ASME B94.9-2008

(Revision of ASME B94.9-1999)

REAFFIRMED 2023

Taps: Ground Thread With Cut Thread Appendix (Inch and Metric Sizes)

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

ASME SETTING THE STANDARD

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Date of Issuance: June 30, 2009

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.

Periodically certain actions of the ASME B1 Committee will be published as Cases. Cases are published on the ASME Web site under the Committee Pages at http://cstools.asme.org as they are issued.

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

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Nonmandatory Appendices

FOREWORD

A subcommittee of the National Screw Thread Commission began standardizing certain dimensions of cut and ground thread taps in 1926. The subcommittee prepared a report that was finally referred to the sectional committee on Small Tools and Machine Tool Elements (B5) organized under the procedure of the American Standards Association (ASA). The original proposal passed through the regular procedure and was designated as an American Standard by ASA in April 193[illegible].

Following the publication of the standard in 1930, Technical Committee 12 on Cut and Ground Thread Taps decided to include in the next edition additional types and sizes, a glossary of terms and definitions, and certain commercial standards issued by the tap and die manufacturers that were reproduced from their publications. Following approval from the sectional committee and the sponsors, the proposal was approved by ASA in November 1939.

In 1962 a new sectional committee, B94, was formed for the standardization of cutting tools. Technical Committee 12 on Cut and Ground Thread Taps now operates within this framework.

In 1967 the revised Standard proposed by Technical Committee 12 was approved and designated B94.9-1967.

In 1971 the revised Standard proposed by Technical Committee 12 was approved and designated B94.9-1971.

In 1979 the revised Standard proposed by Technical Committee 12 was approved and designated B94.9-1979.

In 1987 the revised Standard proposed by Technical Committee 12 was approved following all the procedures of the American National Standards Institute (ANSI) and designated ASME/ANSI B94.9-1987.

In 1999 the revised Standard proposed by Technical Committee 12 was approved and designated ASME B94.9-1999.

In 2005 the revised Standard proposed by Technical Committee 12 was approved and designated ASME B94.9-2008. The following major changes to the standard included are:

(a) ASME B94.9 is now under the B1 Standards Committee. This Standard will still have the B94.9 designation.

(b) All tables for cut thread taps have been moved to the Appendix section of this Standard.

(c) STI size taps have had blank sizes revised to be consistent with standard industry practice. The major diameter values on metric STI taps will follow established values, and pitch diameter values of metric STI taps will remain listed with "H" pitch diameter limits.

(d) The term "lead tolerance" has been changed to "cumulative pitch error," and formulas for calculating the values are included in this Standard.

(e) The practice of marking taps NPS has been changed to NPSC/NSPM.

(f) The practice of marking taps NC, NF, NEF, NS has been changed to UNC, UNF, UNEF, UNS for machine screw and fractions sizes.

(g) The inclusion of HS (high speed steel) and G (ground thread) has been made optional in the marking of taps.

(h) Nomenclature definitions for high speed steel, ground thread taps, and cut thread taps have been added

This Standard was approved as an American National Standard on June 18, 2008.

ASME B1 COMMITTEE
Screw Threads

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

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CORRESPONDENCE WITH THE B1 COMMITTEE

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 proposing revisions, and attending Committee meetings. Correspondence should be addressed to:

Secretary, B1 Standards Committee
The American Society of Mechanical Engineers
Three Park Avenue
New York, NY 10016-5990

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.

Proposing a Case. Cases may be issued for the purpose of providing alternative rules when justified, to permit early implementation of an approved revision when the need is urgent, or to provide rules not covered by existing provisions. Cases are effective immediately upon ASME approval and shall be posted on the ASME Committee Web page.

Requests for Cases shall provide a Statement of Need and Background Information. The request should identify the Standard, the paragraph, figure or table number(s), and be written as a Question and Reply in the same format as existing Cases. Requests for Cases should also indicate the applicable edition(s) of the Standard to which the proposed Case applies.

Attending Committee Meetings. The B1 Standards Committee regularly holds meetings, which are open to the public. Persons wishing to attend any meeting should contact the Secretary of the B1 Standards Committee.

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TAPS: GROUND THREAD WITH CUT THREAD APPENDIX (INCH AND METRIC SIZES)

1 GENERAL

1.1 Scope

This Standard covers various designs of standard taps, nomenclature, and definitions; the standard system of marking; and dimensions and tolerance tables for the types and styles of taps listed below. For thread series designations, refer to Table 1.

Type	Style	Applicable Section(s)
Standard straight thread, general purpose; Tables 2, 3, and 4	Straight fluted	3.1
	Spiral fluted	3.4 and 3.5
	Spiral point, with straight flutes	3.2
	Spiral point only, no straight flutes	3.3
	Straight fluted	3.1
Pulley; Table 6	Straight fluted	3.7
Pipe, taper thread; Table 7	Straight fluted	3.8
Pipe, straight thread; Table 10	Straight fluted	3.8
Thread forming; Tables 2 and 3	Straight lobes	3.6
	Spiral lobes	3.6

1.2 Reference Standards for Screw Thread Nomenclature and Forms of Thread

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

ASME B1.1, Unified Inch Screw Threads (UN and UNR Thread Form)

ASME B1.7, Screw Threads: Nomenclature, Definitions, and Letter Symbols

ASME B1.12, Class 5 Interference-Fit Thread

ASME B1.13M, Metric Screw Threads — M Profile

ASME B1.15, Unified Inch Screw Threads (UNJ Thread Form)

ASME B1.20.1, Pipe Threads, General Purpose (Inch)

ASME B1.20.3, Dryseal Pipe Threads (Inch)

ASME B1.20.7, Hose Coupling Screw Threads (Inch)

ASME B1.21M, Metric Screw Threads: MJ Profile

ASME B1.30, Screw Threads — Standard Practice for Calculating and Rounding Dimensions

ASME B18.29.1, Helical Coil Screw Thread Inserts — Free Running and Screw Locking (Inch Series)

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

SAE AS-8879, Screw Threads-UNJ Profile Inch Controlled Radius Root With Increased Minor Diameter

SAE AS-71051, Pipe Threads Taper, Aeronautical National Form, Symbol ANPT-Design and Inspection Standard

Publisher: Society of Automotive Engineers (SAE), 400 Commonwealth Drive, Warrendale, PA 15096-0001

1.3 Basic Form of Thread

The basic angle of thread between the flanks of thread measured in an axial plane is 60 deg (Fig. 1).

The symmetrical height of the thread form, h, is found as follows:

$$h = 0.64951905P = \frac{0.64951905}{n}$$

The basic pitch diameter is obtained by subtracting the symmetrical single thread height, h, from the basic major diameter as follows:

$$\text{Basic pitch diameter} = D_{\text{bsc}} - h$$

where

D_{bsc} = basic major diameter
h = symmetrical height of thread
n = number of threads per inch
P = pitch of thread

1.4 Tap Pitch Diameter Size

A range of tap pitch diameter limits from which the user may select to suit local conditions is available. Tables A-1 and A-2 in Nonmandatory Appendix A list tap pitch diameter limits that produce common classes of thread when used with reasonable care in average materials. Factors beyond the tap "H" limit affect final part size.

2 TAP CATEGORIZATION

Taps included in this Standard are categorized according to type, style, size and chamfer, and blank