ASME B107.42M-1997

HATCHETS: SAFETY REQUIREMENTS

AN AMERICAN NATIONAL STANDARD

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The American Society of Mechanical Engineers

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HATCHETS: SAFETY REQUIREMENTS

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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
345 East 47th Street, New York, NY 10017

FOREWORD

(This Foreword is not part of ASME B107.42M-1997.)

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. Subsequently, the Committee was reorganized as an ASME Standards Committee and its name was changed to Hand Tools and Accessories.

The development of a safety standard for Hatchets was initiated by the Striking/Struck Tools Standards Committee, consisting of technical representatives of manufacturer members of the Hand Tools Institute (HTI).

The scope of this Standard is limited to the essential safety considerations specifically applicable to hatchets.

Suggestions for improvement of this Standard are welcome. They should be sent to: The American Society of Mechanical Engineers, Secretary, ASME B107 Main Committee, 345 East 47th Street, New York, NY 10017.

This Standard, formerly ANSI/HTI B173.7-1990, was approved as an American National Standard on July 11, 1997.

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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HATCHETS: SAFETY REQUIREMENTS

1 GENERAL

1.1 Scope

This Standard provides safety requirements for the design, construction, testing, and use of hatchets. Hatchets have a striking face on one end of the head for use in driving common (unhardened) nails or striking wood products or both; and a blade or bit on the opposite end for use in cutting, notching, and shaping wood products or wallboard products, or both; cutting, spacing, and aligning soft roofing products; and pulling common (unhardened) nails when the tool is provided with a nail slot.

1.2 Purpose

This Standard is intended to serve as a guide in selecting, testing, and using the hand tools covered herein. Details of design, testing, and use of the tools covered are specified only as they relate to safety. 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.

1.3 Application

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 methods employed to ensure compliance with this Standard shall be determined by the proper regulatory or administrative authority.

1.4 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.

1.5 Equivalent

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

2 NORMATIVE REFERENCES

The following documents form a part of this Standard to the extent specified herein. At the time of publication, the editions indicated are valid. All standards are subject to revision, and parties with agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

ANSI Z87.1-1989, Practice for Occupational and Educational Eye and Face Protection (includes supplement and partial revision ANSI Z87.1A-1991)

ANSI Z535.4-1991, Product Safety Signs and Labels

American National Standards Institute, 11 West 42nd Street, New York, NY 10036

ASTM A 29/A 29M-93A, Specification for Steel Bars, Carbon and Alloy, Hot-Wrought and Cold Finished

ASTM A 576-95, Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality

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

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

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

Hand Tools Institute, 25 North Broadway, Tarrytown, NY 10491

3 DEFINITIONS

bell: when provided, the portion of the hatchet head directly behind the striking face.

bit (blade): the broad tapering portion of the hatchet head that terminates in a sharpened cutting edge.

chamfer: the bevel or equivalent radius encircling the perimeter of the striking face.

cutting edge: the sharpened edge of the bit.

eye: an opening or aperture located between the bit and the striking face into which the handle is inserted, if the handle is separate.

handle: the portion that protrudes from the hatchet head and by which the tool is held.

handle grip: when provided, material securely attached to the grip end of some styles of hatchet handles.

hardness: the condition of the hatchet head resulting from heat treatment.

marking gauge: when provided, the adjustable measuring device attached to the top edge of the bit.

nail slot: when provided, a V-shaped opening in one noncutting edge of the bit.

neck: when provided, that portion of the hatchet head between the eye and the bell.

poll: when provided, that portion of the hatchet head between the eye and the striking face.

safety message: the information imprinted on or affixed to the hatchet that is intended to promote safety (see also para. 5.1.4).

serrations: when provided, the geometric pattern of grooves on the striking face.

sides or cheeks: the outside surface of the hatchet head on either side of the eye and the bit.

striking face: the portion of the hatchet head, exclusive of the bell, neck, poll, and chamfer, located on the side of the eye opposite from the bit.

striking face crown: when provided, the convex shape or radius of the striking face.

thong: when provided, the strap attached to the grip end of the handle.

top (of hatchet): the portion of the hatchet head opposite the handle.

4 GENERAL REQUIREMENTS

4.1 Design

Various typical styles of hatchets are shown in Fig. 1. The names given in Fig. 1 are those generally recognized; styles, however, are not limited to those illustrated.

4.1.1 The striking face shall have a smooth or serrated surface and be convex shape or flat.[1]

4.1.2 The striking face shall have a chamfer of approximately 45 deg. (or equivalent radius) all around the perimeter with a width equal to approximately one-tenth of the diameter of the bell or poll as measured across the chamfer angle. For example, if the bell or poll diameter equals 1.00 in. (25.4 mm), then the chamfer width equals approximately 0.100 in. (2.54 mm).

The chamfer width of tools with approximately square- or rectangular-shaped striking faces shall be approximately one-tenth of the lesser dimension.

4.1.3 Handles shall be of any design, including ergonomic, that will withstand the tests specified in paras. 4.4.3 and 4.4.4.

4.1.4 The head and handle shall be free of nonfunctional sharp edges, points, and surface roughness that could inflict personal injury on the user when handling the hatchet.

4.2 Materials

4.2.1 Hatchet heads shall be made from special-quality, fine-grain, hot-rolled carbon steel bars conforming to the chemical requirements specified in Table 1 and to ASTM A 29/A 29M or A 576, or from an equivalent material.

4.2.2 Hatchet heads shall be free of manufacturing and material defects, such as seams, laps, pipes, and cold shuts, that would jeopardize sound construction. They shall conform to the requirements for mechanical properties specified in para. 4.3, and shall withstand the striking test specified in para. 4.4.3.

4.2.3 Handles shall be made of any suitable material that will withstand the tests specified in paras. 4.4.3 and 4.4.4.

4.3 Mechanical Properties

4.3.1 The striking face shall be hardened and tempered to a hardness of not less than 40 HRC or more than 60 HRC, and the steel directly behind the striking face shall be a toughened supporting core.

[1] Hatchets with serrations on the striking face are intended for driving common (unhardened) nails. The serrated face reduces the incidence of bending or dislodging of nails.

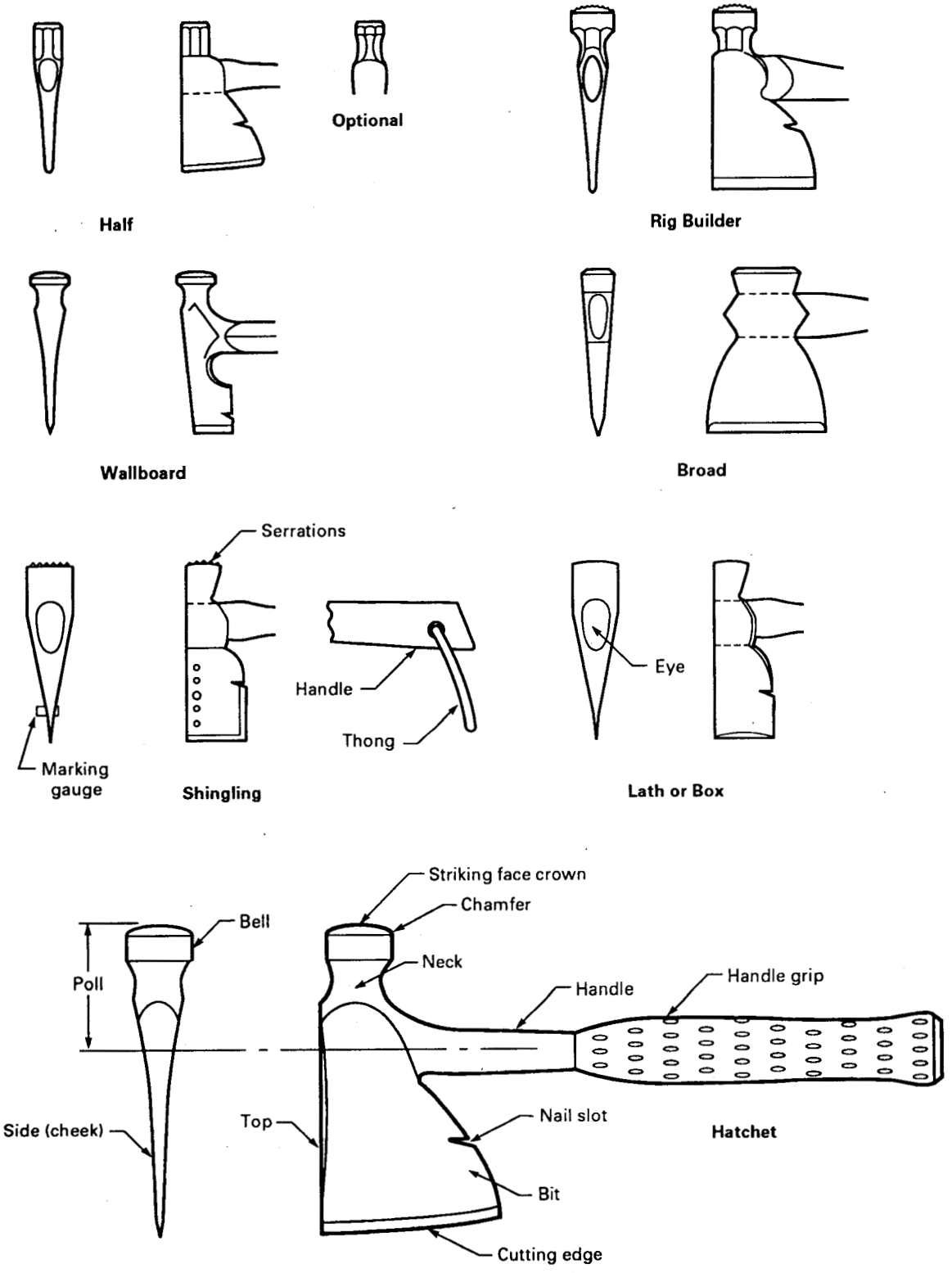

FIG. 1 HATCHET NOMENCLATURE

TABLE 1 CHEMICAL PROPERTIES OF STEEL HATCHET HEADS

Element	Required Percentage of Element	
	Minimum	Maximum
Carbon	0.45	0.88
Manganese	0.20	0.90
Phosphorous	...	0.04
Sulfur	...	0.05
Silicon	...	0.30

4.3.2 The striking face shall not mushroom, chip, crack, or spall when subjected to the striking test specified in para. 4.3.3.[2]

4.3.3 The hatchet bit shall be hardened and tempered to a hardness of not less than 40 HRC or more than 60 HRC for a distance of approximately 0.75 in. (19.1 mm) from the cutting edge.

4.3.4 Handles shall not separate from hatchet heads, crack, or break when subjected to the tests specified in para. 4.4.3 or the test specified in para. 4.4.4.

4.4 Tests

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

4.4.1 General. Hatchets shall be capable of meeting tests specified in paras. 4.4.2 through 4.4.4. Separate (new) hatchets shall be used for each of the tests. Failure to meet the requirements of any one of the tests indicates that the hatchets are not in compliance with this Standard.

4.4.2 Hardness Determination Test. Hardness determination with respect to faces and bits shall be made on fixtured hatchet heads, or on a suitable mounted or unmounted specimen that has been cut from the tools using the wet-abrasive or other equivalent method. Any hardness test will be acceptable that utilizes equipment and methods equivalent to Rockwell hardness determination specified in ASTM E 18.

4.4.3 Striking and Tensile Force Tests. Prior to tensile force testing, sample hatchets shall be subjected to the following striking test: The tool shall withstand twenty full-swinging blows by a person of average build, 160 to 180 lb (73 to 82 kg), or the mechanical equivalent, commensurate with the end use and weight of the hatchet. The blows shall be struck with striking face against the smooth, flat, or slightly convex surface of a rigidly supported steel object that has a minimum diameter of 3.0 in. (76 mm), a minimum length of 2.0 in. (51 mm), and a hardness equivalent to a hardness of 92 to 105 HRB.

Following the striking test, assemblies consisting of two or more separate parts (head and handle) shall not separate when subjected to a static tensile force as follows:

Hatchet Type	Static Tensile Force
Lath, shingling, box, wallboard	150 lbf (667 N)
All others	500 lbf (2225 N)

4.4.4 Static Force Test. Assembled hatchet handles shall not break, loosen, or otherwise fail when subjected to the following static test. The testing loads or bending forces are dependent on the hatchet type and are shown in the following:

Hatchet Type	Static Tensile Force
Lath, shingling, box, wallboard	100 lbf (440 N)
All others	125 lbf (556 N)

The following test procedure shall be used: While the hatchet head is locked securely in test fixture with the striking face up and the handle extended in the horizontal plane, a static force shall be applied vertically at a point on the handle measuring 10.00 in. (254 mm) from the top of the hatchet (see Fig. 2).

5 SAFETY REQUIREMENTS AND LIMITATIONS OF USE

5.1 Safety

5.1.1 To avoid possible eye or other bodily injury, hatchets shall be used only for the purposes specified in para. 1.1.

5.1.2 To avoid 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 in which any hatchet or other striking tool is being used.

5.1.3 Instructors, employers, or both, shall stress proper use and safety in the use of hatchets, and shall emphasize the necessity to wear and ensure the use of safety goggles or equivalent eye protection. The publication *Guide to Hand Tools — Selection, Safety*

[2] The striking test is so severe that a degree of permissible deformation or serrations on the striking face of hatchets can be anticipated.

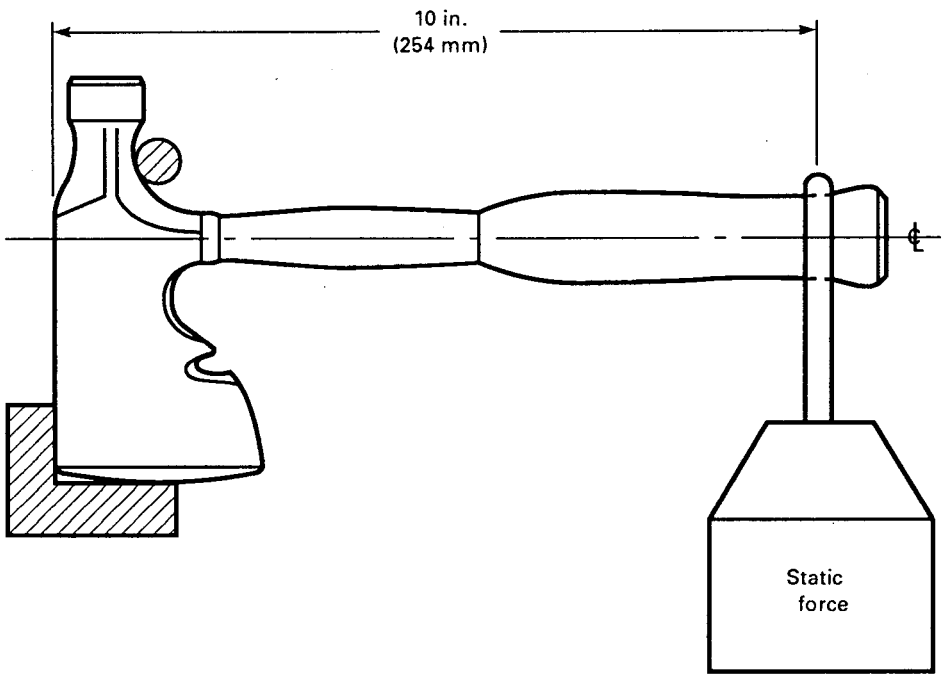

FIG. 2 TYPICAL STATIC FORCE TEST

Tips, Proper Use and Care provides guidelines for safe use of these tools.

5.1.4 Each hatchet shall be stamped, labeled, or otherwise marked by the manufacturer with the following symbol and safety message, or equivalent:

WARNING
WEAR SAFETY GOGGLES
USER AND BYSTANDER

This tool can be made to chip if struck against a hardened nail or other hard object. Use this hatchet face to drive common nails only. Use cutting edge only for cutting wood. Flying chips can result in eye or other bodily injury.

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

The following symbol and safety message, or equivalent, shall appear on all replacement handles:

WARNING
WEAR SAFETY GOGGLES
USER AND BYSTANDER

The principles set forth in ANSI Z535.4 shall be used as the guide for alternate, equivalent methods of labeling.

5.2 Use

Hatchets are special-purpose tools designed and intended only for cutting wood and equally soft materials with the bits; driving or striking common (unhardened) nails, wood, or equally soft materials with the striking face; and pulling common (unhardened) nails when a nail slot is provided.

5.2.1 The sides of the hatchet head shall not be used for striking or pounding.

5.2.2 When nail slots are provided, they should be used only for pulling common (unhardened) nails.

5.2.3 A hatchet shall not be used as a maul or splitting wedge. It shall not be struck by or against another striking tool.

5.3 Inspection

Hatchet heads shall be visually inspected prior to each use and their use discontinued at the first sign of chipping, cracking, or mushrooming of any portion.

5.3.1 No part of the hatchet head shall be ground, welded, treated by reheating, or otherwise altered from the original condition as furnished by the manufacturer, except that the hatchet bit may be properly resharpened (see para. 5.3.2).

5.3.2 When required, the cutting edge or edges should be resharpened, either by a fine whetstone or by hand filing with a fine file to avoid deep scratching. Care should be taken to maintain the original contour of the bit. All filing or whetstone scratches should run at right angles to the cutting edge and should be removed or refined by honing (see redressing instructions as outlined in the *Guide to Hand Tools — Selection, Safety Tips, Proper Use and Care*).

5.3.3 Handles shall be free of splinters and cracks and shall be kept tight in the tool. Handles shall be visually inspected prior to each use and damaged handles shall be replaced. Replacements shall be capable of withstanding the test requirements in paras. 4.4.3 and 4.4.4, and shall be equivalent to the original handle.

5.3.4 When provided, handle grips that have loosened from the handle shall be tightened or replaced.

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