BRITISH STANDARD

BS 3643-1: 1981

(Reprinted, incorporating Amendments No. 1 and No. 2)

Specification for

ISO metric screw threads —

Part 1: Principles and basic data

UDC 621.882.082.1

Cooperating organizations

The Mechanical Engineering Standards Committee, under whose direction this British Standard was prepared, consists of representatives from the following:

Associated Offices Technical Committee
Association of Consulting Engineers
Association of Hydraulic Equipment Manufacturers
Association of Mining Electrical and Mechanical Engineers
British Compressed Air Society
British Electrical and Allied Manufacturers' Association (BEAMA)*
British Gas Corporation
British Gear Manufacturers' Association
British Internal Combustion Engine Manufacturers' Association*
British Pump Manufacturers' Association
British Steel Corporation
British Steel Industry
British Valve Manufacturers' Association Ltd.
Cbmpe
Chartered Institution of Building Services
Crown Agents for Oversea Governments and Administrations
Department of the Environment (PSA)
Department of Industry (Mechanical Engineering)
Department of Industry (National Engineering Laboratory)*
Department of Trade (Marine Division)
Department of Transport
Electricity Supply Industry in England and Wales
Engineering Equipment Users' Association
Federation of Manufacturers of Construction Equipment and Cranes
Health and Safety Executive
Institution of Gas Engineers
Institution of Mechanical Engineers
Institution of Plant Engineers
Institution of Production Engineers
LLoyd's Register of Shipping
London Transport Executive
Machine Tool Industry Research Association
Ministry of Defence*
National Coal Board*
Oil Companies Materials Association
Process Plant Association
Railway Industry Association of Great Britain*
Society of Motor Manufacturers and Traders Limited
Telecommunication Engineering and Manufacturing Association (TEMA)*

The organizations marked with an asterisk in the above list, together with the following, were directly represented on the Technical Committee entrusted with the preparation of this British Standard:

Agricultural Engineers' Association
Bicycle Association of Great Britain
British Industrial Fasteners Federation
British Railways Board
Business Equipment Trade Association
Fasteners and Turned Parts Institute
Gauge and Tool Makers' Association
Screw Thread Tool Manufacturers' Association
Society of British Aerospace Companies Limited
Individual manufacturer

This British Standard, having been prepared under the direction of the Mechanical Engineering Standards Committee, was published under the authority of the Executive Board and comes into effect on
31 March 1981

First published June 1963
First revision March 1981

The following BSI references relate to the work on this standard:
Committee reference MEE/1
Draft for comment 78/80250 DC

ISBN 0 580 11626 3

Amendments issued since publication

Amd. No.	Date of issue	Comments
3910	May 1982	
4701	December 1984	Indicated by a sideline in the margin

Contents

Foreword

This revised British Standard has been prepared under the direction of the Mechanical Engineering Standards Committee. It is based on the following ISO standards relating to ISO metric screw threads prepared by Technical Committee ISO/TC 1, Screw threads, of the International Organization for Standardization (ISO). The clauses in this standard have been so arranged that each relates directly to the relevant ISO standard as indicated:

Clause **3**: ISO 68-1963

Clause **4**: ISO 261-1973

Clause **5**: ISO 724-1968

Clause **6**: ISO 965/1-1980

Clause **7**: ISO 965/3-1980

ISO 965/2-1973 *"ISO general purpose metric screw threads — Tolerances — Part II Limits of sizes for commercial bolt and nut threads — Medium quality"*, has not been included as a separate clause in this standard as the limits of sizes listed are specified in BS 3643-2.

ISO 965 has been revised by ISO/TC 1 to include the tolerance position "f" and the modified bolt root profile. This information has been included in this standard.

Screw thread terms and definitions can be found in BS 6528 (identical with ISO 5408-1983) and these will be adopted in future standards and revised existing standards.

Some terms used in this standard, based on the established ISO standards, may be at variance with, or do not appear in, BS 6528; e.g. "crest diameter" is used in clause **6** but is not defined in BS 6528. However it has been decided to leave this descriptive term which is used to embrace the terms "major diameter of bolt thread" and "minor diameter of nut thread". Moreover the term "nominal size or "nominal diameter" is often confused with basic size, whereas it is now defined in BS 6528 as "The size which is used for the purpose of general identification. It is generally the basic major diameter of the thread".

ISO 262 "ISO general purpose metric screw threads — Selected sizes for screws, bolts and nuts", has not been included as a separate clause in this standard as those sizes will be specified in the various product standards. However, its contents form part of Table 3 in clause **4**.

In order to establish a recognized fine series, a selection of diameter/pitch combinations has been taken from ISO 261. For nominal diameters up to and including M7, one pitch only for each nominal diameter is included in ISO 261 (other than the coarse pitch) and therefore these pitches have been included in this standard. The pitches for nominal diameters larger than M7 have been extracted from ISO 262.

The information given in Appendix A has been given in this form rather than in the appropriate clauses in the standard, so that each clause maintains as far as possible the ISO format, to enable direct cross reference with the ISO standards and the standards of other countries that are also based on the ISO standards.

The information given in Appendix B for the calculation of limits of size for screw threads recognizes that the limitations of the ISO standards on nominal sizes, i.e. 1.0 mm (minimum) to 300 mm (maximum) diameters and also the diameter/pitch combinations may at times need to be exceeded.

When screw threads for aerospace purposes are specified to comply with the requirements of BS 3643, it is permissible for them to be manufactured to the MJ profile in BS 6293 and for their limits of size to be modified accordingly to suit the root radius of that profile. Attention is drawn to the fact that the MJ threads specified in BS 6293 is the preferred series for aerospace use.

Terminology and conventions. For ease of production it has been found convenient to reproduce the tables of the international standards with amendments, where necessary. Some terminology and certain conventions are not identical with those used in British Standards; attention is especially drawn to the following.

The comma has been used throughout as a decimal marker. In British Standards it is current practice to use a full point on the baseline as the decimal marker.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 52, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

blank

1 Scope

This Part of this British Standard specifies the principles and basic data for single-start, parallel screw threads having the ISO basic profile for triangular screw threads. Data for 1,0 mm to 300 mm diameter threads is tabulated and Appendix B is included giving the information necessary to calculate the limits of size for exception to the tabulated data.

NOTE Attention is drawn to the fact that, with the different screw thread forms available, there is the possibility of mismatch. It is the responsibility of the designer of the end product to ensure that this possibility is reduced to a minimum. For further information see PD 6494.

2 References

The titles of the standards publications referred to in this standard are listed on the inside back cover.

BS 3643-2 specifies the fundamental deviations, tolerances and limits of size for the tolerances classes 4H, 5H, 6H and 7H for internal threads and 4h, 6g and 8g for external threads where appropriate for:

course pitch series within the range 1 mm to 68 mm diameter;

fine pitch series with the range 1 mm to 33 mm diameter;

constant pitch series with the range 8 mm to 300 mm diameter.

The following British Standards will be found useful for reference:

BS 3382, *Electroplated coatings on threaded components.*

BS 4827, *ISO miniature screw threads.*

BS 5346, *ISO metric trapezoidal screw threads.*

3 Basic profile

3.1 General. This clause specifies the basic profile for ISO general purpose metric screw threads as shown in Figure 1. The dimensions for the various standard pitches are given in Table 1.

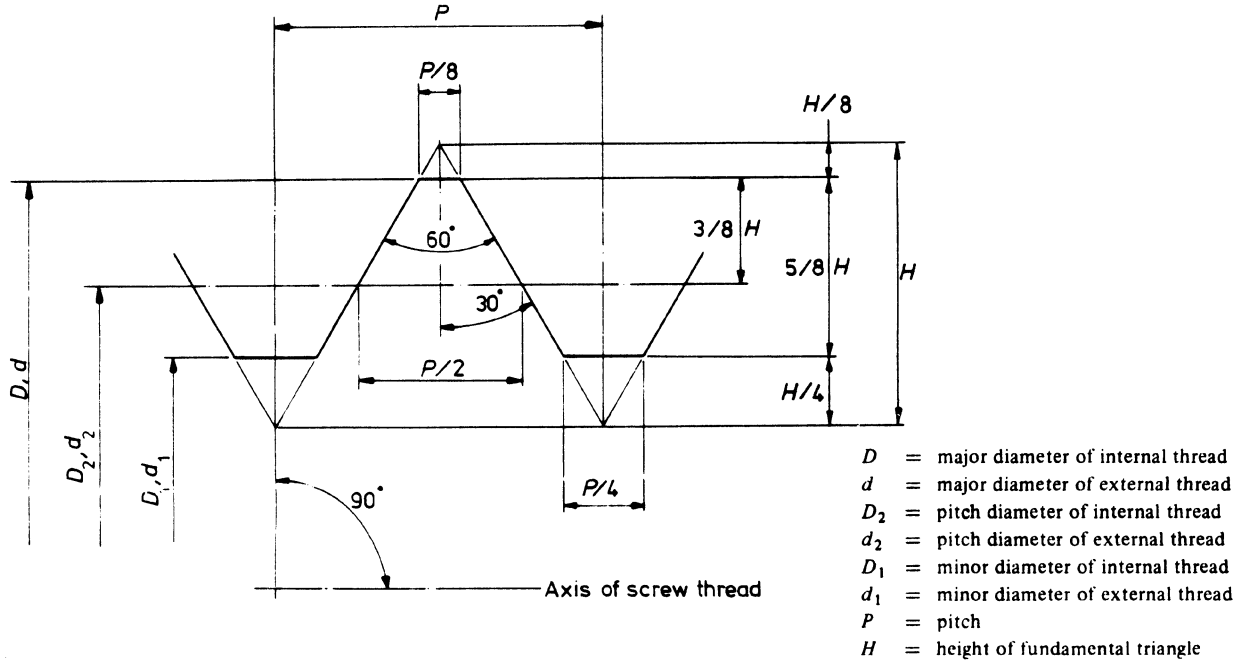


Figure 1 — Basic profile of ISO metric thread

Table 1 — Basic profile dimensions

Dimensions in millimetres

Pitch P	H	$\frac{5}{8}H$	$\frac{3}{8}H$	$\frac{H}{4}$	$\frac{H}{8}$
0,2	0,173 205	0,108 253	0,064 952	0,043 301	0,021 651
0,25	0,216 506	0,135 316	0,081 190	0,054 127	0,027 063
0,3	0,259 808	0,162 380	0,097 428	0,064 952	0,032 476
0,35	0,303 109	0,189 443	0,113 666	0,075 777	0,037 889
0,4	0,346 410	0,216 506	0,129 904	0,086 603	0,043 301
0,45	0,389 711	0,243 570	0,146 142	0,097 428	0,048 714
0,5	0,433 013	0,270 633	0,162 380	0,108 253	0,054 127
0,6	0,519 615	0,324 760	0,194 856	0,129 904	0,064 952
0,7	0,606 218	0,378 886	0,227 332	0,151 554	0,075 777
0,75	0,649 519	0,405 949	0,243 570	0,162 380	0,081 190
0,8	0,692 820	0,433 013	0,259 808	0,173 205	0,086 603
1	0,866 025	0,541 266	0,324 760	0,216 506	0,108 253
1,25	1,082 532	0,676 582	0,405 949	0,270 633	0,135 316
1,5	1,299 038	0,811 899	0,487 139	0,324 760	0,162 380
1,75	1,515 544	0,947 215	0,568 329	0,378 886	0,189 443
2	1,732 051	1,082 532	0,649 519	0,433 013	0,216 506
2,5	2,165 063	1,353 165	0,811 899	0,541 266	0,270 633
3	2,598 076	1,623 798	0,974 279	0,649 519	0,324 760
3,5	3,031 089	1,894 431	1,136 658	0,757 772	0,378 886
4	3,464 102	2,165 063	1,299 038	0,866 025	0,433 013
4,5	3,897 114	2,435 696	1,461 418	0,974 279	0,487 139
5	4,330 127	2,706 329	1,623 798	1,082 532	0,541 266
5,5	4,763 140	2,976 962	1,786 177	1,190 785	0,595 392
6	5,196 152	3,247 595	1,948 557	1,299 038	0,649 519
8	6,928 203	4,330 127	2,598 076	1,732 051	0,866 025

3.2 Definition

basic profile
the theoretical profile, associated with the basic sizes of the major, pitch, and minor diameters of the thread
the deviations are applied to these basic sizes

3.3 Dimensions

$H = \frac{\sqrt{3}}{2}P = 0{,}866\,025\,404\,P$

$\frac{5}{8}H = 0{,}541\,265\,877\,P$

$\frac{3}{8}H = 0{,}324\,759\,526\,P$

$\frac{H}{4} = 0{,}216\,506\,351\,P$

$\frac{H}{8} = 0{,}108\,253\,175\,P$

4 General plan

4.1 General. This clause specifies ISO general purpose metric screw threads having the basic profile as defined in clause **3**.

4.2 Choice of diameter and pitch

4.2.1 Choose, for preference, diameters in column 1 of Table 3 and, if necessary, in column 2 and then in column 3.

4.2.2 The words "coarse" and "fine" are given in order to conform to usage. No concept of quality shall, however, be associated with these words.

Coarse pitches are the largest metric pitches used in current practice.

4.2.3 For the diameter (or the diameter range) selected, choose one of the pitches shown on the corresponding line (or lines), avoiding pitches in parentheses.

4.2.4 If screw threads finer than those given in Table 3 are found to be necessary, only the following pitches shall be used:

3 – 2 – 1,5 – 1– 0,75 – 0,5 – 0,35 – 0,25 – 0,2

When selecting such pitches, take into account the fact that there is increasing difficulty in complying with tolerances as the diameter is increased for a given pitch.

NOTE It is suggested, for the time being, that diameters larger than those shown in Table 2 should generally not be used with the pitches indicated.

Table 2 — Maximum diameters

Dimensions in millimetres

Pitch	Maximum diameter
0,5	22
0,75	33
1	80
1,5	150
2	200
3	300

In cases where it is necessary to use a thread with a pitch larger than 6 mm, in the diameter range 150 to 300 mm, the pitch 8 mm should be used for preference.

4.3 Designation. For complete designation see **6.4**.

A screw thread complying with the requirements of this British Standard shall be designated by the letter M followed by the values of the nominal diameter and of the pitch, expressed in millimetres and separated by the sign ×.

Example: M6 × 0,75

The absence of the indication of pitch means that a coarse pitch is specified.

Example: M6

Table 3 — Diameter/pitch combinations

Dimensions in millimetres

Nominal diameters			Pitches							
Col. 1 1st choice	Col. 2 2nd choice	Col. 3 3rd choice	coarse series	fine series	constant series					
					3	2	1,5	1,25	1	0,75
1			0,25	0,2						
	1,1		0,25	0,2						
			0,25	0,2						
1,2	1,4		0,3	0,2						
1,6			0,35	0,2						
	1,8		0,35	0,2						
2			0,4	0,25						
	2,2		0,45	0,25						
2,5			0,45	0,35						
3			0,5	0,35						
	3,5		0,6	0,35						
4			0,7	0,5						
	4,5		0,75	0,5						
5			0,8	0,5						
		5,5		(0,5)						
6			1	0,75						
	7		1	0,75						
8			1,25	1						0,75
		9	1,25						1	0,75
10			1,5	1,25					1	0,75
		11	1,5						1	0,75
12			1,75	1,25			1,5		1	
	14		2	1,5				1,25[a]	1	
		15					1,5		1	
16			2	1,5					1	
		17					1,5		1	
	18		2,5	1,5		2			1	
20			2,5	1,5		2			1	
	22		2,5	1,5		2			1	
24			3	2			1,5		1	
		25				2	1,5		1	
		26					1,5			
	27		3	2			1,5		1	
		28				2	1,5		1	
30			3,5	2	(3)		1,5		1	
		32				2	1,5			
	33		3,5	2	(3)		1,5			
		35[b]	4		3	2	1,5			
36							1,5			
		38					1,5			
	39		4		3	2	1,5			

[a] Only for spark plugs for engines.

[b] Only for locking nuts for bearings.

Pitches shown in parentheses are to be avoided, as far as possible.

Table 3 — Diameter/pitch combinations

Dimensions in millimetres

Nominal diameters			Pitches					
Col. 1 1st choice	Col. 2 2nd choice	Col. 3 3rd choice	coarse	constant series				
				6	4	3	2	1,5
42		40				3	2	1,5
			4,5		4	3	2	1,5
	45		4,5		4	3	2	1,5
48			5		4	3	2	1,5
		50				3	2	1,5
	52		5		4	3	2	1,5
		55			4	3	2	1,5
56			5,5		4	3	2	1,5
		58			4	3	2	1,5
	60		5,5		4	3	2	1,5
		62			4	3	2	1,5
64			6		4	3	2	1,5
		65			4	3	2	1,5
	68		6		4	3	2	1,5
		70		6	4	3	2	1,5
72				6	4	3	2	1,5
		75			4	3	2	1,5
	76			6	4	3	2	1,5
		78					2	
80				6	4	3	2	1,5
		82					2	
	85			6	4	3	2	
90				6	4	3	2	
	95			6	4	3	2	
100				6	4	3	2	
	105			6	4	3	2	
110				6	4	3	2	
	115			6	4	3	2	
	120			6	4	3	2	
125				6	4	3	2	
	130			6	4	3	2	
		135		6	4	3	2	
140				6	4	3	2	
		145		6	4	3	2	
	150			6	4	3	2	
		155		6	4	3		
160				6	4	3		
		165		6	4	3		
	170			6	4	3		
		175		6	4	3		
180				6	4	3		
		185		6	4	3		
	190			6	4	3		
		195		6	4	3		
200				6	4	3		
		205		6	4	3		
	210			6	4	3		
		215		6	4	3		
220				6	4	3		
		225		6	4	3		
		230		6	4	3		
		235		6	4	3		
	240			6	4	3		
		245		6	4	3		
250				6	4	3		
		255		6	4			
	260			6	4			
		265		6	4			
		270		6	4			
		275		6	4			
280				6	4			
		285		6	4			
		290		6	4			
		295		6	4			
	300			6	4			

5 Basic dimensions

5.1 General. This clause specifies the basic dimensions, in millimetres, of ISO metric screw threads according to clause **4**.

The values refer to the basic profile according to clause **3**.

5.2 Basic dimensions

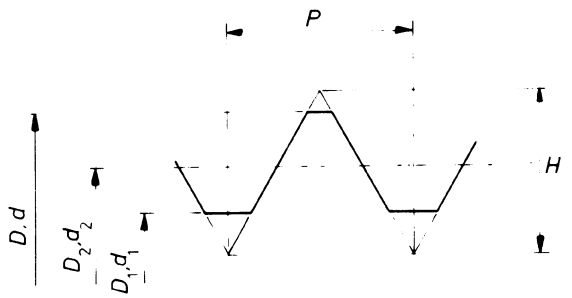


Figure 2 — Basic dimensions

D = basic major diameter of internal thread (nominal diameter)
d = basic major diameter of external thread (nominal diameter)
D_2 = basic pitch diameter of internal thread
d_2 = basic pitch diameter of external thread
D_1 = basic minor diameter of internal thread
d_1 = basic minor diameter of external thread
H = height of fundamental triangle
P = pitch

The values of D_2, d_2, D_1 and d_1 have been calculated from the following formulae and rounded, in the tables, to the third decimal place:

$$D_2 = D - 2 \times \frac{3}{8} H = D - 0{,}649\ 5\ P$$

$$d_2 = d - 2 \times \frac{3}{8} H = d - 0{,}649\ 5\ P$$

$$D_1 = D - 2 \times \frac{5}{8} H = D - 1{,}082\ 5\ P$$

$$d_1 = d - 2 \times \frac{5}{8} H = d - 1{,}082\ 5\ P$$

Table 4 — Basic dimensions

Nominal diameter = Major diameter D, d	Pitch P	Pitch diameter D_2, d_2	Minor diameter D_1, d_1
1	0,25 0,2	0,838 0,870	0,729 0,783
1,1	0,25 0,2	0,938 0,970	0,829 0,883
1,2	0,25 0,2	1,038 1,070	0,929 0,983
1,4	0,3 0,2	1,205 1,270	1,075 1,183
1,6	0,35 0,2	1,373 1,470	1,221 1,383
1,8	0,35 0,2	1,573 1,670	1,421 1,583
2	0,4 0,25	1,740 1,838	1,567 1,729
2,2	0,45 0,25	1,908 2,038	1,713 1,929
2,5	0,45 0,35	2,208 2,273	2,013 2,121
3	0,5 0,35	2,675 2,773	2,459 2,621
3,5	0,6 0,35	3,110 3,273	2,850 3,121
4	0,7 0,5	3,545 3,675	3,242 3,459
4,5	0,75 0,5	4,013 4,175	3,688 3,959
5	0,8 0,5	4,480 4,675	4,134 4,459
5,5	0,5	5,175	4,959
6	1 0,75	5,350 5,513	4,917 5,188
7	1 0,75	6,350 6,513	5,917 6,188
8	1,25 1 0,75	7,188 7,350 7,513	6,647 6,917 7,188
9	1,25 1 0,75	8,188 8,350 8,513	7,647 7,917 8,188
10	1,5 1,25 1 0,75	9,026 9,188 9,350 9,513	8,376 8,647 8,917 9,188

Table 4 — Basic dimensions

Nominal diameter = Major diameter D, d	Pitch P	Pitch diameter D_2, d_2	Minor diameter D_1, d_1
11	1,5 1 0,75	10,026 10,350 10,513	9,376 9,917 10,188
12	1,75 1,5 1,25 1	10,863 11,026 11,188 11,350	10,106 10,376 10,647 10,917
14	2 1,5 1,25 1	12,701 13,026 13,188 13,350	11,835 12,376 12,647 12,917
15	1,5 1	14,026 14,350	13,376 13,917
16	2 1,5 1	14,701 15,026 15,350	13,835 14,376 14,917
17	1,5 1	16,026 16,350	15,376 15,917
18	2,5 2 1,5 1	16,376 16,701 17,026 17,350	15,294 15,835 16,376 16,917
20	2,5 2 1,5 1	18,376 18,701 19,026 19,350	17,294 17,835 18,376 18,917
22	2,5 2 1,5 1	20,376 20,701 21,026 21,350	19,294 19,835 20,376 20,917
24	3 2 1,5 1	22,051 22,701 23,026 23,350	20,752 21,835 22,376 22,917
25	2 1,5 1	23,701 24,026 24,350	22,835 23,376 23,917
26	1,5	25,026	24,376
27	3 2 1,5 1	25,051 25,701 26,026 26,350	23,752 24,835 25,376 25,917
28	2 1,5 1	26,701 27,026 27,350	25,835 26,376 26,917

Table 4 — Basic dimensions

Nominal diameter = Major diameter D, d	Pitch P	Pitch diameter D_2, d_2	Minor diameter D_1, d_1
30	3,5	27,727	26,211
	3	28,051	26,752
	2	28,701	27,835
	1,5	29,026	28,376
	1	29,350	28,917
32	2	30,701	29,835
	1,5	31,026	30,376
33	3,5	30,727	29,211
	3	31,051	29,752
	2	31,701	30,835
	1,5	32,026	31,376
35	1,5	34,026	33,376
36	4	33,402	31,670
	3	34,051	32,752
	2	34,701	33,835
	1,5	35,026	34,376
38	1,5	37,026	36,376
39	4	36,402	34,670
	3	37,051	35,752
	2	37,701	36,835
	1,5	38,026	37,376
40	3	38,051	36,752
	2	38,701	37,835
	1,5	39,026	38,376
42	4,5	39,077	37,129
	4	39,402	37,670
	3	40,051	38,752
	2	40,701	39,835
	1,5	41,026	40,376
45	4,5	42,077	40,129
	4	42,402	40,670
	3	43,051	41,752
	2	43,701	42,835
	1,5	44,026	43,376
48	5	44,752	42,587
	4	45,402	43,670
	3	46,051	44,752
	2	46,701	45,835
	1,5	47,026	46,376
50	3	48,051	46,752
	2	48,701	47,835
	1,5	49,026	48,376
52	5	48,752	46,587
	4	49,402	47,670
	3	50,051	48,752
	2	50,701	49,835
	1,5	51,026	50,376

Table 4 — Basic dimensions

Nominal diameter = Major diameter D, d	Pitch P	Pitch diameter D_2, d_2	Minor diameter D_1, d_1
55	4	52,402	50,670
	3	53,051	51,752
	2	53,701	52,835
	1,5	54,026	53,376
56	5,5	52,428	50,046
	4	53,402	51,670
	3	54,051	52,752
	2	54,701	53,835
	1,5	55,026	54,376
58	4	55,402	53,670
	3	56,051	54,752
	2	56,701	55,835
	1,5	57,026	56,376
60	5,5	56,428	54,046
	4	57,402	55,670
	3	58,051	56,752
	2	58,701	57,835
	1,5	59,026	58,376
62	4	59,402	57,670
	3	60,051	58,752
	2	60,701	59,835
	1,5	61,026	60,376
64	6	60,103	57,505
	4	61,402	59,670
	3	62,051	60,752
	2	62,701	61,835
	1,5	63,026	62,376
65	4	62,402	60,670
	3	63,051	61,752
	2	63,701	62,835
	1,5	64,026	63,376
68	6	64,103	61,505
	4	65,402	63,670
	3	66,051	64,752
	2	66,701	65,835
	1,5	67,026	66,376
70	6	66,103	63,505
	4	67,402	65,670
	3	68,051	66,752
	2	68,701	67,835
	1,5	69,026	68,376
72	6	68,103	65,505
	4	69,402	67,670
	3	70,051	68,752
	2	70,701	69,835
	1,5	71,026	70,376

Table 4 — Basic dimensions

Nominal diameter = Major diameter D, d	Pitch P	Pitch diameter D_2, d_2	Minor diameter D_1, d_1
75	4 3 2 1,5	72,402 73,501 73,701 74,026	70,670 71,752 72,835 73,376
76	6 4 3 2 1,5	72,103 73,402 74,051 74,701 75,026	69,505 71,670 72,752 73,835 74,376
78	2	76,701	75,835
80	6 4 3 2 1,5	76,103 77,402 78,051 78,701 79,026	73,505 75,670 76,752 77,835 78,376
82	2	80,701	79,835
85	6 4 3 2	81,103 82,402 83,051 83,701	78,505 80,670 81,752 82,835
90	6 4 3 2	86,103 87,402 88,051 88,701	83,505 85,670 86,752 87,835
95	6 4 3 2	91,103 92,402 93,051 93,701	88,505 90,670 91,752 92,835
100	6 4 3 2	96,103 97,402 98,051 98,701	93,505 95,670 96,752 97,835
105	6 4 3 2	101,103 102,402 103,051 103,701	98,505 100,670 101,752 102,835
110	6 4 3 2	106,103 107,402 108,051 108,701	103,505 105,670 106,752 107,835
115	6 4 3 2	111,103 112,402 113,051 113,701	108,505 110,670 111,752 112,835
120	6 4 3 2	116,103 117,402 118,051 118,701	113,505 115,670 116,752 117,835

Table 4 — Basic dimensions

Nominal diameter = Major diameter D, d	Pitch P	Pitch diameter D_2, d_2	Minor diameter D_1, d_1
125	6	121,103	118,505
	4	122,402	120,670
	3	123,051	121,752
	2	123,701	122,835
130	6	126,103	123,505
	4	127,402	125,670
	3	128,051	126,752
	2	128,701	127,835
135	6	131,103	128,505
	4	132,402	130,670
	3	133,051	131,752
	2	133,701	132,835
140	6	136,103	133,505
	4	137,402	135,670
	3	138,051	136,752
	2	138,701	137,835
145	6	141,103	138,505
	4	142,402	140,670
	3	143,051	141,752
	2	143,701	142,835
150	6	146,103	143,505
	4	147,402	145,670
	3	148,051	146,752
	2	148,701	147,835
155	6	151,103	148,505
	4	152,402	150,670
	3	153,051	151,752
160	6	156,103	153,505
	4	157,402	155,670
	3	158,051	156,752
165	6	161,103	158,505
	4	162,402	160,670
	3	163,051	161,752
170	6	166,103	163,505
	4	167,402	165,670
	3	168,051	166,752
175	6	171,103	168,505
	4	172,402	170,670
	3	173,051	171,752
180	6	176,103	173,505
	4	177,402	175,670
	3	178,051	176,752
185	6	181,103	178,505
	4	182,402	180,670
	3	183,051	181,752

Table 4 — Basic dimensions

Nominal diameter = Major diameter D, d	Pitch P	Pitch diameter D_2, d_2	Minor diameter D_1, d_1
190	6 4 3	186,103 187,402 188,051	183,505 185,670 186,752
195	6 4 3	191,103 192,402 193,051	188,505 190,670 191,752
200	6 4 3	196,103 197,402 198,051	193,505 195,670 196,752
205	6 4 3	201,103 202,402 203,051	198,505 200,670 201,752
210	6 4 3	206,103 207,402 208,051	203,505 205,670 206,752
215	6 4 3	211,103 212,402 213,051	208,505 210,670 211,752
220	6 4 3	216,103 217,402 218,051	213,505 215,670 216,752
225	6 4 3	221,103 222,402 223,051	218,505 220,670 221,752
230	6 4 3	226,103 227,402 228,051	223,505 225,670 226,752
235	6 4 3	231,103 232,402 233,051	228,505 230,670 231,752
240	6 4 3	236,103 237,402 238,051	233,505 235,670 236,752
245	6 4 3	241,103 242,402 243,051	238,505 240,670 241,752
250	6 4 3	246,103 247,402 248,051	243,505 245,670 246,752
255	6 4	251,103 252,402	248,505 250,670
260	6 4	256,103 257,402	253,505 255,670
265	6 4	261,103 262,402	258,505 260,670

Table 4 — Basic dimensions

Nominal diameter = Major diameter D, d	Pitch P	Pitch diameter D_2, d_2	Minor diameter D_1, d_1
270	6 4	266,103 267,402	263,505 265,670
275	6 4	271,103 272,402	268,505 270,670
280	6 4	276,103 277,402	273,505 275,670
285	6 4	281,103 282,402	278,505 280,670
290	6 4	286,103 287,402	283,505 285,670
295	6 4	291,103 292,402	288,505 290,670
300	6 4	296,103 297,402	293,505 295,670

6 Tolerances: principles and basic data

6.1 General. This clause specifies a tolerance system for screw threads complying with clause **4**.

The tolerance system refers to the basic profile according to clause **3**.

6.2 Structure of the tolerance system. The system gives tolerances defined by tolerance grades and tolerance positions and a selection of grades and positions.

The system provides for:

a) A series of *tolerance grades* for each of the four screw thread diameters, as follows:

	Tolerance grades
Minor diameter of nut threads (D_1)	4, 5, 6, 7, 8,
Major diameter of bolt threads (d)	4, 6, 8,
Pitch diameter of nut threads (D_2)	4, 5, 6, 7, 8,
Pitch diameter of bolt threads (d_2)	3, 4, 5, 6, 7, 8, 9

Details of tolerance grades and combinations of tolerance grades for pitch and crest diameters according to tolerance quality and length of engagement group required, with an order of preference, are given in **6.11**.

b) Series of *tolerance positions*, G and H for nut threads and e, f, g and h for bolt threads. The established tolerance positions comply with the requirements of current coating thicknesses and with the demands of easy assembly. Tolerance positions with respect to zero line (basic size) are shown in Figure 3.

c) *Selection* of recommended combinations of grades and positions (*tolerance classes*) giving the commonly used tolerance qualities Fine, Medium and Coarse for the three groups of length of thread engagement Short, Normal and Long. Moreover a *further selection of tolerance classes* is given for commercial bolt and nut threads. Tolerance classes other than those shown in **6.11** are not recommended and shall be used only for special cases.

6.3 Terminology and symbols

6.3.1 *Terminology.* The term "bolt threads" is used for external screw threads, the term "nut threads" for internal screw threads.

6.3.2 *Symbols.* The following symbols shall be used:

Symbol	Explanation
D	basic major diameter of nut thread
D_1	basic minor diameter of nut thread
D_2	basic pitch diameter of nut thread
d	basic major diameter of bolt thread
d_1	basic minor diameter of bolt thread
d_2	basic pitch diameter of bolt thread
P	pitch
H	height of fundamental triangle
R	bolt root radius
S	designation for thread engagement group Short
N	designation for thread engagement group Normal
L	designation for thread engagement group Long
T	tolerance
T_{D_1}, T_{D_2}	tolerances for D_1, D_2, d, d_2
T_d, T_{d_2}	
ei, EI	lower deviations
es, ES	upper deviations

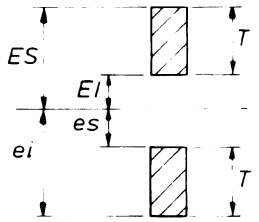


Figure 3 — Tolerance positions with respect to zero line (basic size)

6.4 Designation. The complete designation for a screw thread comprises a designation for the thread system and size, and a designation for the thread tolerance class.

The thread designations are given in clause **4**.

The tolerance class designation comprises a class designation for the pitch diameter tolerance followed by a class designation for the crest diameter tolerance.

Each class designation consists of

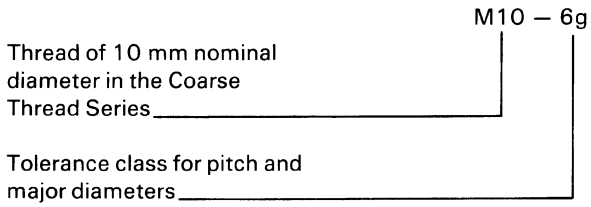
— a figure indicating the tolerance grade;

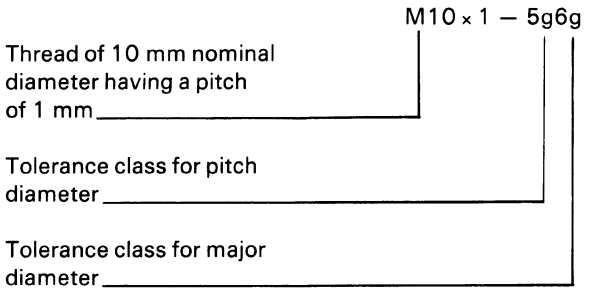
— a letter indicating the tolerance position, capital for nuts, small for bolts.

If the two class designations for a thread are the same, it is not necessary to repeat the symbols.

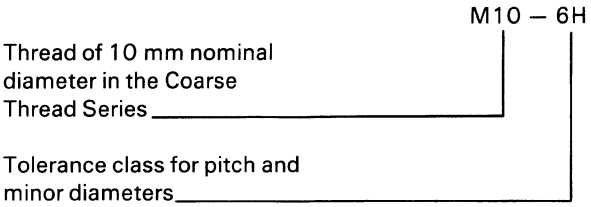
Examples:

Bolt thread





Nut thread



A fit between parts is indicated by the nut thread tolerance class followed by the bolt thread tolerance class separated by an oblique stroke.

Examples:

M6 – 6H/6g

M20 × 2 – 6H/5g6g

For coated threads, the tolerances apply to the parts *before* coating, unless otherwise stated. After coating, the actual thread profile shall not in any point transgress the maximum material limits for either position H or h.

6.5 Tolerance grades. For each of the two main elements, pitch diameter and crest diameter, a number of tolerance grades have been established. In each case, grade 6 shall be used for tolerance quality Medium and Normal length of thread engagement. The grades below 6 are intended for tolerance quality Fine and/or Short lengths of thread engagement. The grades above 6 are intended for tolerance quality Coarse and/or Long lengths of thread engagement. In some grades, certain tolerance values for small pitches are not shown because of insufficient thread overlap or the requirement that the pitch diameter tolerance shall not exceed the crest diameter tolerance.

6.6 Tolerance positions. The following tolerance positions are standardized:

— for nuts: G with positive fundamental deviation
H with zero fundamental deviation
See Figure 4 and Figure 5

— for bolts: e, f and g with negative fundamental deviation
h with zero fundamental deviation
See Figure 6 and Figure 7

Tolerance position e is, however, limited to pitches 0,5 and coarser.

The values of the fundamental deviations are given in Table 5.

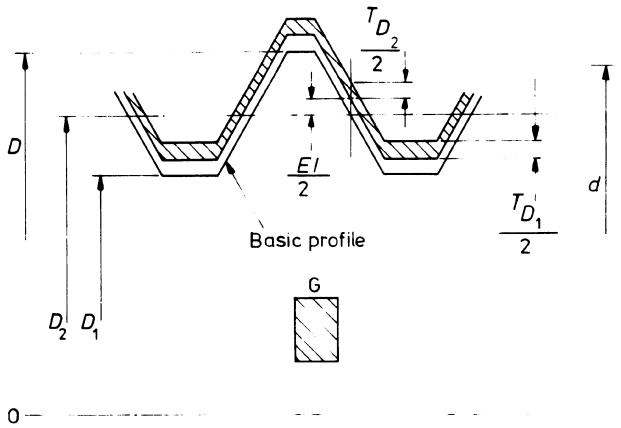


Figure 4 — Nut threads with tolerance position G

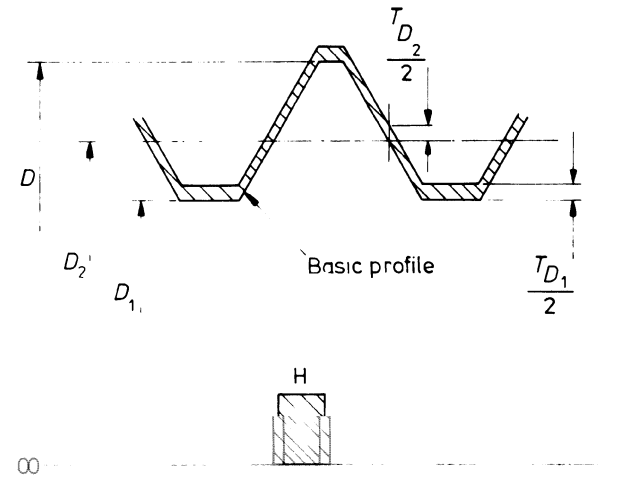


Figure 5 — Nut threads with tolerance position H

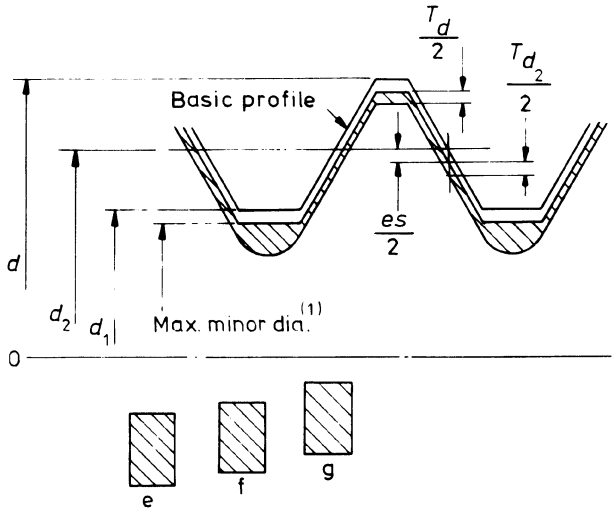


Figure 6 — Bolt threads with tolerance positions e, f and g

(1) Applicable only in connection with minimum material flanks (d_2 min). See **6.10** and Figure 8.

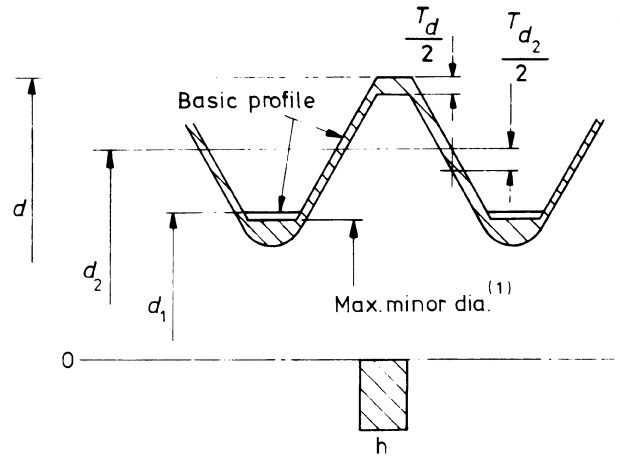


Figure 7 — Bolt threads with tolerance position h

(1) Applicable only in connection with minimum material flanks (d_2 min). See **6.10** and Figure 8.

Table 5 — Fundamental deviations for nut threads and bolt threads

Pitch P	Fundamental deviation					
	Nut thread D_2, D_1		Bolt thread d, d_2			
	G EI	H EI	e es	f es	g es	h es
mm	µm	µm	µm	µm	µm	µm
0,2	+ 17	0			– 17	0
0,25	+ 18	0			– 18	0
0,3	+ 18	0			– 18	0
0,35	+ 19	0		– 34	– 19	0
0,4	+ 19	0		– 34	– 19	0
0,45	+ 20	0		– 35	– 20	0
0,5	+ 20	0	– 50	– 36	– 20	0
0,6	+ 21	0	– 53	– 36	– 21	0
0,7	+ 22	0	– 56	– 38	– 22	0
0,75	+ 22	0	– 56	– 38	– 22	0
0,8	+ 24	0	– 60	– 38	– 24	0
1	+ 26	0	– 60	– 40	– 26	0
1,25	+ 28	0	– 63	– 42	– 28	0
1,5	+ 32	0	– 67	– 45	– 32	0
1,75	+ 34	0	– 71	– 48	– 34	0
2	+ 38	0	– 71	– 52	– 38	0
2,5	+ 42	0	– 80	– 58	– 42	0
3	+ 48	0	– 85	– 63	– 48	0
3,5	+ 53	0	– 90	– 70	– 53	0
4	+ 60	0	– 95	– 75	– 60	0
4,5	+ 63	0	– 100	– 80	– 63	0
5	+ 71	0	– 106	– 85	– 71	0
5,5	+ 75	0	– 112	– 90	– 75	0
6	+ 80	0	– 118	– 95	– 80	0

6.7 Lengths of thread engagement. The length of thread engagement is classified into one of three groups, short, normal or long in accordance with Table 6.

Table 6 — Lengths of thread engagement

Dimensions in millimetres

Basic major diameter d		Pitch P	Length of thread engagement			
			Short	Normal		Long
over	up to and incl.		up to and incl.	over	up to and incl.	over
0,99	**1,4**	0,2	0,5	0,5	1,4	1,4
		0,25	0,6	0,6	1,7	1,7
		0,3	0,7	0,7	2	2
1,4	**2,8**	0,2	0,5	0,5	1,5	1,5
		0,25	0,6	0,6	1,9	1,9
		0,35	0,8	0,8	2,6	2,6
		0,4	1	1	3	3
		0,45	1,3	1,3	3,8	3,8
2,8	**5,6**	0,35	1	1	3	3
		0,5	1,5	1,5	4,5	4,5
		0,6	1,7	1,7	5	5
		0,7	2	2	6	6
		0,75	2,2	2,2	6,7	6,7
		0,8	2,5	2,5	7,5	7,5
5,6	**11,2**	0,75	2,4	2,4	7,1	7,1
		1	3	3	9	9
		1,25	4	4	12	12
		1,5	5	5	15	15
11,2	**22,4**	1	3,8	3,8	11	11
		1,25	4,5	4,5	13	13
		1,5	5,6	5,6	16	16
		1,75	6	6	18	18
		2	8	8	24	24
		2,5	10	10	30	30
22,4	**45**	1	4	4	12	12
		1,5	6,3	6,3	19	19
		2	8,5	8,5	25	25
		3	12	12	36	36
		3,5	15	15	45	45
		4	18	18	53	53
		4,5	21	21	63	63
45	**90**	1,5	7,5	7,5	22	22
		2	9,5	9,5	28	28
		3	15	15	45	45
		4	19	19	56	56
		5	24	24	71	71
		5,5	28	28	85	85
		6	32	32	95	95
90	**180**	2	12	12	36	36
		3	18	18	53	53
		4	24	24	71	71
		6	36	36	106	106
180	**300**	3	20	20	60	60
		4	26	26	80	80
		6	40	40	118	118

6.8 Crest diameter tolerances

6.8.1 *Minor diameter tolerance of nut thread (T_{D_1}).* For the minor diameter tolerance of nut thread, T_{D1}, there are five tolerance grades, 4, 5, 6, 7, and 8, in accordance with Table 7.

Table 7 — Minor diameter tolerances of nut thread *(T_{D_1})*

Pitch P	Tolerance grade				
	4	5	6	7	8
mm	µm	µm	µm	µm	µm
0,2	38	—	—	—	—
0,25	45	56	—	—	—
0,3	53	67	85	—	—
0,35	63	80	100	—	—
0,4	71	90	112	—	—
0,45	80	100	125	—	—
0,5	90	112	140	180	—
0,6	100	125	160	200	—
0,7	112	140	180	224	—
0,75	118	150	190	236	–
0,8	125	160	200	250	315
1	150	190	236	300	375
1,25	170	212	265	335	425
1,5	190	236	300	375	475
1,75	212	265	335	425	530
2	236	300	375	475	600
2,5	280	355	450	560	710
3	315	400	500	630	800
3,5	355	450	560	710	900
4	375	475	600	750	950
4,5	425	530	670	850	1 060
5	450	560	710	900	1 120
5,5	475	600	750	950	1 180
6	500	630	800	1 000	1 250

6.8.2 *Major diameter tolerance of bolt thread* (T_d). For the major diameter tolerance of bolt thread, T_d, there are three tolerance grades, 4, 6 and 8, in accordance with Table 8.

The tolerance grades 5 and 7 do not exist for the major diameter of bolt threads.

Table 8 — Major diameter tolerance of bolt thread (T_d)

Pitch P	Tolerance grade		
	4	6	8
mm	µm	µm	µm
0,2	36	56	—
0,25	42	67	—
0,3	48	75	—
0,35	53	85	—
0,4	60	95	—
0,45	63	100	—
0,5	67	106	—
0,6	80	125	—
0,7	90	140	—
0,75	90	140	—
0,8	95	150	236
1	112	180	280
1,25	132	212	335
1,5	150	236	375
1,75	170	265	425
2	180	280	450
2,5	212	335	530
3	236	375	600
3,5	265	425	670
4	300	475	750
4,5	315	500	800
5	335	530	850
5,5	355	560	900
6	375	600	950

6.9 Pitch diameter tolerances. For the pitch diameter tolerance of nut thread, T_{D_2}, there are five tolerance grades, 4, 5, 6, 7 and 8, in accordance with Table 9.

Table 9 — Pitch diameter tolerance of nut thread (T_{D_2})

Basic major diameter d		Pitch P	Tolerance grade				
over	up to and incl.		4	5	6	7	8
mm	mm	mm	µm	µm	µm	µm	µm
0,99	**1,4**	0,2	40	—	—	—	—
		0,25	45	56	—	—	—
		0,3	48	60	75	—	—
1,4	**2,8**	0,2	42	—	—	—	—
		0,25	48	60	—	—	—
		0,35	53	67	85	—	—
		0,4	56	71	90	—	—
		0,45	60	75	95	—	—
2,8	**5,6**	0,35	56	71	90	—	—
		0,5	63	80	100	125	—
		0,6	71	90	112	140	—
		0,7	75	95	118	150	—
		0,75	75	95	118	150	—
		0,8	80	100	125	160	200
5,6	**11,2**	0,75	85	106	132	170	—
		1	95	118	150	190	236
		1,25	100	125	160	200	250
		1,5	112	140	180	224	280
11,2	**22,4**	1	100	125	160	200	250
		1,25	112	140	180	224	280
		1,5	118	150	190	236	300
		1,75	125	160	200	250	315
		2	132	170	212	265	335
		2,5	140	180	224	280	355
22,4	**45**	1	106	132	170	212	–
		1,5	125	160	200	250	315
		2	140	180	224	280	355
		3	170	212	265	335	425
		3,5	180	224	280	355	450
		4	190	236	300	375	475
		4,5	200	250	315	400	500
45	**90**	1,5	132	170	212	265	335
		2	150	190	236	300	375
		3	180	224	280	355	450
		4	200	250	315	400	500
		5	212	265	335	425	530
		5,5	224	280	355	450	560
		6	236	300	375	475	600
90	**180**	2	160	200	250	315	400
		3	190	236	300	375	475
		4	212	265	335	425	530
		6	250	315	400	500	630
180	**300**	3	212	265	335	425	530
		4	236	300	375	475	600
		6	265	335	425	530	670

For the pitch diameter tolerance of bolt thread, T_{D_2}, there are seven tolerance grades, 3, 4, 5, 6, 7, 8 and 9, in accordance with Table 10.

Table 10 — Pitch diameter tolerance of bolt thread (T_{D_2})

Basic major diameter d		Pitch P	Tolerance grade						
over	up to and incl.		3	4	5	6	7	8	9
mm	mm	mm	µm	µm	µm	µm	µm	µm	µm
0,99	**1,4**	0,2	24	30	38	48	—	—	—
		0,25	26	34	42	53	—	—	—
		0,3	28	36	45	56	—	—	—
1,4	**2,8**	0,2	25	32	40	50	—	—	—
		0,25	28	36	45	56	—	—	—
		0,35	32	40	50	63	80	—	—
		0,4	34	42	53	67	85	—	—
		0,45	36	45	56	71	90	—	—
2,8	**5,6**	0,35	34	42	53	67	85	—	—
		0,5	38	48	60	75	95	—	—
		0,6	42	53	67	85	106	—	—
		0,7	45	56	71	90	112	—	—
		0,75	45	56	71	90	112	150	190
		0,8	48	60	75	95	118		
5,6	**11,2**	0,75	50	63	80	100	125	—	—
		1	56	71	90	112	140	180	224
		1,25	60	75	95	118	150	190	236
		1,5	67	85	106	132	170	212	265
11,2	**22,4**	1	60	75	95	118	150	190	236
		1,25	67	85	106	132	170	212	265
		1,5	71	90	112	140	180	224	280
		1,75	75	95	118	150	190	236	300
		2	80	100	125	160	200	250	315
		2,5	85	106	132	170	212	265	335
22,4	**45**	1	63	80	100	125	160	200	250
		1,5	75	95	118	150	190	236	300
		2	85	106	132	170	212	265	335
		3	100	125	160	200	250	315	400
		3,5	106	132	170	212	265	335	425
		4	112	140	180	224	280	355	450
		4,5	118	150	190	236	300	375	475
45	**90**	1,5	80	100	125	160	200	250	315
		2	90	112	140	180	224	280	355
		3	106	132	170	212	265	335	425
		4	118	150	190	236	300	375	475
		5	125	160	200	250	315	400	500
		5,5	132	170	212	265	335	425	530
		6	140	180	224	280	355	450	560
90	**180**	2	95	118	150	190	236	300	375
		3	112	140	180	224	280	355	450
		4	125	160	200	250	315	400	500
		6	150	190	236	300	375	475	600
180	**300**	3	125	160	200	250	315	400	500
		4	140	180	224	280	355	450	560
		6	160	200	250	315	400	500	630

6.10 Root contours. For nut threads as well as bolt threads, the actual root contours shall not at any point transgress the basic profile.

For bolt threads on fasteners with strength grades 8.8 and higher (see BS 6104-1[1)]), the root profile shall have a non-reversing curvature, no portion of which shall have a radius of less than $0{,}125 \times P$ (see Table 11).

In the maximum minor diameter position the two radii of $R_{min} = 0{,}125 \times P$ will go through the points of intersection between the maximum material flanks and the minor diameter cylinder of the Go gauges according to BS 919-3 and blend tangentially into the minimum material flanks.

The maximum truncation is:

$$\frac{H}{4} - R_{min}\left\{1 - \cos\left[\frac{\pi}{3} - \arccos\left(1 - \frac{T_{d_2}}{4 \times R_{min}}\right)\right]\right\} + \frac{T_{d_2}}{2}$$

and the minimum truncation is:

$$0{,}125 \times P \approx \frac{H}{7}$$

Furthermore a truncation of $H/6$ ($R = 0.14434 \times P$) is the basis for stress calculations (see clause **7**).

NOTE Bolt threads on fasteners with strength grades below 8.8 should preferably comply with the requirements stated above. This is particularly important for fasteners or other screwed connections that are subjected to fatigue or impact. There are, in principle no restrictions other than that the maximum minor diameter of the thread is less than the minimum minor diameter of the Go gauges according to BS 919-3.

Table 11 — Minimum root radii

Pitch P	R min
mm	mm
0,2	0,025
0,25	0,031
0,3	0,038
0,35	0,044
0,4	0,050
0,45	0,056
0,5	0,063
0,6	0,075
0,7	0,088
0,75	0,094
0,8	0,100
1	0,125
1,25	0,156
1,5	0,188
1,75	0,219
2	0,250
2,5	0,313
3	0,375
3,5	0,438
4	0,500
4,5	0,563
5	0,625
5,5	0,688
6	0,750

[1)] In course of preparation based on ISO 898/1.

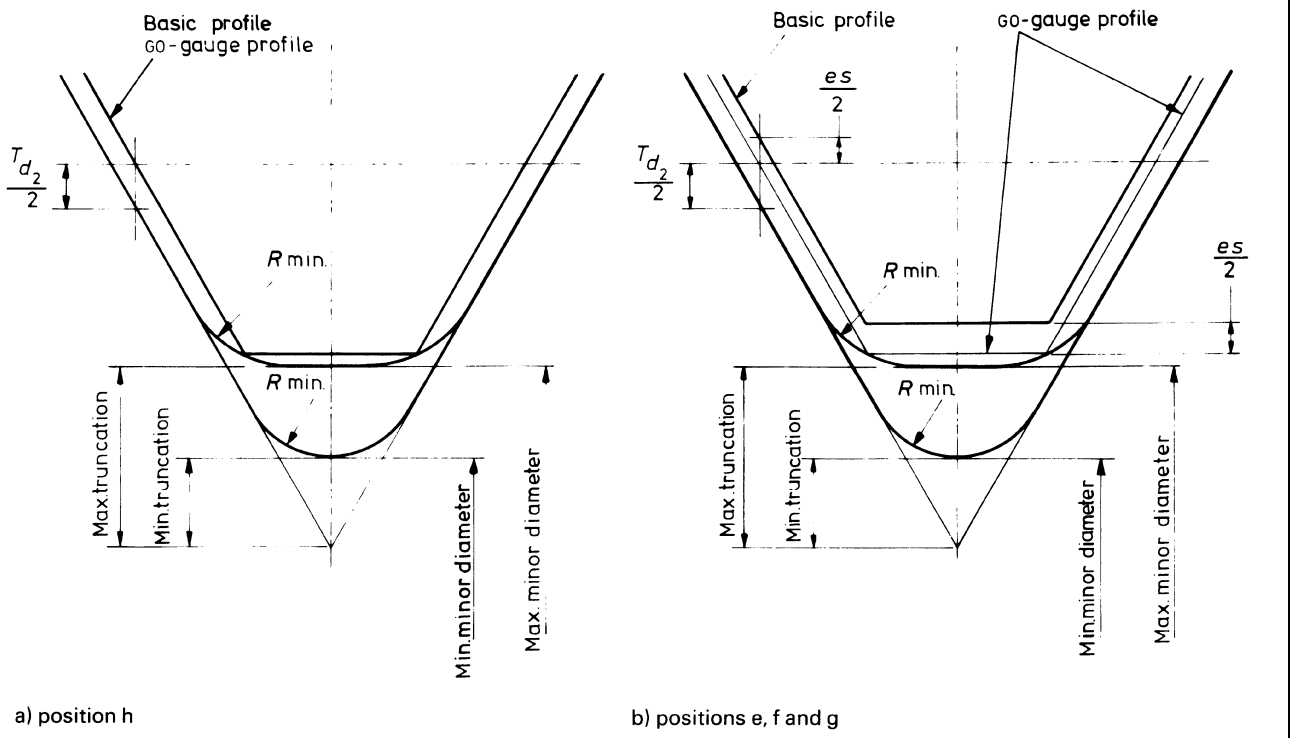


Figure 8 — Bolt root profile

6.11 Tolerance classes. In order to reduce the number of gauges and tools, the tolerance classes shall be chosen from Table 12 and Table 13.

The following general rules apply for the choice of tolerance quality:

— Fine: for precision threads, when little variation of fit character is needed.

— Medium: for general use.

— Coarse: for cases where manufacturing difficulties can arise, for example when threading hot-rolled bars and long blind holes.

If the actual length of thread engagement is unknown (as in the manufacturing of standard bolts), normal is recommended.

Table 12 — Tolerance classes for nuts

Tolerance quality	Tolerance position G			Tolerance position H		
	Short	Normal	Long	Short	Normal	Long
Fine				4H	5H	6H
Medium	*5G*	*6G*	*7G*	5H	**6H**	7H
Coarse		*7G*	*8G*		7H	8H

Tolerance classes within frames are selected for commercial bolt and nut threads.

Tolerance classes in bold type are first choice.

Tolerance classes in ordinary type are second choice.

Tolerance classes in sloping type are third choice; they are to be avoided.

NOTE Any of the recommended tolerance classes for nuts can be combined with any of the recommended tolerance classes for bolts with the exception of thread sizes M1,4 and smaller, where the combination 5H/6h or finer shall be chosen. However, in order to guarantee a sufficient overlap, the finished components should preferably be made to form the fits Hg, Hh, or G/h.

6.12 Formulae

6.12.1 *General.* The values given in this clause are based on experience. In order to obtain a consistent system, mathematical formulae have been developed.

The values for pitch and crest diameter tolerances and for fundamental deviations have been calculated from the formulae and then rounded off to the nearest value in the R 40 series of preferred numbers. However, when decimal fractions occur, the value has been further rounded off to the nearest whole number.

In order to reproduce a smooth progression, these rules of rounding off have not always been used.

The root radii specified in Table 11 are equal to 0,125 P.

6.12.2 *Fundamental deviations.* The fundamental deviations for nut and bolt threads have been calculated according to the following formulae:

$EI_G = + (15 + 11\,P)$ $\quad es_e = - (50 + 11\,P)$[a]

$EI_H = 0$ $\quad es_f = - (30 + 11\,P)$

$es_g = - (15 + 11\,P)$

$es_h = 0$

where

EI and es are expressed in micrometres;

P is expressed in millimetres.

[a] Exceptions are values for threads with $P \leqslant 0{,}45$ mm

6.12.3 *Length of thread engagement.* For the calculation of the limits of the normal length of thread engagement I_N in Table 6, the following rule has been applied.

For each pitch within a certain diameter range, d has been set equal to the smallest diameter (within the range) which appears in clause **4**.

I_N min. approximate $= 2{,}24\,P\,d^{0,2}$

I_N max. approximate $= 6{,}7\,P\,d^{0,2}$

where I_N, P and d are expressed in millimetres.

6.12.4 ***Crest diameter tolerances***

6.12.4.1 *Tolerances for major diameter of bolt thread* (T_d) grade 6.

These tolerances have been calculated according to the following formula.

$$T_d(6) = 180\sqrt[3]{P^2} - \frac{3{,}15}{\sqrt{P}}$$

where

T_d is expressed in micrometres;

P is expressed in millimetres.

T_d tolerances for the other grades are obtained from the T_d (6) values (see Table 8) according to the table below.

Tolerance grade		
4	**6**	**8**
0,63 T_d (6)	T_d (6)	1,6 T_d (6)

6.12.4.2 *Tolerances for minor diameter of nut thread* (T_{D_1}) The T_{D_1} tolerances for grade 6 are calculated according to the following formulae:

a) Pitches 0,2 to 0,8 mm

$T_{D_1}(6) = 433\,P - 190\,P^{1,22}$

b) Pitch 1 mm and coarser

$T_{D_1}(6) = 230\ P^{0,7}$

where

T_{D_1} is expressed in micrometres;

P is expressed in millimetres.

The values for the other grades are obtained from the T_{D_1} (6)–values (in Table 7) according to the table below.

Tolerance grade				
4	5	6	7	8
0,63 T_{D_1} (6)	0,8 T_{D_1} (6)	T_{D_1} (6)	1,25 T_{D_1} (6)	1,6 T_{D_1} (6)

6.12.5 *Pitch diameter tolerances*

6.12.5.1 *Tolerances for pitch diameter of bolt thread* (T_{d_2}) T_{d_2} (6)–values in Table 10 are calculated according to the following formula (d equal to the geometrical mean value of the diameter range limits):

$T_{d_2}(6) = 90\ P^{0,4}\ d^{0,1}$

where

T_{d_2} is expressed in micrometres;

P and d are expressed in millimetres.

Table 13 — Tolerance classes for bolts

Tolerance quality	Tolerance position e			Tolerance position f			Tolerance position g			Tolerance position h		
	Short	Normal	Long	Short	Normal	Long	Short	Normal	Long	Short	Normal	Long
Fine										*3h4h*	4h	*5h4h*
Medium		6e	*7e6e*		6f		*5g6g*	6g	*7g6g*	*5h6h*	6h	*7h6h*
Coarse								8g	*9g8g*			

The values for the other grades are obtained from the T_{d_2} (6)–values (see Table 10) according to the table below.

Tolerance grade			
3	4	5	6
0,5 T_{d_2} (6)	0,63 T_{d_2} (6)	0,8 T_{d_2} (6)	T_{d_2} (6)

7	8	9
1,25 T_{d_2} (6)	1,6 T_{d_2} (6)	2 T_{d_2} (6)

No T_{d_2} –Values are given in the table when values calculated according to the given formula exceed the T_d–values in the tolerance grades which are combined in the tables for recommended tolerance classes.

6.12.5.2 *Tolerances for pitch diameter of nut thread (T_{D_2})*

T_{D_2} –Values are obtained from the T_{D_2} (6)–values (see Table 10) according to the table below.

Tolerance grade				
4	**5**	**6**	**7**	**8**
0,85 T_{d_1} (6)	1,06 T_{d_2} (6)	1,32 T_{d_2} (6)	1,7 T_{d_2} (6)	2,12 T_{d_2} (6)

No T_{D_2} –values are given in the table when values calculated according to the given formula exceed 0,25 P.

7 Tolerances: deviations for constructional threads

7.1 General. This clause specifies deviations for pitch and crest diameters for ISO general purpose metric screw threads complying with the requirements of clause **4**.

The deviations specified are derived from the fundamental deviations and tolerances specified in clause **6**.

The values for the deviations are given in Table 14.

7.2 Designation. Tolerances are designated by the relevant tolerance class as found under the heading "Tolerance class" in the tables.

Examples:

M6 – 6H

M6 – 5g6g

A fit between threaded parts as indicated by the nut thread tolerance designation followed by the bolt thread tolerance designation separated by an oblique.

Example:

M6 – 6H/5g6g

7.3 Remarks. For nut threads as well as bolt threads, the actual root contour shall not in any point transgress the basic profile.

The tabulated deviation values for the minor diameter of the bolt thread are calculated on the basis of an H/6 truncation and may be used for stress calculations.

For coated threads, the tolerances apply to the parts before coating, unless otherwise stated. After coating, the actual thread profile shall not in any point transgress the maximum material limits for either position H or h.

Table 14 — Deviations

ES, es = upper deviation
EI, ei = lower deviation

Basic major diameter		Pitch	Nut thread					Bolt thread					
over	up to and incl.		Tolerance class	Pitch diameter		Minor diameter		Tolerance class	Pitch diameter		Major diameter		Minor diameter[a] (for stress calculations)
				ES	*EI*	*ES*	*EI*		*es*	*ei*	*es*	*ei*	
mm	mm	mm		µm	µm	µm	µm		µm	µm	µm	µm	µm
0,99	**1,4**	**0,2**	—	—	—	—	—	3h4h	0	− 24	0	− 36	− 29
			4H	+ 40	0	+ 38	0	4h	0	− 30	0	− 36	− 29
			5G	—	—	—	—	5g6g	− 17	− 55	− 17	− 73	− 46
			5H	—	—	—	—	5h4h	0	− 38	0	− 36	− 29
			—	—	—	—	—	5h6h	0	− 38	0	− 56	− 29
			—	—	—	—	—	6e	—	—	—	—	—
			—	—	—	—	—	6f	—	—	—	—	—
			6G	—	—	—	—	6g	− 17	− 65	− 17	− 73	− 46
			6H	—	—	—	—	6h	0	− 48	0	− 56	− 29
			—	—	—	—	—	7e6e	—	—	—	—	—
			7G	—	—	—	—	7g6g	—	—	—	—	—
			7H	—	—	—	—	7h6h	—	—	—	—	—
			8G	—	—	—	—	8g	—	—	—	—	—
			8H	—	—	—	—	9g8g	—	—	—	—	—
		0,25	—	—	—	—	—	3h4h	0	− 26	0	− 42	− 36
			4H	+ 45	0	+ 45	0	4h	0	− 34	0	− 42	− 36
			5G	+ 74	+ 18	+ 74	+ 18	5g6g	− 18	− 60	− 18	− 85	− 54
			5H	+ 56	0	+ 56	0	5h4h	0	− 42	0	− 42	− 36
			—	—	—	—	—	5h6h	0	− 42	0	− 67	− 36
			—	—	—	—	—	6e	—	—	—	—	—
			—	—	—	—	—	6f	—	—	—	—	—
			6G	—	—	—	—	6g	− 18	− 71	− 18	− 85	− 54
			6H	—	—	—	—	6h	0	− 53	0	− 67	− 36
			—	—	—	—	—	7e6e	—	—	—	—	—
			7G	—	—	—	—	7g6g	—	—	—	—	—
			7H	—	—	—	—	7h6h	—	—	—	—	—
			8G	—	—	—	—	8g	—	—	—	—	—
			8H	—	—	—	—	9g8g	—	—	—	—	—
		0,3	—	—	—	—	—	3h4h	0	− 28	0	− 48	− 43
			4H	+ 48	0	+ 53	0	4h	0	− 36	0	− 48	− 43
			5G	+ 78	+ 18	+ 85	+ 18	5g6g	− 18	− 63	− 18	− 93	− 61
			5H	+ 60	0	+ 67	0	5h4h	0	− 45	0	− 48	− 43
			—	—	—	—	—	5h6h	0	− 45	0	− 75	− 43
			—	—	—	—	—	6e	—	—	—	—	—
			—	—	—	—	—	6f	—	—	—	—	—
			6G	+ 93	+ 18	+ 103	+ 18	6g	− 18	− 74	− 18	− 93	− 61
			6H	+ 75	0	+ 85	0	6h	0	− 56	0	− 75	− 43
			—	—	—	—	—	7e6e	—	—	—	—	—
			7G	—	—	—	—	7g6g	—	—	—	—	—

[a] Deviation = *es* + *H*/*6*

Table 14 — Deviations

ES, es = upper deviation
EI, ei = lower deviation

Basic major diameter		Pitch	Nut thread					Bolt thread					
over	up to and incl.		Tolerance class	Pitch diameter		Minor diameter		Tolerance class	Pitch diameter		Major diameter		Minor diameter (for stress calculations)
				ES	*EI*	*ES*	*EI*		*es*	*ei*	*es*	*ei*	
mm	mm	mm		µm	µm	µm	µm		µm	µm	µm	µm	µm
0,99	**1,4**	**0,3**	7H	—	—	—	—	7h6h	—	—	—	—	—
			8G	—	—	—	—	8g	—	—	—	—	—
			8H	—	—	—	—	9g8g	—	—	—	—	—
1,4	**2,8**	**0,2**	—	—	—	—	—	3h4h	0	− 25	0	− 36	− 29
			4H	+ 42	0	+38	0	4h	0	− 32	0	− 36	− 29
			5G	—	—	—	—	5g6g	− 17	− 57	− 17	− 73	− 46
			5H	—	—	—	—	5h4h	0	− 40	0	− 36	− 29
			—	—	—	—	—	5h6h	0	− 40	0	− 56	− 29
			—	—	—	—	—	6e	—	—	—	—	—
			—	—	—	—	—	6f	− 32	− 82	− 32	− 88	− 61
			6G	—	—	—	—	6g	− 17	− 67	− 17	− 73	− 46
			6H	—	—	—	—	6h	0	− 50	0	− 56	− 29
			—	—	—	—	—	7e6e	—	—	—	—	—
			7G	—	—	—	—	7g6g	—	—	—	—	—
			7H	—	—	—	—	7h6h	—	—	—	—	—
			8G	—	—	—	—	8g	—	—	—	—	—
			8H	—	—	—	—	9g8g	—	—	—	—	—
		0,25	—	—	—	—	—	3h4h	0	− 28	0	− 42	− 36
			4H	+ 48	0	+ 45	0	4h	0	− 36	0	− 42	− 36
			5G	+ 78	+ 18	+ 74	+ 18	5g6g	− 18	− 63	− 18	− 85	− 54
			5H	+ 60	0	+ 56	0	5h4h	0	− 45	0	− 42	− 36
			—	—	—	—	—	5h6h	0	− 45	0	− 67	− 36
			—	—	—	—	—	6e	—	—	—	—	—
			—	—	—	—	—	6f	− 33	− 89	− 33	− 100	− 69
			6G	—	—	—	—	6g	− 18	− 74	− 18	− 85	− 54
			6H	—	—	—	—	6h	0	− 56	0	− 67	− 36
			—	—	—	—	—	7e6e	—	—	—	—	—
			7G	—	—	—	—	7g6g	—	—	—	—	—
			7H	—	—	—	—	7h6h	—	—	—	—	—
			8G	—	—	—	—	8g	—	—	—	—	—
			8H	—	—	—	—	9g8g	—	—	—	—	—
		0,35	—	—	—	—	—	3h4h	0	− 32	0	− 53	− 51
			4H	+ 53	0	+ 63	0	4h	0	− 40	0	− 53	− 51
			5G	+ 86	+ 19	+ 99	+ 19	5g6g	− 19	− 69	− 19	− 104	− 70
			5H	+ 67	0	+ 80	0	5h4h	0	− 50	0	− 53	− 51
			—	—	—	—	—	5h6h	0	− 50	0	− 85	− 51
			—	—	—	—	—	6e	—	—	—	—	—
			—	—	—	—	—	6f	− 34	− 97	− 34	− 119	− 85
			6G	+ 104	+ 19	+ 119	+ 19	6g	− 19	− 82	− 19	− 104	− 70

Table 14 — Deviations

ES, es = upper deviation
EI, ei = lower deviation

Basic major diameter		Pitch	Nut thread					Bolt thread					
over	up to and incl.		Tolerance class	Pitch diameter		Minor diameter		Tolerance class	Pitch diameter		Major diameter		Minor diameter (for stress calculations)
				ES	*EI*	*ES*	*EI*		*es*	*ei*	*es*	*ei*	
mm	mm	mm		µm	µm	µm	µm		µm	µm	µm	µm	µm
1,4	**2,8**	**03,5**	6H	+ 85	0	+ 100	0	6h	0	− 63	0	− 85	− 51
			—	—	—	—	—	7e6e	—	—	—	—	—
			7G	—	—	—	—	7g6g	− 19	− 99	− 19	− 104	− 70
			7H	—	—	—	—	7h6h	0	− 80	0	− 85	− 51
			8G	—	—	—	—	8g	—	—	—	—	—
			8H	—	—	—	—	9g8g	—	—	—	—	—
		0,4	—	—	—	—	—	3h4h	0	− 34	0	− 60	− 58
			4H	+ 56	0	+ 71	0	4h	0	− 42	0	− 60	− 58
			5G	+ 90	+ 19	+ 109	+ 19	5g6g	− 19	− 72	− 19	− 114	− 77
			5H	+ 71	0	+ 90	0	5h4h	0	− 53	0	− 60	− 58
			—	—	—	—	—	5h6h	0	− 53	0	− 95	− 58
			—	—	—	—	—	6e	—	—	—	—	—
			—	—	—	—	—	6f	− 34	− 101	− 34	− 129	− 92
			6G	+ 109	+ 19	+ 131	+ 19	6g	− 19	− 86	− 19	− 114	− 77
			6H	+ 90	0	+ 112	0	6h	0	− 67	0	− 95	− 58
			—	—	—	—	—	7e6e	—	—	—	—	—
			7G	—	—	—	—	7g6g	− 19	− 104	− 19	− 114	− 77
			7H	—	—	—	—	7h6h	0	− 85	0	− 95	− 58
			8G	—	—	—	—	8g	—	—	—	—	—
			8H	—	—	—	—	9g8g	—	—	—	—	—
		0,45	—	—	—	—	—	3h4h	0	− 36	0	− 63	− 65
			4H	+ 60	0	+ 80	0	4h	0	− 45	0	− 63	− 65
			5G	+ 95	+ 20	+ 120	+ 20	5g6g	− 20	− 76	− 20	− 120	− 85
			5H	+ 75	0	+ 100	0	5h4h	0	− 56	0	− 63	− 65
			—	—	—	—	—	5h6h	0	− 56	0	− 100	− 65
			—	—	—	—	—	6e	—	—	—	—	—
			—	—	—	—	—	6f	− 35	− 106	− 35	− 135	− 100
			6G	+ 115	+ 20	+ 145	+ 20	6g	− 20	− 91	− 20	− 120	− 85
			6H	+ 95	0	+ 125	0	6h	0	− 71	0	− 100	− 65
			—	—	—	—	—	7e6e	—	—	—	—	—
			7G	—	—	—	—	7g6g	− 20	− 110	− 20	− 120	− 85
			7H	—	—	—	—	7h6h	0	− 90	0	− 100	− 65
			8G	—	—	—	—	8g	—	—	—	—	—
			8H	—	—	—	—	9g8g	—	—	—	—	—
2,8	**5,6**	**0,35**	—	—	—	—	—	3h4h	0	− 34	0	− 53	− 51
			4H	+ 56	0	+ 63	0	4h	0	− 42	0	− 53	− 51
			5G	+ 90	+ 19	+ 99	+ 19	5g6g	− 19	− 72	− 19	− 104	− 70
			5H	+ 71	0	+ 80	0	5h4h	0	− 53	0	− 53	− 51
			—	—	—	—	—	5h6h	0	− 53	0	− 85	− 51

Table 14 — Deviations

ES, es = upper deviation
EI, ei = lower deviation

Basic major diameter		Pitch	Nut thread					Bolt thread					
over	up to and incl.		Tolerance class	Pitch diameter		Minor diameter		Tolerance class	Pitch diameter		Major diameter		Minor diameter (for stress calculations)
				ES	*EI*	*ES*	*EI*		*es*	*ei*	*es*	*ei*	
mm	mm	mm		µm	µm	µm	µm		µm	µm	µm	µm	µm
2,8	**5,6**	**0,35**	—	—	—	—	—	6e	—	—	—	—	—
			—	—	—	—	—	6f	− 34	− 101	− 34	− 119	− 85
			6G	+ 109	+ 19	+ 119	+ 19	6g	—	—	—	—	—
			6H	+ 90	0	+ 100	0	6h	—	—	—	—	—
			—	—	—	—	—	7e6e	—	—	—	—	—
			7G	—	—	—	—	7g6g	− 19	− 104	− 19	− 104	− 70
			7H	—	—	—	—	7h6h	0	− 85	0	− 85	− 51
			8G	—	—	—	—	8g	—	—	—	—	—
			8H	—	—	—	—	9g8g	—	—	—	—	—
		0,5	—	—	—	—	—	3h4h	0	− 38	0	− 67	− 72
			4H	+ 63	0	+ 90	0	4h	0	− 48	0	− 67	− 72
			5G	+ 100	+ 20	+ 132	+ 20	5g6g	− 20	− 80	− 20	− 126	− 92
			5H	+ 80	0	+ 112	0	5h4h	0	− 60	0	− 67	− 72
			—	—	—	—	—	5h6h	0	− 60	0	− 106	− 72
			—	—	—	—	—	6e	− 50	− 125	− 50	− 156	− 122
			—	—	—	—	—	6f	− 36	− 111	− 36	− 142	− 108
			6G	+ 120	+ 20	+ 160	+ 20	6g	− 20	− 95	− 20	− 126	− 92
			6H	+ 100	0	+ 140	0	6h	0	− 75	0	− 106	− 72
			—	—	—	—	—	7e6e	− 50	− 145	− 50	− 156	− 122
			7G	+ 145	+ 20	+ 200	+ 20	7g6g	− 20	− 115	− 20	− 126	− 92
			7H	+ 125	0	+ 180	0	7h6h	0	− 95	0	− 106	− 72
			8G	—	—	—	—	8g	—	—	—	—	—
			8H	—	—	—	—	9g8g	—	—	—	—	—
		0,6	—	—	—	—	—	3h4h	0	− 42	0	− 80	− 87
			4H	+ 71	0	+ 100	0	4h	0	− 53	0	− 80	− 87
			5G	+ 111	+ 21	+ 146	+ 21	5g6g	− 21	− 88	− 21	− 146	− 108
			5H	+ 90	0	+ 125	0	5h4h	0	− 67	0	− 80	− 87
			—	—	—	—	—	5h6h	0	− 67	0	− 125	− 87
			—	—	—	—	—	6e	− 53	− 138	− 53	− 178	− 140
			—	—	—	—	—	6f	− 36	− 121	− 36	− 161	− 123
			6G	+ 133	+ 21	+ 181	+ 21	6g	− 21	− 106	− 21	− 146	− 108
			6H	+ 112	0	+ 160	0	6h	0	− 85	0	− 125	− 87
			—	—	—	—	—	7e6e	− 53	− 159	− 53	− 178	− 140
			7G	+ 161	+ 21	+ 121	+ 21	7g6g	− 21	− 127	− 21	− 146	− 108
			7H	+ 140	0	+ 200	0	7h6h	0	− 106	0	− 125	− 87
			8G	—	—	—	—	8g	—	—	—	—	—
			8H	—	—	—	—	9g8g	—	—	—	—	—
		0,7	—	—	—	—	—	3h4h	0	− 45	0	− 90	− 101
			4H	+ 75	0	+ 112	0	4h	0	− 56	0	− 90	− 101

Table 14 — Deviations

ES, es = upper deviation
EI, ei = lower deviation

Basic major diameter		Pitch	Nut thread					Bolt thread					
over	up to and incl.		Tolerance class	Pitch diameter		Minor diameter		Tolerance class	Pitch diameter		Major diameter		Minor diameter (for stress calculations)
				ES	*EI*	*ES*	*EI*		*es*	*ei*	*es*	*ei*	
mm	mm	mm		µm	µm	µm	µm		µm	µm	µm	µm	µm
2,8	**5,6**	**0,7**	5G	+ 117	+ 22	+ 162	+ 22	5g6g	− 22	− 93	− 22	− 162	− 123
			5H	+ 95	0	+ 140	0	5h4h	0	− 71	0	− 90	− 101
			—	—	—	—	—	5h6h	0	− 71	0	− 140	− 101
			—	—	—	—	—	6e	− 56	− 146	− 56	− 196	− 157
			—	—	—	—	—	6f	− 38	− 128	− 38	− 178	− 139
			6G	+ 140	+ 22	+ 202	+ 22	6g	− 22	− 112	− 22	− 162	− 123
			6H	+ 118	0	+ 180	0	6h	0	− 90	0	− 140	− 101
			—	—	—	—	—	7e6e	− 56	− 168	− 56	− 196	− 157
			7G	+ 172	+ 22	+ 246	+ 22	7g6g	− 22	− 134	− 22	− 162	− 123
			7H	+ 150	0	+ 224	0	7h6h	0	− 112	0	− 140	− 101
			8G	—	—	—	—	8g	—	—	—	—	—
			8H	—	—	—	—	9g8g	—	—	—	—	—
		0,75	—	—	—	—	—	3h4h	0	− 45	0	− 90	− 108
			4H	+ 75	0	+ 118	0	4h	0	− 56	0	− 90	− 108
			5G	+ 117	+ 22	+ 172	+ 22	5g6g	− 22	− 93	− 22	− 162	− 130
			5H	+ 95	0	+ 150	0	5h4h	0	− 71	0	− 90	− 108
			—	—	—	—	—	5h6h	0	− 71	0	− 140	− 108
			—	—	—	—	—	6e	− 56	− 146	− 56	− 196	− 164
			—	—	—	—	—	6f	− 38	− 128	− 38	− 178	− 146
			6G	+ 140	+ 22	+ 212	+ 22	6g	− 22	− 112	− 22	− 162	− 130
			6H	+ 118	0	+ 190	0	6h	0	− 90	0	− 140	− 108
			—	—	—	—	—	7e6e	− 56	− 168	− 56	− 196	− 164
			7G	+ 172	+ 22	+ 258	+ 22	7g6g	− 22	− 134	− 22	− 162	− 130
			7H	+ 150	0	+ 236	0	7h6h	0	− 112	0	− 140	− 108
			8G	—	—	—	—	8g	—	—	—	—	—
			8H	—	—	—	—	9g8g	—	—	—	—	—
		0,8	—	—	—	—	—	3h4h	0	− 48	0	− 95	− 115
			4H	+ 80	0	+ 125	0	4h	0	− 60	0	− 95	− 115
			5G	+ 124	+ 24	+ 184	+ 24	5g6g	− 24	− 99	− 24	− 174	− 140
			5H	+ 100	0	+ 160	0	5h4h	0	− 75	0	− 95	− 115
			—	—	—	—	—	5h6h	0	− 75	0	− 150	− 115
			—	—	—	—	—	6e	− 60	− 155	− 60	− 210	− 176
			—	—	—	—	—	6f	− 38	− 133	− 38	− 188	− 153
			6G	+ 149	+ 24	+ 224	+ 24	6g	− 24	− 119	− 24	− 174	− 140
			6H	+ 125	0	+ 200	0	6h	0	− 95	0	− 150	− 115
			—	—	—	—	—	7e6e	− 60	− 178	− 60	− 210	− 176
			7G	+ 184	+ 24	+ 274	+ 24	7g6g	− 24	− 142	− 24	− 174	− 140
			7H	+ 160	0	+ 250	0	7h6h	0	− 118	0	− 150	− 116

Table 14 — Deviations

ES, es = upper deviation
EI, ei = lower deviation

Basic major diameter		Pitch	Nut thread					Bolt thread					
over	up to and incl.		Tolerance class	Pitch diameter		Minor diameter		Tolerance class	Pitch diameter		Major diameter		Minor diameter (for stress calculations)
				ES	*EI*	*ES*	*EI*		*es*	*ei*	*es*	*ei*	
mm	mm	mm		µm	µm	µm	µm		µm	µm	µm	µm	µm
2,8	**5,6**	**0,8**	8G	+ 224	+ 24	+ 339	+ 24	8g	− 24	− 174	− 24	− 260	− 140
			8H	+ 200	0	+ 315	0	9g8g	− 24	− 214	− 24	− 260	− 140
5,6	**11,2**	**0,75**	—	—	—	—	—	3h4h	0	− 50	0	− 90	− 108
			4H	+ 85	0	+ 118	0	4h	0	− 63	0	− 90	− 108
			5G	+ 128	+ 22	+ 172	+ 22	5g6g	− 22	− 102	− 22	− 162	− 130
			5H	+ 106	0	+ 150	0	5h4h	0	− 80	0	− 90	− 108
			—	—	—	—	—	5h6h	0	− 80	0	− 140	− 108
			—	—	—	—	—	6e	− 56	− 156	− 56	− 196	− 164
			—	—	—	—	—	6f	− 38	− 138	− 38	− 178	− 146
			6G	+ 154	+ 22	+ 212	+ 22	6g	− 22	− 122	− 22	− 162	− 130
			6H	+ 132	0	+ 190	0	6h	0	− 100	0	− 140	− 108
			—	—	—	—	—	7e6e	− 56	− 181	− 56	− 196	− 164
			7G	+ 192	+ 22	+ 258	+ 22	7g6g	− 22	− 147	− 22	− 162	− 130
			7H	+ 170	0	+ 236	0	7h6h	0	− 125	0	− 140	− 108
			8G	—	—	—	—	8g	—	—	—	—	—
			8H	—	—	—	—	9g8g	—	—	—	—	—
		1	—	—	—	—	—	3h4h	0	− 56	0	− 112	− 144
			4H	+ 95	0	+ 150	0	4h	0	− 71	0	− 112	− 144
			5G	+ 144	+ 26	+ 216	+ 26	5g6g	− 26	− 116	− 26	− 206	− 170
			5H	+ 118	0	+ 190	0	5h4h	0	− 90	0	− 112	− 144
			—	—	—	—	—	5h6h	0	− 90	0	− 180	− 144
			—	—	—	—	—	6e	− 60	− 172	− 60	− 240	− 204
			—	—	—	—	—	6f	− 40	− 152	− 40	− 220	− 184
			6G	+ 176	+ 26	+ 262	+ 26	6g	− 26	− 138	− 26	− 206	− 170
			6H	+ 150	0	+ 236	0	6h	0	− 112	0	− 180	− 144
			—	—	—	—	—	7e6e	− 60	− 200	− 60	− 240	− 204
			7G	+ 216	+ 26	+ 326	+ 26	7g6g	− 26	− 166	− 26	− 206	− 170
			7H	+ 190	0	+ 300	0	7h6h	0	− 140	0	− 180	− 144
			8G	+ 262	+ 26	+ 401	+ 26	8g	− 26	− 206	− 26	− 306	− 170
			8H	+ 236	0	+ 375	0	9g8g	− 26	− 250	− 26	− 306	− 170
		1,25	—	—	—	—	—	3h4h	0	− 60	0	− 132	− 180
			4H	+ 100	0	+ 170	0	4h	0	− 75	0	− 132	− 180
			5G	+ 153	+ 28	+ 240	+ 28	5g6g	− 28	− 123	− 28	− 240	− 208
			5H	+ 125	0	+ 212	0	5h4h	0	− 95	0	− 132	− 180
			—	—	—	—	—	5h6h	0	− 95	0	− 212	− 180
			—	—	—	—	—	6e	− 63	− 181	− 63	− 275	− 243
			—	—	—	—	—	6f	− 42	− 160	− 42	− 254	− 222
			6G	+ 188	+ 28	+ 293	+ 28	6g	− 28	− 146	− 28	− 240	− 208
			6H	+ 160	0	+ 265	0	6h	0	− 118	0	− 212	− 180

Table 14 — Deviations

ES, es = upper deviation
EI, ei = lower deviation

Basic major diameter		Pitch	Nut thread					Bolt thread					
over	up to and incl.		Tolerance class	Pitch diameter		Minor diameter		Tolerance class	Pitch diameter		Major diameter		Minor diameter (for stress calculations)
				ES	*EI*	*ES*	*EI*		*es*	*ei*	*es*	*ei*	
mm	mm	mm		µm	µm	µm	µm		µm	µm	µm	µm	µm
5,6	**11,2**	**1,25**	—	—	—	—	—	7e6e	− 63	− 213	− 63	− 275	− 243
			7G	+ 228	+ 28	+ 363	+ 28	7g6g	− 28	− 178	− 28	− 240	− 208
			7H	+ 200	0	+ 335	0	7h6h	0	− 150	0	− 212	− 180
			8G	+ 278	+ 28	+ 453	+ 28	8g	− 28	− 218	− 28	− 363	− 208
			8H	+ 250	0	+ 425	0	9g8g	− 28	− 264	− 28	− 363	− 208
		1,5	—	—	—	—	—	3h4h	0	− 67	0	− 150	− 217
			4H	+ 112	0	+ 190	0	4h	0	− 85	0	− 150	− 217
			5G	+ 172	+ 32	+ 268	+ 32	5g6g	− 32	− 138	− 32	− 268	− 249
			5H	+ 140	0	+ 236	0	5h4h	0	− 106	0	− 150	− 217
			—	—	—	—	—	5h6h	0	− 106	0	− 236	− 217
			—	—	—	—	—	6e	− 67	− 199	− 67	− 303	− 284
			—	—	—	—	—	6f	− 45	− 177	− 45	− 281	− 262
			6G	+ 212	+ 32	+ 332	+ 32	6g	− 32	− 164	− 32	− 268	− 249
			6H	+ 180	0	+ 300	0	6h	0	− 132	0	− 236	− 217
			—	—	—	—	—	7e6e	− 67	− 237	− 67	− 303	− 284
			7G	+ 256	+ 32	+ 407	+ 32	7g6g	− 32	− 202	− 32	− 268	− 249
			7H	+ 224	0	+ 375	0	7h6h	0	− 170	0	− 236	− 217
			8G	+ 312	+ 32	+ 507	+ 32	8g	− 32	− 244	− 32	− 407	− 249
			8H	+ 280	0	+ 475	0	9g8g	− 32	− 297	− 32	− 407	− 249
11,2	**22,4**	**1**	—	—	—	—	—	3h4h	0	− 60	0	− 112	− 144
			4H	+ 100	0	+ 150	0	4h	0	− 75	0	− 112	− 144
			5G	+ 151	+ 26	+ 216	+ 26	5g6g	− 26	− 121	− 26	− 206	− 170
			5H	+ 125	0	+ 190	0	5h4h	0	− 95	0	− 112	− 144
			—	—	—	—	—	5h6h	0	− 95	0	− 180	− 144
			—	—	—	—	—	6e	− 60	− 178	− 60	− 240	− 204
			—	—	—	—	—	6f	− 40	− 158	− 40	− 220	− 184
			6G	+ 186	+ 26	+ 262	+ 26	6g	− 26	− 144	− 26	− 206	− 170
			6H	+ 160	0	+ 236	0	6h	0	− 118	0	− 180	− 144
			—	—	—	—	—	7e6e	− 60	− 210	− 60	− 240	− 204
			7G	+ 226	+ 26	+ 326	+ 26	7g6g	− 26	− 176	− 26	− 206	− 170
			7H	+ 200	0	+ 300	0	7h6h	0	− 150	0	− 180	− 144
			8G	+ 276	+ 26	+ 401	+ 26	8g	− 26	− 216	− 26	− 306	− 170
			8H	+ 250	0	+ 375	0	9g8g	− 26	− 262	− 26	− 306	− 170
		1,25	—	—	—	—	—	3h4h	0	− 67	0	− 132	− 180
			4H	+ 112	0	+ 170	0	4h	0	− 85	0	− 132	− 180
			5G	+ 168	+ 28	+ 240	+ 28	5g6g	− 28	− 134	− 28	− 240	− 208
			5H	+ 140	0	+ 212	0	5h4h	0	− 106	0	− 132	− 180
			—	—	—	—	—	5h6h	0	− 106	0	− 212	− 180
			—	—	—	—	—	6e	− 63	− 195	− 63	− 275	− 243

Table 14 — Deviations

ES, es = upper deviation
EI, ei = lower deviation

Basic major diameter		Pitch	Nut thread					Bolt thread					
over	up to and incl.		Tolerance class	Pitch diameter		Minor diameter		Tolerance class	Pitch diameter		Major diameter		Minor diameter (for stress calculations)
				ES	*EI*	*ES*	*EI*		*es*	*ei*	*es*	*ei*	
mm	mm	mm		µm	µm	µm	µm		µm	µm	µm	µm	µm
11,2	**22,4**	**1,25**	—	—	—	—	—	6f	− 42	− 174	− 42	− 254	− 222
			6G	+ 208	+ 28	+ 293	+ 28	6g	− 28	− 160	− 28	− 240	− 208
			6H	+ 180	0	+ 265	0	6h	0	− 132	0	− 212	− 180
			—	—	—	—	—	7e6e	− 63	− 233	− 63	− 275	− 243
			7G	+ 252	+ 28	+ 363	+ 28	7g6g	− 28	− 198	− 28	− 240	− 208
			7H	+ 224	0	+ 335	0	7h6h	0	− 170	0	− 212	− 180
			8G	+ 308	+ 28	+ 453	+ 28	8g	− 28	− 240	− 28	− 363	− 208
			8H	+ 280	0	+ 425	0	9g8g	− 28	− 293	− 28	− 363	− 208
		1,5	—	—	—	—	—	3h4h	0	− 71	0	− 150	− 217
			4H	+ 118	0	+ 190	0	4h	0	− 90	0	− 150	− 217
			5G	+ 182	+ 32	+ 268	+ 32	5g6g	− 32	− 144	− 32	− 268	− 249
			5H	+ 150	0	+ 236	0	5h4h	0	− 112	0	− 150	− 217
			—	—	—	—	—	5h6h	0	− 112	0	− 236	− 217
			—	—	—	—	—	6e	− 67	− 207	− 67	− 303	− 284
			—	—	—	—	—	6f	− 45	− 185	− 45	− 281	− 262
			6G	+ 222	+ 32	+ 332	+ 32	6g	− 32	− 172	− 32	− 268	− 249
			6H	+ 190	0	+ 300	0	6h	0	− 140	0	− 236	− 217
			—	—	—	—	—	7e6e	− 67	− 247	− 67	− 303	− 284
			7G	+ 268	+ 32	+ 407	+ 32	7g6g	− 32	− 212	− 32	− 268	− 249
			7H	+ 236	0	+ 375	0	7h6h	0	− 180	0	− 236	− 217
			8G	+ 332	+ 32	+ 507	+ 32	8g	− 32	− 256	− 32	− 407	− 249
			8H	+ 300	0	+ 475	0	9g8g	− 32	− 312	− 32	− 407	− 249
		1,75	—	—	—	—	—	3h4h	0	− 75	0	− 170	− 253
			4H	+ 125	0	+ 212	0	4h	0	− 95	0	− 170	− 253
			5G	+ 194	+ 34	+ 299	+ 34	5g6g	− 34	− 152	− 34	− 299	− 287
			5H	+ 160	0	+ 265	0	5h4h	0	− 118	0	− 170	− 253
			—	—	—	—	—	5h6h	0	− 118	0	− 265	− 253
			—	—	—	—	—	6e	− 71	− 221	− 71	− 336	− 324
			—	—	—	—	—	6f	− 48	− 198	− 48	− 313	− 301
			6G	+ 234	+ 34	+ 369	+ 34	6g	− 34	− 184	− 34	− 299	− 287
			6H	+ 200	0	+ 335	0	6h	0	− 150	0	− 265	− 253
			—	—	—	—	—	7e6e	− 71	− 261	− 71	− 336	− 324
			7G	+ 284	+ 34	+ 459	+ 34	7g6g	− 34	− 224	− 34	− 299	− 287
			7H	+ 250	0	+ 425	0	7h6h	0	− 190	0	− 265	− 253
			8G	+ 349	+ 34	+ 564	+ 34	8g	− 34	− 270	− 34	− 459	− 287
			8H	+ 315	0	+ 530	0	9g8g	− 34	− 334	− 34	− 459	− 287
		2	—	—	—	—	—	3h4h	0	− 80	0	− 180	− 289
			4H	+ 132	0	+ 236	0	4h	0	− 100	0	− 180	− 289
			5G	+ 208	+ 38	+ 338	+ 38	5g6g	− 38	− 163	− 38	− 318	− 327

Table 14 — Deviations

ES, es = upper deviation
EI, ei = lower deviation

Basic major diameter		Pitch	Nut thread					Bolt thread					
over	up to and incl.		Tolerance class	Pitch diameter		Minor diameter		Tolerance class	Pitch diameter		Major diameter		Minor diameter (for stress calculations)
				ES	*EI*	*ES*	*EI*		*es*	*ei*	*es*	*ei*	
mm	mm	mm		µm	µm	µm	µm		µm	µm	µm	µm	µm
11,2	**22,4**	**2**	5H	+ 170	0	+ 300	0	5h4h	0	– 125	0	– 180	– 289
			—	—	—	—	—	5h6h	0	– 125	0	– 280	– 289
			—	—	—	—	—	6e	– 71	– 231	– 71	– 351	– 360
			—	—	—	—	—	6f	– 52	– 212	– 52	– 332	– 341
			6G	+ 250	+ 38	+ 413	+ 38	6g	– 38	– 198	– 38	– 318	– 327
			6H	+ 212	0	+ 375	0	6h	0	– 160	0	– 280	– 289
			—	—	—	—	—	7e6e	– 71	– 271	– 71	– 351	– 360
			7G	+ 303	+ 38	+ 513	+ 38	7g6g	– 38	– 238	– 38	– 318	– 327
			7H	+ 265	0	+ 475	0	7h6h	0	– 200	0	– 280	– 289
			8G	+ 373	+ 38	+ 638	+ 38	8g	– 38	– 288	– 38	– 488	– 327
			8H	+ 335	0	+ 600	0	9g8g	– 38	– 353	– 38	– 488	– 327
		2,5	—	—	—	—	—	3h4h	0	– 85	0	– 212	– 361
			4H	+ 140	0	+ 280	0	4h	0	– 106	0	– 212	– 361
			5G	+ 222	+ 42	+ 397	+ 42	5g6g	– 42	– 174	– 42	– 377	– 403
			5H	+ 180	0	+ 355	0	5h4h	0	– 132	0	– 212	– 361
			—	—	—	—	—	5h6h	0	– 132	0	– 335	– 361
			—	—	—	—	—	6e	– 80	– 250	– 80	– 415	– 441
			—	—	—	—	—	6f	– 58	– 228	– 58	– 393	– 419
			6G	+ 266	+ 42	+ 492	+ 42	6g	– 42	– 212	– 42	– 377	– 403
			6H	+ 224	0	+ 450	0	6h	0	– 170	0	– 335	– 361
			—	—	—	—	—	7e6e	– 80	– 292	– 80	– 415	– 441
			7G	+ 322	+ 42	+ 602	+ 42	7g6g	– 42	– 254	– 42	– 377	– 403
			7H	+ 280	0	+ 560	0	7h6h	0	– 212	0	– 335	– 361
			8G	+ 397	+ 42	+ 752	+ 42	8g	– 42	– 307	– 42	– 572	– 403
			8H	+ 355	0	+ 710	0	9g8g	– 42	– 377	– 42	– 572	– 403
22,4	**45**	**1**	—	—	—	—	—	3h4h	0	– 63	0	– 112	– 144
			4H	+ 106	0	+ 150	0	4h	0	– 80	0	– 112	– 144
			5G	+ 158	+ 26	+ 216	+ 26	5g6g	– 26	– 126	– 26	– 206	– 170
			5H	+ 132	0	+ 190	0	5h4h	0	– 100	0	– 112	– 144
			—	—	—	—	—	5h6h	0	– 100	0	– 180	– 144
			—	—	—	—	—	6e	– 60	– 185	– 60	– 240	– 204
			—	—	—	—	—	6f	– 40	– 165	– 40	– 220	– 184
			6G	+ 196	+ 26	+ 262	+ 26	6g	– 26	– 151	– 26	– 206	– 170
			6H	+ 170	0	+ 236	0	6h	0	– 125	0	– 180	– 144
			—	—	—	—	—	7e6e	– 60	– 220	– 60	– 240	– 204
			7G	+ 238	+ 26	+ 326	+ 26	7g6g	– 26	– 186	– 26	– 206	– 170
			7H	+ 212	0	+ 300	0	7h6h	0	– 160	0	– 180	– 144
			8G	—	—	—	—	8g	– 26	– 226	– 26	– 306	– 170
			8H	—	—	—	—	9g8g	– 26	– 276	– 26	– 306	– 170

Table 14 — Deviations

ES, es = upper deviation
EI, ei = lower deviation

Basic major diameter		Pitch	Nut thread					Bolt thread					
over	up to and incl.		Tolerance class	Pitch diameter		Minor diameter		Tolerance class	Pitch diameter		Major diameter		Minor diameter (for stress calculations)
				ES	*EI*	*ES*	*EI*		*es*	*ei*	*es*	*ei*	
mm	mm	mm		µm	µm	µm	µm		µm	µm	µm	µm	µm
22,4	**45**	**1,5**	—	—	—	—	—	3h4h	0	− 75	0	− 150	− 217
			4H	+ 125	0	+ 190	0	4h	0	− 95	0	− 150	− 217
			5G	+ 192	+ 32	+ 268	+ 32	5g6g	− 32	− 150	− 32	− 268	− 249
			5H	+ 160	0	+ 236	0	5h4h	0	− 118	0	− 150	− 217
			—	—	—	—	—	5h6h	0	− 118	0	− 236	− 217
			—	—	—	—	—	6e	− 67	− 217	− 67	− 303	− 284
			—	—	—	—	—	6f	− 45	− 195	− 45	− 281	− 262
			6G	+ 232	+ 32	+ 332	+ 32	6g	− 32	− 182	− 32	− 268	− 249
			6H	+ 200	0	+ 300	0	6h	0	− 150	0	− 236	− 217
			—	—	—	—	—	7e6e	− 67	− 257	− 67	− 303	− 284
			7G	+ 282	+ 32	+ 407	+ 32	7g6g	− 32	− 222	− 32	− 268	− 249
			7H	+ 250	0	+ 375	0	7h6h	0	− 190	0	− 236	− 217
			8G	+ 347	+ 32	+ 507	+ 32	8g	− 32	− 268	− 32	− 407	− 249
			8H	+ 315	0	+ 475	0	9g8g	− 32	− 332	− 32	− 407	− 249
		2	—	—	—	—	—	3h4h	0	− 85	0	− 180	− 289
			4H	+ 140	0	+ 236	0	4h	0	− 106	0	− 180	− 289
			5G	+ 218	+ 38	+ 338	+ 38	5g6g	− 38	− 170	− 38	− 318	− 327
			5H	+ 180	0	+ 300	0	5h4h	0	− 132	0	− 180	− 289
			—	—	—	—	—	5h6h	0	− 132	0	− 280	− 289
			—	—	—	—	—	6e	− 71	− 241	− 71	− 351	− 360
			—	—	—	—	—	6f	− 52	− 222	− 52	− 332	− 341
			6G	+ 262	+ 38	+ 413	+ 38	6g	− 38	− 208	− 38	− 318	− 327
			6H	+ 224	0	+ 375	0	6h	0	− 170	0	− 280	− 289
			—	—	—	—	—	7e6e	− 71	− 283	− 71	− 351	− 360
			7G	+ 318	+ 38	+ 513	+ 38	7g6g	− 38	− 250	− 38	− 318	− 327
			7H	+ 280	0	+ 475	0	7h6h	0	− 212	0	− 280	− 289
			8G	+ 393	+ 38	+ 638	+ 38	8g	− 38	− 303	− 38	− 488	− 327
			8H	+ 355	0	+ 600	0	9g8g	− 38	− 373	− 38	− 488	− 327
		3	—	—	—	—	—	3h4h	0	− 100	0	− 236	− 433
			4H	+ 170	0	+ 315	0	4h	0	− 125	0	− 236	− 433
			5G	+ 260	+ 48	+ 448	+ 48	5g6g	− 48	− 208	− 48	− 423	− 481
			5H	+ 212	0	+ 400	0	5h4h	0	− 160	0	− 236	− 433
			—	—	—	—	—	5h6h	0	− 160	0	− 375	− 433
			—	—	—	—	—	6e	− 85	− 285	− 85	− 460	− 518
			—	—	—	—	—	6f	− 63	− 263	− 63	− 438	− 496
			6G	+ 313	+ 48	+ 548	+ 48	6g	− 48	− 248	− 48	− 423	− 481
			6H	+ 265	0	+ 500	0	6h	0	− 200	0	− 375	− 433
			—	—	—	—	—	7e6e	− 85	− 335	− 85	− 460	− 518
			7G	+ 383	+ 48	+ 678	+ 48	7g6g	− 48	− 298	− 48	− 423	− 481

Table 14 — Deviations

ES, es = upper deviation
EI, ei = lower deviation

Basic major diameter		Pitch	Nut thread					Bolt thread					
over	up to and incl.		Tolerance class	Pitch diameter		Minor diameter		Tolerance class	Pitch diameter		Major diameter		Minor diameter (for stress calculations)
				ES	*EI*	*ES*	*EI*		*es*	*ei*	*es*	*ei*	
mm	mm	mm		µm	µm	µm	µm		µm	µm	µm	µm	µm
22,4	**45**	**3**	7H	+ 335	0	+ 630	0	7h6h	0	– 250	0	– 375	– 433
			8G	+ 473	+ 48	+ 848	+ 48	8g	– 48	– 363	– 48	– 648	– 481
			8H	+ 425	0	+ 800	0	9g8g	– 48	– 448	– 48	– 648	– 481
		3,5	—	—	—	—	—	3h4h	0	– 106	0	– 265	– 505
			4H	+ 180	0	+ 355	0	4h	0	– 132	0	– 265	– 505
			5G	+ 277	+ 53	+ 503	+ 53	5g6g	– 53	– 223	– 53	– 478	– 558
			5H	+ 224	0	+ 450	0	5h4h	0	– 170	0	– 265	– 505
			—	—	—	—	—	5h6h	0	– 170	0	– 425	– 505
			—	—	—	—	—	6e	– 90	– 302	– 90	– 515	– 595
			—	—	—	—	—	6f	– 70	– 282	– 70	– 495	– 575
			6G	+ 333	+ 53	+ 613	+ 53	6g	– 53	– 265	– 53	– 478	– 558
			6H	+ 280	0	+ 560	0	6h	0	– 212	0	– 425	– 505
			—	—	—	—	—	7e6e	– 90	– 355	– 90	– 515	– 595
			7G	+ 408	+ 53	+ 763	+ 53	7g6g	– 53	– 318	– 53	– 478	– 558
			7H	+ 355	0	+ 710	0	7h6h	0	– 265	0	– 425	– 505
			8G	+ 503	+ 53	+ 953	+ 53	8g	– 53	– 388	– 53	– 723	– 558
			8H	+ 450	0	+ 900	0	9g8g	– 53	– 478	– 53	– 723	– 558
		4	—	—	—	—	—	3h4h	0	– 112	0	– 300	– 577
			4H	+ 190	0	+ 375	0	4h	0	– 140	0	– 300	– 577
			5G	+ 296	+ 60	+ 535	+ 60	5g6g	– 60	– 240	– 60	– 535	– 637
			5H	+ 236	0	+ 475	0	5h4h	0	– 180	0	– 300	– 577
			—	—	—	—	—	5h6h	0	– 180	0	– 475	– 577
			—	—	—	—	—	6e	– 95	– 319	– 95	– 570	– 672
			—	—	—	—	—	6f	– 75	– 299	– 75	– 550	– 652
			6G	+ 360	+ 60	+ 660	+ 60	6g	– 60	– 284	– 60	– 535	– 637
			6H	+ 300	0	+ 600	0	6h	0	– 224	0	– 475	– 577
			—	—	—	—	—	7e6e	– 95	– 375	– 95	– 570	– 672
			7G	+ 435	+ 60	+ 810	+ 60	7g6g	– 60	– 340	– 60	– 535	– 637
			7H	+ 375	0	+ 750	0	7h6h	0	– 280	0	– 475	– 577
			8G	+ 535	+ 60	+ 1 010	+ 60	8g	– 60	– 415	– 60	– 810	– 637
			8H	+475	0	+ 950	0	9g8g	– 60	– 510	– 60	– 810	– 637
		4,5	—	—	—	—	—	3h4h	0	– 118	0	– 315	– 650
			4H	+ 200	0	+ 425	0	4h	0	– 150	0	– 315	– 650
			5G	+ 313	+ 63	+ 593	+ 63	5g6g	– 63	– 253	– 63	– 563	– 713
			5H	+ 250	0	+ 530	0	5h4h	0	– 190	0	– 315	– 650
			—	—	—	—	—	5h6h	0	– 190	0	– 500	– 650
			—	—	—	—	—	6e	– 100	– 336	– 100	– 600	– 750
			—	—	—	—	—	6f	– 80	– 316	– 80	– 580	– 730
			6G	+ 378	+ 63	+ 733	+ 63	6g	– 63	– 299	– 63	– 563	– 713

Table 14 — Deviations

ES, es = upper deviation
EI, ei = lower deviation

Basic major diameter		Pitch	Nut thread					Bolt thread					
over	up to and incl.		Tolerance class	Pitch diameter		Minor diameter		Tolerance class	Pitch diameter		Major diameter		Minor diameter (for stress calculations)
				ES	*EI*	*ES*	*EI*		*es*	*ei*	*es*	*ei*	
mm	mm	mm		µm	µm	µm	µm		µm	µm	µm	µm	µm
22,4	**45**	**4,5**	6H	+ 315	0	+ 670	0	6h	0	– 236	0	– 500	– 650
			—	—	—	—	—	7e6e	– 100	– 400	– 100	– 600	– 750
			7G	+ 463	+ 63	+ 913	+ 63	7g6g	– 63	– 363	– 63	– 563	– 713
			7H	+ 400	0	+ 850	0	7h6h	0	– 300	0	– 500	– 650
			8G	+ 563	+ 63	+ 1 123	+ 63	8g	– 63	– 438	– 63	– 863	– 713
			8H	+ 500	0	+ 1 060	0	9g8g	– 63	– 538	– 63	– 863	– 713
45	**90**	**1,5**	—	—	—	—	—	3h4h	0	– 80	0	– 150	– 217
			4H	+ 132	0	+ 190	0	4h	0	– 100	0	– 150	– 217
			5G	+ 202	+ 32	+ 268	+ 32	5g6g	– 32	– 157	– 32	– 268	– 249
			5H	+ 170	0	+ 236	0	5h4h	0	– 125	0	– 150	– 217
			—	—	—	—	—	5h6h	0	– 125	0	– 236	– 217
			—	—	—	—	—	6e	– 67	– 227	– 67	– 303	– 284
			—	—	—	—	—	6f	– 45	– 205	– 45	– 281	– 262
			6G	+ 244	+ 32	+ 332	+ 32	6g	– 32	– 192	– 32	– 268	– 249
			6H	+ 212	0	+ 300	0	6h	0	– 160	0	– 236	– 217
			—	—	—	—	—	7e6e	– 67	– 267	– 67	– 303	– 284
			7G	+ 297	+ 32	+ 407	+ 32	7g6g	– 32	– 232	– 32	– 268	– 249
			7H	+ 265	0	+ 375	0	7h6h	0	– 200	0	– 236	– 217
			8G	+ 367	+ 32	+ 507	+ 32	8g	– 32	– 282	– 32	– 407	– 249
			8H	+ 335	0	+ 475	0	9g8g	– 32	– 347	– 32	– 407	– 249
		2	—	—	—	—	—	3h4h	0	– 90	0	– 180	– 289
			4H	+ 150	0	+ 236	0	4h	0	– 112	0	– 180	– 289
			5G	+ 228	+ 38	+ 338	+ 38	5g6g	– 38	– 178	– 38	– 318	– 327
			5H	+ 190	0	+ 300	0	5h4h	0	– 140	0	– 180	– 289
			—	—	—	—	—	5h6h	0	– 140	0	– 280	– 289
			—	—	—	—	—	6e	– 71	– 251	– 71	– 351	– 360
			—	—	—	—	—	6f	– 52	– 232	– 52	– 332	– 341
			6G	+ 274	+ 38	+ 413	+ 38	6g	– 38	– 218	– 38	– 318	– 327
			6H	+ 236	0	+ 375	0	6h	0	– 180	0	– 280	– 289
			—	—	—	—	—	7e6e	– 71	– 295	– 71	– 351	– 360
			7G	+ 338	+ 38	+ 513	+ 38	7g6g	– 38	– 262	– 38	– 318	– 327
			7H	+ 300	0	+ 475	0	7h6h	0	– 224	0	– 280	– 289
			8G	+ 413	+ 38	+ 638	+ 38	8g	– 38	– 318	– 38	– 488	– 327
			8H	+ 375	0	+ 600	0	9g8g	– 38	– 393	– 38	– 488	– 327
		3	—	—	—	—	—	3h4h	0	– 106	0	– 236	– 433
			4H	+ 180	0	+ 315	0	4h	0	– 132	0	– 236	– 433
			5G	+ 272	+ 48	+ 448	+ 48	5g6g	– 48	– 218	– 48	– 423	– 481
			5H	+ 224	0	+ 400	0	5h4h	0	– 170	0	– 236	– 433
			—	—	—	—	—	5h6h	0	– 170	0	– 375	– 433

Table 14 — Deviations

ES, es = upper deviation
EI, ei = lower deviation

Basic major diameter		Pitch	Nut thread					Bolt thread					
over	up to and incl.		Tolerance class	Pitch diameter		Minor diameter		Tolerance class	Pitch diameter		Major diameter		Minor diameter (for stress calculations)
				ES	*EI*	*ES*	*EI*		*es*	*ei*	*es*	*ei*	
mm	mm	mm		µm	µm	µm	µm		µm	µm	µm	µm	µm
45	**90**	**3**	—	—	—	—	—	6e	− 85	− 297	− 85	− 460	− 518
			—	—	—	—	—	6f	− 63	− 275	− 63	− 438	− 496
			6G	+ 328	+ 48	+ 548	+ 48	6g	− 48	− 260	− 48	− 423	− 481
			6H	+ 280	0	+ 500	0	6h	0	− 212	0	− 375	− 433
			—	—	—	—	—	7e6e	− 85	− 350	− 85	− 460	− 518
			7G	+ 403	+ 48	+ 678	+ 48	7g6g	− 48	− 313	− 48	− 423	− 481
			7H	+ 355	0	+ 630	0	7h6h	0	− 265	0	− 375	− 433
			8G	+ 498	+ 48	+ 848	+ 48	8g	− 48	− 383	− 48	− 648	− 481
			8H	+ 450	0	+ 800	0	9g8g	− 48	− 473	− 48	− 648	− 481
		4	—	—	—	—	—	3h4h	0	− 118	0	− 300	− 577
			4H	+ 200	0	+ 375	0	4h	0	− 150	0	− 300	− 577
			5G	+ 310	+ 60	+ 535	+ 60	5g6g	− 60	− 250	− 60	− 535	− 637
			5H	+ 250	0	+ 475	0	5h4h	0	− 190	0	− 300	− 577
			—	—	—	—	—	5h6h	0	− 190	0	− 475	− 577
			—	—	—	—	—	6e	− 95	− 331	− 95	− 570	− 672
			—	—	—	—	—	6f	− 75	− 311	− 75	− 550	− 652
			6G	+ 375	+ 60	+ 660	+ 60	6g	− 60	− 296	− 60	− 535	− 637
			6H	+ 315	0	+ 600	0	6h	0	− 236	0	− 475	− 577
			—	—	—	—	—	7e6e	− 95	− 395	− 95	− 570	− 672
			7G	+ 460	+ 60	+ 810	+ 60	7g6g	− 60	− 360	− 60	− 535	− 637
			7H	+ 400	0	+ 750	0	7h6h	0	− 300	0	− 475	− 577
			8G	+ 560	+ 60	+ 1 010	+ 60	8g	− 60	− 435	− 60	− 810	− 637
			8H	+ 500	0	+ 950	0	9g8g	− 60	− 535	− 60	− 810	− 637
		5	—	—	—	—	—	3h4h	0	− 125	0	− 335	− 722
			4H	+ 212	0	+ 450	0	4h	0	− 160	0	− 335	− 722
			5G	+ 336	+ 71	+ 631	+ 71	5g6g	− 71	− 271	− 71	− 601	− 793
			5H	+ 265	0	+ 560	0	5h4h	0	− 200	0	− 335	− 722
			—	—	—	—	—	5h6h	0	− 200	0	− 530	− 722
			—	—	—	—	—	6e	− 106	− 356	− 106	− 636	− 828
			—	—	—	—	—	6f	− 85	− 335	− 85	− 615	− 807
			6G	+ 406	+ 71	+ 781	+ 71	6g	− 71	− 321	− 71	− 601	− 793
			6H	+ 335	0	+ 710	0	6h	0	− 250	0	− 530	− 722
			—	—	—	—	—	7e6e	− 106	− 421	− 106	− 636	− 828
			7G	+ 496	+ 71	+ 971	+ 71	7g6g	− 71	− 386	− 71	− 601	− 793
			7H	+ 425	0	+ 900	0	7h6h	0	− 315	0	− 530	− 722
			8G	+ 601	+ 71	+ 1 191	+ 71	8g	− 71	− 471	− 71	− 921	− 793
			8H	+ 530	0	+ 1 120	0	9g8g	− 71	− 571	− 71	− 921	− 793
		5,5	—	—	—	—	—	3h4h	0	− 132	0	− 355	− 794
			4H	+ 224	0	+ 475	0	4h	0	− 170	0	− 355	− 794

Table 14 — Deviations

ES, es = upper deviation
EI, ei = lower deviation

Basic major diameter		Pitch	Nut thread					Bolt thread					
over	up to and incl.		Tolerance class	Pitch diameter		Minor diameter		Tolerance class	Pitch diameter		Major diameter		Minor diameter (for stress calculations)
				ES	*EI*	*ES*	*EI*		*es*	*ei*	*es*	*ei*	
mm	mm	mm		µm	µm	µm	µm		µm	µm	µm	µm	µm
45	**90**	**5,5**	5G	+ 355	+ 75	+ 675	+ 75	5g6g	– 75	– 287	– 75	– 635	– 869
			5H	+ 280	0	+ 600	0	5h4h	0	– 212	0	– 355	– 794
			—	—	—	—	—	5h6h	0	– 212	0	– 560	– 794
			—	—	—	—	—	6e	– 112	– 377	– 112	– 672	– 906
			—	—	—	—	—	6f	– 90	– 355	– 90	– 650	– 884
			6G	+ 430	+ 75	+ 825	+ 75	6g	– 75	– 340	– 75	– 635	– 869
			6H	+ 355	0	+ 750	0	6h	0	– 265	0	– 560	– 794
			—	—	—	—	—	7e6e	– 112	– 447	– 112	– 672	– 906
			7G	+ 525	+ 75	+ 1 025	+ 75	7g6g	– 75	– 410	– 75	– 635	– 869
			7H	+ 450	0	+ 950	0	7h6h	0	– 335	0	– 560	– 794
			8G	+ 635	+ 75	+ 1 255	+ 75	8g	– 75	– 500	– 75	– 975	– 869
			8H	+ 560	0	+ 1 180	0	9g8g	– 75	– 605	– 75	– 975	– 869
		6	—	—	—	—	—	3h4h	0	– 140	0	– 375	– 866
			4H	+ 236	0	+ 500	0	4h	0	– 180	0	– 375	– 866
			5G	+ 380	+ 80	+ 710	+ 80	5g6g	– 80	– 304	– 80	– 680	– 946
			5H	+ 300	0	+ 630	0	5h4h	0	– 224	0	– 375	– 866
			—	—	—	—	—	5h6h	0	– 224	0	– 600	– 866
			—	—	—	—	—	6e	– 118	– 398	– 118	– 718	– 984
			—	—	—	—	—	6f	– 95	– 375	– 95	– 695	– 961
			6G	+ 455	+ 80	+ 880	+ 80	6g	– 80	– 360	– 80	– 680	– 946
			6H	+ 375	0	+ 800	0	6h	0	– 280	0	– 600	– 866
			—	—	—	—	—	7e6e	– 118	– 473	– 118	– 718	– 984
			7G	+ 555	+ 80	+ 1 080	+ 80	7g6g	– 80	– 435	– 80	– 680	– 946
			7H	+ 475	0	+ 1 000	0	7h6h	0	– 355	0	– 600	– 866
			8G	+ 680	+ 80	+ 1 330	+ 80	8g	– 80	– 530	– 80	– 1 030	– 946
			8H	+ 600	0	+ 1 250	0	9g8g	– 80	– 640	– 80	– 1 030	– 946
90	**180**	**2**	—	—	—	—	—	3h4h	0	– 95	0	– 180	– 289
			4H	+ 160	0	+ 236	0	4h	0	– 118	0	– 180	– 289
			5G	+ 238	+ 38	+ 338	+ 38	5g6g	– 38	– 188	– 38	– 318	– 327
			5H	+ 200	0	+ 300	0	5h4h	0	– 150	0	– 180	– 289
			—	—	—	—	—	5h6h	0	– 150	0	– 280	– 289
			—	—	—	—	—	6e	– 71	– 261	– 71	– 351	– 360
			—	—	—	—	—	6f	– 52	– 242	– 52	– 332	– 341
			6G	+ 288	+ 38	+ 413	+ 38	6g	– 38	– 228	– 38	– 318	– 327
			6H	+ 250	0	+ 375	0	6h	0	– 190	0	– 280	– 289
			—	—	—	—	—	7e6e	– 71	– 307	– 71	– 351	– 360
			7G	+ 353	+ 38	+ 513	+ 38	7g6g	– 38	– 274	– 38	– 318	– 327
			7H	+ 315	0	+ 475	0	7h6h	0	– 236	0	– 280	– 289
			8G	+ 438	+ 38	+ 638	+ 38	8g	– 38	– 338	– 38	– 488	– 327

Table 14 — Deviations

ES, es = upper deviation
EI, ei = lower deviation

Basic major diameter		Pitch	Nut thread					Bolt thread					
over	up to and incl.		Tolerance class	Pitch diameter		Minor diameter		Tolerance class	Pitch diameter		Major diameter		Minor diameter (for stress calculations)
				ES	*EI*	*ES*	*EI*		*es*	*ei*	*es*	*ei*	
mm	mm	mm		µm	µm	µm	µm		µm	µm	µm	µm	µm
90	**180**	**2**	8H	+ 400	0	+ 600	0	9g8g	– 38	– 413	– 38	– 488	– 327
		3	—	—	—	—	—	3h4h	0	– 112	0	– 236	– 433
			4H	+ 190	0	+ 315	0	4h	0	– 140	0	– 236	– 433
			5G	+ 284	+ 48	+ 448	+ 48	5g6g	– 48	– 228	– 48	– 423	– 481
			5H	+ 236	0	+ 400	0	5h4h	0	– 180	0	– 236	– 433
			—	—	—	—	—	5h6h	0	– 180	0	– 375	– 433
			—	—	—	—	—	6e	– 85	– 309	– 85	– 460	– 518
			—	—	—	—	—	6f	– 63	– 287	– 63	– 438	– 496
			6G	+ 348	+ 48	+ 548	+ 48	6g	– 48	– 272	– 48	– 423	– 481
			6H	+ 300	0	+ 500	0	6h	0	– 224	0	– 375	– 433
			—	—	—	—	—	7e6e	– 85	– 365	– 85	– 460	– 518
			7G	+ 423	+ 48	+ 678	+ 48	7g6g	– 48	– 328	– 48	– 423	– 481
			7H	+ 375	0	+ 630	0	7h6h	0	– 280	0	– 375	– 433
			8G	+ 523	+ 48	+ 848	+ 48	8g	– 48	– 403	– 48	– 648	– 481
			8H	+ 475	0	+ 800	0	9g8g	– 48	– 498	– 48	– 648	– 481
		4	—	—	—	—	—	3h4h	0	– 125	0	– 300	– 577
			4H	+ 212	0	+ 375	0	4h	0	– 160	0	– 300	– 577
			5G	+ 325	+ 60	+ 535	+ 60	5g6g	– 60	– 260	– 60	– 535	– 637
			5H	+ 265	0	+ 475	0	5h4h	0	– 200	0	– 300	– 577
			—	—	—	—	—	5h6h	0	– 200	0	– 475	– 577
			—	—	—	—	—	6e	– 95	– 345	– 95	– 570	– 672
			—	—	—	—	—	6f	– 75	– 325	– 75	– 550	– 652
			6G	+ 395	+ 60	+ 660	+ 60	6g	– 60	– 310	– 60	– 535	– 637
			6H	+ 335	0	+ 600	0	6h	0	– 250	0	– 475	– 577
			—	—	—	—	—	7e6e	– 95	– 410	– 95	– 570	– 672
			7G	+ 485	+ 60	+ 810	+ 60	7g6g	– 60	– 375	– 60	– 535	– 637
			7H	+ 425	0	+ 750	0	7h6h	0	– 315	0	– 475	– 577
			8G	+ 590	+ 60	+ 1 010	+ 60	8g	– 60	– 460	– 60	– 810	– 637
			8H	+ 530	0	+ 950	0	9g8g	– 60	– 560	– 60	– 810	– 637
		6	—	—	—	—	—	3h4h	0	– 150	0	– 375	– 866
			4H	+ 250	0	+ 500	0	4h	0	– 190	0	– 375	– 866
			5G	+ 395	+ 80	+ 710	+ 80	5g6g	– 80	– 316	– 80	– 680	– 946
			5H	+ 315	0	+ 630	0	5h4h	0	– 236	0	– 375	– 866
			—	—	—	—	—	5h6h	0	– 236	0	– 600	– 866
			—	—	—	—	—	6e	– 118	– 418	– 118	– 718	– 984
			—	—	—	—	—	6f	– 95	– 395	– 95	– 695	– 961
			6G	+ 480	+ 80	+ 880	+ 80	6g	– 80	– 380	– 80	– 680	– 946
			6H	+ 400	0	+ 800	0	6h	0	– 300	0	– 600	– 866
			—	—	—	—	—	7e6e	– 118	– 493	– 118	– 718	– 984

Table 14 — Deviations

ES, es = upper deviation
EI, ei = lower deviation

Basic major diameter		Pitch	Nut thread					Bolt thread					
over	up to and incl.		Tolerance class	Pitch diameter		Minor diameter		Tolerance class	Pitch diameter		Major diameter		Minor diameter (for stress calculations)
				ES	*EI*	*ES*	*EI*		*es*	*ei*	*es*	*ei*	
mm	mm	mm		µm	µm	µm	µm		µm	µm	µm	µm	µm
90	**180**	**6**	7G	+ 580	+ 80	+ 1 080	+ 80	7g6g	– 80	– 455	– 80	– 680	– 946
			7H	+ 500	0	+ 1 000	0	7h6h	0	– 375	0	– 600	– 866
			8G	+ 710	+ 80	+ 1 330	+ 80	8g	– 80	– 555	– 80	– 1 030	– 946
			8H	+ 630	0	+ 1 250	0	9g8g	– 80	– 680	– 80	– 1 030	– 946
180	**300**	**3**	—	—	—	—	—	3h4h	0	– 125	0	– 236	– 433
			4H	+ 212	0	+ 315	0	4h	0	– 160	0	– 236	– 433
			5G	+ 313	+ 48	+ 448	+ 48	5g6g	– 48	– 248	– 48	– 423	– 481
			5H	+ 265	0	+ 400	0	5h4h	0	– 200	0	– 236	– 433
			—	—	—	—	—	5h6h	0	– 200	0	– 375	– 433
			—	—	—	—	—	6e	– 85	– 335	– 85	– 460	– 518
			—	—	—	—	—	6f	– 63	– 313	– 63	– 438	– 496
			6G	+ 383	+ 48	+ 548	+ 48	6g	– 48	– 298	– 48	– 423	– 481
			6H	+ 335	0	+ 500	0	6h	0	– 250	0	– 375	– 433
			—	—	—	—	—	7e6e	– 85	– 400	– 85	– 460	– 518
			7G	+ 473	+ 48	+ 678	+ 48	7g6g	– 48	– 363	– 48	– 423	– 481
			7H	+ 425	0	+ 630	0	7h6h	0	– 315	0	– 375	– 433
			8G	+ 578	+ 48	+ 848	+ 48	8g	– 48	– 448	– 48	– 648	– 481
			8H	+ 530	0	+ 800	0	9g8g	– 48	– 548	– 48	– 648	– 481
		4	—	—	—	—	—	3h4h	0	– 140	0	– 300	– 577
			4H	+ 236	0	+ 375	0	4h	0	– 180	0	– 300	– 577
			5G	+ 360	+ 60	+ 535	+ 60	5g6g	– 60	– 284	– 60	– 535	– 637
			5H	+ 300	0	+ 475	0	5h4h	0	– 224	0	– 300	– 577
			—	—	—	—	—	5h6h	0	– 224	0	– 475	– 577
			—	—	—	—	—	6e	– 95	– 375	– 95	– 570	– 672
			—	—	—	—	—	6f	– 75	– 355	– 75	– 550	– 652
			6G	+ 435	+ 60	+ 660	+ 60	6g	– 60	– 340	– 60	– 535	– 637
			6H	+ 375	0	+ 600	0	6h	0	– 280	0	– 475	– 577
			—	—	—	—	—	7e6e	– 95	– 450	– 95	– 570	– 672
			7G	+ 535	+ 60	+ 810	+ 60	7g6g	– 60	– 415	– 60	– 535	– 637
			7H	+ 475	0	+ 750	0	7h6h	0	– 355	0	– 475	– 577
			8G	+ 660	+ 60	+ 1 010	+ 60	8g	– 60	– 510	– 60	– 810	– 637
			8H	+ 600	0	+ 950	0	9g8g	– 60	– 620	– 60	– 810	– 637
		6	—	—	—	—	—	3h4h	0	– 160	0	– 375	– 866
			4H	+ 265	0	+ 500	0	4h	0	– 200	0	– 375	– 866
			5G	+ 415	+ 80	+ 710	+ 80	5g6g	– 80	– 330	– 80	– 680	– 946
			5H	+ 335	0	+ 630	0	5h4h	0	– 250	0	– 375	– 866
			—	—	—	—	—	5h6h	0	– 250	0	– 600	– 866
			—	—	—	—	—	6e	– 118	– 433	– 118	– 718	– 984
			—	—	—	—	—	6f	– 95	– 410	– 95	– 695	– 961

Table 14 — Deviations

ES, es = upper deviation
EI, ei = lower deviation

Basic major diameter		Pitch	Nut thread					Bolt thread					
over	up to and incl.		Tolerance class	Pitch diameter		Minor diameter		Tolerance class	Pitch diameter		Major diameter		Minor diameter (for stress calculations)
				ES	*EI*	*ES*	*EI*		*es*	*ei*	*es*	*ei*	
mm	mm	mm		µm	µm	µm	µm		µm	µm	µm	µm	µm
180	**300**	**6**	6G	+ 505	+ 80	+ 880	+ 80	6g	– 80	– 395	– 80	– 680	– 946
			6H	+ 425	0	+ 800	0	6h	0	– 315	0	– 600	– 866
			—	—	—	—	—	7e6e	– 118	– 518	– 118	– 718	– 984
			7G	+ 610	+ 80	+ 1 080	+ 80	7g6g	– 80	– 480	– 80	– 680	– 946
			7H	+ 530	0	+ 1 000	0	7h6h	0	– 400	0	– 600	– 866
			8G	+ 750	+ 80	+ 1 330	+ 80	8g	– 80	– 580	– 80	– 1 030	– 946
			8H	+ 670	0	+ 1 250	0	9g8g	– 80	– 710	– 80	– 1 030	– 946

Appendix A Notes for guidance

A.1 Maximum material profile. The maximum material profile of the thread for a nut and for a bolt is shown in Figure 9. These profiles are established from the basic profile given in clause **3**.

A.2 Coating. Clause **6** gives information on tolerance position G, e, f and g, which provide clearance fits which may be used to accommodate coatings.

BS ....[2)], which is in course of preparation, will include tables listing pitches and tolerance positions and the maximum thickness of coating that can be accommodated by each.

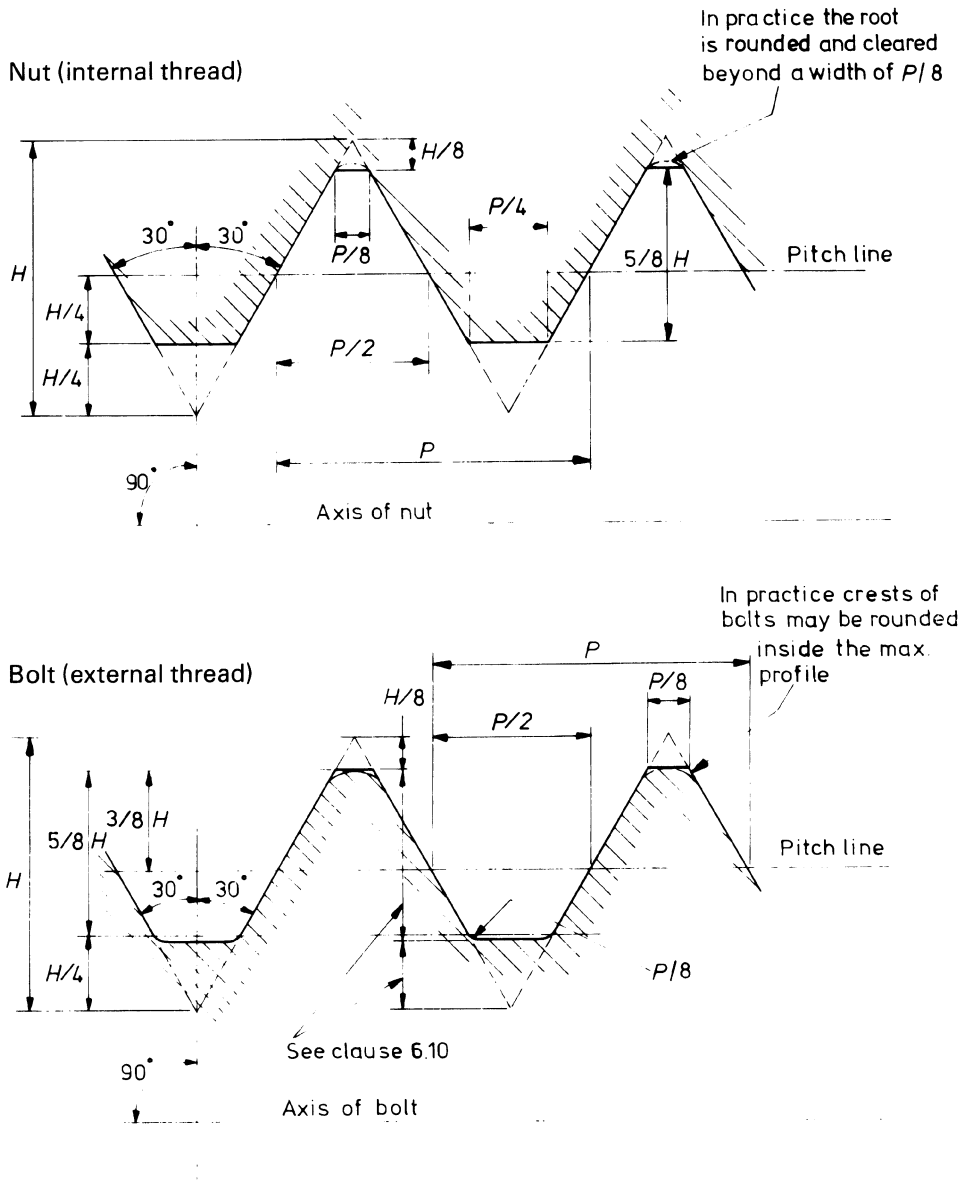


Figure 9 — Maximum material profiles for internal and external threads

[2)] Based on ISO/DIS 4042 "Electroplated coatings on threaded components".

A.3 External threads: stress areas

Stress area $A_s = \frac{\pi}{4}\left(\frac{d_2 + d_3}{2}\right)^2$

where

d_2 is the basic pitch diameter

d_3 is the minor diameter= $d_1 - \frac{H}{6}$

d_1 being the basic minor diameter

H being the height of the fundamental triangle for the thread.

Coarse series

Nominal thread diameter mm	Pitch of the thread mm	Nominal stress area mm^2
1	0,25	0,46
1,1	0,25	0,59
1,2	0,25	0,73
1,4	0,3	0,98
1,6	0,35	1,27
1,8	0,35	1,7
2	0,4	2,07
2,2	0,45	2,48
2,5	0,45	3,39
3	0,5	5,03
3,5	0,6	6,78
4	0,7	8,78
5	0,8	14,2
6	1	20,1
7	1	28,9
8	1,25	36,6
10	1,5	58,0
12	1,75	84,3
14	2	115
16	2	157
18	2,5	192
20	2,5	245
22	2,5	303
24	3	353
27	3	459
30	3,5	561
33	3,5	694
36	4	817
39	4	976
42	4,5	1 121
45	4,5	1 306
48	5	1 473
52	5	1 758
56	5,5	2 030
60	5,5	2 362
64	6	2 676
68	6	3 055

Fine series

Nominal thread diameter mm	Pitch of the thread mm	Nominal stress area mm^2
1	0,2	0,52
1,1	0,2	0,65
1,2	0,2	0,81
1,4	0,2	1,16
1,6	0,2	1,57
1,8	0,2	2,04
2	0,25	2,45
2,2	0,25	3,03
2,5	0,35	3,71
3	0,35	5,61
3,5	0,35	7,90
4	0,5	9,79
4,5	0,5	12,8
5	0,5	16,1
6	0,75	22
7	0,75	31,3
8	1	39,2
10	1,25	61,2
12	1,25	92,1
14	1,5	125
16	1,5	167
18	1,5	216
20	1,5	272
22	1,5	333
24	2	384
27	2	496
30	2	621
33	2	761

A.4 External threads: minor diameters. Minor diameter for external threads can be calculated using the information given in **6.10**.

The minimum minor diameters will normally be tabulated in Part 2. In the case of the maximum minor diameters, these shall be less than the minimum minor diameter of the Go gauges according to BS 919-3.

Appendix B Outline guide and examples for calculating limits of size of untabulated metric screw threads

The examples given below are intended to illustrate the method of calculation to use for untabulated threads. In cases where the data is not included in the referenced table*, the formula shown should be used.

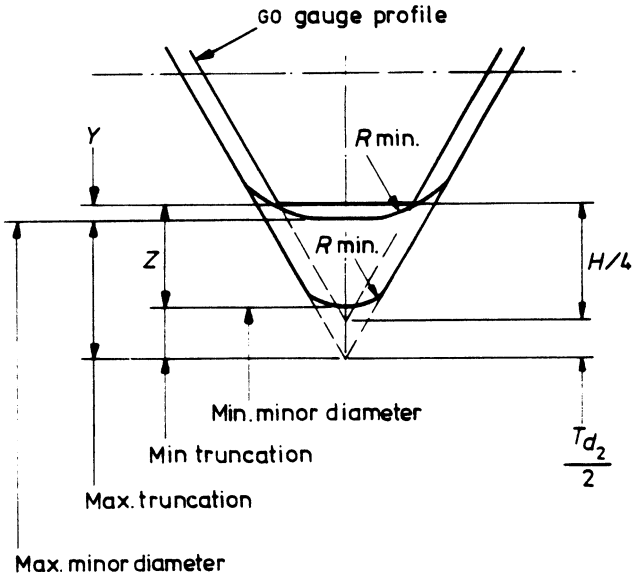
Example 1: External (bolt) thread M30 × 1,255g6g

	Feature	Symbol	Table	Formula	Value
	Basic major diameter	d	—	Nominal size	30,000
	Basic pitch diameter	d_2	4*	d – 0.6495 pitch	29,188
	Basic minor diameter	d_1	4*	d – 1.0825 pitch	28,647
(1)	Fundamental deviation for tolerance position g	es	5	**6.12.2**	0,028
	Maximum major diameter	$d_{\max}$		$d - es$	29,972
(2)	Major diameter tolerance for tolerance grade 6	T_d	8	**6.12.4**	0,212
	Minimum major diameter	$d_{\min}$		$d_{\max} - T_d$	29,760
	Maximum pitch diameter	$d_{2_{\max}}$		$d_2 - es$	29,160
(3)	Pitch diameter tolerance for tolerance grade 5	T_{d_2}	10*	**6.12.5**	0,108
	Minimum pitch diameter	$d_{2_{\min}}$		$d_{2_{\max}} - T_{d_2}$	29,052
	Maximum minor diameter	$d_{1_{\max}}$		$d_1 - es - 2y$ (4)	28,568
	Minimum root radius	$R_{\min}$	11	0.125 pitch	0.156
	Minimum minor diameter	$d_{1_{\min}}$		$d_1 - es - 2_z$ (4)	28,282

NOTE 1 Table 5 covers tolerance positions e, f, g and h.
NOTE 2 Table 8 covers tolerance grades 4, 6 and 8.
NOTE 3 Table 10 covers tolerance grades 3, 4, 5, 6, 7, 8 and 9.
NOTE 4 Explanation for dimensions y and z.

$$y = R_{\min}\left\{1 - \cos\left[\frac{\pi}{3} - \arccos\left(1 - \frac{Td_2}{4 \times R_{\min}}\right)\right]\right\}$$

$$z = \frac{H}{44} + \frac{Td_2}{22} - \frac{p}{88}$$



The maximum root profile shown in Figure 8 (see **6.10**) and used for the calculation of the maximum minor diameter is theoretically possible but unlikely to occur in practice, since it would require the combination of maximum truncation at minor diameter and minimum material position on the thread flanks.

The maximum minor diameter will not normally be specified as part of the thread summary.

Summary:

External (bolt) thread M30 × 1.25 – 5g6g

Major diameter 29,972 – 29,760

Pitch diameter 29,160 – 29,052

Minor diameter 28,568 – 28,282

Example 2: Internal (nut) thread M345 × 4-8G

	Feature	Symbol	Table	Formula	Value
	Basic major diameter	D		Nominal size	345,000
	Basic pitch diameter	D_2		D – 0.6495 pitch	342,402
	Basic minor diameter	D_1		D – 1.0825 pitch	340,670
(5)	Fundamental deviation for tolerance position G	EI	5		0,060
	Minimum major diameter	$D_{\min}$		$D + EI$	345,060
	Maximum major diameter	$D_{\max}$	—	Not required	—
	Minimum pitch diameter	$D_{2\min}$		$D_2 + EI$	342,462
(6)	Pitch diameter tolerance for tolerance grade 8	T_{D_2}	9*	**6.12.5**(8)	0,600
	Maximum pitch diameter	$D_{2_{\max}}$		$D_{2_{\min}} + T_{D_2}$	343,062
	Minimum minor diameter	$D_{1_{\min}}$		$D_1 + EI$	0,730
(7)	Minor diameter tolerance for tolerance grade 8	T_{D_1}		7	0,950
	Maximum minor diameter	$D_{1_{\max}}$		$D_{1_{\min}} + T_{D_1}$	341,680

NOTE 5 Table 5 covers tolerance positions G and H.
NOTE 6 Table 9 covers tolerance grades 4, 5, 6, 7 and 8.
NOTE 7 Table 7 covers tolerance grades 4, 5, 6, 7 and 8.
NOTE 8 It is important to note that where pitch diameter tolerances require calculation that it will be necessary firstly to calculate the equivalent T_{d_2} grade 6 for external (bolt) thread.

Summary:

Internal (nut) thread M345 × 4 – 8G

Major diameter 345,060 min.

Pitch diameter 342,462 – 343,062

Minor diameter 340,730 – 341,680

blank

Publications referred to

BS 919, *Screw gauge limits and tolerances.*
BS 919-3, *Gauges for ISO metric screw threads.*
BS 3643, *ISO metric screw threads.*
BS 3643-2, *Specification for selected limits of size.*
BS 6104-1, *Mechanical properties of fasteners — Part I: Bolts, screws and studs.*
BS 6293, *MJ threads for aerospace construction.*
BS 6293-1, *Specification for dimensions of basic profile.*
BS 6293-2, *Specification for dimensions for bolts and nuts.*
BS 6528, *Glossary of terms for cylindrical screw threads.*
PD 6494, *Mismatch of screw thread systems.*
ISO 68, *ISO general purpose screw threads — Basic profile.*
ISO 261, *ISO general purpose metric screw threads — General plan.*
ISO 262, *ISO general purpose metric screw threads — Selected sizes for screws, bolts and nuts.*
ISO 724, *ISO general purpose metric screw threads — Basic dimensions.*
ISO 965/1, *ISO general purpose metric screw threads — Tolerances — Part I: Principles and basic data.*
ISO 965/2, *ISO general purpose metric screw threads — Tolerances — Part 2: Limits of sizes for general purpose bolt and nut threads — Medium quality.*
ISO 965/3, *ISO general purpose metric screw threads — Tolerances — Part III: Deviations for constructional threads.*

BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Tel: 020 8996 9000. Fax: 020 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: 020 8996 9001. Fax: 020 8996 7001.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre. Tel: 020 8996 7111. Fax: 020 8996 7048.

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration. Tel: 020 8996 7002. Fax: 020 8996 7001.

Copyright

BSI
389 Chiswick High Road
London
W4 4AL