

ASME B107.48-2005
(Consolidation of ASME B107.47M and B107.48M)

Metal Chisels, Punches, and Drift Pins

AN AMERICAN NATIONAL STANDARD



**The American Society of
Mechanical Engineers**

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**The American Society of
Mechanical Engineers**

Three Park Avenue • New York, NY 10016

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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 published an earlier version of this Standard as B209.1 and B209.2, merged with the B107 Committee, and the B107 Committee scope was expanded to include safety considerations.

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

The purposes of this Standard are to define essential safety considerations specifically applicable to Metal Chisels, Punches, and Drift Pins, specify test methods to evaluate performance relating to the defined safety considerations, and indicate limitations of safe use.

A principal change in this edition of the Standard is the allowance of any material that meets the performance and safety requirements specified. Further, this Standard includes material previously included in B107.47-1998 and is intended to supersede that document.

The format of this Standard is in accordance with *The ASME Codes and 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 Committee, Three Park Avenue, New York, NY 10016-5990.

The requirements of this Standard become effective at the time of publication. ASME B107.48-2005 was approved as an American National Standard on March 14, 2005.

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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New York, NY 10016-5990

Proposing Revisions. Revisions are made periodically to the Code to incorporate changes, which appear necessary or desirable, as demonstrated by the experience gained from the application of the Code. Approved revisions will be published periodically.

The Committee welcomes proposals for revisions to this Code. 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 Code. 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 request in the following format:

Subject:	Cite the applicable paragraph number(s) and a concise description.
Edition:	Cite the applicable edition of the Code 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 will be rewritten 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. ASME does not “approve,” “certify,” “rate,” or “endorse” any item, construction, proprietary device, or activity.

Attending Committee Meetings. The B107 Standards Committee holds meetings or telephone conferences, which are open to the public. Persons wishing to attend any meeting or telephone conference should contact the Secretary of the B107 Standards Committee or check our Web site at <http://www.asme.org/codes/>.

METAL CHISELS, PUNCHES, AND DRIFT PINS

1 SCOPE

This Standard provides performance and safety requirements for handheld and handled metal chisels, punches, and drift pins. Chisels are intended specifically for use in cutting and shaping metal objects. Punches and drift pins are intended specifically for use in marking metal, driving and removing such things as pins and rivets, and aligning holes in different sections of material. Power-driven chisels, punches, and drift pins are excluded from this Standard. This Standard is intended to serve as a guide in selecting, testing, and using the hand tools covered. It is not the purpose of this Standard to specify the details of manufacturing. Inclusion of dimensional data in this Standard does not mean that all products 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 manufacture the tools covered.

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

2 CLASSIFICATIONS

2.1 Type I Chisels

- (a) Class 1 Cape: for cutting grooves and keyways
- (b) Class 2 Cold: for general-purpose cutting and shaping
- (c) Class 3 Concave Splitting: for splitting bushings, mufflers, and tailpipes
- (d) Class 4 Diamond Point: for cutting V-grooves, inside corners, and square holes
- (e) Class 5 Half Round: for cutting grooves
- (f) Class 6 Blacksmith's Cold: handle-held cold chisel for general-purpose cutting and shaping

2.2 Type II Punches

- (a) Class 1 Backing-out: handle-held punch for backing out and driving such things as rivets and pins (a.k.a. Blacksmith's Backing-out)
- (b) Class 2 Bearing Race: punch used for removing races from bearings

(c) Class 3 Center: punch used for marking by indentation to start drills in metal and other materials

(d) Class 4 Drift or Lining-up: punch used for aligning and sizing holes in metal and other materials

(e) Class 5 Pin: punch used for driving and removing such things as pins and keys after initial movement by a starting punch

(f) Class 6 Prick: punch used for marking by indentation, as in layout work, and piercing holes in light-gage metal and other materials

(g) Class 7 Round: handle-held punch for drifting holes, aligning, and drifting and driving such things as pins (a.k.a. Blacksmith's Round)

(h) Class 8 Starting: punch used for loosening such things as frozen pins and keys

(i) Type III Drift Pins: pin used for aligning and sizing holes in metal and other materials

3 REFERENCES

The following is a list of publications referenced in this Standard. Unless a specific edition is referenced, the latest available edition should be used.

ANSI Z87.1, Practice for Occupational and Educational Eye and Face Protection

ANSI Z535.4, Product Safety Signs and Labels

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

ASTM E 18, Standard Test Methods 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 19428-2959

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

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

4 DEFINITIONS

See Figs. 1 through 4 as applicable.

bevel: conical portion of the punch adjacent to the point end extending to the taper or the angular portion of the chisel adjacent to the cutting edge extending to the taper.

body: straight portion of the punch or chisel between the chamfer and taper or the tapers of the drift pin.

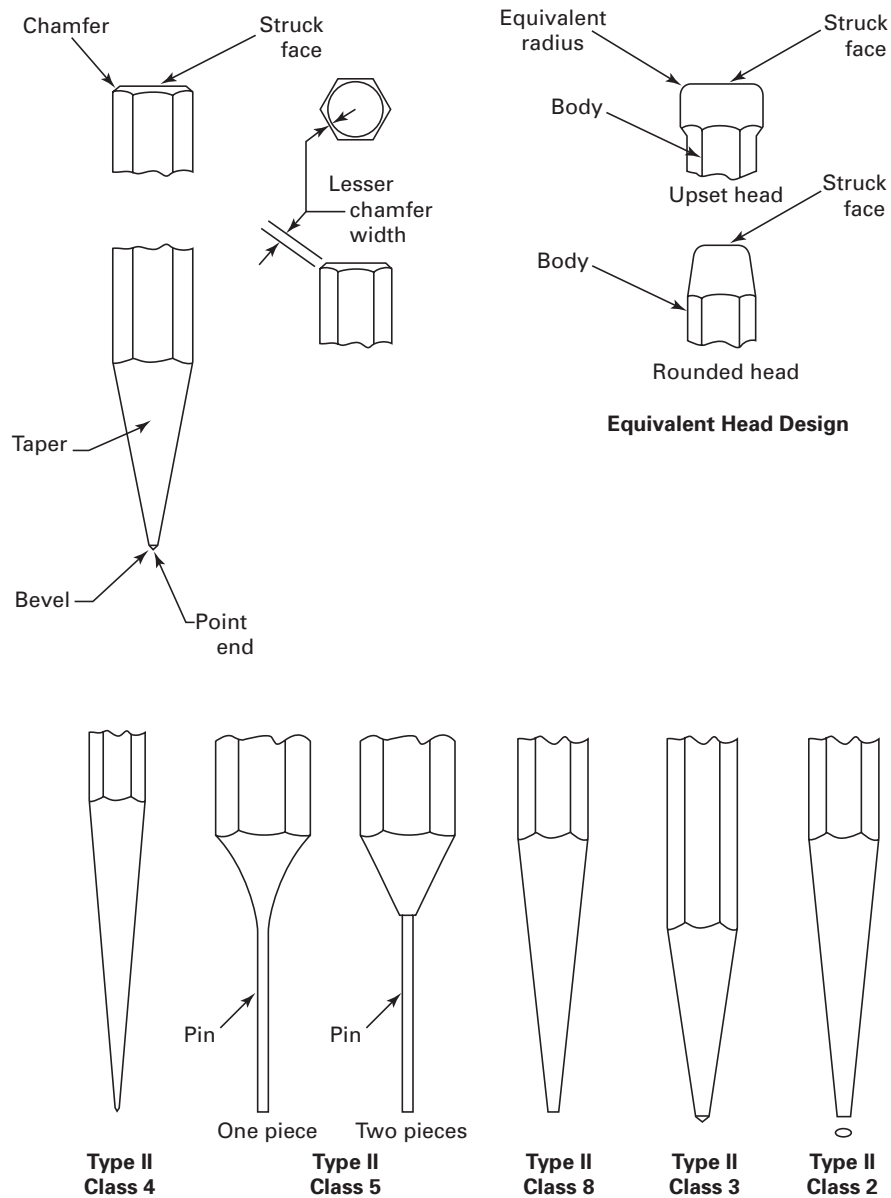


Fig. 1 Nomenclature for Type II Punches

chamfer: angled flat surface or equivalent radius between the struck face and body of the punch or chisel encircling the perimeter of the struck face.

cutting edge: the edge formed by the bevel directly opposite the struck face.

equivalent: in this Standard, the word shall mean alternative designs or features that will provide an equal degree of safety.

eye: an opening or aperture located in the body of the punch or chisel into which a handle is inserted.

handheld chisel: a chisel designed to be held by its body.

handheld punch: a punch designed to be held by its body.

handle: portion protruding from the punch or chisel body by which the tool is held.

hardness: condition of the tool resulting from heat treatment.

pin: straight cylindrical section of the punch between the point and taper or body.

point end: formed end directly opposite the struck face of the punch.

point size: diameter of the point end or the diameter at the bevel/taper intersection.

rounded head: an equivalent design for the struck face and chamfer portion of the punch or chisel.

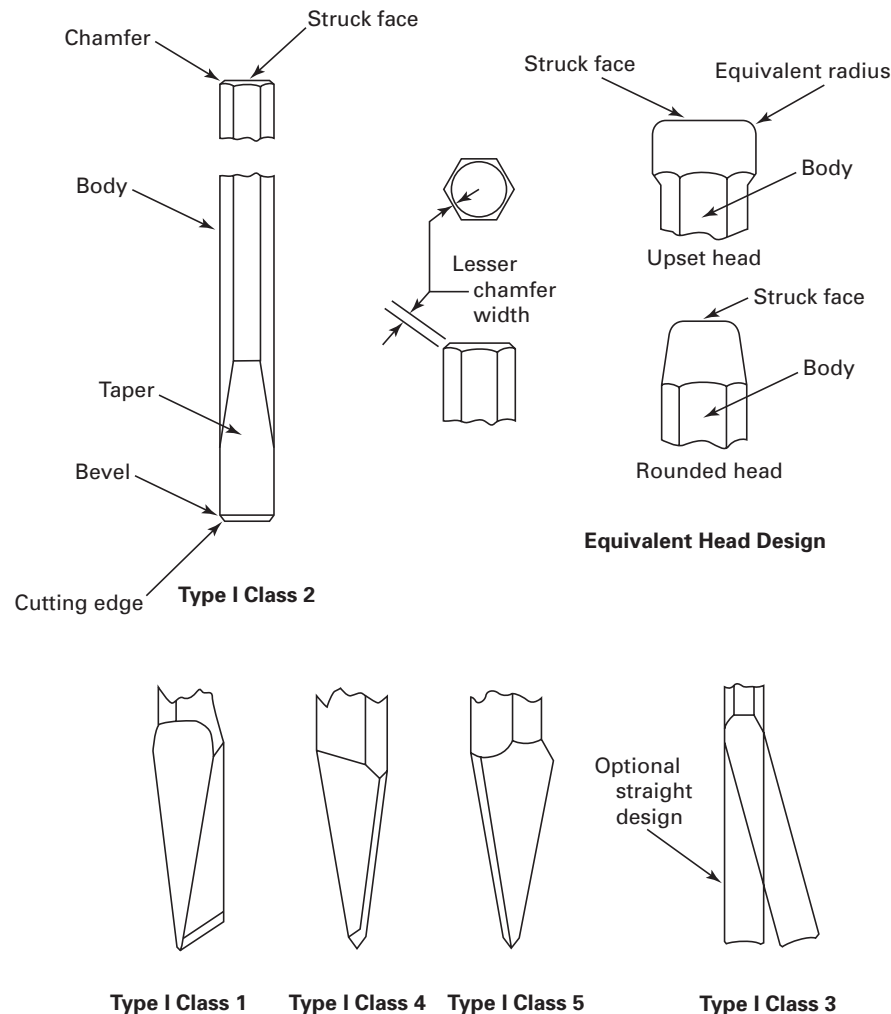


Fig. 2 Nomenclature for Type I Chisels

safety message: information imprinted on or affixed to the tool 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.

struck face: portion of the punch or chisel exclusive of the chamfer and body, directly opposite the point end; the extreme end portions of the drift pin exclusive of the body and tapers.

taper: portion of the punch or chisel between the body and bevel or point end with a gradually reducing cross-sectional area; the portion of the drift pin between the body and struck face with a gradually reducing cross-sectional area.

upset head: portion of the punch or chisel body having an enlarged cross-sectional area at the struck end of the tool, including and underlying the struck face.

5 REQUIREMENTS

The illustrations shown herein are descriptive and nonrestrictive and not intended to preclude the manufacture of chisels, punches, or drift pins that otherwise comply with this Standard.

5.1 Design

Metal chisels, punches, and drift pins shall pass applicable tests in para. 6. All metal chisels, punches, drift pins, and handles shall be free of nonfunctional sharp edges, points, and surface roughness that could inflict personal injury to the user when handling the tool.

5.1.1 Type I Chisels. Chisels shall have a cutting edge at one end for cutting, shaping, and removing metal softer than the cutting edge itself, such as cast iron, wrought iron, steel, bronze, copper, and the like, and shall have a struck face on the opposite end to be struck by a hammer of the

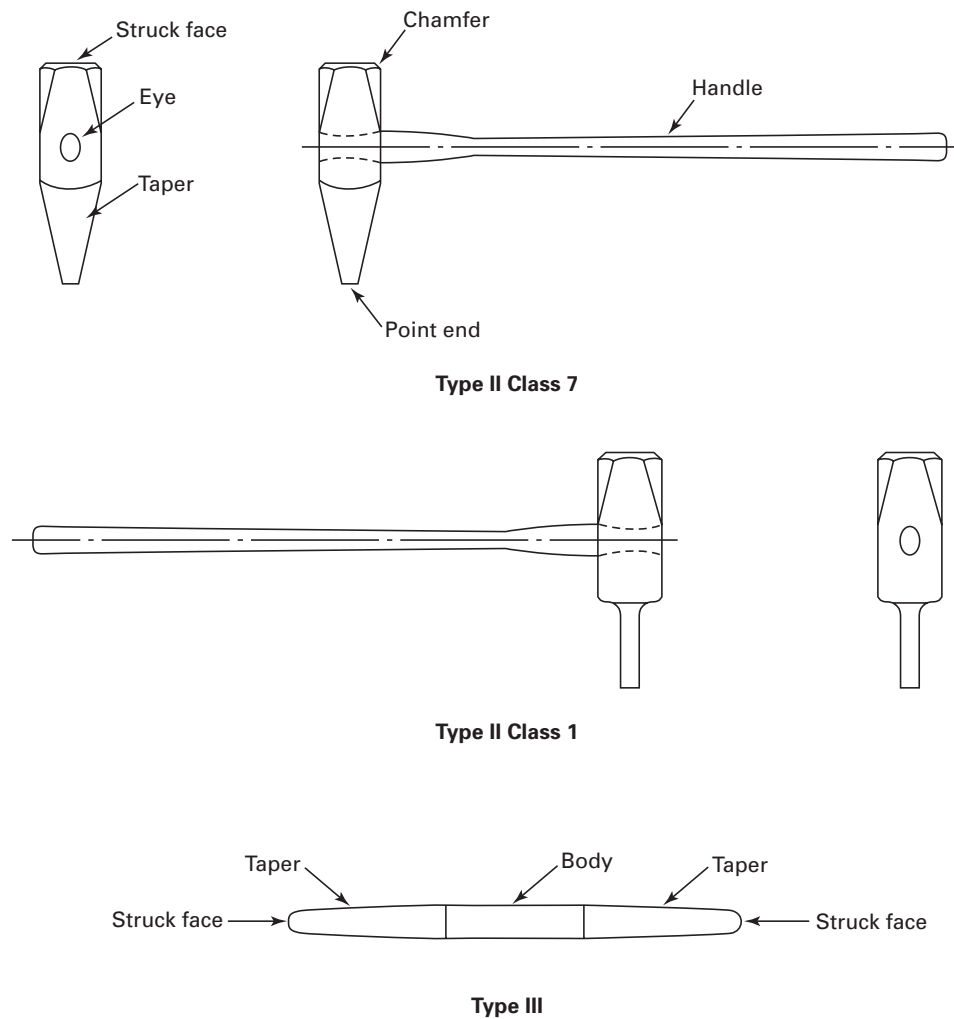


Fig. 3 Nomenclature for Type II Handle-Held Punches and Type III Drift Pins

appropriate type and size. The appropriate hammer shall have a striking face approximately 0.375 in. larger in diameter than the struck face of the chisel. Various typical styles of chisels are shown in Figs. 2 and 4.

(a) The struck face of all chisels shall have a convex or flat surface.

(b) The struck face of all chisels shall have a chamfer of approximately 45 deg or equivalent radius all around the perimeter, with the lesser width (see Fig. 2) equal to approximately one-tenth the body stock size. For example, if the body stock size equals 1 in., then the lesser chamfer width will equal approximately 0.1 in.

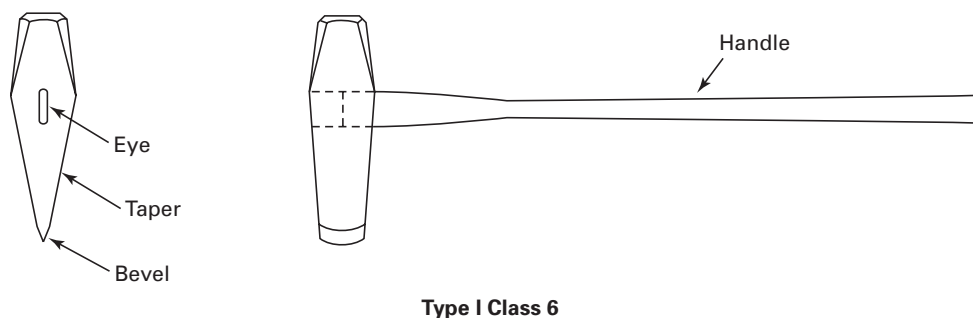


Fig. 4 Nomenclature for Type I Handle-Held Chisels

(c) Handles may be of any design and shall be inserted securely into the chisel and permit the chisel to be held over the work. Handles shall withstand the test specified in para. 6.4.

(d) All chisels and handles shall be free of nonfunctional sharp edges, points, and surface roughness that could adversely affect performance or safety.

5.1.2 Type II Punches. Punches shall have a point end for marking metal, driving and removing such things as pins and rivets, and aligning holes in different sections of material and a struck face on the opposite end to be struck by a hammer of the appropriate type and size. The appropriate hammer shall have a striking face approximately 0.375 in. larger in diameter than the struck face of the punch. Various typical styles of punches are shown in Figs. 1 and 3.

(a) The struck face of all Type II punches shall have a convex or flat surface.

(b) The struck face of all Type II punches shall have a chamfer of approximately 45 deg or equivalent radius all around the perimeter, with the lesser width (see Fig. 1) equal to approximately one-tenth the body stock size. For example, if the body stock size equals 1 in., then the lesser chamfer width will equal approximately 0.1 in.

(c) Type II, Class 1 and Type II, Class 7 handles may be of any design and shall be inserted securely into the punch and permit the punch to be held over the work without exposing the user to personal injury. Handles shall withstand the test specified in para. 6.4.

5.1.3 Type III Drift Pins. Type III drift pins shall taper to a convex struck face at each end to be struck by a hammer of the appropriate size to align holes in metal. The appropriate hammer shall have a striking face not less than 0.375 in. larger in diameter than the struck face of the pin.

5.2 Materials

The materials used in the manufacture of punches, chisels, and drift pins shall be such as to produce tools conforming to this Standard.

5.3 Mechanical Properties

5.3.1 All Type II punches shall have a hardness of 48 to 60 HRC or equivalent for a distance of not less than 0.25 in. from the point end.

5.3.2 Hardness of the struck face of chisels, punches, and drift pins shall not exceed 44 HRC or equivalent.

5.3.3 Chisels shall have a hardness of 53 HRC to 60 HRC or equivalent for a distance of not less than 0.25 in. from the cutting edge.

5.4 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 chisel, punch, or drift pin.

5.5 Marking

All chisels, punches, and drift pins shall be marked in a plain and permanent manner with the manufacturer's name or a trademark of such known character that the source of manufacture shall be readily determined. All types shall also be marked with nominal size. Marking shall be as permanent as the normal life expectancy of the tool to which it is applied (providing the marked surface has not been subjected to a fretting or abrading action) and be capable of withstanding the cleaning procedures normally experienced during its intended use.

Each punch and chisel shall be stamped, labeled, or otherwise marked, size permitting, with the safety message given below. Handled chisels and punches shall be stamped on the body, and the same safety message or equivalent shall appear on all replacement handles.



WARNING
WEAR SAFETY GOGGLES
USER AND BYSTANDER

This safety message shall be located in a position that will not interfere with the quality or performance of the tool. The principles given in ANSI Z535.4 shall be used as a guide for alternative, equivalent methods of labeling.

6 TESTS

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

Separate (new) samples shall be used for each of these tests. Failure to meet the requirements of any one of these tests indicates that the chisels, punches, or drift pins do not comply with this Standard.

6.1 Hardness

Hardness determination shall be made in accordance with ASTM E18.

6.2 Impact Test

Impact tests are conducted by mounting the subject tool vertically with the cutting edge, point end, or drift pin struck face resting against the test object. For chisels, the test object shall be a steel bar as specified in Table 1. For punches and drift pins, the test object shall be a steel plate of the hardness specified in Tables 2 and 3, respectively. The test object shall rest on a steel block weighing

Table 1 Impact Test Parameters—Type I Chisels

Chisel Class	Cutting Edge Width, in.	Drop Weight, lb	Drop Height of Weight, in.	Number of Hits	Test Bar	
					Shape and Material	Hardness
1, 2, and 3	<0.375 0.375 to <0.56 ≥0.56	10	6 20 30	20	0.25 in. dia. rod, AISI 01	33–35 HRC
4 and 5	All sizes	5	10	10	Rectangular, 0.75 in. min. thick and at least 0.25 in. wider than chisel cutting edge, SAE-AISI 1018-1030	80–85 HRB
6	All sizes	10	40	10	Rectangular, 0.75 in. min. thick and at least 0.25 in. wider than chisel cutting edge, SAE-AISI 1018-1030	25–30 HRC

GENERAL NOTE: For further information about AISI designations, contact Iron and Steel Society, 410 Commonwealth Drive, Warrendale, PA 15086.

Table 2 Impact Test Parameters—Type II Punches

Punch Class	Nominal Point Size, in. [Note (1)]	Drop Weight, lb	Drop Height of Weight, in.	Number of Hits	Test Plate Hardness, HRC
1 and 7 (Backing-out or)	3/8 to <5/8	20	25	20	45–50
2 (Bearing race)	≥5/8	20	30		
	7/16 × 15/64	20	15	20	45–50
	1/2 × 17/64		20		
	9/16 × 19/64		25		
	5/8 × 9/16		30		
3 (Center)	<3/16	5	10	20	25–30
	≥3/16	5	15		
4 (Drift or lining-up)	3/32	5	5	20	45–50
	1/8	5	10		
	3/16	5	20		
	1/4	5	20		
	5/16	10	20		
	3/8	10	20		
5 (Pin)	1/16	1	5	20	45–50
	3/32	1	7		
	1/8	2.5	10		
	5/32	5	10		
	3/16	5	20		
	7/32	5	30		
	1/4	10	25		
	5/16	10	30		
	3/8	10	30		
6 (Prick)	All sizes	5	5	20	25–30
8 (Starting)	1/16	1	20	20	45–50
	3/32	2.5	10		
	1/8	5	10		
	3/16	10	15		
	7/32	10	20		
	1/4	10	35		

NOTE:

(1) Sizes other than those listed are tested to the next smaller point size.

Table 3 Impact Test Parameters—Type III Drift Pins

Body Size, in.	Drop Weight, lb	Drop Height of Weight, in.	Number of Hits	Test Plate Hardness, HRC
9/16	5	25	20	25–30
11/16	10	20		25–30
13/16	10	25		45–50
15/16	20	25		45–50
1-1/16	20	30		45–50

not less than 200 lb. A test weight having a diameter not less than 0.375 in. larger than the struck face of the tool being tested shall be dropped from the height and for the number of hits specified in the appropriate table (Table 1, 2, or 3) for the type of tool. The test weight shall have a striking face hardness of 45 HRC to 60 HRC or equivalent and shall be dropped squarely onto the subject tool's struck face. The test object shall be moved after each drop of the weight. There shall be no chipping or spalling of the cutting edge, point end, or struck face and no cracking of the chisel, punch, or drift pin as a result of the test. Normal deformation at either end is permitted.¹

6.3 Bending Moment Test for Drift or Lining-up Punches

With the punch supported not more than 0.25 in. from the point end, pivoted on a cylindrical fulcrum that is located one-third of the taper length from the point end, a bending moment is applied by a static force at the mid-

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

point of the body with the force acting substantially at right angles to the axis of the body. The diameter of the fulcrum shall be approximately twice that of the punch cross-section at the point of contact and oriented at right angles to the axis of the punch. The punch must show at least 20 deg permanent deformation without fracture (see Fig. 5).

6.4 Handle Static Force Test

Handles of assembled chisels and punches shall not break, loosen, or otherwise fail when subjected to a force of 150 lbf while

(a) the chisel or punch body is locked securely in the test fixture with the struck face up and the handle extended in the horizontal plane, and

(b) the static force is applied vertically at a point on the handle measuring 10 in. from the top of the tool (see Figs. 6 and 7).

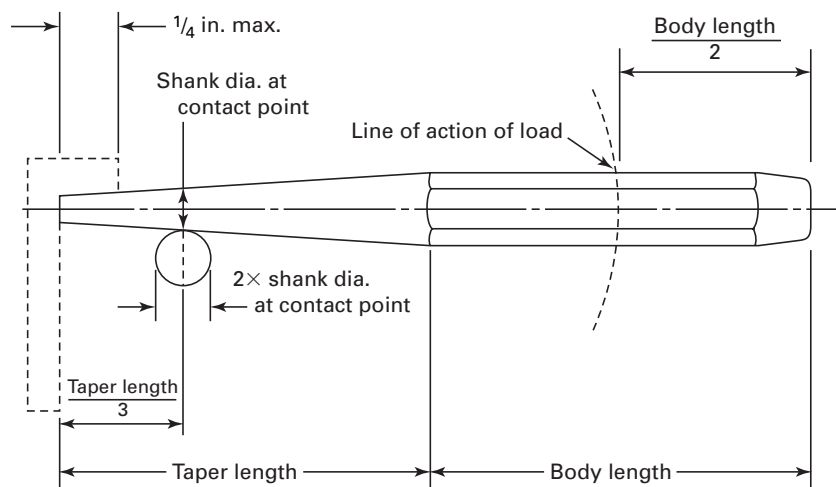
7 SAFETY REQUIREMENTS AND LIMITATIONS OF USE

Instructors and employers shall stress proper use and safety in the use of striking tools and emphasize the necessity to wear, and ensure the use of, safety goggles or equivalent eye protection.

The publication Guide to Hand Tools—Selection, Safety Tips, Proper Use, and Care provides guidelines for the safe use of these tools.

7.1

Metal punches are special-purpose tools designed and intended only for the uses listed in para. 5.1.2. They are intended only for marking metal, driving such things as pins and rivets, or aligning holes in different sections of material.

**Fig. 5 Bending Moment Test**

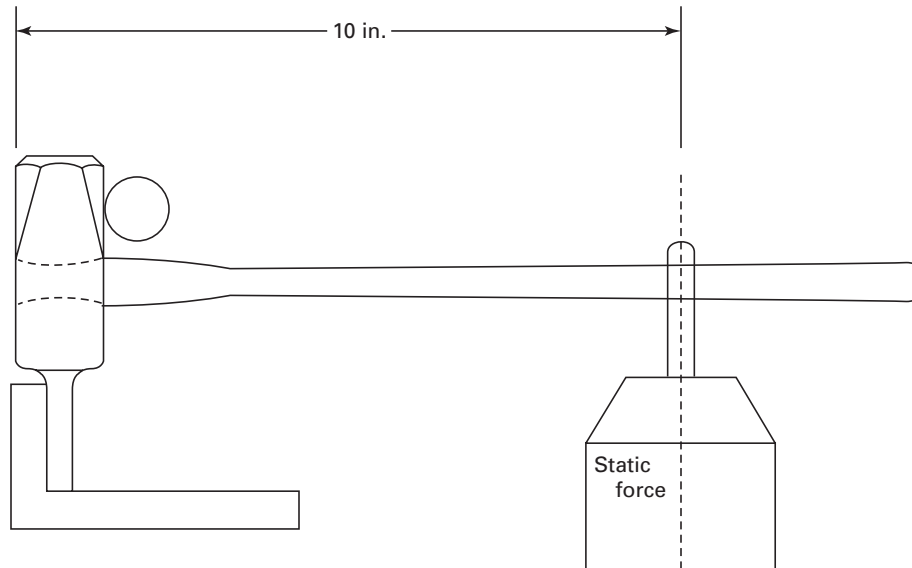


Fig. 6 Static Force Test for Handle-Held Punches

7.2

Metal drift pins are special-purpose tools designed and intended only for the uses listed in para. 5.1.3. They are intended only for aligning holes in different sections of material.

7.3

When using a pin, round, starting, or backing-out punch, the point end diameter of the punch shall approximate the size of the pin or rivet being driven.

7.4

Prick, center, pin, backing-out, and round punches shall not be used for prying or wedging. Pin, prick, and center punches shall not be used as starting punches. Prick and center punches shall not be used for driving pins.

7.5

Metal chisels are special-purpose tools designed and intended for the cutting, shaping, and removing of metal

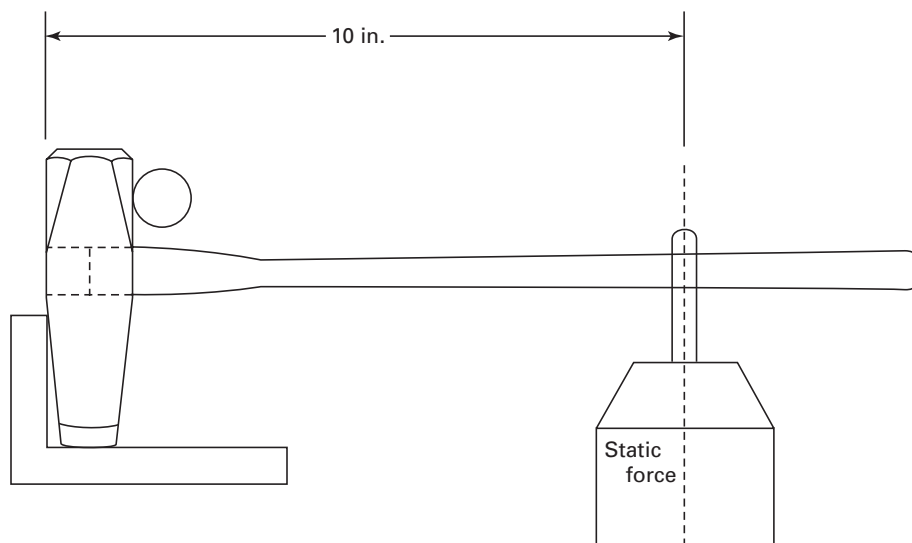


Fig. 7 Static Force Test for Handle-Held Chisels

softer than the cutting edge of the chisel itself. Such softer materials include cast iron, wrought iron, steel, bronze, copper, and the like. An initial cautious blow may be used to ascertain the relative hardness of the stuck object with subsequent examination of the cutting edge. To avoid possible eye or other bodily injury, chisels shall not be used to cut objects as hard or harder than the chisel cutting edge, such as stone or concrete.

7.6

Chisels shall not be used for prying or wedging.

7.7

Drift or lining-up punches and drift pins are special-purpose tools intended for aligning holes and shall not be used for driving metal or other hard objects.

7.8

A hammer should always be used with the striking face parallel with the struck face of the chisel, punch, or drift pin. Glancing blows, overstrikes, and understrikes should be avoided. No surface of a chisel, punch, or drift pin shall be struck other than the struck face. The striking tool of the appropriate size shall have a diameter not less than 0.375 in. larger than the struck face of the punch or drift pin.

7.9

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 chisel, punch, or drift pin is being used to avoid possible eye injury from flying objects.

7.10

Chisels, punches, and drift pins shall be inspected prior to each use and their use discontinued at the first

sign of bending, chipping, or cracking of the point end or the struck face.

7.11

Except as indicated in paras. 7.12 and 7.13, no area, section, or portion of a punch, chisel, or drift pin shall be ground, welded, treated by reheating, or otherwise altered from the original condition as furnished by the manufacturer.

7.12

As dulling of the cutting edge or point end occurs from tool usage, it shall be redressed to its original contour only by the use of a whetstone or hand file.²

7.13

Any mushrooming of the tool-struck face shall be promptly redressed to the original contour by use of a whetstone or hand file.²

7.14

Handles shall be inspected prior to each use, and those damaged shall be replaced. The handles of tools shall be free of splinters or cracks and kept tight in the tool. Replacements shall withstand the test requirements specified in para. 6.4 and be equivalent to the original handle in size and quality.

7.15

Chisels and punches with handles shall not be swung against the work but rather held by the handle with the tool on the work and struck with a hammer of the appropriate size (see para. 7.8).

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

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)	.B107.4-2005
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
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