BS ISO 3547-3:2017

BSI Standards Publication

Plain bearings — Wrapped bushes

Part 3: Lubrication holes, grooves and indentations

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National foreword

This British Standard is the UK implementation of ISO 3547-3:2017. It supersedes BS ISO 3547-3:2006 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee MCE/12, Plain bearings.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Plain bearings — Wrapped bushes —

Part 3: Lubrication holes, grooves and indentations

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 123, *Plain bearings*, Subcommittee SC 3, *Dimensions, tolerances and construction details*.

This third edition cancels and replaces the second edition (ISO 3547-3:2006), which has been technically revised.

A list of all the parts in the ISO 3547 series can be found on the ISO website.

Plain bearings — Wrapped bushes —

Part 3: Lubrication holes, grooves and indentations

1 Scope

This document specifies dimensions of lubrication holes, grooves and bore indentations on wrapped bushes made of mono and multi-layer bearing material for plain bearing applications.

NOTE Wrapped bushes with lubrication holes, grooves or bore indentations in accordance with this document can be ordered with dimensions in accordance with ISO 3547-1 and made from materials in accordance with ISO 3547-4.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 3547-1, *Plain bearings — Wrapped bushes — Part 1: Dimensions*

ISO 4378-1, *Plain bearings — Terms, definitions, classification and symbols — Part 1: Design, bearing materials and their properties*

ISO 4378-4, *Plain bearings — Terms, definitions, classification and symbols — Part 4: Basic symbols*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4378-1 and ISO 4378-4 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Symbols and units

See Table 1.

Table 1 — Symbols and units

Symbol	Description	Unit
B	Width of the bush	mm
c	Edge length of the diamond-shaped lubrication indentation	mm
D_i	Inside diameter of the bush	mm
d_b	Diameter of the lubrication indentation	mm
d_L	Diameter of the lubrication hole	mm
D_o	Outside diameter of the bush	mm
e	Distance between the lubrication grooves	mm

Table 1 *(continued)*

Symbol	Description	Unit
n_1, n_2	Width of lubrication groove	mm
R	Radius	mm
s_3	Wall thickness	mm
s_4	Residual wall thickness	mm
t	Depth of the lubrication indentation	mm
α	Layout of the lubrication indentation	°

5 General

Lubrication holes, grooves and bore indentations may be carried out in the flat strip prior to forming. Dimensional changes due to forming of the strip are permissible. Marks of lubrication grooves and bore indentations produced by stamping may appear on the back of the bush. Small cracks in the bearing material in lubrication grooves and bore indentations are permissible, provided that no pieces become detached.

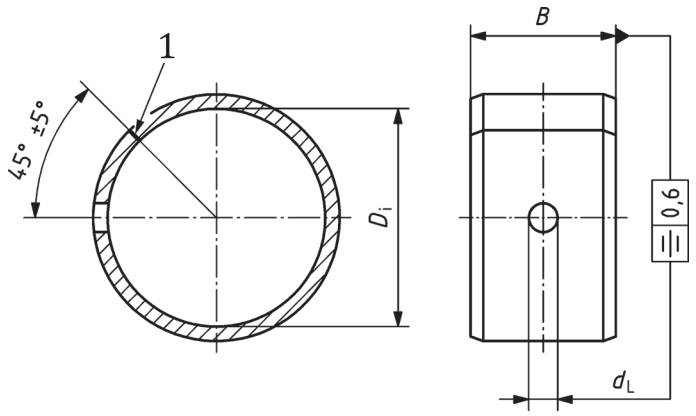
Untoleranced and unspecified dimensions may be specified differently subject to agreement between the user and supplier.

6 Lubrication holes

See Figures 1 and 2.

For the nominal dimensions, see Table 2.

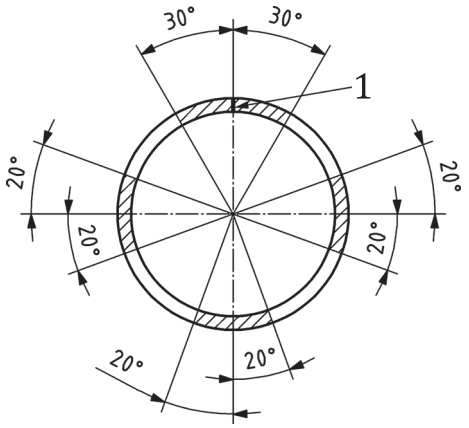
Dimensions in millimetres



Key

1 butt joint

Figure 1 — Lubrication holes (Type L) — Dimensions (see **Table 2**)



Key

1 butt joint

Lubrication holes in the hatched areas should be avoided as far as possible.

Figure 2 — Lubrication holes (Type L) — Areas of bush not recommended for holes

Table 2 — Nominal dimensions of lubrication holes

Dimensions in millimetres

D_i		d_L[a]
>14	≤22	3
>22	≤40	4
>40	≤50	5
>50	≤100	6
>100		7

[a] Minimum dimension after forming.

7 Lubrication grooves

7.1 General

Lubrication grooves types M1 and M2 are used for lubrication. See Figures 3 to 8 and Tables 3 to 6.

Widening of the lubrication grooves in the area of the lubrication holes, at the butt joint and at the end faces of the bush, is permissible.

Lubrication grooves are normally represented on the developed shape of the bush before forming.

Distortions to the groove shape can occur during the outside diameter forming operations.

In order to facilitate measurement, the dimensions of the bush thickness remaining at the base of the groove may be specified on the drawing as the control dimension.

7.2 Type M1

7.2.1 General

See Figure 3 and Table 3.

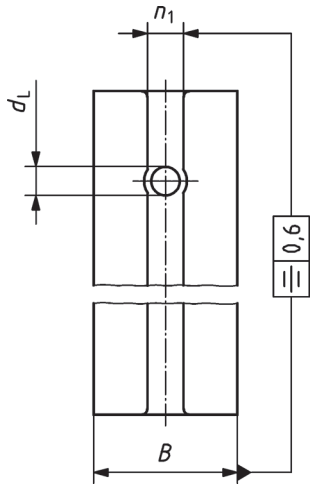


Figure 3 — Type M1 — Dimensions (see Table 3)

Table 3 — Nominal dimensions of lubrication grooves type M1

Dimensions in millimetres

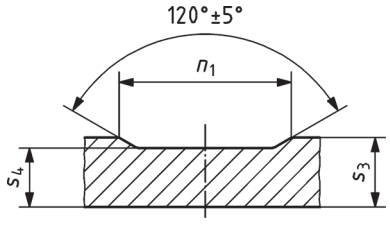
D_i nominal		n_1 ±0,5	
		Series (in accordance with ISO 3547-1)	
		A, B, D, W	**C, E**
>14	≤22	4	5
>22	≤40	5	6
>40	≤50	6	7
>50	≤100	7	8
>100		8	9

7.2.2 Type M1A

See Figure 4 and Table 4.

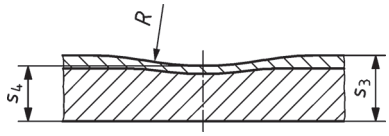
7.2.3 Type M1B

See Figure 5 and Table 4.



NOTE The groove cross-section is represented on an enlarged scale.

Figure 4 — Type M1A



NOTE The groove cross-section is represented on an enlarged scale.

Figure 5 — Type M1B

Table 4 — Nominal dimensions of lubrication grooves types M1A and M1B

Dimensions in millimetres

s_3		**0,75**	**1**	**1,5**	**2**	**2,5**
$s_{4\,-0,2}^{\ 0}$	**M1A**	0,65	0,85	1,3	1,7	2,2
	M1B	—	0,7	1,1	1,6	2,1
R		—	6	8	10	12

7.3 Type M2

7.3.1 General

See Figure 6 and Table 5.

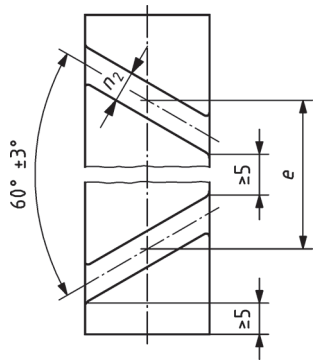


Figure 6 — Type M2 — Dimensions (see **Table 5**)

Table 5 — Nominal dimensions of lubrication grooves type M2

Dimensions in millimetres

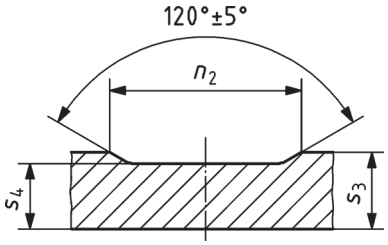
D_i nominal		e	n_2 ±0,5	
			Series (in accordance with ISO 3547-1)	
			A, B, D, W	**C, E**
>18	≤26	32	3	4
>26	≤36	45	3	4
>36	≤50	70	5	6
>50	≤70	100	5	6
>70	≤100	130	6	7
>100		140	7	8

7.3.2 Type M2A

See Figure 7 and Table 6.

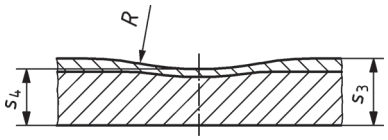
7.3.3 Type M2B

See Figure 8 and Table 6.



NOTE The groove cross-section is represented on an enlarged scale.

Figure 7 — Type M2A



NOTE The groove cross-section is represented on an enlarged scale.

Figure 8 — Type M2B

Table 6 — Nominal dimensions of lubrication grooves types M2A and M2B

Dimensions in millimetres

s_3		0,75	1	1,5	2	2,5
$s_{4\,-0,2}^{\ 0}$	**M2A**	0,65	0,85	1,3	1,7	2,2
	M2B	—	0,7	1,1	1,6	2,1
R		—	6	8	10	12

8 Lubrication indentations

8.1 General

See Figures 9 to 11 and Tables 7 and 8. These lubrication indentations are only applicable for bushes with $s_3 \geq 1$ mm.

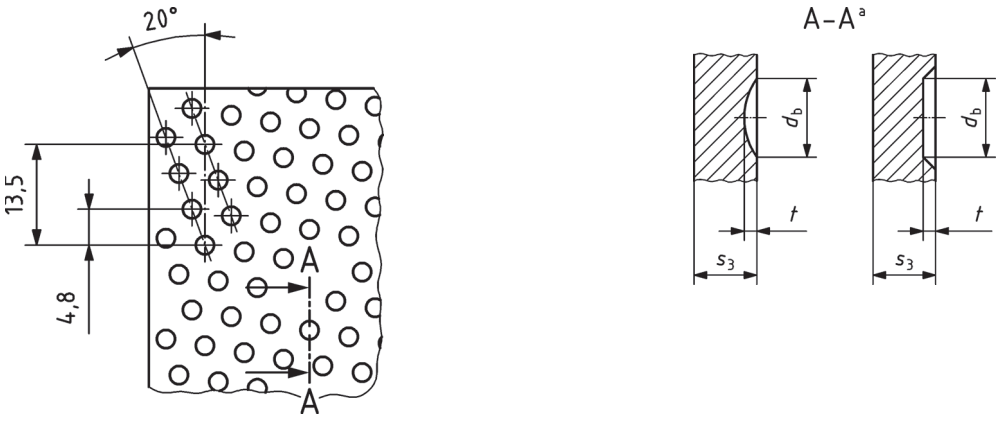
Figures 9, 10 and 11 are examples of indentation patterns which can vary at the discretion of the supplier.

NOTE Lubrication indentations can be used alone or in conjunction with lubrication holes and/or grooves.

8.2 Types N1

This type of indentation is used for oil or grease lubrication. See Figure 9 and Table 7.

Dimensions in millimetres



a) Type N1A **b) Type N1B**

Key

[a] Section A-A is represented on an enlarged scale.

Figure 9 — Lubrication indentation — Type N1

Table 7 — Nominal dimensions of lubrication indentations types N1A and N1B

Dimensions in millimetres

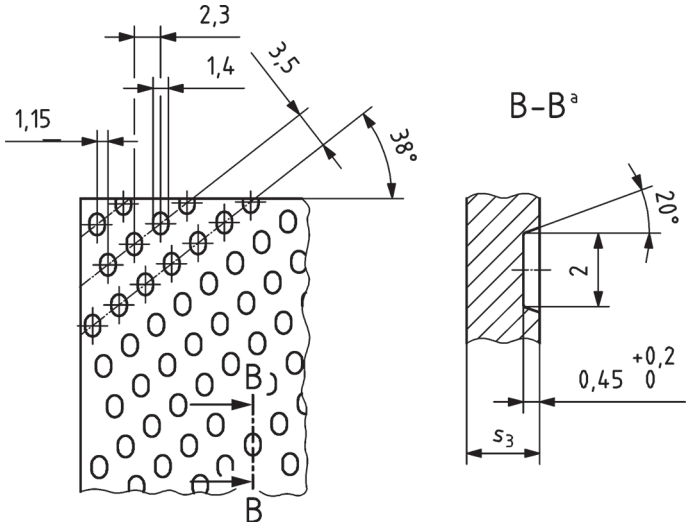
Bushes (in accordance with ISO 3547-1)	d_b	t ± 0,2
Series A, B, D, W	1,5 to 3	0,4
Series C, E		0,55

8.3 Type N2

This type of indentation is used for solid or grease lubrication.

For bushes of Series A, B, D and W in accordance with ISO 3547-1, the oval-shaped lubrication indentation, N_2 (see Figure 10), is chosen at the discretion of the supplier.

Dimensions in millimetres



Key

a Section B-B is represented on an enlarged scale.

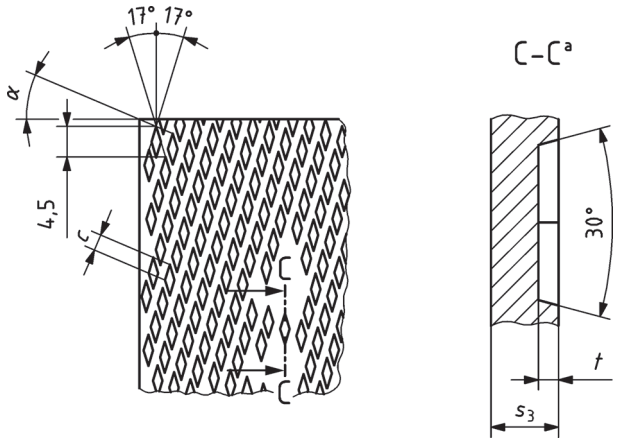
Figure 10 — Type N2

8.4 Type N3

This type of indentation is used for solid or grease lubrication.

For bushes of Series A, B, D and W, in accordance with ISO 3547-1, the diamond-shaped lubrication indentation, N3 (see Figure 11), is chosen at the discretion of the supplier.

Dimensions in millimetres



Key

a Section C-C is represented on an enlarged scale.

Figure 11 — Type N3

Table 8 gives nominal dimensions of lubrication indentations type N3.

Table 8 — Nominal dimensions of lubrication indentations type N3

Dimensions in millimetres

D_i **nominal**		c	t ±0,2	α
	<22	1,9	0,4	20°
>22		2,4	0,6	23°

9 Designation

The following are examples of the designation of bushes conforming to ISO 3547 (all parts).

EXAMPLE 1 A wrapped cylindrical bush (Type C) of inside diameter D_i = 30 mm, wall thickness deviation limit series A, having an outside diameter D_o = 34 mm and width B = 20 mm, made of a multi-layer material, code S5, in accordance with ISO 3547-4, with a lubrication hole and a circumferential groove of design M1A, and with lubrication indentations of design N1B, in accordance with this document, and where ISO 3547-2, test A, and wall thickness measurements are specified, is designated as follows:

Bush ISO 3547 — C30 A 34 × 20 — S5 — LM1A N1B — AS

NOTE "S" signifies the required wall thickness measurement in accordance with ISO 3547-7.

EXAMPLE 2 A wrapped cylindrical bush (Type C) of inside diameter D_i = 30 mm, wall thickness deviation limit series D, having an outside diameter D_o = 34 mm and width B = 16 mm, made of multi-layer material, code P2, in accordance with ISO 3547-4, with a lubrication hole and lubrication indentations of design N1B, and where ISO 3547-2, tests A and C, are specified, is designated as follows:

Bush ISO 3547 — C30 W 34 × 16 — P2 — L N1B — AC

Bibliography

[1] ISO 3547-2, *Plain bearings — Wrapped bushes — Part 2: Test data for outside and inside diameters*

[2] ISO 3547-4, *Plain bearings — Wrapped bushes — Part 4: Materials*

[3] ISO 3547-7, *Plain bearings — Wrapped bushes — Part 7: Measurement of wall thickness of thin-walled bushes*

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