ASME B1.30-2024
[Revision of ASME B1.30-2002 (R2022)]

Screw Threads: Standard Practice for Calculating and Rounding Dimensions

AN AMERICAN NATIONAL STANDARD

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FOREWORD

The Committee B1 for standardization of screw threads was organized in 1920 under the sponsorship of the American Society of Mechanical Engineers (ASME), the Society of Automotive Engineers, and the American Engineering Standards Committee [now known as the American National Standards Institute (ANSI)]. The efforts of this committee through the years resulted in the development of several screw thread standards.

The ASME B1 Standards Committee recognized the need to standardize the method of rounding decimal values in the calculation of screw thread dimensions. It charged Subcommittee 30 with the responsibility for producing such a standard. ASME B1.30 was developed only to serve as the basis for rounding of decimal values associated with the computation of screw thread dimensions.

The examples and formulas depicted within this Standard are for reference only and are presented only to clarify the rounding procedures described. When calculating the different thread characteristics for a particular thread form, see the appropriate ASME B1 standard for the formulas and methodology of calculation for that thread.

ASME B1.30 was originally approved as an American National Standard on June 29, 1992. It was revised in 2002 and reaffirmed in 2012 and reaffirmed again in 2017.

The 2002 revisions included a clarification of the use of this Standard for metric applications; an exception to the number of decimal places for the allowance 2A when used in intermediate calculations as Td_2; and the addition of the maximum external UN minor diameter, maximum and minimum internal pitch diameters, and the minimum internal major diameter to the examples cited in para. 3.2. The 2002 update also removed Appendix A because the values for 60-deg thread elements were either listed or could be calculated by formulas in other existing B1 standards. It was replaced with a new Nonmandatory Appendix A containing a table listing the number of decimal places for each of the thread characteristics used in the examples in ASME B1.30. Examples of a standard metric size listed in ASME B1.13M and ISO 261 and a special inch size showing how to round numbers with an infinite number of digits after the decimal point were also added.

This 2024 edition of ASME B1.30 includes the following updates:

(a) General rules for trigonometric functions have been added.

(b) Examples for the calculation of 3A and 3B threads have been added.

(c) The wording in various paragraphs has been clarified.

(d) A small number of values has been corrected.

(e) Symbols r and Td_2 have been added to Table A-1.

(f) Tables 3.2-1, 3.2-5, and 4-1 (formerly Tables 2, 4, and 10) have been revised as follows for consistency with changes in ASME B1.1-2024:

(1) In Characteristic Description (5) of Tables 3.2-1 and 3.2-5, the UNR $2h_s$ constant has been corrected from 1.19078493P to 1.22686932P.

(2) In Table 4-1, the UNR $2h_s$ constant 1.19078493P was replaced with the corrected value 1.22686932P and the h_s constant 0.59539247 P was replaced with the corrected value 0.61343466P.

(g) Tables have been redesignated.

ASME B1.30-2024 was approved as an American National Standard on May 7, 2024.

ASME B1 COMMITTEE
Standardization and Unification of Screw Threads

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

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A. L. Barrows, *Chair*
P. Larouche, *Vice Chair*
D. Papert, *Secretary*

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CORRESPONDENCE WITH THE B1 COMMITTEE

General. ASME codes and standards are developed and maintained by committees with the intent to represent the consensus of concerned interests. Users of ASME codes and standards may correspond with the committees to propose revisions or cases, report errata, or request interpretations. Correspondence for this Standard should be sent to the staff secretary noted on the committee's web page, accessible at https://go.asme.org/B1committee.

Revisions and Errata. The committee processes revisions to this Standard on a periodic basis 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 in the next edition of the Standard.

In addition, the committee may post errata on the committee web page. Errata become effective on the date posted. Users can register on the committee web page to receive email notifications of posted errata.

This Standard is always open for comment, and the committee welcomes proposals for revisions. Such proposals should be as specific as possible, citing the paragraph number, the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent background information and supporting documentation.

Cases. The committee does not issue cases for this Standard.

Interpretations. The committee does not issue interpretations for this Standard.

Committee Meetings. The B1 Standards Committee regularly holds meetings that are open to the public. Persons wishing to attend any meeting should contact the secretary of the committee. Information on future committee meetings can be found on the committee web page at https://go.asme.org/B1committee.

SCREW THREADS: STANDARD PRACTICE FOR CALCULATING AND ROUNDING DIMENSIONS

1 GENERAL

1.1 Purpose

The purpose of this Standard is to establish uniform and specific practices for calculating and rounding the numeric values used for inch and metric screw thread design data dimensions and for gages where appropriate. No attempt is made to establish a policy of rounding actual thread characteristics measured by the manufacturer or user of thread gages. The standard rounding practice regarding the last figure or decimal place to be retained by a numeric value and the number of decimal places to be retained by values used in intermediate calculations of thread design data dimensions is covered. Values calculated to this Standard for inch and metric screw thread design data dimensions may vary slightly from values shown in existing ASME B1 standards and shall take precedence, unless a specific standard states otherwise, in all new or future revisions of ASME B1 standards as applicable (see para. 1.2 for exceptions).

1.2 Metric Application

Allowances (fundamental deviations) and tolerances for metric M and MJ screw threads are based on formulas in applicable standards. Values of allowances for standard tolerance positions and values of tolerances for standard tolerance grades are tabulated in these standards for a selection of pitches. The rounding rules specified herein have not been applied to these values but have followed practices of the International Organization for Standardization (ISO). For pitches, which are not included in the tables, standard formulas and the rounding rules specified herein are applicable.

NOTE: ISO rounding practices for screw thread tolerances and allowances use rounding to the nearest values in the ISO R40 series of numbers in accordance with ISO 3. In some cases, the rounded values have been adjusted to produce a smooth progression. Since the ISO rounded values have been standardized internationally for metric screw threads, recalculating tolerances and allowances using ASME B1.30 rules in the United States would lead to confusion. ASME B1.30 rounding rules are, therefore, only applicable to special threads where tabulated values do not exist in ISO standards. Values calculated using the ISO R40 series values may differ from those calculated using ASME B1.30. In such a case, the special thread values generated using ASME B1.30 take precedence.

1.3 References

The following is a list of publications referenced in this Standard. Unless otherwise specified, the latest edition shall apply.

ASME B1.1. Unified Inch Screw Threads (UN, UNR, and UNJ Thread Forms). The American Society of Mechanical Engineers.

ASME B1.13M. Metric Screw Threads: M Profile. The American Society of Mechanical Engineers.

ASME SI-1. ASME Orientation and Guide for Use of SI (Metric) Units (9th ed.). The American Society of Mechanical Engineers.

IEEE/ASTM SI 10. American National Standard for Metric Practice. IEEE/ASTM International.

ISO 3. Preferred numbers — Series of preferred numbers. International Organization for Standardization.

ISO 261. ISO general purpose metric screw threads — General plan. International Organization for Standardization.

ISO 965-1. ISO general-purpose metric screw threads — Tolerances — Part 1: Principles and basic data. International Organization for Standardization.