INTERNATIONAL STANDARD

ISO 3161

Second edition
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Aerospace — UNJ threads, with controlled root radius, for aerospace — Inch series

Aéronautique et espace — Filetage UNJ, avec rayon à fond de filet contrôlé, pour applications aérospatiales — Série en inches

INTERNATIONAL ISO

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 3161 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 4, *Aerospace fastener systems*.

This second edition cancels and replaces the first edition (ISO 3161:1977), of which it constitutes a technical revision.

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Aerospace — UNJ threads, with controlled root radius, for aerospace — Inch series

1 Scope

This International Standard specifies the characteristics of inch series UNJ threads with controlled root radius.

It determines the basic triangular profile for this type of thread and gives a system for designating the diameter/pitch combinations. For all diameters 0,060 in to 6,000 in, it offers in the form of tables the basic dimensions and tolerances for a selection of diameter/pitch combinations. It also provides the method of calculation for the dimensions and tolerances for any diameter/pitch combination not given in the tables, including threads with a diameter in excess of 6,000 in.

NOTE 1 Pending publication of the International Standard relating to limit gauges referred to in the footnote in clause 7, special care must be taken to ensure that the dimensions and tolerances specified in this International [illegible]

This International Standard applies primarily to the threads of inch series aerospace fasteners.

2 Definition

For the purposes of this International Standard, the following definition applies.

2.1 basic profile: The theoretical profile corresponding to the basic dimensions, i.e. the major diameter, the pitch diameter and the minor diameter. See figure 1 and clause 3.

The tolerances are applied to the basic profile.

3 Symbols

D = basic major diameter of internal thread

D_2 = basic pitch diameter of internal thread

D_1 = basic minor diameter of internal thread

d = basic major diameter of external thread

d_2 = basic pitch diameter of external thread

d_1 = basic minor diameter of external thread

H = height of fundamental triangle

P = pitch

n = number of threads per inch

4 Basic profile of thread

4.1 Basic profile dimensions

Values given in table 1 have been calculated according to the following formulae:

$$P = \frac{1}{n}$$

$$n = \frac{1}{P}$$

$$H = \frac{\sqrt{3}}{2} \times P = 0{,}866\,025P = \frac{0{,}866\,025}{n}$$

$$\frac{9}{16}H = 0{,}487\,14P = \frac{0{,}487\,14}{n}$$

$$\frac{3}{8}H = 0{,}324\,759P = \frac{0{,}324\,759}{n}$$

$$\frac{5}{16}H = 0{,}270\,63P = \frac{0{,}270\,63}{n}$$

$$\frac{H}{8} = 0{,}108\,25P = \frac{0{,}108\,25}{n}$$

4.2 Basic dimensions of thread

Values given in table 2 have been calculated according to the following formulae:

$$D_2 = D - \left(2 \times \frac{3}{8} H\right) = D - 0{,}649\,519P = D - \frac{0{,}649\,519}{n}$$

$$d_2 = d - \left(2 \times \frac{3}{8} H\right) = d - 0{,}649\,519P = d - \frac{0{,}649\,519}{n}$$

$$D_1 = D - \left(2 \times \frac{9}{16} H\right) = D - 0{,}974\,28P = D - \frac{0{,}974\,28}{n}$$

$$d_1 = d - \left(2 \times \frac{9}{16} H\right) = d - 0{,}974\,28P = d - \frac{0{,}974\,28}{n}$$

5 Series of threads

This International Standard includes various series of threads, i.e. groups of diameter/pitch combinations distinguished from each other by the number of threads per inch associated with any given thread diameter. These series of threads are given in table 3.

5.1 Diameters

Columns 1 and 2 of table 3 give the primary and secondary series nominal sizes which satisfy current requirements.

5.2 Number of threads per inch

Columns 3 to 9 (inclusive) of table 3 give the numbers of threads per inch which are recommended to be associated with the diameters in columns 1 and 2.

These columns of the numbers of threads per inch are divided into two groups:

— Series with increasing pitches: columns 3, 4 and 5;

— Constant (uniform) pitch series: columns 6, 7, 8 and 9.

5.2.1 Series with increasing pitches

There are three series of increasing pitches. They are headed "Coarse pitch", "Fine pitch" and "Extra fine pitch" in accordance with current practice.

These terms indicate the relative pitches of the three series for each given thread diameter and do not imply a difference in quality between the series.

5.2.2 Constant (uniform) pitch series

In addition to these three series of increasing pitches, table 3 includes details of constant pitch series which have been selected from the range of 8 to 20 threads per inch. Each of these series is limited to an appropriate range of diameters.

5.3 Special diameter/pitch combinations

The screw threads specified in 5.2.1 and 5.2.2 meet most requirements. If other diameter/pitch combinations or threads larger than 6,000 in in diameter are required, then these shall be calculated using the formulae in 6.3.1.

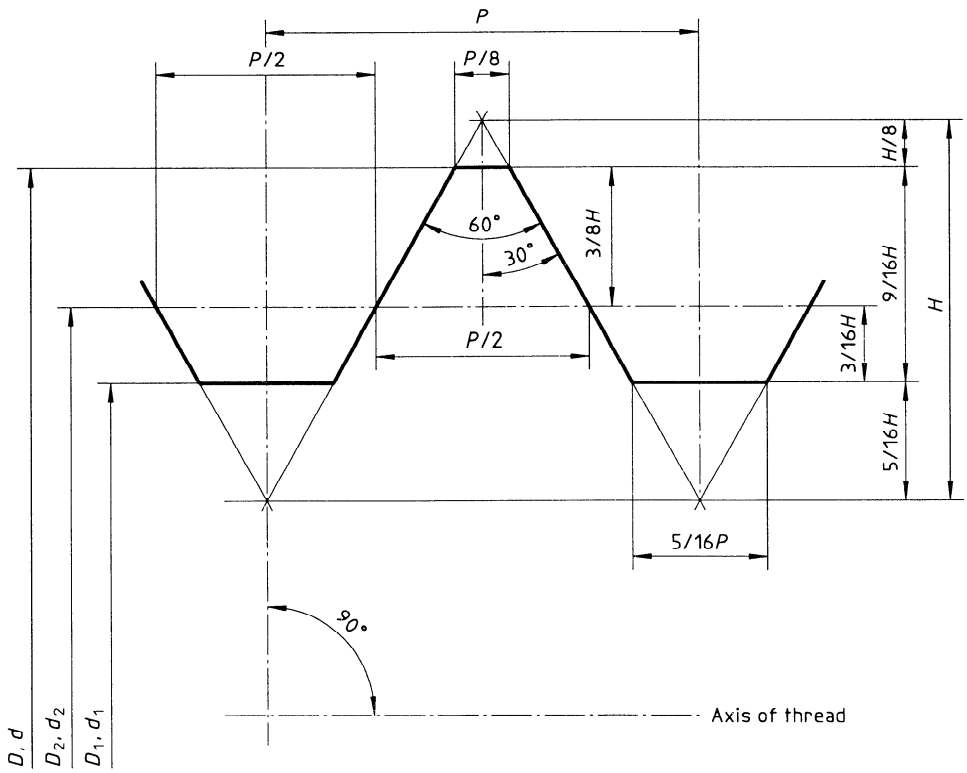

Figure 1 — Basic profile

6 Tolerances

6.1 Length of thread engagement used for calculating the pitch diameter tolerances

The length of thread engagement (L_e) (see figure 2) used in this International Standard is equal to

— the basic external diameter for the series UNJC, UNJF and 8 UNJ. This is applicable for actual lengths of engagement between $5P$ and $1{,}5D$.

— $9P$ for the series UNJEF, 12 UNJ, 16 UNJ, 20 UNJ and all UNJS. This is applicable for actual lengths of engagement between $5P$ and $15P$.

For applications with lengths of engagement not within the above limits, the tolerances on the pitch diameter shall be calculated according to the calculation formulae for T_{d2} and T_{D2}, using the design length of engagement as L_e. The GO gauge and GO contacts length shall also be equal to this length L_e.

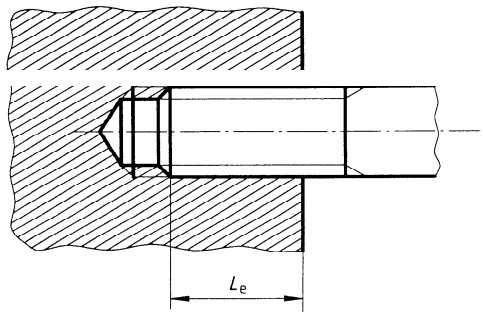

Figure 2 — Length of engagement

6.2 Position of tolerances

The tolerances are positive (+) for the internal threads and negative (−) for the external threads (that is, the tolerances are applied in the direction of minimum material).

6.2.1 Internal thread

See figure 3.

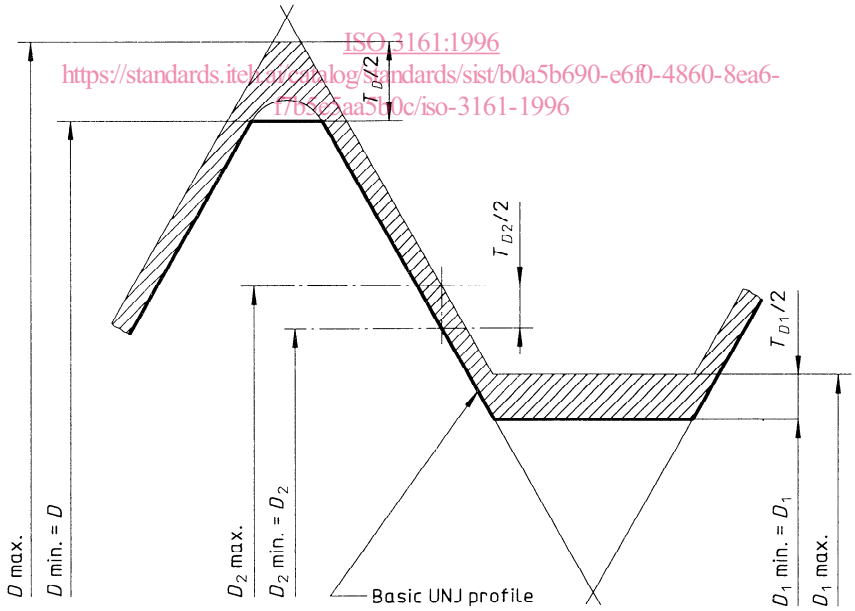

Figure 3 — Internal thread tolerances

6.2.2 External thread

See figure 4.

6.3 Values of tolerances for profile dimensions and tolerances of the profile form

Values indicated in tables 4, 5 and 6 have been calculated according to the formulae given in 6.3.1 and are based on the length of engagement equal to that shown in 6.1, where

α is the basic half-angle at the base of the thread side, i.e. 30°;

$\delta\alpha$ is the maximum permissible variation of the half-angle;

T_{D1} is the internal thread minor diameter tolerance;

T_{D2} and T_{d2} are the pitch diameter tolerances;

δP is the maximum permissible pitch variation between any two of the threads engaged;

δD_2 is the pitch diameter increment due to lead variation for the internal threads;

$\delta D'_2$ is the pitch diameter increment due to variations in the half-angles for the internal threads;

δd_2 is the pitch diameter increment due to lead variation for the external threads;

$\delta d'_2$ is the pitch diameter increment due to variations in the half-angles for the external threads.

6.3.1 Calculation formulae

Limits of size for untabulated (UNJS) screw threads shall also be calculated using the formulae given in 6.3.1.1 and 6.3.1.2.

6.3.1.1 External threads

The formulae are as follows:

d max. = d

d min. = d max. − tolerance $0{,}060\sqrt[3]{P^2}$ (listed in table 7, column 3)

d_2 max. = d_2 = d max. − value $0{,}649\,519P$ (listed in table 7, column 4)

d_2 min. = d_2 max. − T_{d2}

$$T_{d2} = 0{,}750\left(0{,}001\,5\sqrt[3]{d} + 0{,}001\,5\sqrt{L_e} + 0{,}015\sqrt[3]{P^2}\right)$$ (listed in table 8)

d_3 max. = d_3 = d_2 max. − value $0{,}505\,18P$ (listed in table 7, column 5)

d_3 min. = d_2 min. − value $0{,}565\,80P$ (listed in table 7, column 6)

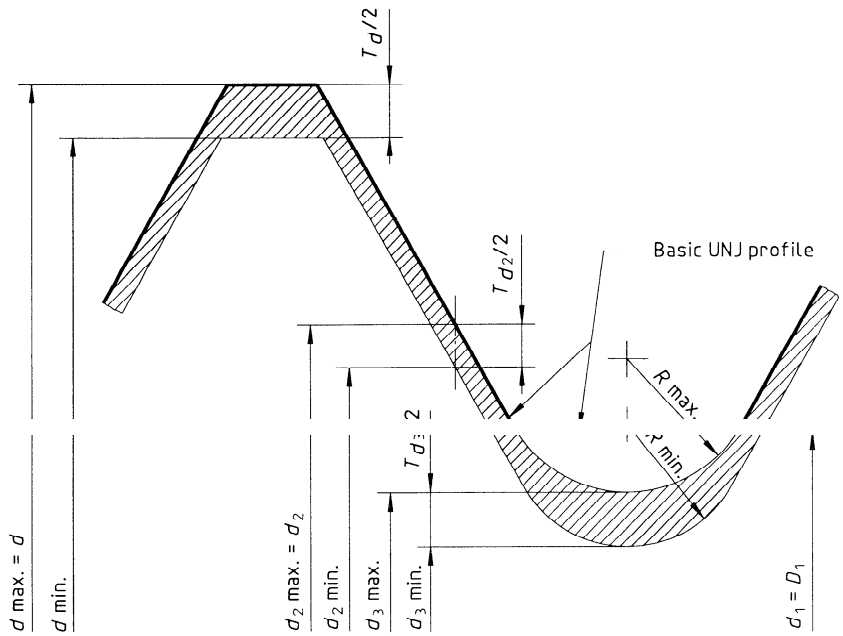

Figure 4 — External thread tolerances

R max. = 0,180 42P (listed in table 7, column 7)

R min. = 0,150 11P (listed in table 7, column 8)

6.3.1.2 Internal threads

The formulae are as follows:

D max. = D_2 max. + value 0,793 86P (listed in table 7, column 9)

D min. = D

D_2 max. = D_2 min. + T_{D2}

$$T_{D2} = 0{,}975\left(0{,}001\,5\sqrt[3]{d} + 0{,}001\,5\sqrt{L_e} + 0{,}015\sqrt[3]{P^2}\right) \text{ (listed in table 9)}$$

D_2 min. = D min. − value 0,649 519P (listed in table 7, column 4)

D_1 max. = D_1 min. + T_{D1}

T_{D1} for threads with more than 12 threads per inch = $\left(0{,}05\sqrt[3]{P^2} + 0{,}03P/d\right) - 0{,}002$ (listed in table 10)

T_{D1} for threads with 12 threads per inch or less = 0,120P (listed in table 10)

D_1 min. = D min. − value 0,974 28P (listed in table 7, column 10)

$$\delta P = \frac{\delta D_2}{\cot\alpha} = \frac{\delta D_2}{1{,}732\,1} = \frac{0{,}4T_{D2}}{1{,}732\,1} \quad \text{for internal threads}$$

$$\delta P = \frac{\delta d_2}{\cot\alpha} = \frac{\delta d_2}{1{,}732\,1} = \frac{0{,}4T_{d2}}{1{,}732\,1} \quad \text{for external threads}$$

$$\tan\delta\alpha = \frac{\delta D_2'}{1{,}5P} = \frac{0{,}4T_{D2}}{1{,}5P} \quad \text{for internal threads}^{1)}$$

$$\tan\delta\alpha = \frac{\delta d_2'}{1{,}5P} = \frac{0{,}4T_{d2}}{1{,}5P} \quad \text{for external threads}^{1)}$$

NOTE 2 On completion of the calculations, round off to four decimal points. Round up if the fifth decimal is ⩾ 5. Keep the fourth decimal if the fifth decimal is < 5.

6.3.2 Root radius of the thread

6.3.2.1 Internal threads

For internal threads, the profile of the actual root of the thread shall at no point be below the basic profile given in figure 3. No particular radius is specified.

6.3.2.2 External threads

For external threads, the profile of the actual root of the thread shall lie within the root radius tolerance zone shown in figure 5. The limit values of the root radius R are specified in table 4. The profile shall be a continuous blended curve, no part of which shall have a radius of less than 0,150 11P and which is tangential to the thread flanks at not less than 0,562 5H thread depth. The profile may comprise tangent flank radii that are joined by a tangential flat at the root.

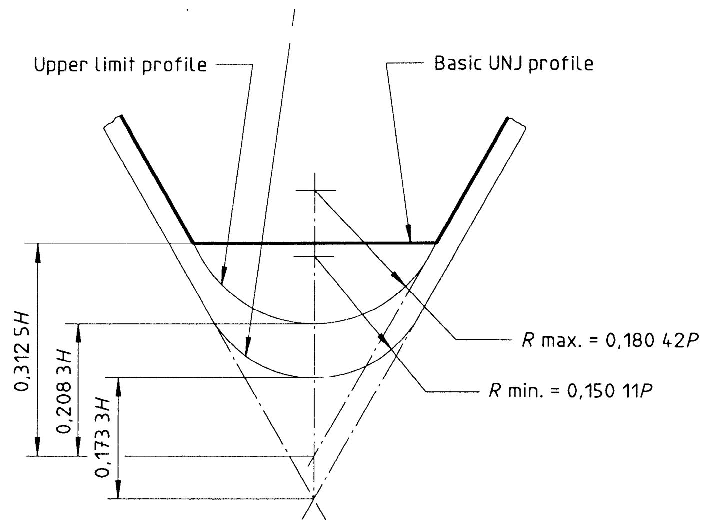

Figure 5 — Radius at the root of the screw thread

1) The calculation formulae for the tangent of the variations of the half-angle of the thread pitch are approximations of the maximum effects when the two half-angles are equal.

6.4 Special case for coated threads

When required, the thread shall be protected by applying a metal coating or a layer of solid lubricant.

6.4.1 External threads

Where the external threads are intended to be coated, the minimum value of the pitch diameter of the thread may be reduced by 0,001 in max. for threads with a tolerance for the pitch diameter of the thread of less than 0,003 5 in in table 5.

For threads with a tolerance for the minimum pitch diameter of the thread of more than 0,003 5 in, the value of the pitch diameter of the thread may be reduced by 0,3 times the tolerance of the pitch diameter of the thread, but this reduction shall not exceed 0,001 5 in. The maximum limits for the dimensions of the threads of coated screws shall be in accordance with the values given is this International Standard.

6.4.2 Internal threads

Where the internal threads are intended to be coated

thread may be increased in the same way as specified in 6.4.1 for the reduction of the minimum pitch diameter of the external thread. The minimum limits of the dimensions of the coated internal threads shall be in accordance with the values given in this International Standard.

7 Gauging by limit gauges[2)]

7.1 Gauging of internal threads

For checking the internal threads, threaded gauges of the GO and NOT-GO type shall be used.

To check the minor diameter of the internal threads, plug gauges of the GO and NOT-GO type shall be used.

7.2 Gauging of external threads

For checking the maximum limits of the material, a thread GO ring gauge or a functional dial gauge (properly calibrated) shall be used.

A thread dial gauge or reference gauge with a limited pitch diameter and single ridge contact (properly calibrated) shall be used to check the minimum limits of the material of the pitch diameter.

Measuring instruments or reference gauges (properly calibrated) shall be used to check the measured difference between simple and virtual (functional) pitch

and helix variations. This difference, form verification, shall not be greater than 0,5 times the pitch diameter tolerance.

Snap gauges, indicating gauges or measuring instruments shall be used to check the major diameter.

7.3 Root radius

The radius of the thread root shall be checked by an optical method.

The minor diameter of the thread shall be checked using flange gauges or dial gauges (properly calibrated), by measuring instruments or by optical procedures.

8 Designation of threads

Threads shall be designated as shown in 8.1, 8.2 and 8.3 by indicating, in sequence, the nominal size, the number of threads per inch, the thread series symbol and the thread class symbol.

each column in table 3, with the addition of the thread class (3A: external thread; 3B: internal thread).

8.1 Thread designation with increasing pitches

	Designation
Coarse pitch series — External thread:	UNJC - 3A
Fine pitch series — External thread:	UNJF - 3A
Extra fine pitch series — External thread:	UNJEF - 3A
Coarse pitch series — Internal thread:	UNJC - 3B
Fine pitch series — Internal thread:	UNJF - 3B
Extra fine pitch series — Internal thread:	UNJEF - 3B

EXAMPLE

An external thread of the fine pitch series (UNJF), of basic diameter 0,250 0 in, 28 threads per inch and of thread class 3A is designated as follows:

0,250 0 - 28 UNJF - 3A

8.2 Constant pitch series

The diameter/pitch combinations of threads of the constant pitch series are all designated by the three

ternal thread; 3B: internal thread).

2) The gauges to be used will be the subject of a future International Standard.

EXAMPLES

An internal thread of the constant pitch series (UNJ), of basic diameter 3,500 in, 12 threads per inch and of thread class 3B is designated as follows:

3,500 - 12 UNJ - 3B

A left-hand thread (LH) of the constant pitch series (UNJ), of basic diameter 3,500 in, 12 threads per inch and of thread class 3B is designated as follows:

Threads derived using the formulae in 6.3.1 are designated UNJS threads, and have the basic form of designation set out in 8.1, but always supplemented by the limits of size.

EXAMPLES

0,250 0 - 24 UNJS - 3A
MAJOR DIA 0,250 0 - 0,242 8
PITCH DIA 0,222 9 - 0,220 1
MINOR DIA 0,201 9 - 0,196 5
ROOT RAD 0,007 5 - 0,006 3
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0,437 5 - 24 UNJS - 3B
MINOR DIA 0,396 9 - 0,403 8
PITCH DIA 0,410 4 - 0,414 1
MAJOR DIA 0,437 5 - 0,447 2
ISO 3161

8.4 Designation of threads having modified crests

Occasionally it is necessary to modify the major diameter of external threads or the minor diameter of internal threads in order to fit a specific purpose, but without changing the pitch diameter limits (it should be noted that existing gauges may be used to accept such threads). Such threads shall be specified with the established thread designation followed by the modified crest diameter limits and the designation "MOD".

EXAMPLES

0,375 0 - 24 UNJF - 3A MOD
MAJOR DIA 0,372 0 - 0,364 8 MOD

0,500 0 - 20 UNJF - 3B MOD
MINOR DIA 0,454 3 - 0,462 1 MOD

9 Tables

rounded to be within the inch product limits.

Table 1 gives the dimensions of basic profile.

Table 2 specifies the basic dimensions.

Table 3 gives the preferred selection of diameter/pitch combinations. It is recommended that usage be restricted to the primary sizes indicated.

Table 4 gives the limit values of the root radius.

Table 5 specifies the values of tolerances for profile dimensions.

Table 6 specifies the maximum permissible variations in the half-angle and the lead variation.

Table 7 gives the basic profile values required for calculating special diameter/pitch combinations.

Table 8 gives the values of pitch diameter tolerances for external threads of special diameter/pitch combinations.

Table 9 gives the values of pitch diameter tolerances for internal threads of special diameter/pitch combinations.

Table 10 gives the values of minor diameter tolerances for internal threads of special diameter/pitch combinations.

Table 1 — Basic profile

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Number of threads per inch	**Pitch** $P = \frac{1}{n}$	$\frac{P}{2}$ $0{,}5P$	$\frac{5}{16}P$ $0{,}312\,5P$	$\frac{P}{8}$ $0{,}125P$	H $0{,}866\,025P$	$\frac{9}{16}H$ $0{,}487\,14P$	$\frac{3}{8}H$ $0{,}324\,76P$	$\frac{5}{16}H$ $0{,}270\,63P$	$\frac{H}{8}$ $0{,}108\,25P$
80	0,012 500	0,006 250	0,003 91	0,001 56	0,010 825	0,006 09	0,004 06	0,003 38	0,001 35
72	0,013 889	0,006 944	0,004 34	0,001 74	0,012 028	0,006 77	0,004 51	0,003 76	0,001 50
64	0,015 625	0,007 812	0,004 88	0,001 95	0,013 532	0,007 61	0,005 07	0,004 23	0,001 69
56	0,017 857	0,008 928	0,005 58	0,002 23	0,015 465	0,008 70	0,005 80	0,004 83	0,001 93
48	0,020 833	0,010 416	0,006 51	0,002 60	0,018 042	0,010 15	0,006 77	0,005 64	0,002 26
44	0,022 727	0,011 363	0,007 10	0,002 84	0,019 682	0,011 07	0,007 38	0,006 15	0,002 46
40	0,025 000	0,012 500	0,007 81	0,003 12	0,021 651	0,012 18	0,008 12	0,006 77	0,002 71
36	0,027 778	0,013 889	0,008 68	0,003 47	0,024 056	0,013 53	0,009 02	0,007 52	0,003 01
32	0,031 250	0,015 625	0,009 77	0,003 91	0,027 063	0,015 22	0,010 15	0,008 46	0,003 38
28	0,035 714	0,017 857	0,011 16	0,004 46	0,030 929	0,017 40	0,011 60	0,009 67	0,003 87
24	0,041 667	0,020 833	0,013 02	0,005 21	0,036 084	0,020 30	0,013 53	0,011 28	0,004 51
20	0,050 000	0,025 000	0,015 62	0,006 25	0,043 301	0,024 36	0,016 24	0,013 53	0,005 41
18	0,055 556	0,027 778	0,017 36	0,006 94	0,048 113	0,027 06	0,018 04	0,015 04	0,006 01
16	0,062 500	0,031 250	0,019 53	0,007 81	0,054 127	0,030 45	0,020 30	0,016 91	0,006 77
14	0,071 429	0,035 714	0,022 32	0,008 93	0,061 859	0,034 80	0,023 20	0,019 33	0,007 73
13	0,076 923	0,038 461	0,024 04	0,009 62	0,066 617	0,037 47	0,024 98	0,020 82	0,008 33
12	0,083 333	0,041 666	0,026 04	0,010 42	0,072 169	0,040 59	0,027 06	0,022 55	0,009 02
11	0,090 909	0,045 454	0,028 41	0,011 36	0,078 730	0,044 29	0,029 52	0,024 60	0,009 84
10	0,100 000	0,050 000	0,031 25	0,012 50	0,086 603	0,048 71	0,032 48	0,027 06	0,010 83
9	0,111 111	0,055 555	0,034 72	0,013 89	0,096 225	0,054 13	0,036 08	0,030 07	0,012 03
8	0,125 000	0,062 500	0,039 06	0,015 62	0,108 253	0,060 89	0,040 59	0,033 83	0,013 53
7	0,142 857	0,071 428	0,044 64	0,017 86	0,123 718	0,069 59	0,046 39	0,038 66	0,015 46
6	0,166 667	0,083 333	0,052 08	0,020 83	0,144 338	0,081 19	0,054 13	0,045 10	0,018 04
5	0,200 000	0,100 000	0,062 50	0,025 00	0,173 205	0,097 43	0,064 95	0,054 13	0,021 65
4,5	0,222 222	0,111 111	0,069 44	0,027 78	0,192 450	0,108 25	0,072 17	0,060 14	0,024 06
4	0,250 000	0,125 000	0,078 12	0,031 25	0,216 506	0,121 78	0,081 19	0,067 66	0,027 06

Table 2 — Basic dimensions

(1)	(2)	(3)	(4)	(5)
Nominal sizes	**Number of threads per inch** n	**Major diameter** D, d	**Pitch diameter** D_2, d_2	**Minor diameter** D_1, d_1
0,060 0	80	0,060 0	0,051 9	0,047 9
0,073 0	72	0,073 0	0,064 0	0,059 5
	64		0,062 9	0,057 8
0,086 0	64	0,086 0	0,075 9	0,070 8
	56		0,074 4	0,068 6
0,099 0	56	0,099 0	0,087 4	0,081 6
	48		0,085 5	0,078 7
0,112 0	48	0,112 0	0,098 5	0,091 7
	40		0,095 8	0,087 7
0,125 0	44	0,125 0	0,110 2	0,102 9
	40		0,108 8	0,100 7
0,138 0	40	0,138 0	0,121 8	0,113 7
	32		0,117 7	0,107 6
0,164 0	36	0,164 0	0,146 0	0,137 0
	32		0,143 7	0,133 6
0,190 0	32	0,190 0	0,169 7	0,159 6
	24		0,162 9	0,149 4
0,216 0	32	0,216 0	0,195 7	0,185 6
	28		0,192 8	0,181 2
	24		0,188 9	0,175 4
0,250 0	32	0,250 0	0,229 7	0,219 6
	28		0,226 8	0,215 2
	20		0,217 5	0,201 3
0,312 5	32	0,312 5	0,292 2	0,282 1
	24		0,285 4	0,271 9
	20		0,280 0	0,263 8
	18		0,276 4	0,258 4
0,375 0	32	0,375 0	0,354 7	0,344 6
	24		0,347 9	0,334 4
	20		0,342 5	0,326 3
	16		0,334 4	0,314 2
[illegible]	28	[illegible]	[illegible]	[illegible]
	20		0,405 0	0,388 8
	16		0,396 9	0,376 7
	14		0,391 1	0,368 0
0,500 0	28	0,500 0	0,476 8	0,465 2
	20		0,467 5	0,451 3
	16		0,459 4	0,439 2
	13		0,450 0	0,425 1
0,562 5	24	0,562 5	0,535 4	0,521 9
	20		0,530 0	0,513 8
	18		0,526 4	0,508 4
	16		0,521 9	0,501 7
	12		0,508 4	0,481 4

(1)	(2)	(3)	(4)	(5)
Nominal sizes	**Number of threads per inch** n	**Major diameter** D, d	**Pitch diameter** D_2, d_2	**Minor diameter** D_1, d_1
0,625 0	24	0,625 0	0,597 9	0,584 4
	20		0,592 5	0,576 3
	18		0,588 9	0,570 9
	16		0,584 4	0,564 2
	12		0,570 9	0,543 9
	11		0,566 0	0,536 5
0,687 5	24	0,687 5	0,660 4	0,646 9
	20		0,655 0	0,638 8
	16		0,646 9	0,626 7
	12		0,633 4	0,606 4
0,750 0	20	0,750 0	0,717 5	0,701 3
	16		0,709 4	0,689 2
	12		0,695 9	0,668 9
	10		0,685 0	0,652 6
0,812 5	20	0,812 5	0,780 0	0,763 8
	16		0,771 9	0,751 7
	12		0,758 4	0,731 4
0,875 0	20	0,875 0	0,842 5	0,826 3
	16		0,834 4	0,814 2
	14		0,828 6	0,805 5
	12		0,820 9	0,793 9
	9		0,802 8	0,766 8
0,937 5	20	0,937 5	0,905 0	0,888 8
	16		0,896 9	0,876 7
	12		0,883 4	0,856 4
1,000 0	20	1,000 0	0,967 5	0,951 3
	16		0,959 4	0,939 2
	12		0,945 9	0,918 9
	8		0,918 8	0,878 3
1,062 5	20	1,062 5	1,030 0	1,013 8
	18		1,026 4	1,008 4
	16		1,021 9	1,001 7
	12		1,008 4	0,981 4
[illegible]	8	[illegible]	[illegible]	[illegible]
1,125 0	20	1,125 0	1,092 5	1,076 3
	18		1,088 9	1,070 9
	16		1,084 4	1,064 2
	12		1,070 9	1,043 9
	8		1,043 8	1,003 3
	7		1,032 2	0,985 9
1,187 5	20	1,187 5	1,155 0	1,138 8
	18		1,151 4	1,133 4
	16		1,146 9	1,126 7
	12		1,133 4	1,106 4
	8		1,106 3	1,065 8

Table 2 *(continued)*

(1)	(2)	(3)	(4)	(5)
Nominal sizes	**Number of threads per inch** n	**Major diameter** D, d	**Pitch diameter** D_2, d_2	**Minor diameter** D_1, d_1
1,250 0	20	1,250 0	1,217 5	1,201 3
	18		1,213 9	1,195 9
	16		1,209 4	1,189 2
	12		1,195 9	1,168 9
	8		1,168 8	1,128 3
	7		1,157 2	1,110 9
1,312 5	20	1,312 5	1,280 0	1,263 8
	18		1,276 4	1,258 4
	16		1,271 9	1,251 7
	12		1,258 4	1,231 4
	8		1,231 3	1,190 8
1,375 0	20	1,375 0	1,342 5	1,326 3
	18		1,338 9	1,320 9
	16		1,334 4	1,314 2
	12		1,320 9	1,293 9
	8		1,293 8	1,253 3
	6		1,266 7	1,212 7
1,437 5	20	1,437 5	1,405 0	1,388 8
	18		1,401 4	1,383 4
	16		1,396 9	1,376 7
	12		1,383 4	1,356 4
	8		1,356 3	1,315 8
1,500 0	20	1,500 0	1,467 5	1,451 3
	18		1,463 9	1,445 9
	16		1,459 4	1,439 2
	12		1,445 9	1,418 9
	8		1,418 8	1,378 3
	6		1,391 7	1,337 7
1,562 5	20	1,562 5	1,530 0	1,513 8
	18		1,526 4	1,508 4
	16		1,521 9	1,501 7
	12		1,508 4	1,481 4
	8		1,481 3	1,440 8
1,625 0	20	1,625 0	1,592 5	1,576 3
	18		1,588 9	1,570 9
	16		1,584 4	1,564 2
	12		1,570 9	1,543 9
	8		1,543 8	1,503 3
1,687 5	20	1,687 5	1,655 0	1,638 8
	18		1,651 4	1,633 4
	16		1,646 9	1,626 7
	12		1,633 4	1,606 4
	8		1,606 3	1,565 8
1,750 0	20	1,750 0	1,717 5	1,701 3
	16		1,709 4	1,689 2
	12		1,695 9	1,668 9
	8		1,668 8	1,628 3
	5		1,620 1	1,555 2
1,812 5	20	1,812 5	1,780 0	1,763 8
	16		1,771 9	1,751 7
	12		1,758 4	1,731 4
	8		1,731 3	1,690 8
1,875 0	20	1,875 0	1,842 5	1,826 3
	16		1,834 4	1,814 2
	12		1,820 9	1,793 9
	8		1,793 8	1,753 3
1,937 5	20	1,937 5	1,905 0	1,888 8
	16		1,896 9	1,876 7
	12		1,883 4	1,856 4
	8		1,856 3	1,815 8
2,000 0	20	2,000 0	1,967 5	1,951 3
	16		1,959 4	1,939 2
	12		1,945 9	1,918 9
	8		1,918 8	1,878 3
	4,5		1,855 7	1,783 5
2,125 0	20	2,125 0	2,092 5	2,076 3
	16		2,084 4	2,064 2
	12		2,070 9	2,043 9
	8		2,043 8	2,003 3
2,250 0	20	2,250 0	2,217 5	2,201 3
	16		2,209 4	2,189 2
	12		2,195 9	2,168 9
	8		2,168 8	2,128 3
	4,5		2,105 7	2,033 5
2,375 0	20	2,375 0	2,342 5	2,326 3
	16		2,334 4	2,314 2
	12		2,320 9	2,293 9
	8		2,293 8	2,253 3
2,500 0	20	2,500 0	2,467 5	2,451 3
	16		2,459 4	2,439 2
	12		2,445 9	2,418 9
	8		2,418 8	2,378 3
	4		2,337 6	2,256 5
2,625 0	20	2,625 0	2,592 5	2,576 3
	16		2,584 4	2,564 2
	12		2,570 9	2,543 9
	8		2,543 8	2,503 3
2,750 0	20	2,750 0	2,717 5	2,701 3
	16		2,709 4	2,689 2
	12		2,695 9	2,668 9
	8		2,668 8	2,628 3
	4		2,587 6	2,506 5
2,875 0	20	2,875 0	2,842 5	2,826 3
	16		2,834 4	2,814 2
	12		2,820 9	2,793 9
	8		2,793 8	2,753 3

Table 2 *(concluded)*

(1)	(2)	(3)	(4)	(5)
Nominal sizes	**Number of threads per inch** n	**Major diameter** D, d	**Pitch diameter** D_2, d_2	**Minor diameter** D_1, d_1
3,000 0	20	3,000 0	2,967 5	2,951 3
	16		2,959 4	2,939 2
	12		2,945 9	2,918 9
	8		2,918 8	2,878 3
	4		2,837 6	2,756 5
3,125 0	16	3,125 0	3,084 4	3,064 2
	12		3,070 9	3,043 9
	8		3,043 8	3,003 3
3,250 0	16	3,250 0	3,209 4	3,189 2
	12		3,195 9	3,168 9
	8		3,168 8	3,128 3
	4		3,087 6	3,006 5
3,375 0	16	3,375 0	3,334 4	3,314 2
	12		3,320 9	3,293 9
	8		3,293 8	3,253 3
3,500 0	16	3,500 0	3,459 4	3,439 2
	12		3,445 9	3,418 9
	8		3,418 8	3,378 3
	4		3,337 6	3,256 5
3,625 0	16	3,625 0	3,584 4	3,564 2
	12		3,570 9	3,543 9
	8		3,543 8	3,503 3
3,750 0	16	3,750 0	3,709 4	3,689 2
	12		3,695 9	3,668 9
	8		3,668 8	3,628 3
	4		3,587 6	3,506 5
3,875 0	16	3,875 0	3,834 4	3,814 2
	12		3,820 9	3,793 9
	8		3,793 8	3,753 3
4,000 0	16	4,000 0	3,959 4	3,939 2
	12		3,945 9	3,918 9
	8		3,918 8	3,878 3
	4		3,837 6	3,756 5
4,125 0	16	4,125 0	4,084 4	4,064 2
	12		4,070 9	4,043 9

(1)	(2)	(3)	(4)	(5)
Nominal sizes	**Number of threads per inch** n	**Major diameter** D, d	**Pitch diameter** D_2, d_2	**Minor diameter** D_1, d_1
4,250 0	16	4,250 0	4,209 4	4,189 2
	12		4,195 9	4,168 9
4,375 0	16	4,375 0	4,334 4	4,314 2
	12		4,320 9	4,293 9
4,500 0	16	4,500 0	4,459 4	4,439 2
	12		4,445 9	4,418 9
4,625 0	16	4,625 0	4,584 4	4,564 2
	12		4,570 9	4,543 9
4,750 0	16	4,750 0	4,709 4	4,689 2
	12		4,695 9	4,668 9
4,875 0	16	4,875 0	4,834 4	4,814 2
	12		4,820 9	4,793 9
5,000 0	16	5,000 0	4,959 4	4,939 2
	12		4,945 9	4,918 9
5,125 0	16	5,125 0	5,084 4	5,064 2
	12		5,070 9	5,043 9
5,250 0	16	5,250 0	5,209 4	5,189 2
	12		5,195 9	5,168 9
5,375 0	16	5,375 0	5,334 4	5,314 2
	12		5,320 9	5,293 9
5,500 0	16	5,500 0	5,459 4	5,439 2
	12		5,445 9	5,418 9
5,625 0	16	5,625 0	5,584 4	5,564 2
	12		5,570 9	5,543 9
5,750 0	16	5,750 0	5,709 4	5,689 2
	12		5,695 9	5,668 9
5,875 0	16	5,875 0	5,834 4	5,814 2
	12		5,820 9	5,793 9
6,000 0	16	6,000 0	5,959 4	5,939 2
	12		5,945 9	5,918 9