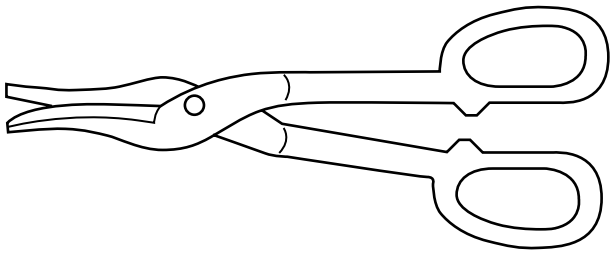


FIG. 3 TYPE I TINNER, CLASS 3 DUCKBILL (COMBINATION STRAIGHT AND CIRCULAR CUT)

TABLE 4 DIMENSIONS FOR TYPE II, CLASS 1, 2, 3, 4, AND 5, COMPOUND LEVER, in.

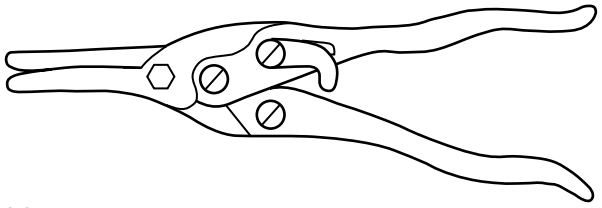
Class	Nominal Size	Overall Length		Length of Cut,	Weight, oz		Cutting Capacity		Cutting Test	
		Min.	Max.	Min.	Min.	Max.	Cold-Rolled Steel Gage	Stainless Steel Gage	Point of Application [Note (1)] ± 0.50	Test Load, Min., lb
1	8	7.00	8.75	0.87	8	14	24	28	4.00	27
1	9	9.00	9.50	0.75	9	14	16	18	6.00	120
1	10	9.25	10.50	1.18	10	18	18	22	6.00	85
1	12	11.75	12.50	2.37	12	22	16	18	8.00	133
2 and 3	10	9.25	10.50	1.18	11	18	18	22	6.00	80
4 and 5	9	9.00	10.50	1.18	10	18	18	22	6.00	80

NOTE:
(1) Point of load application on handle from center fastener.

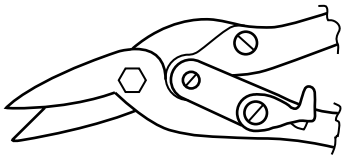
TABLE 4A DIMENSIONS FOR TYPE II, CLASS 1, 2, 3, 4, AND 5, COMPOUND LEVER, mm

Class	Nominal Size	Overall Length		Length of Cut,	Weight, g		Cutting Capacity		Cutting Test	
		Min.	Max.	Min.	Min.	Max.	Cold-Rolled Steel Gage	Stainless Steel Gage	Point of Application [Note (1)] ± 0.50	Test Load, Min., [Note (1)] kN
1	200	177.8	222.3	22.1	227	397	24	28	101.6	120
1	230	228.6	241.3	19.1	255	397	16	18	152.4	534
1	250	234.9	266.7	30.0	284	510	18	22	152.4	378
1	300	298.5	317.5	60.2	340	624	16	18	203.2	592
2 and 3	250	234.9	266.7	30.0	312	510	18	22	152.4	356
4 and 5	230	228.6	266.7	30.0	284	510	20	22	152.4	356

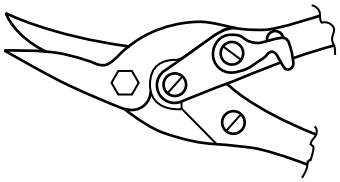
NOTE:
(1) Point of load application on handle from center fastener.



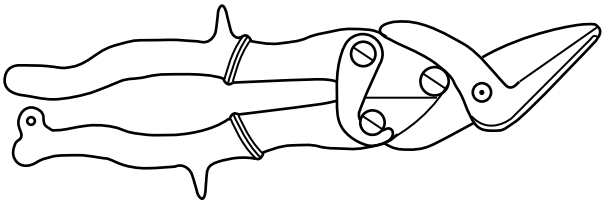
(a) Class 1 — Straight Cutting



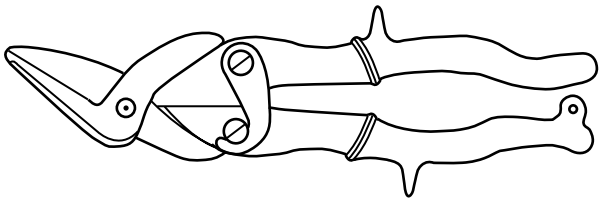
(b) Class 2 — Circular Cutting to the Right



(c) Class 3 — Circular Cutting to the Left

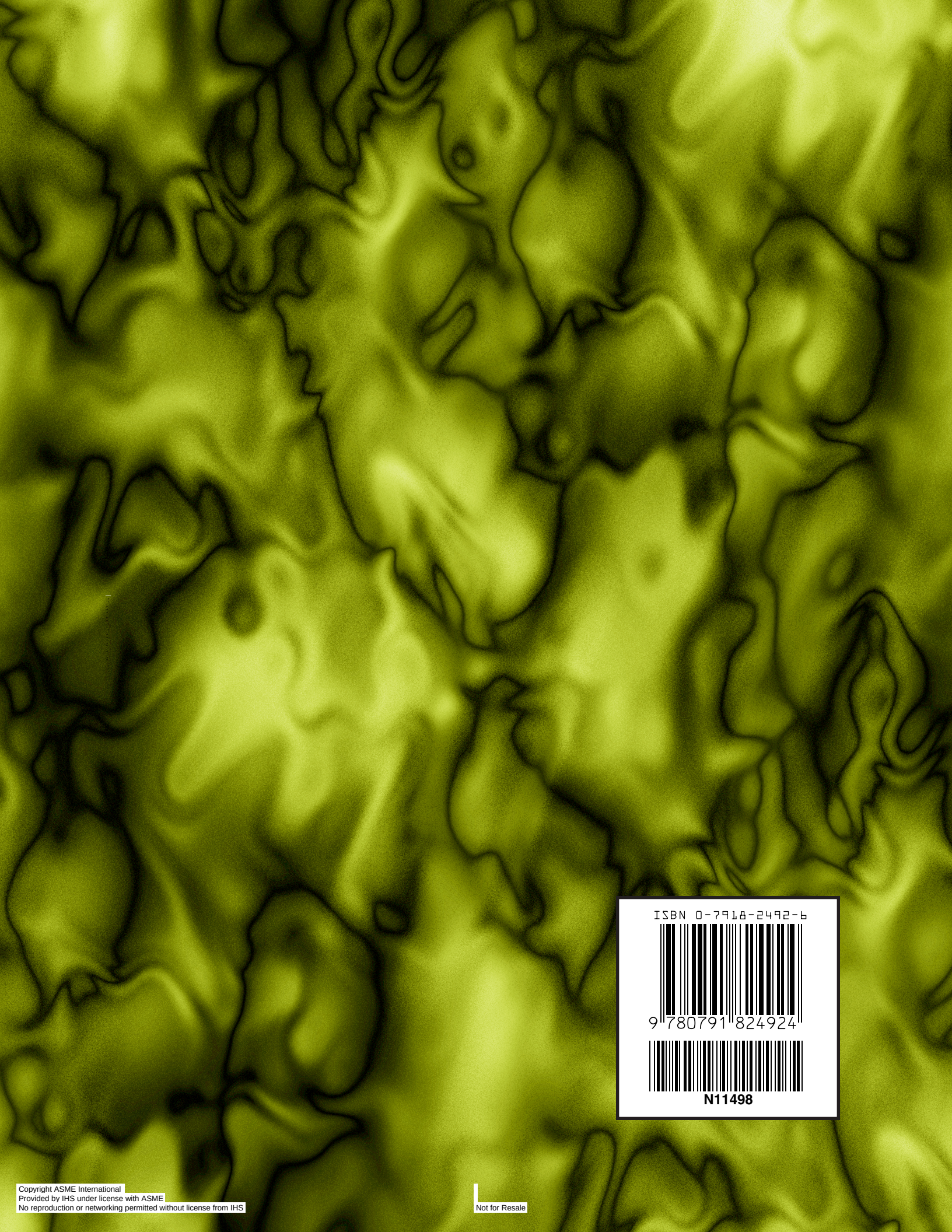


(d) Class 4 — Offset Jaw Heavy Duty, Straight and Circular Cutting to the Right



(e) Class 5 — Offset Jaw Heavy Duty, Straight and Circular Cutting to the Left

FIG. 4 TYPE II COMPOUND LEVER (AVIATION), CLASS 1 THROUGH 5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