ASME B1.30-2002
(Revision of ASME B1.30M-1992)

SCREW THREADS: STANDARD PRACTICE FOR CALCULATING AND ROUNDING DIMENSIONS

AN AMERICAN NATIONAL STANDARD

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FOREWORD

The American National Standards Committee B1 for standardization of screw threads was organized in 1920 as sectional Committee B1 under the sponsorship of the American Engineering Standards Committee (later the American Standards Association, then the United States of America Standards Institute and as of October 6, 1969, the American National Standards Institute, Inc.), with the Society of Automotive Engineers and The American Society of Mechanical Engineers as joint sponsors. As a result, a great deal of effort was expended through the years toward development of several screw thread standards.

Recognizing the need to standardize the method of rounding decimal values in the calculation of screw thread dimemsions, the ASME Standards Committee B1 charged Subcommittee 30 with the responsibility for producing such a standard.

This Standard designated 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, refer to the appropriate ASME B1 standard for the formulas and methodology of calculation for that thread.

This Standard was originally approved as an American National Standard on June 29, 1992. This issue updates the 1992 issue and includes:

(a) the addition of a note to para. 1.2 for the clarification of the use of this Standard for metric applications;

(b) the addition of an exception in para. 3.1.3 to the number of decimal places for the allowance 2A when used in intermediate calculations as Td_2;

(c) the addition of the maximum external UN minor diameter, maximum and minimum internal pitch diameters and the minimum internal major diameter to the example in para. 3.2.1;

(d) removal of Appendix A containing various common values for 60 deg thread elements. This was done because the values are either listed or can be calculated by formulas in other existing B1 standards;

(e) the addition of an example for a standard metric size that is listed in ASME B1.13M and ISO 261;

(f) the addition of an example for a special inch size showing how to round numbers with an infinite number of digits after the decimal point;

(g) added a new Appendix A with a table listing the number of decimal places for each of the thread characteristics used in the examples in B1.30.

Suggestions for improvement of this Standard will be welcome. They should be sent to Secretary, ASME B1 Standards Committee, Three Park Avenue, New York, NY 10016-5990 U.S.A.

This revision was approved as an American National Standard on July 12, 2002.

ASME STANDARDS COMMITTEE B1
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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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 only. No attempt is made to establish a policy of rounding actual thread characteristics measured by the manufacturer or user of thread gages. Covered is the Standard Rounding Policy 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. Values calculated to this Standard for inch and metric screw thread design data dimensions may vary slightly from values shown in existing issues of ASME B1 screw thread standards and are to take precedence in all new or future revisions of ASME B1 standards as applicable except as noted in para. 1.2.

1.2 Metric Application

Allowances (fundamental deviations) and tolerances for metric M and MJ screw threads are based upon formulas, which appear 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. Rounding rules specified below 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 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, it would lead to confusion if tolerances and allowances were recalculated using B1.30 rules, for use in the USA. 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 B1.30. In such a case the special thread values generated using B1.30 take precedence.

2 ROUNDING OF DECIMAL VALUES

The following rounding practice represents the method to be used in all new or future revisions of ASME B1 thread standards.

NOTE: It is recognized that this Standard is not in agreement with other published documents, e.g., ASME SI-9, Guide for Metrication of Codes and Standards SI (Metric) Units, and IEEE/ASTM SI 10, Standard for Metric Practice. The rounding practices used in the forenamed documents are designed to produce even distribution of numerical values. The purpose of this document is to define the most practical and common used method of rounding numerical thread form values. Considering today's technology, application of this method is far more practical in the rounding of thread form values.

2.1 Rounding Policy

2.1.1 When the figure next beyond the last figure or place retained is less than 5, the figure in the last place retained is kept unchanged.

EXAMPLE:

1.012342	1.01234
1.012342	1.0123
1.012342	1.012

2.1.2 When the figure next beyond the last figure or place retained is greater than 5, the figure in the last place retained is increased by 1.

EXAMPLE:

1.56789	1.5679
1.56789	1.568
1.56789	1.57

2.1.3 When the figure next beyond the last figure or place retained is 5, and:

(a) there are no figures, or only zeros, beyond this 5, the last figure should be increased by 1;

EXAMPLE:

1.01235	1.0124
1.0123500	1.0124
1.012345	1.01235
1.01234500	1.01235

(b) if the 5 next beyond the figure in the last place to be retained are followed by any figures other than zero,

Table 1
Number of Decimal Places Used in Calculations

Units	Pitch	Constants	Intermediate	Final
Inch	8	8	6	4 (except as outlined in para. 3.1.3)
Metric	as designated	7	5	3

the figure in the last place retained should be increased by 1.

EXAMPLE:

1.0123501	1.0124
1.0123599	1.0124
1.01234501	1.01235
1.01234599	1.01235

2.1.4 The final rounded value is obtained from the most precise value available and not from a series of successive rounding. For example, 0.5499 should be rounded to 0.550, 0.55 and 0.5 (not 0.6), since the most precise value available is less than 0.55. Similarly, 0.5501 should be rounded as 0.550, 0.55 and 0.6, since the most precise value available is more than 0.55. In the case of 0.5500 rounding should be 0.550, 0.55 and 0.6, since the most precise value available is 0.5500.

3 CALCULATIONS FROM FORMULAS

3.1 General Rules

3.1.1 Values for pitch and constants derived from a function of pitch are used out to eight decimal places for inch series. The eight place values are obtained by rounding their truncated ten place values. Seven decimal place values for metric series constants are derived by rounding their truncated nine place values. See para. 4 for thread form constants. Values used in intermediate calculations are rounded to two places beyond the number of decimal places retained for the final value, see Table 1.

EXAMPLE:

$n = 28$ threads per inch
$P = 1/n$
$P = 1/28$
$P = 0.0357142857$
$P = 0.03571429$

3.1.2 Rounding to the final value is the last step in a calculation.

3.1.3 For inch screw thread dimensions, four decimal places are required for the final values of pitch diameter, major diameter, and minor diameter with the exception of Class 1B and 2B internal thread minor diameters for thread sizes 0.138 and larger, see below. The final values for the allowances and tolerances applied to thread elements are expressed to four decimal places except for external thread pitch diameter tolerance, Td_2, which is expressed to six decimal places.

(a) Minor Diameter Exceptions for Internal Threads:

(1) Minimum Minor Diameter. All classes are calculated and then rounded off to the nearest 0.001 in. and expressed in three decimal places for sizes 0.138 in. and larger. For Class 3B, a zero is added to yield four decimal places.

(2) Maximum Minor Diameter. All classes are calculated before rounding, then rounded for Classes 1B and 2B to the nearest 0.001 in. for sizes 0.138 in. and larger. Class 3B values are rounded to four decimal places.

3.1.4 Metric screw threads are dimensioned in millimeters. The final values of pitch diameter, major diameter, minor diameter, allowance and thread element tolerances are expressed to three decimal places.

3.1.5 Values containing multiple trailing zeros out to the required number of decimal places can be expressed by displaying only two of them beyond the last significant digit.

EXAMPLE: 20 threads per inch has a pitch equal to 0.05000000 and can be expressed as 0.0500.

3.2 Examples

The formulas in the examples for inch screw threads in Tables 2, 3, 4 and 5 are based on those listed in ASME B1.1, Unified Inch Screw Threads. Tables 2 and 3 are based on a size that when converted from a fraction to a decimal will result in a number that has only four decimal places. Tables 4 and 5 are based on a size that when converted will result in a number with infinite numbers of digits after the decimal point.

The formulas in the examples for metric screw threads in Tables 6, 7, 8 and 9 are based on those listed in ASME B1.13M, Metric Screw Threads. Tables 6 and 7 show the use of the tabulated values for allowances and tolerances (in accordance with ISO 965-1) for the calculation of size limits for standard diameter/pitch combinations listed in both ISO 261 and ASME B1.13M. The constant values differ from those used for inch screw threads, in accordance with the policy of rounding of this Standard, because metric limits of size are expressed to only three decimal places rather than four.

4 THREAD FORM CONSTANTS

For thread form data tables, see Table 10. The number of decimal places and the manner in which they are

listed should be consistent. Thread form constants printed in older thread standards are based on a function of thread height (H) or pitch (P). The equivalent of the corresponding function is also listed. There are some constants that would require these values to 8 or 7 decimal places before they would round to equivalent values. For standardization the tabulated listing of thread values based on a function of pitch has been established, with thread height used as a reference only. All thread calculations are to be performed using a function of pitch (P), rounded to 8 decimal places for inch series and as designated for metric series, not a function of thread height (H). Thread height is to be used for reference only.

Table 2 Example of External Inch Screw Threads, $\frac{1}{2}$-28 UNEF-2A

Thread Size = $\frac{1}{2}$-28 or 0.5000-28 UNEF-2A		
Characteristic Description	**Example of Size Calculation**	**Additional Information**
(1) Maximum external major diameter (d max.) = Basic major diameter (d bsc) – allowance (es)	d max. = d bsc – es	. . .
	d bsc = 0.5000	This is the final value of the basic major diameter which is rounded to four decimal places.
	es = 0.300 (Td_2 for class 2A)	For the Class 2A pitch diameter tolerance, see Table 2 (4).
	es = 0.300 (0.003668)	The six decimal place value for Class 2A pitch diameter tolerance (Td_2) is used in this calculation.
	es = 0.001100	This figure is rounded to four decimal places to obtain the final value of es.
	es = 0.0011	. . .
	d max. = 0.5000 – 0.0011	. . .
	d max. = 0.4989	. . .
(2) Minimum external major diameter (d min.) = Maximum external major diameter (d max.) – major diameter tolerance (Td)	d min. = d max. – Td	. . .
	$Td = 0.060\sqrt[3]{P^2}$	. . .
	$Td = 0.060\sqrt[3]{(0.03571429)^2}$	All thread calculations are to be performed using (P) rounded to 8 decimal places.
	$Td = 0.060\sqrt[3]{0.001276)}$	. . .
	Td = 0.060 (0.108463)	. . .
	Td = 0.006508	This figure is rounded to four decimal places to obtain the final value of Td.
	Td = 0.0065	. . .
	d min. = 0.4989 – 0.0065	. . .
	d min. = 0.4924	. . .

Table 2 Example of External Inch Screw Threads, 1/2-28 UNEF-2A (Cont'd)

Thread Size = 1/2-28 or 0.5000-28 UNEF-2A		
Characteristic Description	**Example of Size Calculation**	**Additional Information**
(3) Maximum external pitch diameter ($d_2$max.) = Maximum external major diameter (d max.) – twice the external thread addendum ($2h_{as}$)	$d_2\text{max.} = d\text{ max.} - 2h_{as}$ $2h_{as} = 0.64951905P$ $2h_{as} = 0.64951905\ (0.03571429)$	. . . . . . All thread calculations are to be performed using (P) rounded to 8 decimal places.
	$2h_{as} = 0.023197$ $d_2\text{max.} = 0.4989 - 0.023197$ $d_2\text{max.} = 0.475703$	. . . . . . This figure is rounded to four decimal places to obtain the final value of $d_2$max.
	$d_2\text{max.} = 0.4757$	. . .
(4) Minimum external pitch diameter ($d_2$min.) = Maximum external pitch diameter ($d_2$max.) – external pitch diameter tolerance (Td_2)	$d_2\text{min.} = d_2\text{max.} - Td_2$	. . .
	$Td_2 = 0.0015\sqrt[3]{d\ \text{bsc}} + 0.0015\sqrt{LE} + 0.015\sqrt[3]{P^2}$	LE (length of engagement) required in this example, is equal to $9P$. See ASME B1.1 for LE applications for other thread series.
	$Td_2 = 0.0015\sqrt[3]{0.5000} + 0.0015\sqrt{9\ (0.03571429)} + 0.015\sqrt[3]{(0.03571429)^2}$	. . .
	$Td_2 = 0.0015\sqrt[3]{0.5000} + 0.0015\sqrt{0.321429} + 0.015\sqrt[3]{0.001276}$	. . .
	$Td_2 = (0.0015)\ (0.793701) + (0.0015)\ (0.566947) + (0.015)\ (0.108463)$ $Td_2 = 0.001191 + 0.000850 + 0.001627$ $Td_2 = 0.003668$	. . . . . . This figure is rounded to six decimal places to obtain the final value of the external pitch diameter tolerance Td_2.
	$d_2\text{min.} = 0.4757 - 0.003668$ $d_2\text{min.} = 0.472032$	. . . This figure is rounded to four decimal places to obtain the final value of $d_2$min.
	$d_2\text{min.} = 0.4720$	. . .

Table 2 Example of External Inch Screw Threads, $\frac{1}{2}$-28 UNEF-2A (Cont'd)

Thread Size = $\frac{1}{2}$-28 or 0.5000-28 UNEF-2A		
Characteristic Description	**Example of Size Calculation**	**Additional Information**
(5) Maximum external UNR minor diameter ($d_3$max.) = Maximum external major diameter (d max.) – double height of external UNR thread ($2h_s$)	$d_3\text{max.} = d\text{ max.} - 2h_s$	. . .
	$2h_s = 1.19078493P$	. . .
	$2h_s = 1.19078493\ (0.03571429)$	All thread calculations are to be performed using (P) rounded to 8 decimal places.
	$2h_s = 0.042528$	. . .
	$d_3\text{max.} = 0.4989 - 0.042528$	. . .
	$d_3\text{max.} = 0.456372$	This figure is rounded to four decimal places to obtain the final value of d_3 max.
	$d_3\text{max.} = 0.4564$	. . .
(6) Maximum external UN minor diameter ($d_1$max.) = Maximum external major diameter (d max.) – double height of external UN thread ($2h_s$)	$d_1\text{max.} = d\text{ max.} - 2h_s$	. . .
	$2h_s = 1.08253175P$	For UN threads, $2h_s = 2h_n$
	$2h_s = 1.08253175\ (0.03571429)$	All thread calculations are to be performed using (P) rounded to 8 decimal places.
	$2h_s = 0.038662$	. . .
	$d_1\text{max.} = 0.4989 - 0.038662$	. . .
	$d_1\text{max.} = 0.460238$	This figure is rounded to four decimal places to obtain the final value of $d_1$max.
	$d_1\text{max.} = 0.4602$	. . .

GENERAL NOTES:
(a) All dimensions expressed in inches for calculations in this table.
(b) $P = 1/n = 1/28 = 0.03571429$.

Table 3 Example of Internal Inch Screw Threads, ½-28 UNEF-2B

Thread Size = ½-28 or 0.5000-28 UNEF-2B		
Characteristic Description	**Example of Size Calculation**	**Additional Information**
(1) Minimum internal minor diameter (D_1min.) = Basic major diameter (D bsc) – double height of internal thread ($2h_n$)	D_1min. = D bsc – $2h_n$	. . .
	$2h_n = 1.08253175P$	. . .
	$2h_n = 1.08253175\ (0.03571429)$	All thread calculations are to be performed using (P) rounded to 8 decimal places.
	$2h_n = 0.038662$	. . .
	D_1min. = 0.5000 – 0.038662	. . .
	D_1min. = 0.461338	For the Class 2B thread used in this example this figure is rounded to three decimal places to obtain the final value of D_1 min. Other sizes and classes are expressed in a four place decimal. See para. 3.1.3(a)(1).
	D_1min. = 0.461	. . .
(2) Maximum internal minor diameter (D_1max.) = Minimum internal minor diameter (D_1min.) rounded to six decimal places + internal minor diameter tolerance (TD_1)	D_1max. = D_1min. (to six decimal places) + TD_1	See para 3.1.3(a)(2) for exception rule when calculating D_1 max.
	$TD_1 = 0.25P - 0.4P^2$	See ASME B1.1 for limitations on use of this formula.
	$TD_1 = 0.25\ (0.03571429) - 0.4\ (0.03571429)^2$	All thread calculations are to be performed using (P) rounded to 8 decimal places.
	$TD_1 = 0.25\ (0.03571429) - 0.4\ (0.001276)$	. . .
	$TD_1 = 0.008929 - 0.000510$	. . .
	$TD_1 = 0.008419$	This figure is rounded to four decimal places to obtain the final value of TD_1.
	$TD_1 = 0.0084$	. . .
	D_1max. = 0.461338 + 0.0084	. . .
	D_1max. = 0.469757	For the Class 2B thread used in this example this figure is rounded to three decimal places to obtain the final value of D_1 max. Other sizes and classes are expressed in a four place decimal. See para. 3.1.3(a).
	D_1max. = 0.470	. . .

Table 3 Example of Internal Inch Screw Threads, ½-28 UNEF-2B (Cont'd)

Characteristic Description	Thread Size = ½-28 or 0.5000-28 UNEF-2B Example of Size Calculation	Additional Information
(3) Minimum internal pitch diameter (D_2min.) = Basic major diameter (D bsc) – twice the external thread addendum (h_b)	D_2min. = D bsc – h_b	. . .
	h_b = 0.64951905P	. . .
	h_b = 0.64951905 (0.03571429)	All thread calculations are to be performed using (P) rounded to 8 decimal places.
	h_b = 0.023197	. . .
	D_2min. = 0.5000 – 0.023197	. . .
	D_2min. = 0.476803	This figure is rounded to four decimal places to obtain the final value of D_2 min.
	D_2min. = 0.4768	. . .
(4) Maximum internal pitch diameter (D_2max.) = Minimum internal pitch diameter (D_2min.) + internal pitch diameter tolerance (TD_2)	D_2max. = D_2min. + TD_2	. . .
	TD_2 = 1.300 (Td_2 for class 2A)	The constant 1.300 is for this Class 2B example and will be different for Classes 1B and 3B. See ASME B1.1.
	TD_2 = 1.300 (0.003668)	For the Td_2 Class 2A pitch diameter tolerance, see Table 2 (4). The six place decimal place value is used.
	TD_2 = 0.004768	This figure is rounded to four decimal places to obtain the final value of TD_2.
	TD_2 = 0.0048	. . .
	D_2max. = 0.4768 + 0.0048	. . .
	D_2max. = 0.4816	. . .
(5) Minimum internal major diameter (D min.) = Basic major diameter (D bsc)	D min. = D bsc	. . .
	D bsc = 0.5000	. . .
	D min. = 0.5000	. . .

GENERAL NOTES:
(a) All dimensions expressed in inches for calculations in this table.
(b) $P = 1/n = 1/28 = 0.03571429$.

Table 4 Example of External Inch Screw Threads, $^{19}/_{64}$-36 UNS-2A

Thread Size = $^{19}/_{64}$-36 or 0.2969 (0.296875 Rounded to Four Decimal Places)-36 UNS-2A		
Characteristic Description	**Example of Size Calculation**	**Additional Information**
(1) Maximum external major diameter (d max.) = Basic major diameter (d bsc) – allowance (es)	d max. = d bsc – es	. . .
	d bsc = 0.2969	This is the final value of the basic major diameter which is rounded to four decimal places.
	es = 0.300 (Td_2 for Class 2A)	For the Class 2A pitch diameter tolerance, see Table 4 (4).
	es = 0.300 (0.003127)	The six decimal place value for Class 2A pitch diameter tolerance (Td_2) is used in this calculation.
	es = 0.000938	This figure is rounded to four decimal places to obtain the final value of es.
	es = 0.0009	. . .
	d max. = 0.2969 – 0.0009	. . .
	d max. = 0.2960	. . .
(2) Minimum external major diameter (d min.) = Maximum external major diameter (d max.) – major diameter tolerance (Td)	d min. = d max. – Td	. . .
	$Td = 0.060\sqrt[3]{P^2}$	. . .
	$Td = 0.060\sqrt[3]{(0.02777778)^2}$	All thread calculations are to be performed using (P) rounded to 8 decimal places.
	$Td = 0.060\sqrt[3]{0.000772}$	. . .
	Td = 0.060 (0.091736)	. . .
	Td = 0.005504	This figure is rounded to four decimal places to obtain the final value of Td.
	Td = 0.0055	. . .
	d min. = 0.2960 – 0.0055	. . .
	d min. = 0.2905	. . .

Table 4 Example of External Inch Screw Threads, $^{19}/_{64}$-36 UNS-2A (Cont'd)

Thread Size = $^{19}/_{64}$-36 or 0.2969 (0.296875 Rounded to Four Decimal Places)-36 UNS-2A		
Characteristic Description	**Example of Size Calculation**	**Additional Information**
(3) Maximum external pitch diameter ($d_2$max.) = Maximum external major diameter (d max.) – twice the external thread addendum ($2h_{as}$)	$d_2\text{max.} = d\text{ max.} - 2h_{as}$	...
	$2h_{as} = 0.64951905P$	...
	$2h_{as} = 0.64951905\ (0.02777778)$	All thread calculations are to be performed using (P) rounded to 8 decimal places.
	$2h_{as} = 0.018042$	...
	$d_2\text{max.} = 0.2960 - 0.018042$	...
	$d_2\text{max.} = 0.277958$	This figure is rounded to four decimal places to obtain the final value of $d_2$max.
	$d_2\text{max.} = 0.2780$	...
(4) Minimum external pitch diameter ($d_2$min.) = Maximum external pitch diameter ($d_2$max.) – external pitch diameter tolerance (Td_2)	$d_2\text{min.} = d_2\text{max.} - Td_2$	...
	$Td_2 = 0.0015\sqrt[3]{d\ \text{bsc}} + 0.0015\sqrt{LE} + 0.015\sqrt[3]{P^2}$	LE (length of engagement) required in this example, is equal to $9P$. See ASME B1.1 for LE applications for other thread series.
	$Td_2 = 0.0015\sqrt[3]{0.2969} + 0.0015\sqrt{9\ (0.02777778)} + 0.015\sqrt[3]{(0.02777778)^2}$	...
	$Td_2 = 0.0015\sqrt[3]{0.2969} + 0.0015\sqrt{0.250000} + 0.015\sqrt[3]{0.000772}$	...
	$Td_2 = (0.0015)\ (0.667119) + (0.0015)\ (0.500000) + (0.015)\ (0.091736)$	...
	$Td_2 = 0.001001 + 0.000750 + 0.001376$	...
	$Td_2 = 0.003127$	This figure is rounded to six decimal places to obtain the final value of the external pitch diameter tolerance Td_2.
	$d_2\text{min.} = 0.2780 - 0.003127$	...
	$d_2\text{min.} = 0.274873$	This figure is rounded to four decimal places to obtain the final value of $d_2$min.
	$d_2\text{min.} = 0.2749$	...

Table 4 Example of External Inch Screw Threads, $^{19}/_{64}$-36 UNS-2A (Cont'd)

Thread Size = $^{19}/_{64}$-36 or 0.2969 (0.296875 Rounded to Four Decimal Places)-36 UNS-2A		
Characteristic Description	**Example of Size Calculation**	**Additional Information**
(5) Maximum external UNR minor diameter ($d_3$max.) = Maximum external major diameter (d max.) – double height of external UNR thread ($2h_s$)	$d_3\text{max.} = d\text{ max.} - 2h_s$ $2h_s = 1.19078493P$ $2h_s = 1.19078493\ (0.02777778)$ $2h_s = 0.033077$ $d_3\text{max.} = 0.2960 - 0.033077$ $d_3\text{max.} = 0.262923$ $d_3\text{max.} = 0.2629$	. . . . . . All thread calculations are to be performed using (P) rounded to eight decimal places. . . . . . . This figure is rounded to four decimal places to obtain the final value of d_3 max. . . .
(6) Maximum external UN minor diameter ($d_1$max.) = Maximum external major diameter (d max.) – double height of external UN thread ($2h_s$)	$d_1\text{max.} = d\text{ max.} - 2h_s$ $2h_s = 1.08253175P$ $2h_s = 1.08253175\ (0.02777778)$ $2h_s = 0.030070$ $d_1\text{max.} = 0.2960 - 0.030070$ $d_1\text{max.} = 0.265930$ $d_1\text{max.} = 0.2659$	. . . For UN threads, $2h_s = 2h_n$ All thread calculations are to be performed using (P) rounded to eight decimal places. . . . . . . This figure is rounded to four decimal places to obtain the final value of $d_1$max. . . .

GENERAL NOTES:
(a) All dimensions expressed in inches for calculations in this table.
(b) $P = 1/n = 1/36 = 0.02777778$.

Table 5 Example of Internal Inch Screw Threads, $^{19}/_{64}$-36 UNS-2B

Thread Size = $^{19}/_{64}$-36 or 0.2969 (0.296875 Rounded to Four Decimal Places)-36 UNS-2B		
Characteristic Description	**Example of Size Calculation**	**Additional Information**
(1) Minimum internal minor diameter (D_1min.) = Basic major diameter (D bsc) – double height of internal thread ($2h_n$)	D_1min. = D bsc – $2h_n$	. . .
	$2h_n$ = 1.08253175P	. . .
	$2h_n$ = 1.08253175 (0.02777778)	All thread calculations are to be performed using (P) rounded to 8 decimal places.
	$2h_n$ = 0.030070	. . .
	D_1min. = 0.2969 – 0.030070	. . .
	D_1min. = 0.266830	For the Class 2B thread used in this example this figure is rounded to three decimal places to obtain the final value of D_1 min. Other sizes and classes are expressed in a four place decimal. See para. 3.1.3(a)(1).
	D_1min. = 0.267	. . .
(2) Maximum internal minor diameter (D_1max.) = Minimum internal minor diameter (D_1min.) rounded to six decimal places + internal minor diameter tolerance (TD_1)	D_1max. = D_1min. (to six decimal places) + TD_1	See para 3.1.3(a)(2) for exception rule when calculating D_1 max.
	TD_1 = 0.25P – 0.4P^2	See ASME B1.1 for limitations on use of this formula.
	TD_1 = 0.25 (0.02777778) – 0.4 (0.2777778)^2	All thread calculations are to be performed using (P) rounded to 8 decimal places.
	TD_1 = 0.25 (0.02777778) – 0.4 (0.000772)	. . .
	TD_1 = 0.006944 – 0.000309	. . .
	TD_1 = 0.006635	This figure is rounded to four decimal places to obtain the final value of TD_1.
	TD_1 = 0.0066	. . .
	D_1max. = 0.266830 + 0.0066	. . .
	D_1max. = 0.273465	For the Class 2B thread used in this example this figure is rounded to three decimal places to obtain the final value of D_1 max. Other sizes and classes are expressed in a four place decimal. See para. 3.1.3(a).
	D_1max. = 0.273	. . .

Table 5 Example of Internal Inch Screw Threads, $^{19}/_{64}$-36 UNS-2B (Cont'd)

Thread Size = $^{19}/_{64}$-36 or 0.2969 (0.296875 Rounded to Four Decimal Places)-36 UNS-2B		
Characteristic Description	**Example of Size Calculation**	**Additional Information**
(3) Minimum internal pitch diameter (D_2min.) = Basic major diameter (D bsc) – twice the external thread addendum (h_b)	D_2min. = D bsc – h_b	. . .
	h_b = 0.64951905P	. . .
	h_b = 0.64951905 (0.02777778)	All thread calculations are to be performed using (P) rounded to 8 decimal places.
	h_b = 0.018042	. . .
	D_2min. = 0.2969 – 0.018042	. . .
	D_2min. = 0.278858	This figure is rounded to four decimal places to obtain the final value of D_2 min.
	D_2min. = 0.2789	. . .
(4) Maximum internal pitch diameter (D_2max.) = Minimum internal pitch diameter (D_2min.) + internal pitch diameter tolerance (TD_2)	D_2max. = D_2min. + TD_2	. . .
	TD_2 = 1.300 (Td_2 for Class 2A)	The constant 1.300 is for this Class 2B example and will be different for Classes 1B and 3B. See ASME B1.1.
	TD_2 = 1.300 (0.003127)	For Class 2A pitch diameter tolerance, see Table 4 (4).
	TD_2 = 0.004065	This figure is rounded to four decimal places to obtain the final value of TD_2.
	TD_2 = 0.0041	. . .
	D_2max. = 0.2789 + 0.0041	. . .
	D_2max. = 0.2830	. . .
(5) Minimum internal major diameter (D min.) = Basic major diameter (D bsc)	D min. = D bsc	. . .
	D bsc = 0.296875	This figure is rounded to four decimal places to obtain the final value of D bsc
	D bsc = 0.2969	. . .
	D min. = 0.2969	. . .

GENERAL NOTES:
(a) All dimensions expressed in inches for calculations in this table.
(b) $P = 1/n = 1/36 = 0.02777778$.

Table 6 Example of External Metric Screw Threads, M12 x 1.75-4g6g

Thread Size = M12 x 1.75-4g6g [Notes (1), (2)]		
Characteristic Description	**Example of Size Calculation**	**Additional Information**
(1) Maximum external major diameter (d max.) = Basic major diameter (d bsc) – allowance (es)	d max. = d bsc – $\|es\|$; $\|es\|$ is absolute value d bsc = 12.000 $\|es_g\|$ = 0.034 d max. = 12.000 – 0.034 d max. = 11.966 when rounded	. . . . . . (Tabulated value from ASME B1.13M). This figure is rounded to three decimal places to obtain the final value of d max. . . .
(2) Minimum external major diameter (d min.) = Maximum external major diameter (d max.) – major diameter tolerance (Td)	d min. = d max. – Td d max. = 11.966 Td = 0.265 d min. = 11.966 – 0.265 d min. = 11.701 when rounded	. . . [See Table 6 (1)] (Tabulated value from ASME B1.13M). . . . This figure is rounded to three decimal places to obtain the final value of d min.
(3) Maximum external pitch diameter ($d_2$max.) = Basic major diameter (d bsc) – allowance (es) – 0.6495191P or Maximum external major diameter (d max.) – 0.6495191P	$d_2$max. = d max. – 0.6495191P d max. = 11.966 0.6495191P = (0.6495191) (1.75) 0.6495191P = 1.1366584 0.6495191P = 1.13666 $d_2$max. = 11.966 – 1.13666 $d_2$max. = 10.82934 $d_2$max. = 10.829 when rounded	. . . [See Table 6 (1)] . . . This figure is rounded to five decimal places which is two places beyond the three decimal place final value $d_2$max. This value may also be found in thread data table in ASME B1.13M. . . . This figure is rounded to three decimal places to obtain the final value of $d_2$max. . . .
(4) Minimum external pitch diameter ($d_2$min.) = Maximum external pitch diameter ($d_2$max.) – external pitch diameter tolerance (Td_2)	$d_2$min. = $d_2$max. – Td_2 $d_2$max. = 10.829 Td_2 = 0.095 $d_2$min. = 10.829 – 0.095 = 10.734 $d_2$min. = 10.734 when rounded	. . . [See Table 6 (3)] (Tabulated value from ASME B1.13M). . . . . . .

Table 6 Example of External Metric Screw Threads, M12 x 1.75-4g6g (Cont'd)

Thread Size = M12 x 1.75-4g6g [Notes (1), (2)]		
Characteristic Description	**Example of Size Calculation**	**Additional Information**
(5) Maximum external minor diameter ($d_1$max.) (flat form) = Maximum external pitch diameter ($d_2$max.) – 0.4330127P	$d_1$max. = $d_2$max. – 0.4330127P	. . .
	$d_2$max. = 10.829	[See Table 6 (3)]
	0.4330127P = (0.4330127) (1.75)	. . .
	0.4330127P = 0.7577722	This figure is rounded to five decimal places which is two places beyond the three decimal place final value of $d_1$max.
	0.4330127P = 0.75777	This value may also be found in thread data table in ASME B1.13M.
	$d_1$max. = 10.829 – 0.75777	. . .
	$d_1$max. = 10.07123	This figure is rounded to three decimal places to obtain the final value of $d_1$max.
	$d_1$max. = 10.071 when rounded	. . .
(6) For reference: Minimum external minor diameter ($d_3$min.) (round form) = Minimum external pitch diameter ($d_2$min.) – 0.6160254P	$d_3$min. = $d_2$min. – 0.6160254P	. . .
	$d_2$min. = 10.734	[See Table 6 (4)]
	0.6160254P = (0.6160254) (1.75)	. . .
	0.6160254P = 1.0780445	This figure is rounded to five decimal places which is two places beyond the three decimal place final value $d_3$min.
	0.6160254P = 1.07804	This value may be also be found in thread data table in ASME B1.13M.
	$d_3$min. = 10.734 – 1.07804 = 9.65596	This figure is rounded to three decimal places to obtain the final value of $d_3$min.
	$d_3$min. = 9.656 when rounded	. . .

GENERAL NOTE: All dimensions are expressed in millimeters.

NOTES:

(1) Example of how tabulated values for allowances and tolerances (in accordance with ISO 965-1) are used for the calculation of size limits (in ASME B1.13M tables) for standard diameter/pitch combinations listed in ISO 261.

(2) For an example of size limit calculations by the use of formulas for sizes not listed see Table 8 (external) and Table 9 (internal).

Table 7 Example of Internal Metric Screw Threads, M12 x 1.75-6H

Thread Size = M12 x 1.75-6H [Notes (1), (2)]		
Characteristic Description	**Example of Size Calculation**	**Additional Information**
(1) Minimum internal major diameter (D min.) = Basic internal major diameter (D bsc) + allowance (EI)	D min. = D bsc + $\|EI\|$; $\|EI\|$ is absolute value	. . .
	D bsc = d bsc = 12.000	[See Table 6 (1)]
	$\|EI_H\| = 0$	Tabulated value from ASME B1.13M.
	D min. = 12.000 + 0.000	. . .
	D min. = 12.000	. . .
(2) Minimum internal pitch diameter (D_2min.) = Basic internal major diameter (D bsc) − 0.6495191P + allowance (EI) or Minimum internal major diameter (D min.) − 0.6495191P	D_2min. = D min. − 0.6495191P	. . .
	D min. = 12.000	[See Table 7 (1)]
	0.6495191P = 0.6495191 (1.75)	. . .
	0.6495191P = 1.1366584	This figure is rounded to five decimal places which is two places beyond the three decimal place final value of D_2min.
	0.6495191P = 1.13666	This value may also be found in thread data table in ASME B1.13M.
	D_2min. = 12.000 − 1.13666	. . .
	D_2min. = 10.86334	This figure is rounded to obtain the final value of minimum pitch diameter.
	D_2min. = 10.863 when rounded	. . .
(3) Maximum internal pitch diameter (D_2max.) = Minimum internal pitch diameter (D_2min.) + internal pitch diameter tolerance (TD_2)	D_2max. = D_2min. + TD_2	. . .
	D_2min. = 10.863	[See Table 7 (2)]
	TD_2 (6) = 0.200	Tabulated value from ASME B1.13M for internal tolerance grade 6.
	D_2max. = 10.863 + 0.200	. . .
	D_2max. = 11.063	. . .
(4) Minimum internal minor diameter (D_1min.) = Minimum internal major diameter (D min.) − 1.0825318P	D_1min. = D min. − 1.0825318P	. . .
	D min. = 12.000	[See Table 7 (1)]
	1.0825318P = (1.0825318) (1.75)	. . .
	1.0825318P = 1.8944306	This figure is rounded to five decimal places which is two places beyond the three decimal place final value D_1min.
	1.0825318P = 1.89443	This value may also be found in thread data table in ASME B1.13M.
	D_1min. = 12.000 − 1.89443	. . .
	D_1min. = 10.10557	This figure is rounded to three decimal places to obtain the final value of minimum pitch diameter.
	D_1min. = 10.106 when rounded	. . .

Table 7 Example of Internal Metric Screw Threads, M12 x 1.75-6H (Cont'd)

Thread Size = M12 x 1.75-6H [Notes (1), (2)]		
Characteristic Description	**Example of Size Calculation**	**Additional Information**
(5) Maximum internal minor diameter (D_1max.) = Minimum internal minor diameter (D_1min.) + internal minor diameter tolerance (TD_1)	D_1max. = D_1min. + TD_1 D_1min. = 10.106 TD_1(6) = 0.335 D_1max. = 10.106 + 0.335 D_1max. = 10.441	. . . [See Table 7 (4)] Tabulated value from ASME B1.13M for internal tolerance grade 6. . . . . . .
(6) For reference: Maximum internal major diameter (D max.) = Maximum internal pitch diameter (D_2max.) + 0.7938566P	D max. = D_2max. + 0.7938566P D_2max. = 11.063 0.7938566P = (0.7938566) 1.75 0.7938566P = 1.3892490 0.7938566P = 1.38925 D max. = 11.063 + 1.38925 D max. = 12.45225 D max. = 12.452 when rounded	. . . [See Table 7 (3)] . . . This figure is rounded to five decimal places which is two places beyond the three decimal place final value D max. This value may also be found in thread data table in ASME B1.13M. . . . This figure is rounded to three decimal places to obtain the final value of maximum major diameter. . . .

GENERAL NOTE: All dimensions are expressed in millimeters.

NOTES:

(1) Example of how tabulated values for allowances and tolerances (in accordance with ISO 965-1) are used for the calculation of size limits (in ASME B1.13M tables) for standard diameter/pitch combinations listed in ISO 261.

(2) For an example of size limit calculations by the use of formulas for sizes not listed see Table 9 (external) and Table 10 (internal).

Table 8 Example of External Metric Screw Threads, M13 x 0.9-4g6g

Characteristic Description	Example of Size Calculation	Additional Information
	Thread Size = M13 x 0.9-4g6g [Notes (1), (2)]	
(1) Maximum external major diameter (d max.) = Basic major diameter (d bsc) – allowance (es)	d max. = d bsc – $\lvert es \rvert$; $\lvert es \rvert$ is absolute value	. . .
	d bsc = 13.000	This is the final value of the basic major diameter and is therefore expressed with three decimal places.
	$\lvert es_g \rvert = 0.015 + 0.011P$	es for tolerance position g is not tabulated for $P = 0.9$ so it must be calculated.
	$\lvert es_g \rvert = 0.015 + 0.011(0.9)$	. . .
	$\lvert es_g \rvert = 0.0249$	This figure is rounded to three decimal places to obtain the final absolute value of allowance for tolerance position g.
	$\lvert es_g \rvert = 0.025$ when rounded	. . .
	d max. = 13.000 – 0.025	. . .
	d max. = 12.975	. . .
(2) Minimum external major diameter (d min.) = Maximum external major diameter (d max.) – tolerance (Td)	d min. = d max. – Td	. . .
	d max. = 12.975	[see Table 8 (1)]
	$Td\ (6) = 0.18\sqrt[3]{P^2} - \dfrac{0.00315}{\sqrt{P}}$	Td for tolerance grade 6 is not tabulated for $P = 0.9$ so it must be calculated.
	$Td\ (6) = 0.18\sqrt[3]{0.9^2} - \dfrac{0.00315}{\sqrt{0.9}}$	. . .
	$Td\ (6) = 0.18\sqrt[3]{0.81000} - \dfrac{0.00315}{0.94868}$	. . .
	$Td\ (6) = 0.18\ (0.93217) - \dfrac{0.00315}{0.94868}$	. . .
	$Td\ (6) = 0.16779 - 0.00332$	. . .
	$Td\ (6) = 0.16447$	This figure is rounded to three decimal places to obtain the final value of major diameter tolerance for tolerance grade 6.
	$Td\ (6) = 0.164$ when rounded	. . .
	d min. = 12.975 – 0.164	. . .
	d min. = 12.811	. . .
(3) Maximum external pitch diameter ($d_2$max.) = [Basic major diameter (d bsc) – allowance (es)] – 0.6495191P or Maximum external major diameter (d max.) – 0.6495191P	$d_2$max. = d max. – 0.6495191P	. . .
	d max. = 12.975	[See Table 8 (1)]
	0.6495191P = 0.6495191(0.9)	. . .
	0.6495191P = 0.5845672	This figure is rounded to five decimal places to obtain the final value.
	0.6495191P = 0.58457	. . .
	$d_2$max. = 12.975 – 0.58457	. . .
	$d_2$max. = 12.39043	This figure is rounded to obtain the final value of $d_2$max.
	$d_2$max. = 12.390 when rounded	. . .

Table 8 Example of External Metric Screw Threads, M13 x 0.9-4g6g (Cont'd)

Characteristic Description	Example of Size Calculation	Additional Information
	Thread Size = M13 x 0.9-4g6g [Notes (1), (2)]	
(4) Minimum external pitch diameter ($d_2$min.) = Maximum external pitch diameter ($d_2$max.) – external pitch diameter tolerance (Td_2)	$d_2$min. = $d_2$max. – Td_2	. . .
	$d_2$max. = 12.390	[See Table 8 (3)]
	Td_2 (4) = 0.63Td_2 (6)	Td_2 for tolerance grade 4 is not tabulated for P=0.9 so it must be calculated.
	Td_2 (4) = 0.63 [0.09$P^{0.4}d^{0.1}$]	. . .
	Td_2 (4) = 0.63 [0.09 (0.9)$^{0.4}$(13)$^{0.1}$]	. . .
	Td_2 (4) = 0.63 [0.09 (0.95873) (1.29239)]	. . .
	Td_2 (4) = 0.63 [(0.09) (1.23905)]	. . .
	Td_2 (4) = (0.63) (0.11151)	. . .
	Td_2 (4) = 0.07025	This figure is rounded to three decimal places to obtain the final value of pitch diameter tolerance for tolerance grade 4.
	Td_2 (4) = 0.070, when rounded	. . .
	$d_2$min. = 12.390 – 0.070	. . .
	$d_2$min. = 12.320	. . .
(5) Maximum external minor diameter ($d_1$max.) (flat form) = Maximum external pitch diameter ($d_2$max.) – 0.4330127P	$d_1$max. = $d_2$max. – 0.4330127P	. . .
	$d_2$max. = 12.390	[See Table 8 (3)]
	0.4330127P = 0.4330127 (0.9)	. . .
	0.4330127P = 0.3897114	This figure is rounded to five decimal places, which is two decimal places beyond the three decimal place value of $d_1$max.
	0.4330127P = 0.38971	. . .
	$d_1$max. = 12.390 – 0.38971	. . .
	$d_1$max. = 12.00029	This figure is rounded to three decimal places to obtain the final value of maximum minor diameter.
	$d_1$max. = 12.000, when rounded	. . .
(6) For reference: Minimum external minor diameter ($d_3$min.) (round form) = Minimum external pitch diameter ($d_2$min.) – 0.6160254P	$d_3$min. = $d_2$min. – 0.6160254P	. . .
	$d_2$min. = 12.320	[See Table 8 (4)]
	0.6160254P = 0.6160254 (0.9)	. . .
	0.6160254P = 0.5544229	This figure is rounded to five decimal places, which is two decimal places beyond the three decimal place final value of $d_3$min.
	0.6160254P = 0.55442	. . .
	$d_3$min. = 12.320 – 0.55442	. . .
	$d_3$min. = 11.76558	This figure is rounded to obtain the final value of minimum minor diameter.
	$d_3$min. = 11.766 when rounded	. . .

GENERAL NOTE: All dimensions are expressed in millimeters.

NOTES:

(1) For an example of how tabulated values for allowances and tolerances (in accordance with ISO 965-1) are used for the calculation of size limits (in ASME B1.13M tables) for standard diameter/pitch combinations listed in ISO 261, see Table 6 and 7.

(2) Example of size limit calculations by the use of formulas for diameter/pitch combinations not listed in ISO 261.

Table 9 Example of Internal Metric Screw Threads, M13 x 0.9-6H

Thread Size = M13 x 0.9-6H [Notes (1), (2)]		
Characteristic Description	**Example of Size Calculation**	**Additional Information**
(1) Minimum internal major diameter (D min.) = Basic internal major diameter (D bsc) + allowance (EI)	D min. = D bsc + $\|EI\|$; $\|EI\|$ is absolute value	. . .
	D bsc = d bsc = 13.000	[see Table 8 (1)]
	EI_H = 0	Tabulated value from ASME B1.13M for internal tolerance position H.
	D min. = 13.000 + 0.000	. . .
	D min. = 13.000	. . .
(2) Minimum internal pitch diameter (D_2min.) = Basic internal major diameter (D min.) – 0.6495191P + allowance (EI) or Minimum internal major diameter (D min.) – 0.6495191P	D_2min. = D min. – 0.6495191P	. . .
	D min. = 13.000	[See Table 9 (1)]
	0.6495191P = 0.6495191 (0.9)	. . .
	0.6495191P = 0.5845672	This figure is rounded to five decimal places, which is two places beyond the three decimal place final value of D_2min.
	0.6495191P = 0.58457	. . .
	D_2min. = 13.000 – 0.58457	. . .
	D_2min. = 12.41543	This figure is rounded to obtain the final value of minimum pitch diameter.
	D_2min. = 12.415 when rounded	. . .
(3) Maximum internal pitch diameter (D_2max.) = Minimum internal pitch diameter (D_2min.) + internal pitch diameter tolerance (TD_2)	D_2max. = D_2min + TD_2	. . .
	D_2min. = 12.415	[See Table 9 (2)]
	TD_2 (6) = 1.32Td_2 (6)	TD_2 (or Td_2) for tolerance grade 6 is not tabulated for P = 0.9 so it must be calculated.
	TD_2 (6) = 1.32 [0.09$P^{0.4}d^{0.1}$]	. . .
	TD_2 (6) = 1.32 [0.09 (0.9)$^{0.4}$(13)$^{0.1}$]	. . .
	TD_2 (6) = 1.32 [0.09 (0.95873)(1.29239)]	. . .
	TD_2 (6) = 0.14720	This figure is rounded to three decimal places to obtain the final value of pitch diameter tolerance for tolerance grade 6.
	TD_2 (6) = 0.147, when rounded	. . .
	D_2max. = 12.415 + 0.147	. . .
	D_2max. = 12.562	. . .
(4) Minimum internal minor diameter (D_1min.) = Minimum internal major diameter (D min.) – 1.0825318P	D_1min. = D min. – 1.0825318P	. . .
	D min. = 13.000	[See para. 3.2.8 (1)]
	1.0825318P = 1.0825318 (0.9)	. . .
	1.0825318P = 0.9742786	This figure is rounded to five decimal places, which is two places beyond the three decimal place final value of D_1 min.
	1.0825318P = 0.97428	. . .
	D_1min. = 13.000 – 0.97428	. . .
	D_1min. = 12.02572	This figure is rounded to three decimal places to obtain the final value of minimum pitch diameter.
	D_1min. = 12.026 when rounded	. . .

Table 9 Example of Internal Metric Screw Threads, M13 x 0.9-6H (Cont'd)

Thread Size = M13 x 0.9-6H [Notes (1), (2)]		
Characteristic Description	**Example of Size Calculation**	**Additional Information**
(5) Maximum internal minor diameter (D_1max.) = Minimum internal minor diameter (D_1min.) + tolerance(TD_1)	D_1max. = D_1min. + TD_1	. . .
	D_1min. = 12.026	[See Table 9 (4)]
	TD_1 (6) = 0.218	P = 0.9 is not tabulated nor is there any ISO formula applicable to this pitch. Therefore, a tolerance mid-way between the tabulated values for P = 0.8 and P = 1.0 has been selected. This value is TD_1 (6) = 0.218.
	D_1max. = 12.026 + 0.218 = 12.244	. . .
	D_1max. = 12.244	. . .
(6) For Reference: Maximum internal major diameter (D max.) = Maximum internal pitch diameter (D_2max.) + 0.7938566P	D max. = D_2max. + 0.7938566P	. . .
	D_2max. = 12.562	[See Table 9 (3)]
	0.7938566P = 0.7938566 (0.9)	. . .
	0.7938566P = 0.7144709	This figure is rounded to five decimal places, which is two places beyond the three decimal place final value of D max.
	0.7938566P = 0.71447	. . .
	D max. = 12.562 + 0.71447	. . .
	D max. = 13.27647	This figure is rounded to three decimal places to obtain the final value of maximum major diameter.
	D max. = 13.276 when rounded	. . .

GENERAL NOTE: All dimensions are expressed in millimeters.

NOTES:

(1) For an example of how tabulated values for allowances and tolerances (in accordance with ISO 965-1) are used for the calculation of size limits (in ASME B1.13M tables) for standard diameter/pitch combinations listed in ISO 261, see Table 6 and 7.

(2) Example of size limit calculations by the use of formulas for diameter/pitch combinations not listed in ISO 261.

Table 10 Thread Form Data

Constant for Inch Series	Reference Values		Constant for Metric Series
0.04811252*P*	*H*/18	0.0556*H*	0.0481125*P*
0.05412659*P*	*H*/16	0.0625*H*	0.0541266*P*
0.08660254*P*	*H*/10	0.1000*H*	0.0866025*P*
0.09622504*P*	*H*/9	0.1111*H*	0.0962250*P*
0.10825318*P*	*H*/8	0.1250*H*	0.1082532*P*
0.12990381*P*	3*H*/20	0.1500*H*	0.1299038*P*
0.14433757*P*	*H*/6	0.1667*H*	0.1443376*P*
0.16237976*P*	3*H*/16	0.1875*H*	0.1623798*P*
0.21650635*P*	*H*/4	0.2500*H*	0.2165064*P*
0.28867513*P*	*H*/3	0.3333*H*	0.2886751*P*
0.32475953*P*	3*H*/8	0.3750*H*	0.3247595*P*
0.36084392*P*	5*H*/12	0.4167*H*	0.3608439*P*
0.39692831*P*	11*H*/24	0.4583*H*	0.3969283*P*
0.43301270*P*	*H*/2	0.5000*H*	0.4330127*P*
0.48713929*P*	9*H*/16	0.5625*H*	0.4871393*P*
0.54126588*P*	5*H*/8	0.6250*H*	0.5412659*P*
0.57735027*P*	2*H*/3	0.6667*H*	0.5773503*P*
0.59539247*P*	11*H*/16	0.6875*H*	0.5953925*P*
0.61343466*P*	17*H*/24	0.7083*H*	0.6134347*P*
0.61602540*P*	. . .	0.7113*H*	0.6160254*P*
0.64951905*P*	3*H*/4	0.7500*H*	0.6495191*P*
0.72168784*P*	5*H*/6	0.8333*H*	0.7216878*P*
0.79385662*P*	11*H*/12	0.9167*H*	0.7938566*P*
0.86602540*P*	*H*	1.0000*H*	0.8660254*P*
1.08253175*P*	5*H*/4	1.2500*H*	1.0825318*P*
1.19078493*P*	11*H*/8	1.3750*H*	1.1907849*P*
1.22686932*P*	17*H*/12	1.4167*H*	1.2268693*P*

NONMANDATORY APPENDIX A
THREAD CHARACTERISTICS GOVERNED BY THIS STANDARD

This Appendix contains Table A1, a listing of screw thread dimensions with their symbols and the number of decimal places that each are to be carried out to when used in calculation. It indicates whether they are considered an intermediate value, used in subsequent calculations, or considered a final value. It also should be noted that a final value can be used in subsequent calculations. This table contains only those dimensions used in the examples in B1.30 for both inch and metric 60 deg threads. Similar format should be used for other dimensions not used in the examples within this Standard.

Table A1 Threads Characteristics

Symbol	Dimensions	Intermediate		Final	
		Inch	Metric	Inch	Metric
d	Major diameter, external thread	...	...	4	3
D	Major diameter, internal thread	...	...	4	3
d_2	Pitch diameter, external thread	...	...	4	3
D_2	Pitch diameter, internal thread	...	...	4	3
d_1	Minor diameter, external thread	...	...	4	3
d_3	Minor diameter, rounded root external thread	...	...	4	3
D_1	Minor diameter, internal thread for sizes 0.138 and larger for Classes 1B and 2B only	...	...	3	N/A
D_1	Minor diameter, internal thread for sizes smaller than 0.138 for Classes 1B and 2B and all sizes for Class 3B	...	...	4	N/A
D_1	Minor diameter, internal metric thread	...	...	N/A	3
es	Allowance at major pitch and minor diameters of external thread	...	...	4	3
LE	Length of thread engagement	6	N/A	...	...
P	Pitch	...	...	8	[Note (1)]
Td	Major diameter tolerance	...	...	4	3
Td_2	Pitch diameter tolerance, external threads	...	...	6	3
TD_2	Pitch diameter tolerance, internal threads	...	...	4	3
TD_1	Minor diameter tolerance, internal threads	...	...	4	3
$2h_{as}$	Twice the external thread addendum	6	N/A	...	...
$2h_s$	Twice the external height of UNR thread	6	N/A	...	...
$2h_n$	Twice the external height of UN thread	6	N/A	...	...
h_b	Twice the external thread addendum	6	N/A	...	...

GENERAL NOTE: Constants based on a function of P are rounded to an eight place decimal for inch and seven place decimal for metric.

NOTE:

(1) Metric pitches are not calculated. They are stated in the screw thread designation and are to be used out to the number of decimal places as stated.

OTHER STANDARDS FOR SCREW THREADS

Unified Inch Screw Threads (UN and UNR Thread Form) B1.1-1989
Gages and Gaging for Unified Inch Screw Threads ..... B1.2-1983(R1991)
Screw Thread Gaging Systems for Dimensional Acceptability —
Inch and Metric Screw Threads (UN, UNR, UNJ, M, and MJ) B1.3M-1992
Acme Screw Threads B1.5-1997
Nomenclature, Definitions, and Letter Symbols for Screw Threads ..... B1.7M-1984(R1992)
Stub Acme Screw Threads ..... B1.8-1988(R1994)
Buttress Inch Screw Threads 7°/45° Form With 0.6 Pitch
Basic Height of Thread Engagement ..... B1.9-1973(R1992)
Unified Miniature Screw Threads B1.10M-1997
Microscope Objective Thread ..... B1.11-1958(R1994)
Class 5 Interference-Fit Thread ..... B1.12-1987(R1992)
Metric Screw Threads — M Profile B1.13M-2001
Unified Inch Screw Threads (UNJ Thread Form) B1.15-1995
Gages and Gaging for Metric M Screw Threads ..... B1.16M-1984(R1992)
Pipe Threads, General Purpose (Inch) ..... B1.20.1-1983(R1992)
Dryseal Pipe Threads (Inch) ..... B1.20.3-1976(R1991)
Gaging for Dryseal Pipe Threads (Inch) B1.20.5-1991
Hose Coupling Screw Threads (Inch) B1.20.7-1991
Metric Screw Threads: MJ Profile B1.21M-1997
Gages and Gaging for MJ Series Metric Screw Threads ..... B1.22M-1985(R1992)
Screw Threads: Standard Practice for Calculating and Rounding Dimensions B1.30-2002

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