

BRITISH STANDARD

Screw gauge limits and tolerances –

Part 3: Specification for gauges for screw threads of ISO metric form

ICS 21.040.10



NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW

Publishing and copyright information

The BSI copyright notice displayed in this document indicates when the document was last issued.

© BSI 2007

ISBN 978 0 580 57935 6

The following BSI references relate to the work on this standard:

Committee reference TDW/4

Draft for comment 07/30158517 DC

Publication history

First published December 1968

Second edition, October 2007

Amendments issued since publication

Amd. no.	Date	Text affected
-----------------	-------------	----------------------

Contents

Foreword *iii*

- 1** Scope *1*
- 2** Normative references *1*
- 3** Terms and definitions and symbols *1*
- 4** General design features and tolerances of gauges *2*
- 5** Marking *4*

Annexes

- Annex A (informative) Function and method of use of various gauge types *27*
- Annex B (informative) Inspection procedures and the settlement of disputes *31*
- Annex C (informative) Reference temperature *32*
- Annex D (informative) Hardness *32*

Bibliography *33*

List of figures

- Figure 0 – “Blunt start” at end of thread on gauge *5*
- Figure 1 – Thread profiles for screw plug, ring and calliper gauges having complete flanks *6*
- Figure 2 – Thread profiles for screw plug, ring and calliper threads of truncated form *8*
- Figure 3 – Alternative form of GO calliper gauge anvil for product threads having pitches finer than 0.5 mm *10*
- Figure 4 – Alternative form of NOT GO calliper gauge anvil for product threads having pitches finer than 1.0 mm *10*
- Figure 5 – Effective diameter tolerance zones of gauges for external product threads having pitch diameter tolerances above 80 μm and up to 125 μm *12*
- Figure 6 – Effective diameter tolerance zones of gauges for external product threads having pitch diameter tolerances above 200 μm and up to 315 μm *13*
- Figure 7 – Effective diameter tolerance zones of gauges for internal product threads having pitch diameter tolerances above 80 μm and up to 125 μm *14*
- Figure 8 – Effective diameter tolerance zones of gauges for internal product threads having pitch diameter tolerances above 200 μm and up to 315 μm *15*

List of tables

- Table 1 – Dimensions of root clearances of GO screw gauges (see Figure 1) *7*
- Table 2 – Dimensions of root clearances of NOT GO screw gauges (see Figure 2) *9*
- Table 3 – Flank angle tolerances *11*
- Table 4 – Pitch tolerances *11*
- Table 5 – External product thread deviations for effective diameters of GO screw limit gauges and their associated check plugs and setting plugs *16*
- Table 6 – External product thread deviations for effective diameters of NOT GO screw limit gauges and their associated check plugs and setting plugs *16*

Table 7 – External product thread deviations for effective diameters of NOT GO screw limit gauges and their associated check plugs and setting plugs 17

Table 8 – Deviations for minor diameters of new GO and NOT GO screw ring gauges, major diameters of new GO and NOT GO screw plug gauges, and plain check plugs for new screw ring gauges 18

Table 9 – Deviations for major diameters of screw check plugs and setting plugs for GO screw ring and calliper gauges 19

Table 10 – Deviations for major diameters of screw check plugs and setting plugs for NOT GO screw ring and calliper gauges 20

Table 11 – External product thread deviations and allowable wear for GO and NOT GO plain calliper and ring gauges 20

Table 12 – Internal product thread deviations and allowable wear for GO and NOT GO plain plug gauges 21

Table 13 – External product thread information for calculation of limits for new solid GO screw ring gauges and their associated check plugs 22

Table 14 – External product thread information for calculation of limits for adjustable GO screw ring and calliper gauges and their associated setting plugs 23

Table 15 – External product thread information for calculation of limits for new solid NOT GO screw ring gauges and their associated check plugs 24

Table 16 – External product thread information for calculation of limits for adjustable NOT GO screw ring and calliper gauges and their associated setting plugs 25

Table 17 – Internal product thread information for calculation of limits for GO and NOT GO screw plug gauges 26

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iii, a blank page, pages 1 to 33 and a back cover.

Foreword

This British Standard is published by BSI and came into effect on 31 October 2007. It was prepared by Subcommittee SFTSE/1, *Screws and fasteners technical specification committee*, under the authority of Technical Committee TDW/4, *Technical product realization*. A list of organizations represented on these committees can be obtained on request to their secretaries.

BS 919, *Screw gauge limits and tolerances* is in four parts:

Part 1: Specification for gauges for screw threads of unified form

Part 2: Specification for gauges for screw threads of Whitworth and B.A. forms

Part 3: Specification for gauges for screw threads of ISO metric form

Part 4: Limits of size for gauges for screw threads of unified form diameters $\frac{1}{4}$ in and larger

Supersession

This Part of BS 919 supersedes BS 919-3:1968, which is withdrawn.

NOTE Attention is drawn to the fact that, for reasons of economy, this standard provides for wear limits for some GO gauges which are outside those of the product thread.

Relationship with other publications

This British Standard is intended for use with BS 3643, which specifies the corresponding screw threads.

Information about this document

This British Standard has been fully revised to bring it up to date.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is "shall".

Commentary, explanation and general informative material is presented in notes in smaller italic type, and does not constitute a normative element.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

BSI Standards Bazaar

1 Scope

This Part of BS 919 specifies requirements for the following types of gauges for checking ISO metric screw threads of nominal diameter 1 mm and larger made in accordance with BS 3643.

a) Screw gauges:

- 1) GO and NOT GO screw plug gauges;
- 2) GO and NOT GO screw ring gauges, solid type;
- 3) GO and NOT GO screw ring gauges, adjustable type;
- 4) GO and NOT GO screw calliper gauges, adjustable type.

b) GO and NOT GO plain plug gauges and GO and NOT GO calliper and ring gauges for the crest diameters of product threads.

c) Setting plugs for GO and NOT GO adjustable screw ring gauges and for GO and NOT GO screw calliper gauges:

- 1) double length;
- 2) single length.

d) GO and NOT GO check plug gauges for solid type GO and NOT GO screw ring gauges.

e) NOT GO wear check plug gauges for solid type GO and NOT GO screw ring gauges.

Annex A provides guidance on the functions and methods of use of the various types of gauges and Annex B recommends a procedure for the settlement of disputes arising when borderline products are inspected. Guidance on the hardness of gauges is given in Annex C, and Annex D provides information on the reference temperature.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 1044-1:1964, *Specification for gauge blanks – Part 1: Plug, ring and calliper gauges*

3 Terms and definitions and symbols

3.1 Terms and definitions

For the purposes of this part of BS 919, the terms and definitions given in BS 6528:1984 and the following apply.

3.1.1 basic profile

theoretical profile of a screw thread in an axial plane defined by theoretical dimensions and angles common to internal and external threads

NOTE This definition is repeated from BS 6528:1984 for the convenience of users of this standard.

3.1 Symbols

For the purposes of this part of BS 919, the following symbols apply.

b	maximum width of clearance groove
D	basic major diameter of internal thread (nominal diameter)
D_1	basic minor diameter of internal thread
D_2	basic pitch diameter of internal thread
d	basic major diameter of external thread (nominal diameter)
d_1	basic minor diameter of external thread
d_2	basic pitch diameter of external thread
d_3	minor diameter of external thread
H	height of fundamental triangle
P	pitch
r	root radius of external thread
T	tolerance
T_{D1}	tolerance for D_1
T_{D2}	tolerance for D_2
T_{d1}	tolerance for d_1
T_{d2}	tolerance for d_2

4 General design features and tolerances of gauges

4.1 Dimensions of gauges

The general dimensions of gauges shall conform to BS 1044-1, subject to any special requirements in 4.2 to 4.7. For normal purposes, the length of thread shall be determined by the length of the gauge blank.

4.2 Thread profiles of screw gauges

NOTE The various types of screw gauges have full flank or truncated thread profiles.

Nominal full flank profiles for screw plug, ring and calliper gauges shall be as shown in Figure 1a) and Figure 1b). The corresponding truncated thread profiles shall be as shown in Figure 2a) and Figure 2b).

The maximum widths b_1 and b_2 of the clearance grooves shall be as shown on the full flank profiles in Figure 1a) and Figure 1b) and specified in Table 1. No clearance grooves need be provided on full flank profiles provided the flanks are continued to clear width b_1 or b_2 as appropriate, but the root shall be radiused as shown. Maximum values for r_1 and r_2 shall be as specified in Table 1. For fine pitches (below 1.25 mm on ring gauges and 0.6 mm on plug gauges) it is not practicable to provide separate clearance grooves.

The forms of the clearance grooves and crest truncations on gauges with truncated profiles shall be as shown in Figure 2a) and Figure 2b). F_1 , F_2 and b_3 shall be as specified in Table 2. The form of root clearance is optional but it may not be displaced in relation to the centre of the profile by more than $S = 0.05P$ (see Note to Table 2).

Alternative forms of GO and NOT GO calliper gauge anvils for product threads having fine pitches shall be as shown in Figure 3 and Figure 4, respectively.

4.3 Flank angle and pitch tolerances on screw gauges

The flank angle tolerances for gauges having full flank threads and truncated threads respectively shall be as specified in Table 3.

The pitch tolerances for gauges shall be as specified in Table 4.

4.4 Disposition of effective diameter tolerance zones of gauges

The positions of the effective diameter tolerance zones of the GO and NOT GO screw gauges, setting plugs and various check plugs shall be as shown in relation to the effective diameter limits of the product threads in Figure 5 to Figure 8.

4.5 Diametral tolerances on screw gauges

Limits of tolerance (upper and lower deviations) for the effective diameters of the various types of gauges shall be as specified in Table 5 to Table 7.

Limits of tolerance for the crest diameters of the various types of gauges shall be as specified in Table 8 to Table 10.

4.6 Tolerances on plain gauges

4.6.1 Limits of tolerance (upper and lower deviations) for GO and NOT GO plain calliper and ring gauges shall be as specified in Table 11 and, for GO and NOT GO plain plug gauges, as specified in Table 12.

4.6.2 Limits of tolerance for GO and NOT GO plain check plugs for the minor diameters of solid GO and NOT GO screw ring gauges shall be as specified in Table 8. These tolerances shall be applied to the appropriate deviations for the minor diameter of the screw ring gauge.

4.7 Determination of gauge limits

The screw gauge limits can be calculated using the information summarized in Table 13 to Table 17 inclusive.

4.8 Feather edges

To avoid feather edges on screw plug and ring gauges and setting plugs, the partial thread at both ends of the gauge shall be removed to a blunt start (see Figure 0), except for:

- a) screw plug gauges and setting plugs in sizes below 4 mm and/or with external core centres;
- b) screw ring gauges of 12 mm nominal size and smaller or with pitches of 1.25 mm and finer, and all screw plug gauges and setting plugs with pitches of 1 mm and finer for which a 60° chamfer from the axis of the gauge is permitted in lieu of the removal of the partial thread.

Not more than one complete turn of the thread shall be removed to the point where the full thread form is obtained.

On double length setting plugs with pitches of 1 mm and coarser, the feather edge shall be completely removed where the truncated portion meets the full form portion.

4.9 Dirt clearance grooves

When specified by the purchaser, a screw plug gauge shall have a dirt clearance groove cut axially to the thread to a depth slightly below the root of the thread. This groove shall be cut at the position where the thread commences its full section as described in 4.8.

4.10 Removal of sharp edges

All sharp edges on the gauging portions and handles shall be removed.

5 Marking

Each gauge shall be plainly and permanently marked with the minimum marking essential for positive identification.

Unless otherwise specified by the purchaser, each gauge shall be marked with the following particulars:

- a) the designation of the corresponding product thread in accordance with BS 3643;

NOTE In the case of left-hand screw gauges, the symbol L.H. follows the designation.

- b) the size of the gauge, i.e. the limiting size of the product thread which the gauge is intended to control;
- c) “GO” or “NOT GO”, as applicable;
- d) “SET”, in the case of setting plugs for adjustable screw ring or calliper gauges;
- e) “CHECK”, in the case of check plugs for solid screw rings or calliper gauges;
- f) the manufacturer’s name or trade mark;
- g) a serial number if required for recording purposes.

The marking of plug gauges of the renewable end type shall, where practicable, appear on the face of the gauging member in addition to the handle.

Examples of marking for gauges

Class of gauge	Marking
GO screw plug	M8 × 1-6H, GO 7.350, X Co. No. 35
NOT GO screw plug	M8 × 1-6H, NOT GO 7.500, X Co. No. 3
Plain plugs for minor diameter	M8 × 1-6H, GO 6.917, X Co. No. 9
	M8 × 1-6H, NOT GO 7.153, X Co. No. 15
GO screw ring or calliper	M10 × 1.5-6g, GO 8.994, X Co. No. 56
NOT GO screw ring or calliper	M10 × 1.5-6g, NOT GO 8.862, X Co. No. 75
Plain callipers for major diameter	M10 × 1.5-6g, GO 9.968, X Co. No. 43
	M10 × 1.5-6g, NOT GO 9.732, X Co. No. 64
GO setting plug	M10 × 1.5-6g, GO SET 8.994, X Co. No. 24
NOT GO check plug	M10 × 1.5-6g, NOT GO CHECK 8.862, X Co. No. 97

Figure 0 “Blunt start” at end of thread on gauge

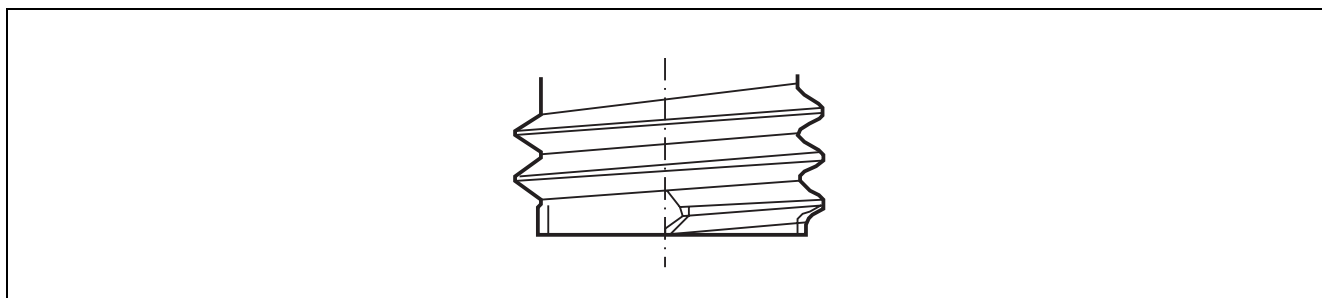
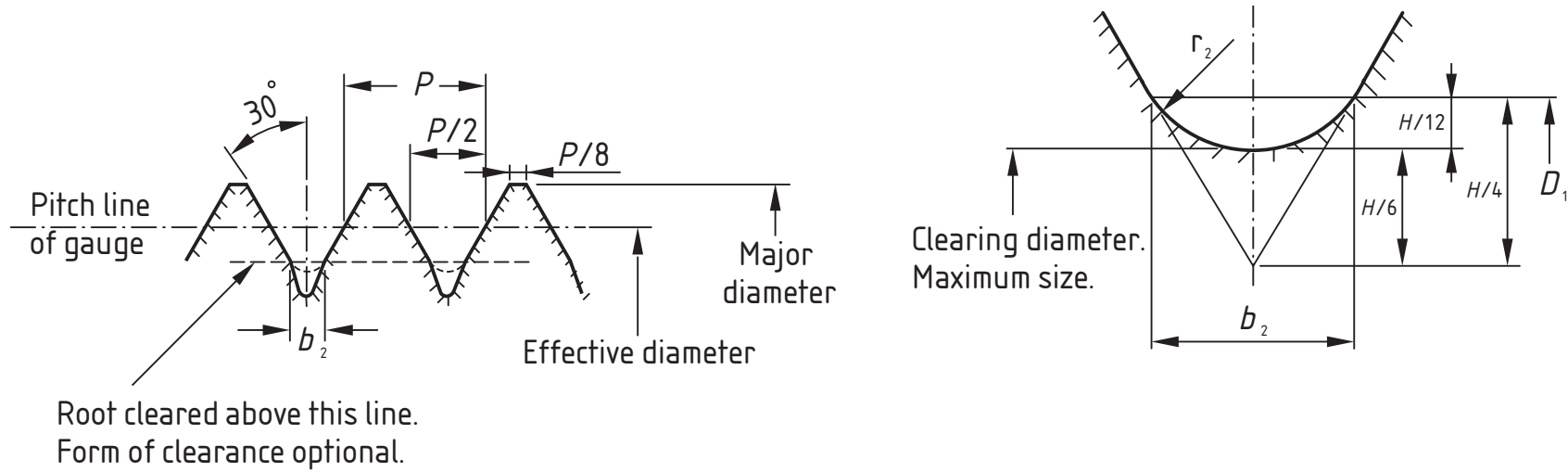
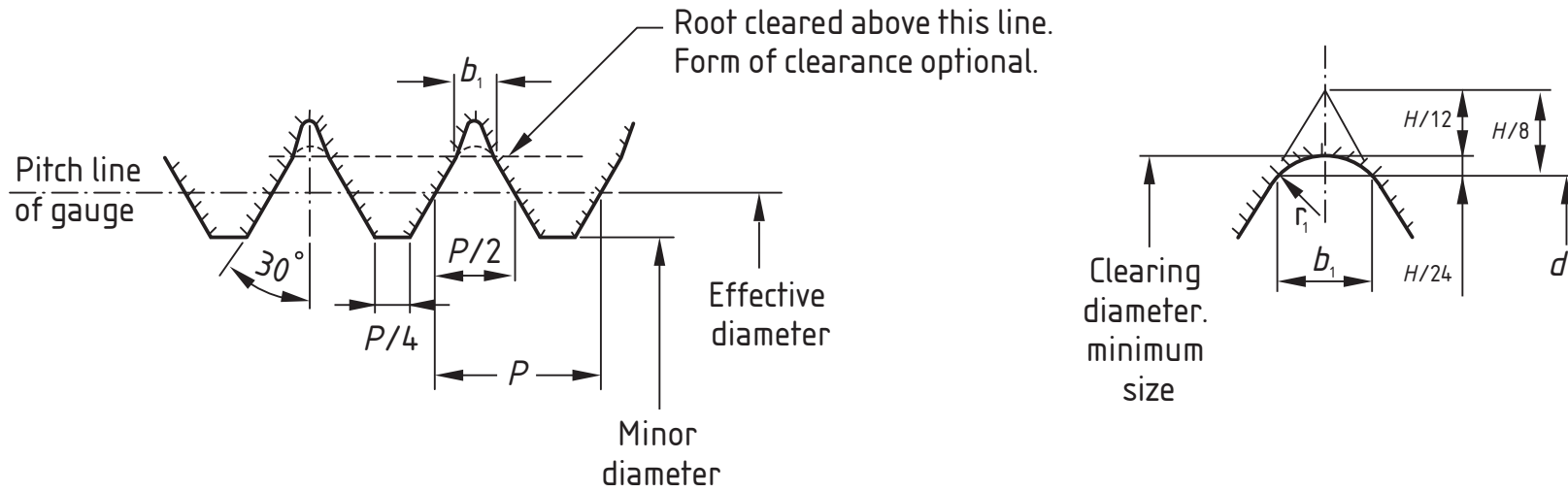


Figure 1 Thread profiles for screw plug, ring and calliper gauges having complete flanks



a) Full flank thread on GO plug gauge (Form of clearance for pitches below 0.6 mm; optional for coarser pitches. $r_2 = 0.144P$; clearing diameter max = $D_1 - 0.144P$)



b) Full flank thread on GO ring or calliper gauge (Form of clearance for pitches below 1.25 mm; optional for coarser pitches. $r_1 = 0.072P$; clearing diameter max = $d + 0.072P$)

Table 1 Dimensions of root clearances of GO screw gauges
(see Figure 1)

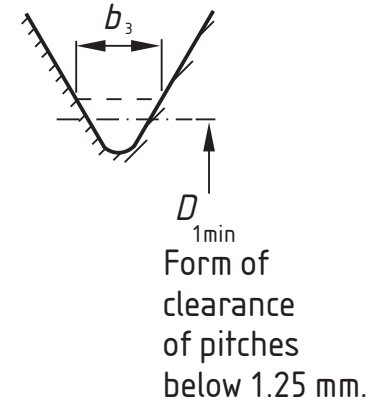
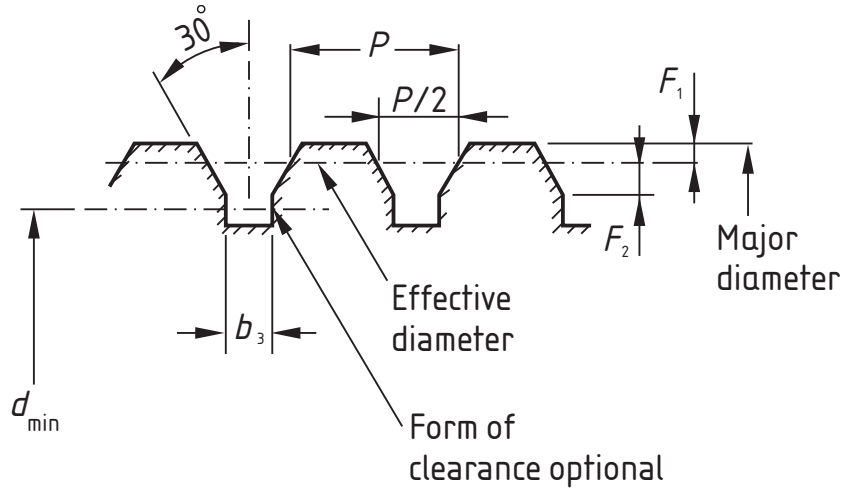
unit = mm

1	2	3	4	5
Pitch (P)	b_1 max. ($0.125P$)	r_1 max. ($0.072P$)	b_2 max. ($0.25P$)	r_2 max. ($0.144P$)
0.2	A)	0.014	B)	0.029
0.25	A)	0.018	B)	0.036
0.3	A)	0.022	B)	0.043
0.35	A)	0.025	B)	0.050
0.4	A)	0.029	B)	0.058
0.45	A)	0.032	B)	0.065
0.5	A)	0.036	B)	0.072
0.6	A)	0.043	0.15	0.086
0.7	A)	0.050	0.18	0.10
0.75	A)	0.054	0.19	0.11
0.8	A)	0.058	0.20	0.12
1.0	A)	0.072	0.25	0.14
1.25	0.16	0.09	0.31	0.18
1.5	0.19	0.11	0.38	0.22
1.75	0.22	0.13	0.44	0.25
2.0	0.25	0.14	0.50	0.29
2.5	0.31	0.18	0.61	0.36
3.0	0.38	0.22	0.75	0.43
3.5	0.44	0.25	0.88	0.50
4.0	0.5	0.29	1.0	0.58
4.5	0.55	0.32	1.1	0.65
5.0	0.6	0.36	1.25	0.72
5.5	0.7	0.40	1.4	0.79
6.0	0.8	0.43	1.5	0.86

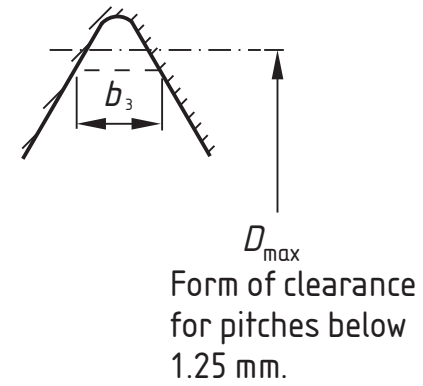
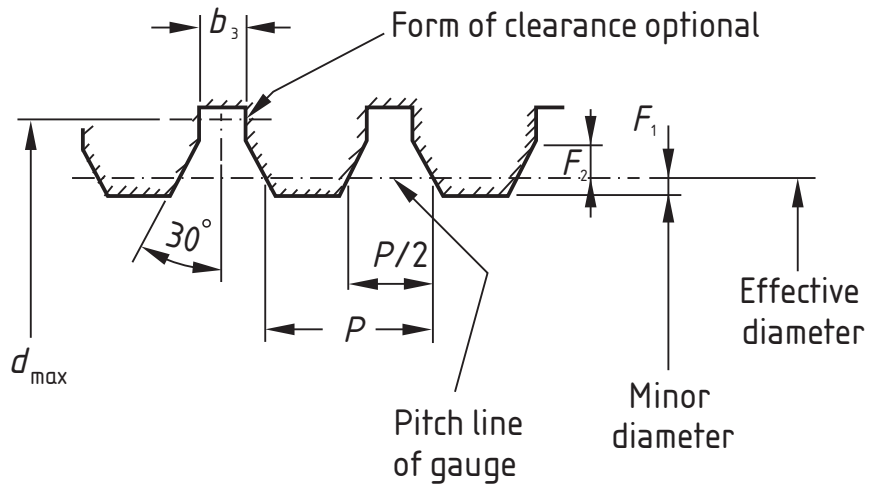
A) Without clearance groove. The flanks have to be continued to clear width b_1 [see Figure 1b)] and the root has to be radiused (r_1 max., see Column 3).

B) Without clearance groove. The flanks have to be continued to clear width b_2 [see Figure 1a)] and the root has to be radiused (r_2 max., see Column 5).

Figure 2 Thread profiles for screw plug, ring and calliper threads of truncated form



a) Truncated thread on NOT GO plug gauge



b) Truncated thread on NOT GO ring or calliper gauge

Table 2 Dimensions of root clearances of NOT GO screw gauges (see Figure 2)

unit = mm

1	2	3	4	5	6	7
Pitch (P)	F_1 ($0.1P$)	F_2			b_2	
		$0.2P$	$0.15P$	$0.1P$	Nominal size	Deviation (\pm)
0.2	0.02					
0.25	0.025					
0.3	0.03					
0.35	0.035					
0.4	0.04					
0.45	0.045					
0.5	0.05					
0.6	0.06					
0.7	0.07					
0.75	0.075					
0.8	0.08					
1	0.10					
1.25	0.125	0.25			0.3	0.04
1.5	0.15	0.3			0.4	0.04
1.75	0.175	0.35			0.45	0.05
2	0.2	0.4			0.5	0.05
2.5	0.25		0.375		0.8	0.05
3	0.3		0.45		1.0	0.08
3.5	0.35		0.525		1.1	0.08
4	0.4		0.6		1.3	0.1
4.5	0.45			0.45	1.7	0.1
5	0.5			0.5	1.9	0.1
5.5	0.55			0.55	2.1	0.1
6	0.6			0.6	2.3	0.1

NOTE The form of clearance b_2 is optional; the clearance may be displaced in relation to the centre of the profile of the thread by an amount S which is equal to the permissible deviation of b_2 (Table 2, Column 7). The deviation for b_2 can be increased if the actual displacement is smaller than S by an amount which is double the difference between the actual displacement and S .

Figure 3 **Alternative form of GO calliper gauge anvil for product threads having pitches finer than 0.5 mm**

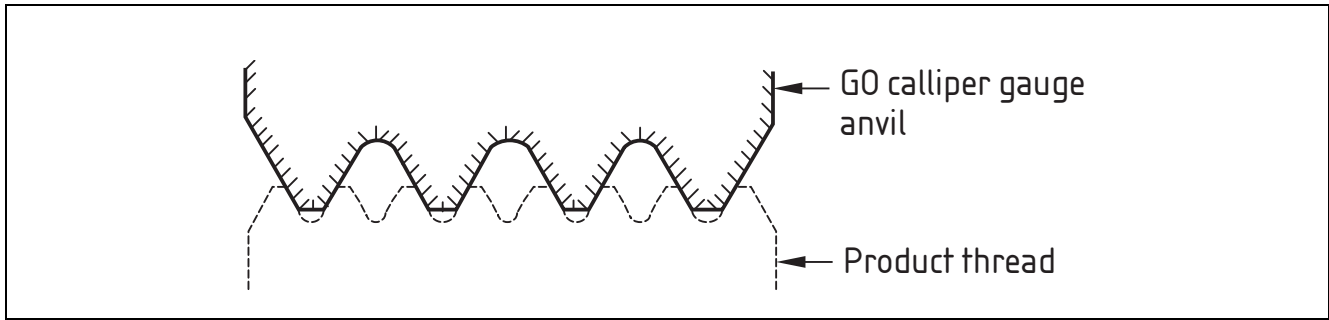
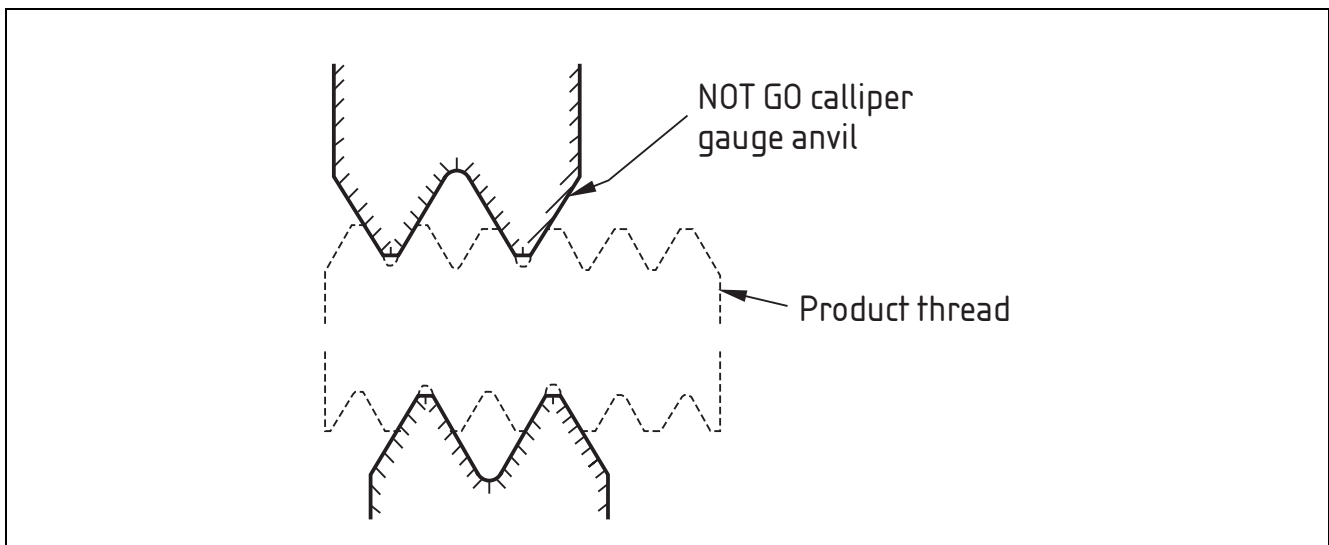


Figure 4 **Alternative form of NOT GO calliper gauge anvil for product threads having pitches finer than 1.0 mm**



BSI

Table 3 Flank angle tolerances

1	2	3
Pitch (<i>P</i>)	Flank angle tolerances	
mm	Gauges with full form profiles. Figure 1 minutes ±	Gauges with truncated profiles. Figure 2 minutes ±
0.2	60	60
0.25	48	48
0.3	40	40
0.35	35	35
0.4	31	31
0.45	26	26
0.5	25	25
0.6	21	21
0.7	18	18
0.75	17	17
0.8	16	16
1	16	16
1.25	13	16
1.5	12	16
1.75	11	16
2	10	14
2.5	10	14
3	9	13
3.5	9	12
4	8	11
4.5	8	11
5	8	11
5.5	8	10
6	8	10

Table 4 Pitch tolerances

Unit = mm × 0.001 (µm)

1	2	3
Thread lengths up to 32 mm	Thread lengths over 32 mm up to 50 mm	Thread lengths over 50 mm up to 80 mm
5	6	7

NOTE The pitch tolerances are the maximum permissible errors between any two threads irrespective of sign except in the case of a double length setting plug, where the thread length used when determining the pitch tolerance is one-half the overall thread length of the setting plug, and the pitch tolerance is the maximum permissible error between any two threads spaced apart by not more than one-half the overall thread length of the setting plug.

Figure 5 Effective diameter tolerance zones of gauges for external product threads having pitch diameter tolerances above 80 μm and up to 125 μm

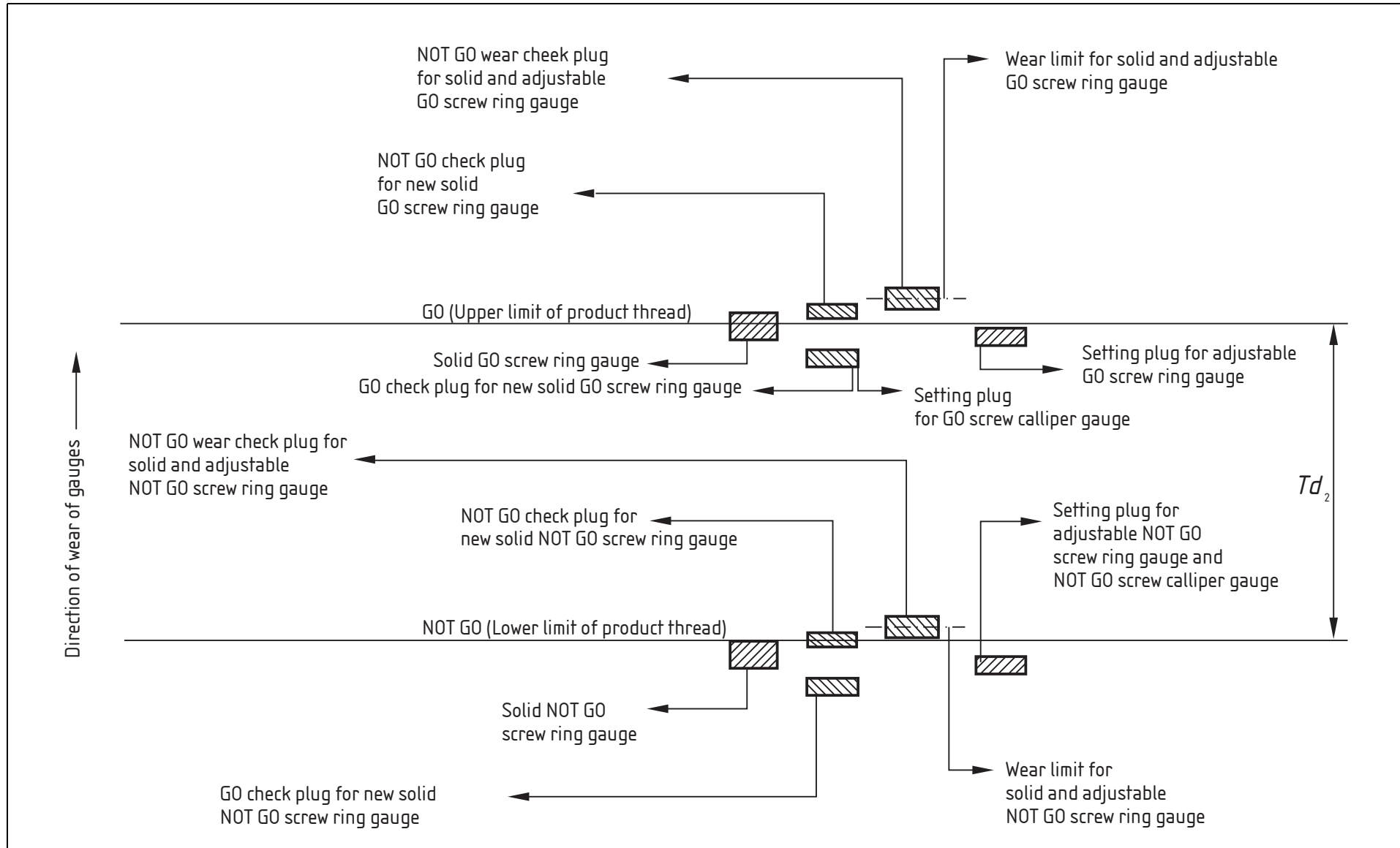


Figure 6 Effective diameter tolerance zones of gauges for external product threads having pitch diameter tolerances above 200 μm and up to 315 μm

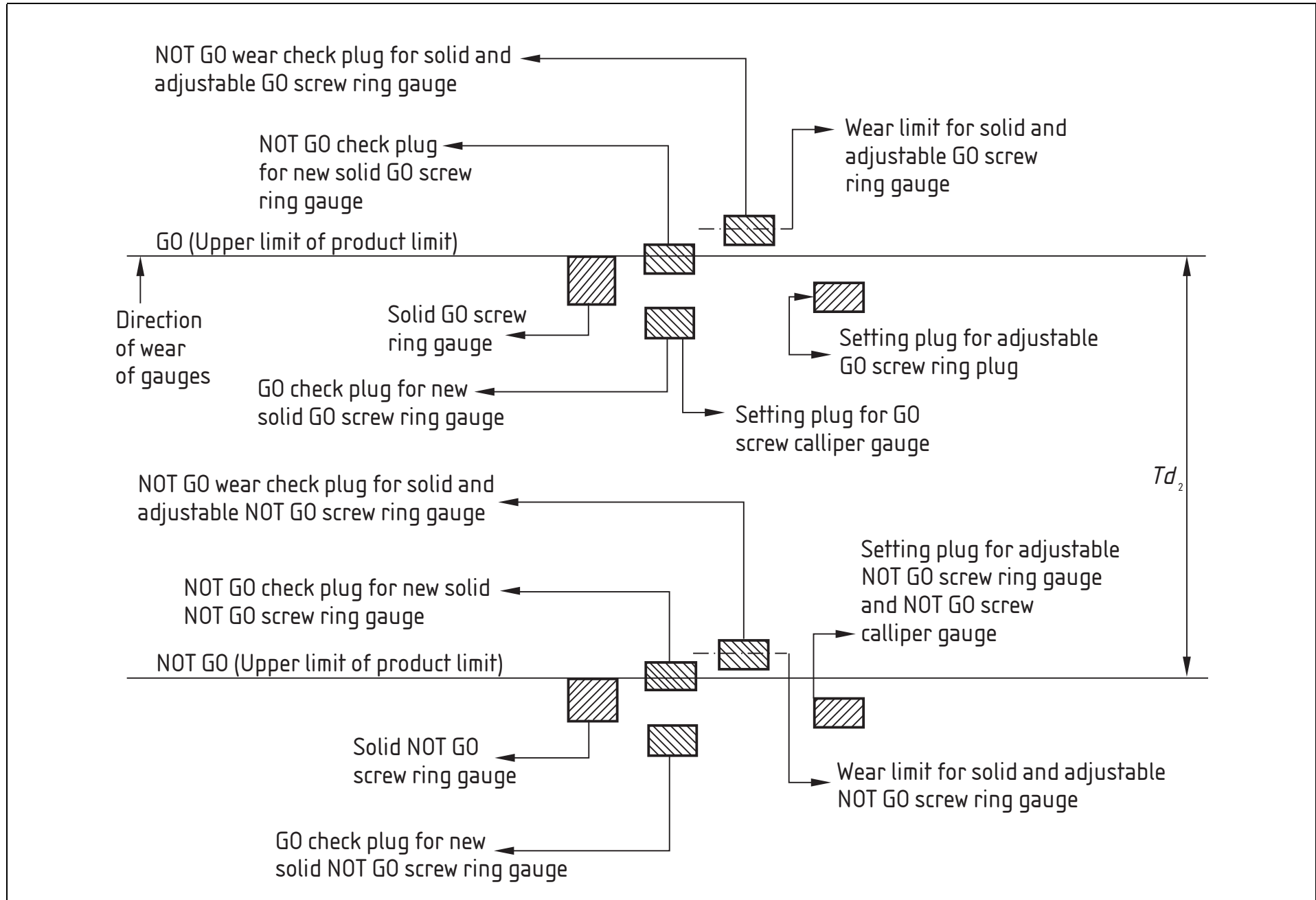


Figure 7 **Effective diameter tolerance zones of gauges for internal product threads having pitch diameter tolerances above 80 μm and up to 125 μm**

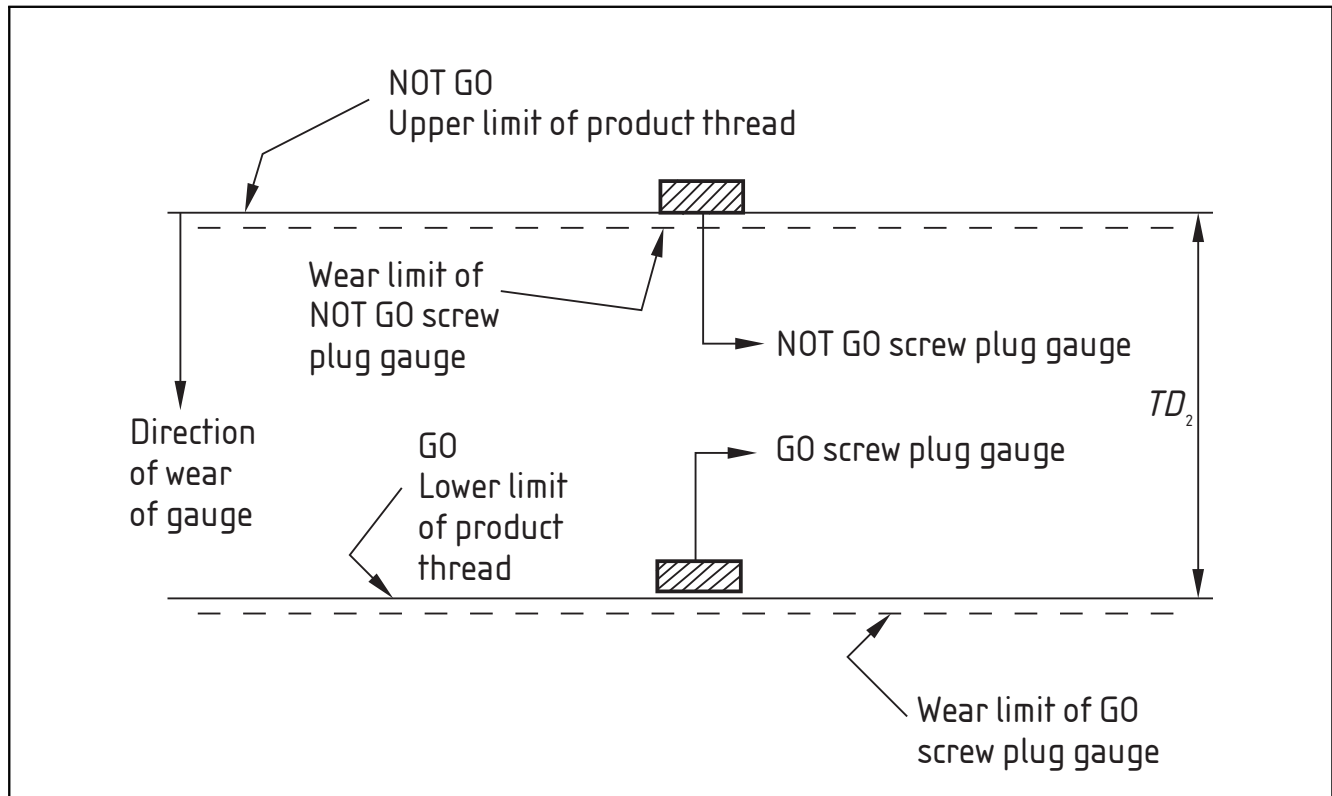


Figure 8 Effective diameter tolerance zones of gauges for internal product threads having pitch diameter tolerances above 200 μm and up to 315 μm

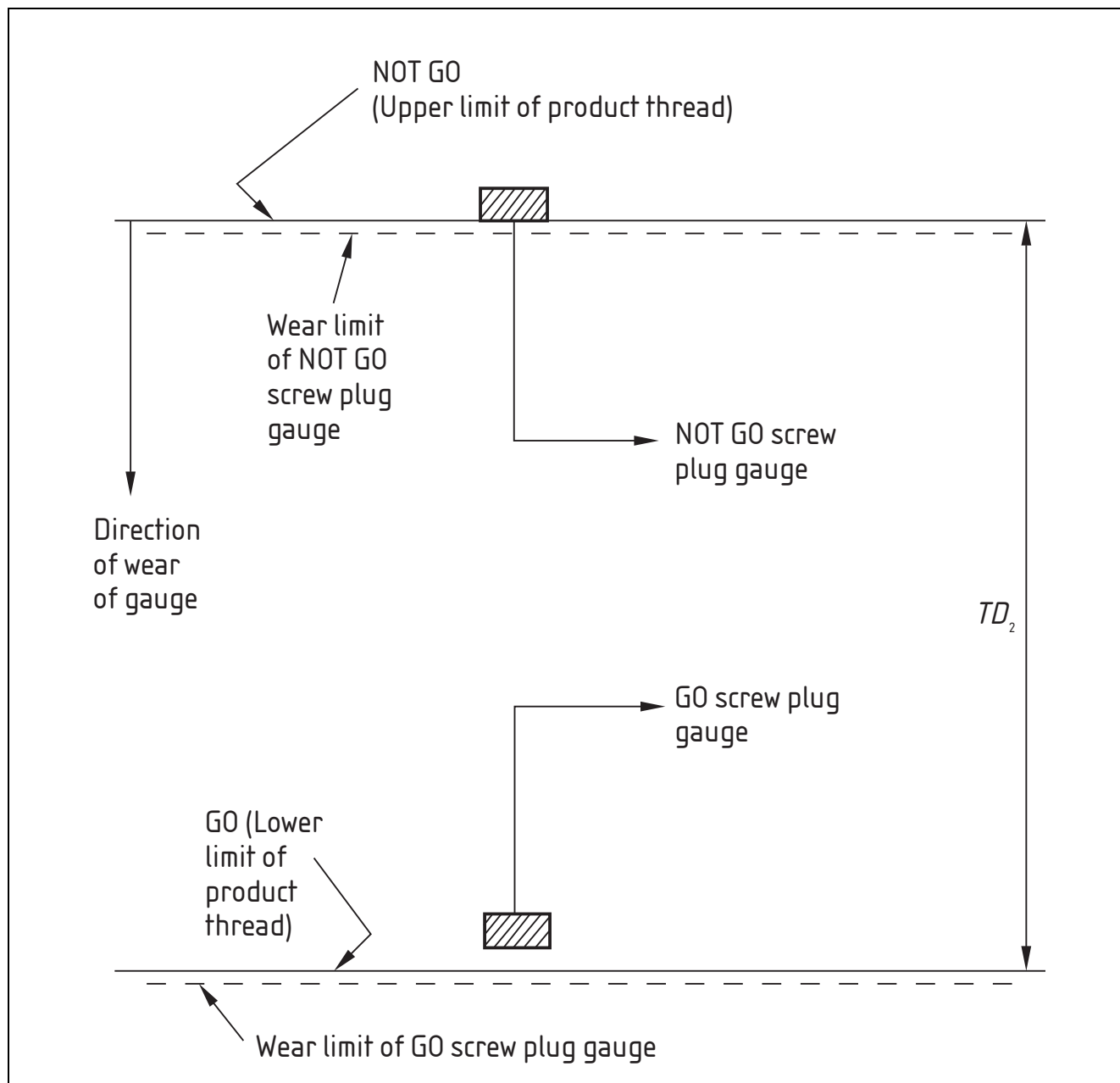


Table 5 External product thread deviations for effective diameters of GO screw limit gauges and their associated check plugs and setting plugs

Unit = mm × 0.001 (µm)

1	2	3	4	5	6	7	8	9	10	11	12
Effective diameter tolerance on external product thread Td_2		New solid GO screw ring gauge		GO check plug for ring gauge and setting plug for calliper gauge		NOT GO check plug		NOT GO wear check plug		Setting plug for adjustable GO screw ring gauge	
		Effective diameter deviations from maximum effective diameter limit of external product thread									
Above	Up to	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower
(24)	50	+8	0	-3	-9	+11	+5	+16	+10	+4	-2
50	80	+7	-3	-6.5	13.5	+10.5	+3.5	+16.5	+9.5	+2	-5
80	125	+5	-9	-13	-21	+9.5	+0.5	+17.5	+8.5	-2	-10
125	200	+1	-17	-21.5	-30.5	+6.5	-4.5	+18.5	+7.5	-8	-17
200	315	-0.5	23.5	-28	-40	+6.5	-7.5	+20.5	+6.5	-12	-24
315	500	-5	-35	-39.5	-54.5	+4	-14	+22	+4	-20	-35
500	670	-9	-47	-52	-70	+2	-20	+24	+2	-28	-46

Table 6 External product thread deviations for effective diameters of NOT GO screw limit gauges and their associated check plugs and setting plugs

Unit = mm × 0.001 (µm)

1	2	3	4	5	6	7	8	9	10	11	12
Effective diameter tolerance on external product thread Td_2		Effective diameter deviations from minimum pitch diameter limit of external product thread								Setting plug for adjustable NOT GO screw ring gauge and NOT GO screw calliper gauge	
		New solid NOT GO screw ring gauge		GO check plug for ring gauge		NOT GO check plug		NOT GO wear check plug ^{A)}			
Above	Up to	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower
(24)	50	0	-8	-11	-17	+3	-3	+6	0	-4	-10
50	80	0	-10	-13.5	-20.5	+3.5	-3.5	+7.5	+0.5	-5	-12
80	125	0	-14	-18	-26	+4.5	-4.5	+9.5	+0.5	-7	-15
125	200	0	-18	-22.5	-31.5	+5.5	-5.5	+11.5	+0.5	-9	-18
200	315	0	-23	-27.5	-39.5	+7	-7	+15	+1	-11.5	-23.5
315	500	0	-30	-34.5	-49.5	+9	-9	+19	+1	-15	-30
500	670	0	-38	-43	-61	+11	-11	+23	+1	-19	-37

^{A)} The use of a NOT GO wear check plug for a NOT GO screw ring gauge is not recommended in this British Standard. The limit of wear should be controlled by the use of the NOT GO check plug (Columns 7 and 8).

Table 7 External product thread deviations for effective diameters of NOT GO screw limit gauges and their associated check plugs and setting plugs

Unit = mm × 0.001 (μm)

1	2	3	4	5	6	7	8
Effective diameter tolerance on internal product thread Td_2	GO screw plug gauge				NOT GO screw plug gauge		
	New gauge		Worn gauge		New gauge		Worn gauge
	Deviations from minimum effective diameter limit of internal product thread				Deviations from maximum effective diameter limit of internal product thread		
Above	Up to	Upper	Lower	Lower	Upper	Lower	Lower
(24)	50	+3	-3	-8	+6	0	-3
50	80	+5.5	-1.5	-7.5	+7	0	-4
80	125	+10.5	+1.5	-6.5	+9	0	-5
125	200	+17.5	+6.5	-5.5	+11	0	-6
200	315	+23	+9	-5	+14	0	-8
315	500	+33	+15	-3	+18	0	-10
500	670	+43	+21	-1	+22	0	-12

Table 8 Deviations for minor diameters of new GO and NOT GO screw ring gauges, major diameters of new GO and NOT GO screw plug gauges, and plain check plugs for new screw ring gauges

Unit = mm × 0.001 (µm)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Effective diameter tolerance (see Note 1)		New solid GO screw ring gauge		Adjustable GO screw ring gauge		New solid NOT GO screw ring gauge. Adjustable NOT GO screw ring gauge		Plain check plugs for minor diameters of GO and NOT GO screw ring gauges		New GO screw plug gauge		New NOT GO screw plug gauge	
		Minor diameter deviations from diameter A ^{A)}		Minor diameter deviations from diameter A ^{A)}		Minor diameter deviations from diameter B ^{B)}		Tolerance		Major diameter deviations from diameter C ^{E)}		Major diameter deviations from diameter D ^{F)}	
Above	Up to	Upper	Lower	Upper	Lower	Upper	Lower	GO ^{C)}	NOT GO ^{D)}	Upper	Lower	Upper	Lower
(24)	50	+4	-4	+8	0	0	-16	-2	+2	+6	-6	+9	-3
	50	+5	-5	+7	-3	0	-20	-2	+2	+9	-5	+10.5	-3.5
	80	+7	-7	-5	-9	0	-28	-2	+2	+15	-3	+13.5	-4.5
	125	+9	-9	+1	-17	0	-36	-2	+2	+23	+1	+16.5	-5.5
	200	+11.5	-11.5	-0.5	-23.5	0	-46	-3	+3	+30	+2	+21	-7
	315	+15	-15	-5	-35	0	-60	-4	+4	+42	+6	+27	-9
	500	+19	-19	-9	-47	0	-76	-5	+5	+54	+10	+33	-11

NOTE 1 Effective diameter tolerance Td_2 or TD_2 on external or internal product threads respectively. Td_2 for Columns 3 to 10; TD_2 for Columns 11 to 14.

NOTE 2 GO screw calliper gauge anvils. The distance from the pitch line to the crests (minor diameter) is $(H/4 \pm 5 \mu\text{m})$, i.e. $(0.216 51P \pm 5 \mu\text{m})$.

NOT GO screw calliper gauge anvils. The distance from the pitch line to the crests (minor diameter) is $(F_1 \pm 5 \text{ mm})$. Values of F_1 are given in Table 2.

A) Diameter A = basic minor diameter of product thread minus fundamental deviation.

B) Diameter B = minimum effective diameter of external product thread $-2F_1$ (see Figure 2).

C) Apply tolerance to minimum minor diameter of screw ring gauge (Column 4, 6 or 8).

D) Apply tolerance to maximum minor diameter of screw ring gauge (Column 3, 5 or 7).

E) Diameter C = basic major diameter of product thread + fundamental deviation.

F) Diameter D = maximum effective diameter of internal product thread $+2F_1$ (see Figure 2).

Table 9 Deviations for major diameters of screw check plugs and setting plugs for GO screw ring and calliper gauges

Unit = mm × 0.001 (µm)

1	2	3	4	5	6	7	8	9	10	11	12
Effective diameter tolerance on external product thread Td_2		GO screw check plug for new solid GO screw ring gauge and setting plug for GO screw calliper gauge		NOT GO screw check plug for new solid GO screw ring gauge		NOT GO screw wear check plug for solid GO screw ring gauge		Setting plugs for adjustable GO screw ring gauges			
		Major diameter deviations from diameter $A^A)$		Major diameter deviations from diameter $B^B)$				Full form portion of double length plug		Truncated portion of double length plug	
Above	Up to	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower
(24)	50	+6	-6	+12	+4	+17	+9	+6	-6	+5	-3
50	80	+7	-7	+12	+2	+18	+8	+7	-7	+3.5	-6.5
80	125	+9	-9	+12	-2	+20	+6	+9	-9	+0.5	-13.5
125	200	+11	-11	+10	-8	+22	+4	+11	-11	-4.5	-22.5
200	315	+14	-14	+11	-12	+25	+2	+14	-14	-7.5	-30.5
315	500	+18	-18	+10	-20	+28	-2	+18	-18	-14	-44
500	670	+22	-22	+10	-28	+32	-6	+22	-22	-20	-58

A) Diameter A maximum major diameter limit of external product thread.B) Diameter B maximum effective diameter limit of external product thread + $2F_1$ (see Figure 2).

Table 10 Deviations for major diameters of screw check plugs and setting plugs for NOT GO screw ring and calliper gauges

Unit = mm × 0.001 (µm)

1	2	3	4	5	6	7	8	9	10	11	12
Effective diameter tolerance on external product thread Td_2		GO screw check plug for new solid NOT GO screw ring gauge		NOT GO screw check plug for new solid NOT GO screw ring gauge		NOT GO screw wear check plug for solid NOT GO screw ring gauge		Setting plugs for adjustable NOT GO screw ring gauges and NOT GO screw calliper gauges			
		Major diameter deviations from diameter B^A		Major diameter deviations from diameter B^A			Major diameter deviations from diameter B^A		Full form portion of double length setting plug for adjustable screw ring gauges. Setting plug for screw calliper gauges		Truncated portion of double length plug for adjustable screw ring gauges
Above	Up to	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower
(24)	50	+6	-6	+6	-6	+9	-3	+2	-10	-1	-13
50	80	+7	-7	+7	-7	+11	-3	+2	-12	-1.5	-15.5
80	125	+9	-9	+9	-9	+14	-4	+2	-16	-2.5	-20.5
125	200	+11	-11	+11	-11	+17	-5	+2	-20	-3.5	-25.5
200	315	+14	-14	+14	-14	+22	-6	+2.5	-25.5	-4.5	-32.5
315	500	+18	-18	+18	-18	+28	-8	+3	-33	-6	-42
500	670	+22	-22	+22	-22	+34	-10	+3	-41	-8	-52

A) Diameter B = maximum major diameter limit of external product thread – pitch (effective) diameter tolerance Td_2 (see Columns 1 and 2).

B) Diameter C = minimum effective diameter limit of external product thread + $4F_1$ (see Table 2).

Table 11 External product thread deviations and allowable wear for GO and NOT GO plain calliper and ring gauges

Unit = mm × 0.001 (µm)

1	2	3	4	5	6	7
Major diameter tolerance on external product thread Td		GO plain calliper or ring gauge			NOT GO plain calliper or ring gauge	
		New gauge		Worn gauge	New gauge	
		Deviations from maximum major diameter limit of product thread			Deviations from minimum major diameter limit of product thread	
Above	Up to	Upper	Lower	Upper	Upper	Lower
(36)	85	-4	-12	0	+4	-4
85	140	-15	-25	0	+5	-5
140	335	-50	-46	0	+8	-8
335	850	-39	-69	0	+15	-15
850	950	-39	-81	0	+21	-21

Table 12 Internal product thread deviations and allowable wear for GO and NOT GO plain plug gauges

Unit = mm × 0.001 (µm)

1	2	3	4	5	6	7
Minor diameter tolerance on internal product thread TD_1	GO plain plug gauge				NOT GO plain plug gauge	
	New gauge			Worn gauge	New gauge	
	Deviations from minimum minor diameter limit of product thread				Deviations from maximum minor diameter limit of product thread	
Above	Up to	Upper	Lower	Lower	Upper	Lower
(38)	100	+12	+5	0	+4	-4
100	180	+27	+17	0	+5	-5
180	375	+46	+30	0	+8	-8
375	710	+65	+39	0	+13	-13
710	1 250	+88	+42	0	+23	-23

Table 13 External product thread information for calculation of limits for new solid GO screw ring gauges and their associated check plugs

1	2	3	4	5	6	7	8	9	10	11
Type of gauge	Thread form	Flank angle tolerances	Pitch tolerance	Major diameter		Effective diameter		Minor diameter		Remarks
				Deviations						
				Upper	Lower	Upper	Lower	Upper	Lower	
Solid GO screw ring gauge	Figure 1b)	Table 3 Column 2	Table 4	Cleared as shown in Figure 1b) See Table 1, Columns 2 and 3		Table 5 Column 3	Table 5 Column 4	Table 8 Column 3	Table 8 Column 4	The deviations specified in Columns 5 to 10 are for use only when the screw ring gauge is inspected by direct measurement
GO screw check plug for new solid GO screw ring gauge	Figure 1a)	Table 3 Column 2	Table 4	Table 9 Column 3	Table 9 Column 4	Table 5 Column 5	Table 5 Column 6	Cleared as shown in Figure 1a) See Table 1, Columns 4 and 5		
NOT GO screw check plug for new solid GO screw ring gauge	Figure 2a)	Table 3 Column 3	Table 4	Table 9 Column 5	Table 9 Column 6	Table 5 Column 7	Table 5 Column 8	Cleared as shown in Figure 2a) See Table 2, Columns 6 and 7		
Wear check plug for solid GO screw ring gauge	Figure 2a)	Table 3 Column 3	Table 4	Table 9 Column 7	Table 9 Column 8	Table 5 Column 9	Table 5 Column 10	Cleared as shown in Figure 2a) See Table 2, Columns 6 and 7		

NOTE GO and NOT GO plain check plugs may be used to check the minor diameter of the solid GO screw ring gauge. (See 4.6.2 and Table 8.)

Table 14 External product thread information for calculation of limits for adjustable GO screw ring and calliper gauges and their associated setting plugs

1	2	3	4	5	6	7	8	9	10	11
Type of gauge	Thread form	Flank angle tolerances	Pitch tolerance	Major diameter		Effective diameter		Minor diameter		Remarks
				Deviations						
				Upper	Lower	Upper	Lower	Upper	Lower	
Adjustable GO screw ring gauge	Figure 1b)	Table 3 Column 2	Table 4	Cleared as shown in Figure 1b) See Table 1, Columns 2 and 3		—	—	Table 8 Column 5	Table 8 Column 6	Adjusted to size by means of double length setting plug
Setting plug (double length) for adjustable GO screw ring gauge	Figure 1a)	Table 3 Column 2	Table 4	Table 9 Column 9	Table 9 Column 10	Table 5 Column 11	Table 5 Column 12	Cleared as shown in Figure 1a) See Table 1, Columns 4 and 5		Full form thread
	See remarks (Column 11)	Table 3 Column 3		Table 9 Column 11	Table 9 Column 12					Truncated thread Crests truncated as Figure 2a). Roots cleared as Figure 1a)
Adjustable GO screw calliper gauge	Figure 1b) See Note 2	Table 3 Column 2	Table 4	Cleared as shown in Figure 1b) See Table 1, Columns 2 and 3		—	—	Table 8, Note	Table 8, Note	Adjusted to size by means of single length setting plug
Setting plug for adjustable GO screw calliper gauge	Figure 1a)	Table 3 Column 2	Table 4	Table 9 Column 3	Table 9 Column 4	Table 5 Column 5	Table 5 Column 6	Cleared as shown in Figure 1a) See Table 1, Columns 4 and 5		

NOTE 1 GO and NOT GO plain check plugs may be used to check the minor diameter of the adjustable GO screw ring gauge. (See 4.6.2 and Table 8.)

NOTE 2 Alternate profiles may be omitted on GO calliper gauges having fine pitches (see Figure 4).

NOTE 3 Wear check plug for adjustable GO screw ring gauge is the same as that for the solid GO screw ring gauge.

Table 15 External product thread information for calculation of limits for new solid NOT GO screw ring gauges and their associated check plugs

1	2	3	4	5	6	7	8	9	10	11
Type of gauge	Thread form	Flank angle tolerances	Pitch tolerance	Major diameter		Effective diameter		Minor diameter		Remarks
				Deviations						
				Upper	Lower	Upper	Lower	Upper	Lower	
Solid NOT GO screw ring gauge	Figure 2b)	Table 3 Column 3	Table 4	Cleared as shown in Figure 2b) See Table 2, Columns 6 and 7		Table 6 Column 3	Table 6 Column 4	Table 8 Column 7	Table 8 Column 8	The deviations specified in Columns 7 to 10 are for use only when the screw ring gauge is inspected by direct measurement
GO screw check plug for new solid NOT GO screw ring gauge	Figure 1a)	Table 3 Column 2	Table 4	Table 10 Column 3	Table 10 Column 4	Table 6 Column 5	Table 6 Column 6	Cleared as shown in Figure 1a) See Table 1, Columns 4 and 5		
NOT GO screw check plug for new solid NOT GO screw ring gauge	Figure 1a)	Table 3 Column 2	Table 4	Table 10 Column 5	Table 10 Column 6	Table 6 Column 7	Table 6 Column 8	Cleared as shown in Figure 1a) See Table 1, Columns 4 and 5		
Wear check plug for solid NOT GO screw ring gauge	Figure 1a)	Table 3 Column 2	Table 4	Table 10 Column 7	Table 10 Column 8	Table 6 Column 9	Table 6 Column 10	Cleared as shown in Figure 1a) See Table 1, Columns 4 and 5		

NOTE GO and NOT GO plain check plugs may be used to check the minor diameter of the solid NOT GO screw ring gauge. (See 4.6.2 and Table 8.)

Table 16 External product thread information for calculation of limits for adjustable NOT GO screw ring and calliper gauges and their associated setting plugs

1	2	3	4	5	6	7	8	9	10	11
Type of gauge	Thread form	Flank angle tolerances	Pitch tolerance	Major diameter		Effective diameter		Minor diameter		Remarks
				Deviations						
				Upper	Lower	Upper	Lower	Upper	Lower	
Adjustable NOT GO screw ring gauge	Figure 2b)	Table 3 Column 3	Table 4	Cleared as shown in Figure 2b) See Table 2, Columns 6 and 7		—	—	Table 8 Column 7	Table 8 Column 8	Adjusted to size by means of double length setting plug
Setting plug (double length) for adjustable NOT GO screw ring gauge	Figure 1a)	Table 3 Column 2	Table 4	Table 10 Column 9	Table 10 Column 10	Table 6 Column 11	Table 6 Column 12	Cleared as shown in Figure 1a) See Table 1, Columns 4 and 5		Full form thread
	See remarks (Column 11)	Table 3 Column 3		Table 10 Column 11	Table 10 Column 12					Truncated thread Crests truncated as Figure 2a) Roots cleared as Figure 1a)
Adjustable NOT GO screw calliper gauge	Figure 2b)	Table 3 Column 3	Table 4	Cleared as shown in Figure 2b) See Table 2, Columns 6 and 7		—	—	Table 8, Note	Table 8, Note	Adjusted to size by means of single length setting plug.
Setting plug for adjustable NOT GO screw calliper gauge	Figure 1a)	Table 3 Column 2	Table 4	Table 10 Column 9	Table 10 Column 10	Table 6 Column 11	Table 6 Column 12	Cleared as shown in Figure 1a) See Table 1, Columns 4 and 5		

NOTE 1 GO and NOT GO plain check plugs may be used to check the minor diameter of the adjustable NOT GO screw ring gauge. (See 4.6.2 and Table 8.)

NOTE 2 The anvil shall contact the product thread on two flanks only, and on gauges having fine pitches these flanks shall be not more than three pitches apart (see Figure 5).

NOTE 3 Wear check plug for adjustable NOT GO screw ring gauge is same as that for solid NOT GO screw ring gauge.

Table 17 Internal product thread information for calculation of limits for GO and NOT GO screw plug gauges

1	2	3	4	5	6	7	8	9	10	11
Type of gauge	Thread form	Flank angle tolerances	Pitch tolerance	Major diameter		Effective diameter		Minor diameter		Remarks
				Deviations						
				Upper	Lower	Upper	Lower	Upper	Lower	
GO screw plug gauge	Figure 1a)	Table 3 Column 2	Table 4	Table 8 Column 11	Table 8 Column 12	Table 7 Column 3	Table 7 Column 4	Cleared as shown in Figure 1a) See Table 1, Columns 4 and 5		
NOT GO screw plug gauge	Figure 2a)	Table 3 Column 3	Table 4	Table 8 Column 13	Table 8 Column 14	Table 7 Column 6	Table 7 Column 7	Cleared as shown in Figure 2a) See Table 2, Columns 6 and 7		

Annex A (informative) **Function and method of use of various gauge types**

A.1 Gauges for internal screw threads

A.1.1 GO screw plug gauge

This gauge checks that the virtual effective diameter and the major diameter of the product thread are not smaller than the minimum limits specified. It does not check the minimum minor diameter of the product thread since, for practical reasons, the root of the plug gauge has to be cleared.

The minor diameter is examined separately by means of a GO plain plug gauge made to the minimum minor diameter of the internal thread. It has to be possible to screw the GO screw plug gauge by hand, without using excessive force, into the complete length of the product thread. This gauge does not take account of any eccentricity between the crest and flank diameters of the internal product thread which might affect assembly. Any such eccentricity can be identified using a GO screw plug gauge provided with a pilot GO plain plug, the diameter of which is made to the minimum minor diameter of the internal thread. This ensures that:

- the effective diameter of the external thread does not exceed the maximum size specified for it; and
- the external thread will assemble with an internal thread having a minimum minor diameter.

Such a gauge does not ensure that the major diameter of the external thread is not too large since, for practical reasons, the root of the ring gauge has to be cleared.

The major diameter is examined separately by means of a GO plain calliper gauge made to the maximum major diameter of the external thread (see **A.2.3**). Here again any eccentricity between the crest and flank diameters of the thread will not be detected by the GO gauge. The amount of any eccentricity present is most readily determined by means of optical projection.

Since its purpose is to ensure, as far as possible, assembly of mating threads, a GO screw gauge should be perfect form and equal to the maximum metal size of the products being inspected.

NOTE When, for reasons of economy, standard gauge blanks are used in the manufacture of the gauge, the length of the gauge might be less than the length of engagement of the product threads. Suitable precautions have therefore to be taken when using the gauge.

A.1.2 NOT GO screw plug gauge

This gauge checks that the maximum effective diameter of the product thread is not too large. Ideally it should not be possible for the gauge to enter the product thread but, as internal threads are often slightly bell-mouthed, it is permissible to allow entry provided that, on withdrawal, disengagement takes place within two full turns of thread. If the product has a length of thread of three turns or less, the gauge should not screw completely through the product thread. The gauge should be applied by hand without using excessive force.

A.1.3 GO and NOT GO plain plug gauges

These gauges check that the minor diameter of the product thread is between its specified limits. The GO plain plug gauge should assemble completely with the product thread. The NOT GO plain plug gauge may enter the product thread by not more than a distance of two full turns of the thread. If the product has a length of thread of three turns or less, the NOT GO gauge should not pass completely through the product thread.

A.2 Gauges for external screw threads

A.2.1 Solid or adjustable GO screw ring gauge

This gauge checks that the virtual effective diameter of the product thread is not too large. The major and minor diameters of the product thread are not checked by this gauge. It should be possible to screw the gauge by hand, without using excessive force, over the complete length of the product thread.

A.2.2 Solid or adjustable NOT GO screw ring gauge

This gauge checks that the effective diameter of the product thread is not too small. Ideally it should not be possible for the product thread to enter the gauge but, as external threads are often slightly tapered at the leading end, it is permissible to allow entry provided that, on withdrawal, disengagement takes place within two full turns of thread. If the product has a length of thread of three turns or less the gauge should not screw completely on to the product thread. The gauge should be applied by hand without using excessive force.

A.2.3 Adjustable GO screw calliper gauge

This gauge is intended to check that the virtual effective diameter of the product thread is not too large. The major and minor diameters of the product thread are not checked by this gauge. The gauge is generally applied to the product thread under its own weight or in accordance with a fixed working load at three positions at least evenly spaced around the circumference of the thread. The gauge should pass completely over the product thread at any of the positions at which it is applied.

A.2.4 Adjustable NOT GO screw calliper gauge

This gauge checks that the effective diameter of the product thread is not too small. It is generally applied to the product thread under its own weight or under a fixed working load at three positions evenly spaced around the circumference of the thread. The gauge should not pass over the product thread except possibly for the first two turns of thread.

A.2.5 GO and NOT GO plain ring or calliper gauges

These gauges check that the major diameter of the product thread is between the specified limits. The gauges are applied to the product thread under the same conditions as the corresponding screw gauges.

A.2.6 Setting plugs (double length) for adjustable GO and NOT GO screw ring gauges

These setting plugs are used to set adjustable screw ring gauges to the specified effective diameters. Each setting plug has a length of thread approximately equal to twice the length of the screw ring gauge to be controlled. The effective diameter of the setting plug is constant throughout, but half the length of the setting plug has a full form thread and the remaining half has a truncated form of thread. The screw ring gauge is adjusted to be a snug fit on the full form portion of the setting plug. The setting plug is then unscrewed by hand, without using excessive force, through the screw ring gauge until the truncated portion of the setting plug completely engages the screw ring gauge. In the latter condition there should be no perceptible shake or play between the setting plug and the screw ring gauge: shake or play is an indication of an unacceptable error of thread form of the adjustable screw ring gauge.

A.2.7 Setting plugs (single length) for adjustable GO and NOT GO screw calliper gauges

These setting plugs are used to set the adjustable screw calliper gauges, and are approximately equal in length to the gauges. The setting plugs for the GO and NOT GO screw calliper gauges have full form threads. A calliper gauge is adjusted so that it just passes over the appropriate setting plug under its own weight or under a fixed working load.

For any given product size, setting plugs for calliper gauges are made slightly smaller in effective diameter than the corresponding setting plugs for adjustable ring gauges. This difference in size permits the results obtained by a calliper gauge to be compared with those obtained with an adjustable ring gauge.

Single-length setting plugs provide little help in detecting any error in thread form caused by wear of the calliper gauge anvils, so it is necessary to examine periodically for such error by other means.

A.2.8 Screw check plugs for new solid GO and NOT GO screw ring gauges

These screw check plugs are used to check that the effective diameters of screw ring gauges are within the specified limits. It should be possible to screw the GO check plug by hand completely through the appropriate screw ring gauge. The NOT GO check plug, when screwed by hand without excessive force, may be allowed to enter both ends of the screw ring gauge provided that, on withdrawal, disengagement takes place within one full turn of thread.

When setting a new calliper gauge with the setting plugs discussed in **A.2.7**, an additional check should be made with the NOT GO check plug for the corresponding new screw ring gauge. The latter check may also be applied to a used calliper gauge to ensure that the thread form is not worn. The wear check plug for the screw ring gauge should not be used as a wear check plug for the calliper gauge.

A.2.9 Plain check plugs for new solid GO and NOT GO screw ring gauges

These check plugs are used to verify that the minor diameter of a screw ring gauge is between the specified limits. A GO check plug should assemble completely with the screw ring gauge. A NOT GO check plug may enter both ends of the screw ring gauge by not more than a distance of one turn.

A.2.10 NOT GO screw wear check plugs for used solid GO and NOT GO screw ring gauges

These wear check plug gauges are used to check that the appropriate solid screw ring gauges have not worn beyond the specified limits of wear.

A wear check plug gauge, when screwed by hand without excessive force, may be allowed to enter both ends of the screw ring gauge provided that, on withdrawal, disengagement takes place within one full turn of thread.

A.3 Check gauges

GO and NOT GO screw check gauges verify that new solid type ring gauges are within limits. They correspond to the GO and NOT GO screw plug gauges used for testing the product but are made to much finer tolerances. They serve as an alternative to direct measurement in the testing of ring gauges above, say, $\frac{1}{4}$ inch in diameter. Check gauges are indispensable for sizes smaller than $\frac{1}{4}$ inch in diameter, which is about the limit of size for direct measurement.

NOT GO effective diameter checks also ensure that solid GO ring gauges are not allowed to remain in service after they have worn by a specific amount.

A.4 Use of screw gauges

It is not necessary for all the different types of screw gauges described in **A.2.1** and **A.2.2** to be used for checking external threads on products, but it is essential for one of the types of GO screw gauges and one of the types of NOT GO screw gauges to be used.

A solid or adjustable GO screw ring gauge should always be used for gauging the maximum effective diameter of an external thread but, to save time in checking, a GO screw calliper gauge may be employed. Gauging with a GO screw calliper gauge should be supplemented by random sampling with a GO screw ring gauge to give greater assurance that parts outside the limits are not accepted. In cases of dispute, gauging with a GO screw ring gauge is decisive.

A GO screw calliper gauge should *not* be used if the manufacturing process is likely to introduce errors in the product thread which this gauge is not certain to detect, e.g. lobing, local pitch errors in milled threads and burrs at the start of the thread. Further, a GO screw calliper gauge is not suitable for checking non-rigid, e.g. thin-walled, parts which would deform when the gauge is applied; in such cases a GO screw ring gauge should be used.

For large screw threads (over about 100 mm diameter) the size to which the GO screw calliper gauge is set may be reduced to compensate for the effect of form errors that may occur in these threads; this reduces the possibility of accepting screw threads that are outside the specified limits.

A NOT GO screw calliper gauge should be used to check the minimum effective diameter of an external thread. The solid or adjustable NOT GO screw ring gauge should only be used to check non-rigid product threads, e.g. those on thin-walled parts which would deform if a NOT GO screw calliper were applied.

Annex B (informative) **Inspection procedures and the settlement of disputes**

B.1 Method of inspection of product threads

The product manufacturer should ask the purchaser which procedure is to be employed for the inspection of the product threads when the order is made.

B.2 Inspection by the manufacturer

Generally speaking, where product threads are also checked at the manufacturer's works, the inspection department can use the same kind of gauges as the workshop. In order to avoid differences between the results obtained by the workshop and the inspection department, the workshop should use new or only slightly worn GO gauges while the inspection department is provided with GO gauges the effective diameter of which lies nearer the permissible wear limit. The reverse procedure should be adopted for NOT GO gauges.

In case of dispute, the product threads are regarded as satisfactory when the gauges with which they are checked and passed conform to the sizes specified for those gauges, including the permissible wear limits. This can be proved by measuring the gauges or by checking them with the check plugs specified.

NOTE In some special cases where it is essential to ensure that threads which could be outside the limits are not accepted and in the case of GO gauges used for sample inspection, gauges which have worn beyond the maximum metal limit of the product thread should not be used.

B.3 Inspection by the purchaser

There are three possible procedures for inspection on behalf of the purchaser by an inspector who is independent of the manufacturing plant concerned.

- a) The inspector may gauge the product threads with the manufacturer's own gauges. In this case, he should check the accuracy of the ring or calliper gauges employed by means of check plugs and setting plugs which belong either to the manufacturer or to the inspector (purchaser). Screw plugs should be checked by direct measurement.
- b) The inspector may use his own gauges made in accordance with this standard for gauging product threads. In this case, the recommendations in **B.2** for checking during manufacture and the procedure for settling disputes apply.

- c) The inspector may use his own inspection gauges for checking the product threads. The disposition of the tolerance zones for these gauges should be such as to ensure that the purchaser does not reject product threads the actual size (e.g. effective diameter) of which lies within the limits specified for the product.

Annex C (informative) Reference temperature

In accordance with BS EN ISO 1, the sizes of both the gauge and the workpiece are related to the standard reference temperature of 20 °C, deviation from which by even a few degrees can cause dimensions to vary by an undesirable percentage of tolerance.

If the workpiece and the gauge have the same thermal coefficient of expansion (e.g. both are of steel construction), the checking temperature can deviate from 20 °C without detriment to the result, always provided that the temperature of both the gauge and the workpiece is the same at the time of gauging.

If the workpiece and gauge have different thermal coefficients of expansion (e.g. steel workpiece and carbide gauge or brass workpiece and gauge of steel or carbide), the temperature of the gauge and the workpiece should, in principle, be close to 20 °C at the time of gauging.

Annex D (informative) Hardness

A steel gauge should be hardened to the value most appropriate to its type, size and pitch and to the steel from which it is made.

Experience has shown that if the hardness of steel gauges is kept within the range 650 HV to 800 HV (57 HRC to 62 HRC) the threads do not easily burr nor are they brittle.

Experience has also shown that the gauging surfaces of plain plug and calliper gauges should be hardened within the range 750 HV to 850 HV (61 HRC to 63 HRC).

Bibliography

BS 3643 (both parts), *ISO metric screw threads*

BS 6528:1984, ISO 5408:1983, *Glossary of terms for cylindrical screw threads*

BS EN ISO 1, *Geometrical product specifications (GPS) – Standard reference temperature for geometrical product specification and verification*

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: +44 (0)20 8996 9000. Fax: +44 (0)20 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: +44 (0)20 8996 9001.

Fax: +44 (0)20 8996 7001. Email: orders@bsi-global.com. Standards are also available from the BSI website at <http://www.bsi-global.com>.

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: +44 (0)20 8996 7111. Fax: +44 (0)20 8996 7048. Email: info@bsi-global.com.

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: +44 (0)20 8996 7002. Fax: +44 (0)20 8996 7001. Email: membership@bsi-global.com.

Information regarding online access to British Standards via British Standards Online can be found at <http://www.bsi-global.com/bsonline>.

Further information about BSI is available on the BSI website at <http://www.bsi-global.com>.

Copyright

Copyright subsists in all BSI publications. BSI also holds the copyright, in the UK, of the publications of the international standardization bodies. Except as permitted under the Copyright, Designs and Patents Act 1988 no extract may be reproduced, stored in a retrieval system or transmitted in any form or by any means – electronic, photocopying, recording or otherwise – without prior written permission from BSI.

This does not preclude the free use, in the course of implementing the standard, of necessary details such as symbols, and size, type or grade designations. If these details are to be used for any other purpose than implementation then the prior written permission of BSI must be obtained.

Details and advice can be obtained from the Copyright & Licensing Manager.

Tel: +44 (0)20 8996 7070. Fax: +44 (0)20 8996 7553.

Email: copyright@bsi-global.com.



389 Chiswick High Road
London
W4 4AL