INTERNATIONAL STANDARD

ISO
5855-1

Aerospace — MJ threads —

Part 1:
General requirements

Aéronautique et espace — Filetage MJ —

Partie 1: Exigences générales

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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 5855-1 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 4, *Aerospace fastener systems*.

This third edition cancels and replaces the second edition (ISO 5855-1:1988), of which it constitutes a technical revision.

ISO 5855 consists of the following parts, under the general title *Aerospace — MJ threads*:

— *Part 1: General requirements*

— *Part 2: Limit dimensions for bolts and nuts*

— *Part 3: Limit dimensions for fittings for fluid systems*

Aerospace — MJ threads —

Part 1:
General requirements

1 Scope

This part of ISO 5855 specifies the general requirements for MJ threads used in aerospace construction.

It determines the basic triangular profile for this type of thread and gives a system for designating the diameter and pitch combinations. For all diameters 1,6 mm to 300 mm, it offers in the form of tables the basic dimensions and tolerances for a selection of diameter and pitch combinations. It also provides the method of calculation for the dimensions and tolerances for any diameter and pitch combination not given in the tables, including threads with a diameter in excess of 300 mm.

For limit dimensions for bolts and nuts of nominal diameter 1,6 mm to 39 mm, see ISO 5855-2. For limit dimensions for fittings for fluid systems, see ISO 5855-3.

2 Normative reference

The following normative document contains provisions which, through reference in this text, constitute provisions of this part of ISO 5855. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 5855 are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 965-1:1998, *ISO general-purpose metric screw threads — Tolerances — Part 1: Principles and basic data.*

3 Term and definition

For the purpose of this part of ISO 5855, the following term and definition apply.

3.1
basic profile
theoretical profile, in an axial plane, corresponding to the basic dimensions (without tolerances) of the thread, i.e. major diameter, pitch diameter and minor diameter

See Figure 1.

4 Basic profile

4.1 Symbols

See Figure 1.

4.2 Dimensions

See Figure 1 and Table 1.

Basic deviations shall be applied to the basic dimensions.
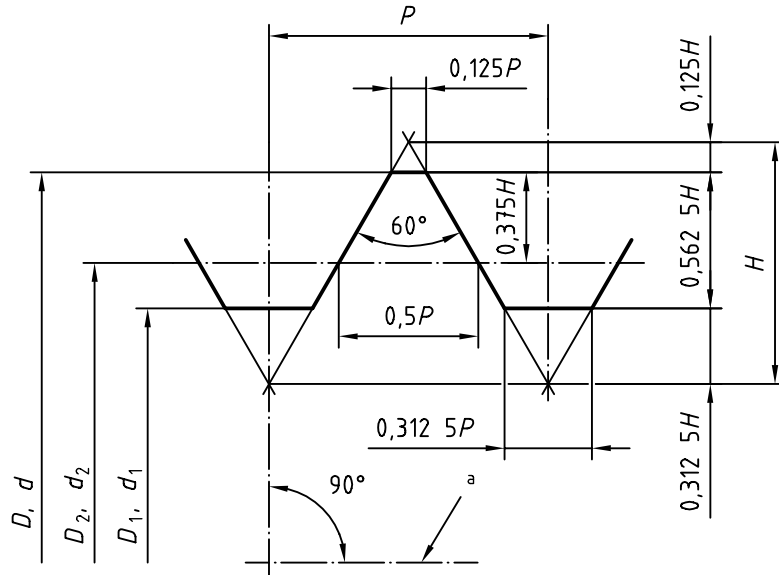
where

D	is the basic major diameter of internal thread
D_2	is the basic pitch diameter of internal thread
D_1	is the basic minor diameter of internal thread
d	is the basic major diameter of external thread
d_2	is the basic pitch diameter of external thread
d_1	is the basic minor diameter of external thread
H	is the height of fundamental triangle
P	is the pitch

a Axis of thread

Figure 1 — Basic profile

Table 1 — Dimensions

Dimensions in millimetres

P	0,125P	0,312 5P	H 0,866 025 403 8P	0,125H 0,108 25P	0,312 5H 0,270 63P	0,375H 0,324 76P	0,562 5H 0,487 14P	0,583 33H 0,505 18P	0,565 80P	0,75H 0,649 519P	0,916 67H 0,793 86P	1,125H 0,974 28P
0,2	0,025	0,062 5	0,173 21	0,021 65	0,054 13	0,064 95	0,097 43	0,101 04	0,113 16	0,129 904	0 158 77	0,194 85
0,25	0,031 25	0,078 13	0,216 51	0,027 06	0,067 66	0,081 19	0,121 79	0,126 30	0,141 45	0,162 380	0,198 46	0,243 57
0,35	0,043 75	0,109 38	0,303 11	0,037 89	0,094 72	0,113 67	0,170 5	0,176 81	0,198 03	0,227 332	0,277 85	0,341
0,4	0,05	0,125	0,346 41	0,043 3	0,108 25	0,129 9	0,194 86	0,202 07	0,226 32	0,259 808	0,317 54	0,389 71
0,45	0,056 25	0,140 62	0,389 71	0,048 71	0,121 78	0,146 14	0,219 21	0,227 33	0,254 61	0,292 283	0,357 24	0,438 43
0,5	0,062 5	0,156 25	0,433 01	0,054 13	0,135 32	0,162 38	0,243 57	0,252 59	0,282 9	0,324 759	0,396 93	0,487 14
0,6	0,075	0,187 5	0,519 62	0,064 95	0,162 38	0,194 86	0,292 28	0,303 11	0,339 48	0,389 711	0,476 32	0,584 57
0,7	0,087 5	0,218 75	0,606 22	0,075 78	0,189 44	0,227 33	0,341	0,353 63	0,396 06	0,454 663	0,555 70	0,682
0,75	0,093 75	0,234 38	0,649 52	0,081 19	0,202 97	0,243 57	0,365 36	0,378 88	0,425 35	0,487 139	0,595 39	0,730 71
0,8	0,1	0,25	0,692 82	0,086 6	0,216 51	0,259 81	0,389 71	0,404 14	0,452 64	0,519 615	0,635 09	0,779 42
1	0,125	0,312 5	0,866 03	0,108 25	0,270 63	0,324 76	0,487 14	0,505 18	0,565 8	0,649 519	0,793 86	0,974 28
1,25	0,156 25	0,390 62	1,082 53	0,135 32	0,338 29	0,405 95	0,608 92	0,631 47	0,707 25	0,811 899	0,992 32	1,217 85
1,5	0,187 5	0,468 75	1,299 04	0,162 38	0,405 95	0,487 14	0,730 71	0,757 78	0,848 7	0,974 278	1,190 79	1,461 42
1,75	0,218 75	0,546 88	1,515 54	0,189 44	0,473 6	0,568 33	0,852 5	0,884 06	0,990 15	1,136 658	1,389 25	1,704 99
2	0,25	0,625	1,732 05	0,216 51	0,541 27	0,649 52	0,974 28	1,010 36	1,131 6	1,299 038	1,587 72	1,948 56
2,5	0,312 5	0,781 25	2,165 06	0,270 63	0,676 58	0,811 9	1,217 85	1,262 95	1,414 5	1,623 797	1,984 65	2,435 7
3	0,375	0,937 5	2,598 08	0,324 75	0,811 89	0,974 28	1,461 42	1,515 54	1,697 4	1,948 557	2,381 58	2,922 84
3,5	0,437 5	1,093 75	3,031 09	0,378 88	0,947 21	1,136 66	1,704 99	1,768 13	1,980 3	2,273 316	2,778 51	3,409 98
4	0,5	1,25	3,464 1	0,433	1,082 52	1,299 04	1,948 56	2,020 72	2,263 2	2,598 076	3,175 44	3,897 12
4,5	0,562 5	1,406 25	3,897 11	0,487 13	1,217 84	1,461 42	2,192 13	2,273 31	2,546 1	2,922 835	3,572 37	4,384 26
5	0,625	1,562 5	4,330 13	0,541 25	1,353 15	1,623 8	2,435 7	2,525 9	2,829	3,247 595	3,969 3	4,871 4
5,5	0,687 5	1,718 75	4,763 14	0,595 38	1,488 47	1,786 18	2,679 27	2,778 49	3,111 9	3,572 354	4,366 23	5,358 54
6	0,75	1,875	5,196 15	0,649 5	1,623 78	1,948 56	2,922 84	3,031 08	3,394 8	3,897 114	4,763 16	5,845 68

5 Position and form of limit profiles
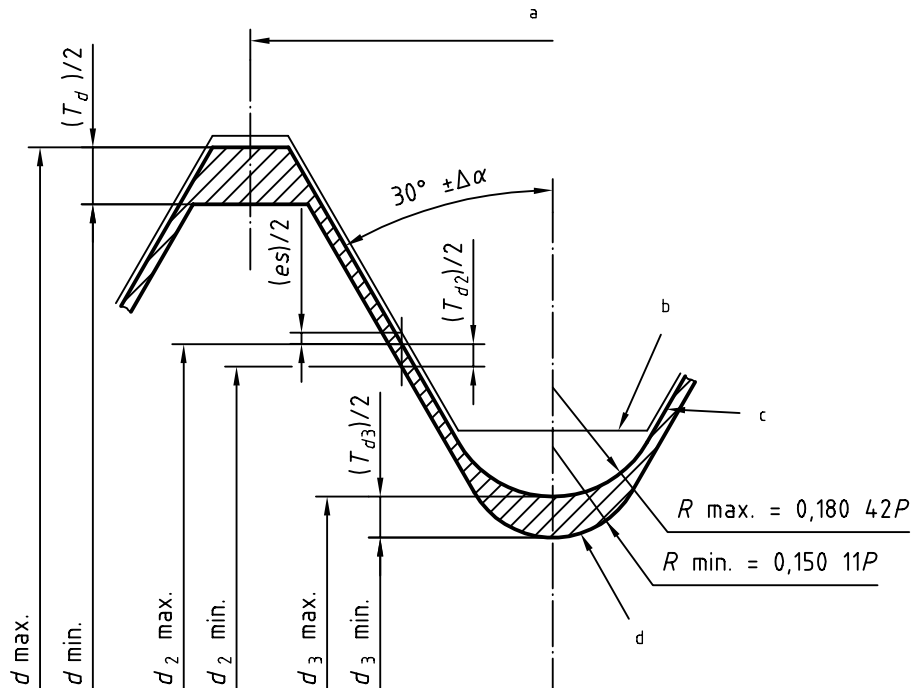
5.1 External threads

The actual thread profile is located between the limit profiles shown in Figures 2 and 3.

Within these limits, any continuous, non-reversing curve is permitted, provided that it comprises radii no less than 0,150 11P.
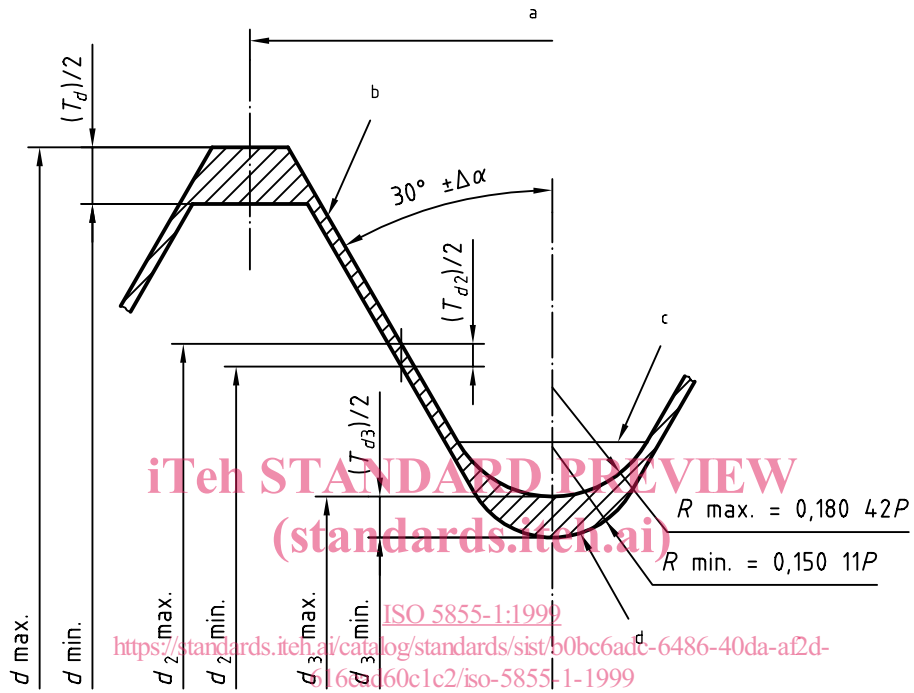
a Pitch $\pm \Delta P$

b Basic and maximum profiles

c Basic profile

d Minimum profile

Figure 2 — Limit profiles for external threads (clearance may be nil)

a   Pitch $\pm \Delta P$

b   Basic profile

c   Maximum profile

d   Minimum profile

Figure 3 — Limit profiles for external threads (systematic clearance)

5.2 Internal threads

The actual thread profile is located between the limit profiles shown in Figures 4 and 5.

The form of the connection between the root (corresponding to diameter D_3) and the thread flanks is not mandatory. The root is generally rounded beyond the nominal diameter. The radius is not specified.
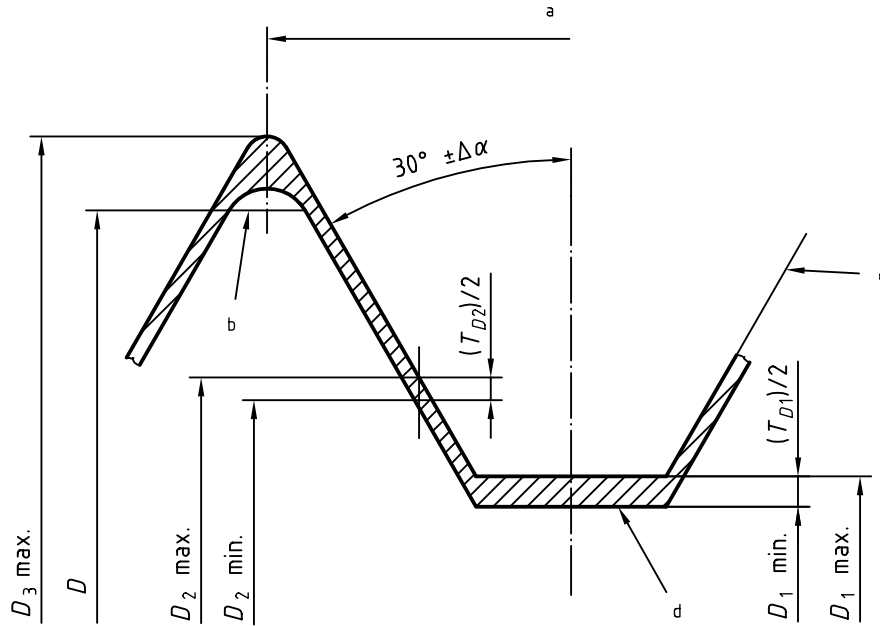
a Pitch $\pm \Delta P$

b Basic profile

c Maximum profile

d Basic and minimum profiles

Figure 4 — Limit profiles for internal threads (clearance may be nil)
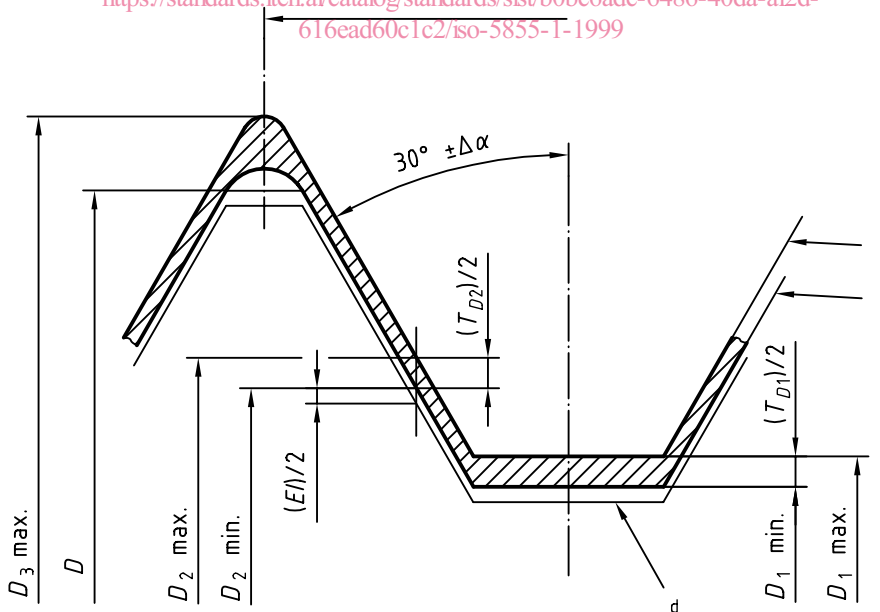
a Pitch $\pm \Delta P$

b Maximum profile

c Minimum profile

d Basic profile

Figure 5 — Limit profiles for internal threads (systematic clearance)

6 Tolerances

6.1 Tolerances on diameters

The grades, positions and basic upper and lower (*es* and *EI*) tolerance deviations (see Figures 3 and 5) shall be as specified in ISO 965-1.

6.2 Tolerances on other parameters

Tolerances on pitch ΔP and on the half flank angle $\Delta\alpha$ shall be determined from the formulae given in clause 10.

Within the limits of the thread pitch diameter, and over the chosen length of measurement, the sum of the effects of variations in the pitch, flank angle, helix, taper and circularity and all other variations affecting the form of the thread shall not exceed 0,5 times the tolerance on the pitch diameter. The following information is therefore given for information only.

The thread pitch may vary by $\pm \Delta P$ from the basic profile, but the total variation between any two threads located within the length of engagement should not exceed ΔP.

6.3 Provisions for coated threads

In order to reduce the number of manufacturing and inspection tools, it is recommended that, where possible, standardized tolerance classes for threads (grade and position) as specified in ISO 965-1 be used.

7 Limit dimensions

iTeh STANDARD PREVIEW
(standards.iteh.ai)

The limit dimensions, shown in Figures 2 to 5, shall be determined from the formulae given in clause 10.

8 Nominal diameter and pitch combinations

The threads in 5.1 and 5.2 and indicated in Table 2 meet most requirements. If other diameter and pitch combinations or threads larger than 300 mm in diameter are required, then these shall be calculated using the formulae in clause 10.

9 Designation

9.1 General

The threads specified in this part of ISO 5855 are designated by:

— M, a letter identifying metric threads;

— J, a letter symbolizing the thread profile;

— the nominal diameter $\times$ pitch, expressed in millimetres;

— the tolerance class on pitch diameter, followed by the tolerance class on the major diameter or on the minor diameter[1].

---

[1] If a single tolerance class is given, it refers to the pitch diameter d_2 or D_2 and the major diameter d or minor diameter D_1.

EXAMPLE 1   An external MJ thread, of nominal diameter 6 mm, pitch 1 mm and tolerance classes 4h6h is designated as follows:

MJ6 × 1-4h6h

EXAMPLE 2   An internal MJ thread, of nominal diameter 6 mm, pitch 1 mm and tolerance classes 4H5H is designated as follows:

MJ6 × 1-4H5H

9.2 Special cases

MJ threads not specified in this part of ISO 5855 are special threads.

They shall be calculated in accordance with clause 10 and designated by

— MJ, see 9.1;

— S, a letter symbolizing a special thread;

— all the information necessary to produce the thread.

EXAMPLE 1   An external MJ thread, of nominal diameter 13 mm, pitch 1 mm and tolerance class 4h[2] is designated as follows:

MJS13 × 1-4h

Major diameter d **=**   **13**
              12,888 mm

Pitch diameter d_2 **=**   **12,350**
              12,275 mm

Minor diameter d_3 **=**   **11,845**
              11,709 mm

Root radius =   **0,18**
              0,15 mm

EXAMPLE 2   An internal MJ thread of nominal diameter 13 mm, pitch 1 mm and tolerance class 4H5H, is designated as follows:

MJS13 × 1-4H5H

Major diameter D_3 **max. =**   **13,244 mm**

Pitch diameter D_2 **=**   **12,450**
              12,350 mm

Minor diameter D_1 **=**   **12,216**
              12,026 mm

---

[2] If a single tolerance class is given, it refers to the pitch diameter d_2 or D_2 and the major diameter d or minor diameter D_1.

9.3 Left-hand threads

In the case of left-hand threads, the designation given in 9.1 and 9.2 is followed by the letters LH (Left-Hand).

9.3.1 General

EXAMPLE 1   **MJ6 × 1-4h6h-LH**

EXAMPLE 2   **MJ6 × 1-4H5H-LH**

9.3.2 Special cases

EXAMPLE 1   **MJS13 × 1-4h-LH**

EXAMPLE 2   **MJS13 × 1-4H5H-LH**

10 Calculation formulae

10.1 External threads (see Figures 2 and 3)

d max. $= d - es$

   es: in accordance with ISO 965-1

d min. $= d$ max. $- T_d$

   T_d: in accordance with ISO 965-1 or as defined by part designer

d_2 max. $= d_2 = d$ max. $- 0{,}649\ 519P$

   $0{,}649\ 519P$: see Table 1.

d_2 min. $= d_2$ max. $- T_{d2}$

   T_{d2}: in accordance with ISO 965-1 or as defined by part designer

d_3 max. $= d_3 = d_2$ max. $- 0{,}505\ 18P$

   $0{,}505\ 18P$: see Table 1.

d_3 min. $= d_2$ min. $- 0{,}565\ 80P$

   $0{,}565\ 80P$: see Table 1.

$\Delta P = 0{,}4\ T_{d2}/1{,}732\ 1$

$\Delta\alpha$ is such that $\tan(\Delta\alpha) = 0{,}3\ T_{d2}/1{,}125P$

Tables 3 and 4 give information for the limit dimensions for respectively 4h6h and 4g6g external threads.

Table 5 gives information for the root radii for external threads.

Table 6 gives information for the maximum permissible deviations on pitch (lead) and on half flank angle.

10.2 Internal threads (see Figures 4 and 5)

D_1 min. = D – 0,974 28P + EI

> 0,974 28P: see Table 1.

> EI: in accordance with ISO 965-1

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

> T_{D1}: in accordance with ISO 965-1 or as defined by part designer

D_2 min. = D_2 = D – 0,649 519P + EI

> 0,649 519P: see Table 1.

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

> T_{D2}: in accordance with ISO 965-1 or as defined by part designer

D_3 max. = D_2 max. + 0,793 86P

> 0,793 86P: see Table 1.

$\Delta P = 0,4 T_{D2}/1,732\ 1$

$\Delta\alpha$ is such that tan $(\Delta\alpha) = 0,3 T_{D2}/1,125 P$

Table 7 gives information for the limit dimensions for internal threads.

Table 6 gives information for the maximum permissible deviations on pitch (lead) and on half flank angle.

Table 2 — Nominal diameter and pitch combinations

Dimensions in millimetres

$D \times P$	$D \times P$	$D \times P$	$D \times P$	$D \times P$	$D \times P$	$D \times P$
1,6 × 0,35	17 × 1	39 × 2	62 × 2	85 × 3	140 × 6	220 × 3
1,8 × 0,35	17 × 1,5	39 × 3	62 × 3	85 × 4	145 × 2	220 × 4
2 × 0,4	18 × 1	39 × 4	62 × 4	85 × 6	145 × 3	220 × 6
2,2 × 0,45	18 × 1,5	40 × 1,5	64 × 1,5	88 × 1,5	145 × 4	225 × 3
2,5 × 0,35	18 × 2	40 × 2	64 × 2	90 × 1,5	145 × 6	225 × 4
2,5 × 0,45	18 × 2,5	40 × 3	64 × 3	90 × 2	150 × 2	225 × 6
3 × 0,35	20 × 1	42 × 1,5	64 × 4	90 × 3	150 × 3	230 × 3
3 × 0,5	20 × 1,5	42 × 2	64 × 6	90 × 4	150 × 4	230 × 4
3,5 × 0,35	20 × 2	42 × 3	65 × 1,5	90 × 6	150 × 6	230 × 6
3,5 × 0,6	20 × 2,5	42 × 4	65 × 2	95 × 2	155 × 3	235 × 3
4 × 0,5	22 × 1	42 × 4,5	65 × 3	95 × 3	155 × 4	235 × 4
4 × 0,7	22 × 1,5	45 × 1,5	65 × 4	95 × 4	155 × 6	235 × 6
4,5 × 0,5	22 × 2	45 × 2	68 × 1,5	95 × 6	160 × 3	240 × 3
4,5 × 0,75	22 × 2,5	45 × 3	68 × 2	100 × 2	160 × 4	240 × 4
5 × 0,5	24 × 1	45 × 4	68 × 3	100 × 3	160 × 6	240 × 6
5 × 0,8	24 × 1,5	45 × 4,5	68 × 4	100 × 4	165 × 3	245 × 3
5,5 × 0,5	24 × 2	48 × 1,5	68 × 6	100 × 6	165 × 4	245 × 4
6 × 0,75	24 × 3	48 × 2	70 × 1,5	105 × 2	165 × 6	245 × 6
6 × 1	25 × 1	48 × 3	70 × 2	105 × 3	170 × 3	250 × 3
7 × 0,75	25 × 1,5	48 × 4	70 × 3	105 × 4	170 × 4	250 × 4
7 × 1	25 × 2	48 × 5	70 × 4	105 × 6	170 × 6	250 × 6
8 × 0,75	26 × 1,5	50 × 1,5	70 × 6	110 × 2	175 × 3	255 × 4
8 × 1	27 × 1	50 × 2	72 × 1,5	110 × 3	175 × 4	255 × 6
8 × 1,25	27 × 1,5	50 × 3	72 × 2	110 × 4	175 × 6	260 × 4
9 × 0,75	27 × 2	52 × 1,5	72 × 3	110 × 6	180 × 3	260 × 6
9 × 1	27 × 3	52 × 2	72 × 6	115 × 2	180 × 4	265 × 4
9 × 1,25	28 × 1	52 × 3	72 × 6	115 × 3	180 × 6	265 × 6
10 × 0,75	28 × 1,5	52 × 4	75 × 1,5	115 × 4	185 × 3	270 × 4
10 × 1	28 × 2	52 × 5	75 × 2	115 × 6	185 × 4	270 × 6
10 × 1,25	30 × 1	55 × 1,5	75 × 3	120 × 2	185 × 6	275 × 4
10 × 1,5	30 × 1,5	55 × 2	75 × 4	120 × 3	190 × 3	275 × 6
11 × 0,75	30 × 2	55 × 3	76 × 1,5	120 × 4	190 × 4	280 × 4
11 × 1	30 × 3	55 × 4	76 × 3	120 × 6	190 × 6	280 × 6
11 × 1,25	30 × 3,5	56 × 1,5	76 × 4	125 × 2	195 × 3	285 × 4
11 × 1,5	32 × 1,5	56 × 2	76 × 6	125 × 3	195 × 4	285 × 6
12 × 1	32 × 2	56 × 3	78 × 1,5	125 × 4	195 × 6	290 × 4
12 × 1,25	33 × 1,5	56 × 4	78 × 2	125 × 6	200 × 3	290 × 6
12 × 1,5	33 × 2	56 × 5,5	78 × 3	130 × 2	200 × 4	295 × 4
12 × 1,75	33 × 3	58 × 1,5	80 × 1,5	130 × 3	200 × 6	295 × 6
14 × 1	33 × 3,5	58 × 2	80 × 2	130 × 4	205 × 3	300 × 4
14 × 1,25	35 × 1,5	58 × 3	80 × 3	130 × 6	205 × 4	300 × 6
14 × 1,5	35 × 2	58 × 4	80 × 4	135 × 2	205 × 6	
14 × 2	36 × 1,5	60 × 1,5	80 × 6	135 × 3	210 × 3	
15 × 1	36 × 2	60 × 2	82 × 1,5	135 × 4	210 × 4	
15 × 1,5	36 × 3	60 × 3	82 × 2	135 × 6	210 × 6	
16 × 1	36 × 4	60 × 4	82 × 3	140 × 2	215 × 3	
16 × 1,5	38 × 1,5	60 × 5,5	85 × 1,5	140 × 3	215 × 4	
16 × 2	39 × 1,5	62 × 1,5	85 × 2	140 × 4	215 × 6	