



BSI Standards Publication

Dimensions of spiral anti-extrusion back-up rings and their housings – Specification

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Foreword

Publishing information

This British Standard is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 30 April 2024. It was prepared by Technical Committee MCE/11, *Fluid seals and their housings*. A list of organizations represented on this committee can be obtained on request to the committee manager.

Supersession

This British Standard supersedes [BS 5106:1988](#), which is withdrawn.

Relationship with other publications

This British Standard was developed from, and is complementary to, [BS 4518](#).

Information about this document

This is a full revision of the document, and introduces the following principal changes:

- the preferred shaft (rod) and cylinder diameters in accordance with [BS ISO 3320](#) are indicated; and
- references have been updated.

[Annex A](#) gives guidance on the assembly of spiral back-up rings into their housings.

Due to the lack of demand for the 4.1 mm section rings introduced in [BS 4518:1974](#), requirements for the compatible back-up rings are not included in this revision. However, details of the rings are given in [Annex B](#) and for information if required for replacement purposes. This parallels similar changes introduced into [BS 4518:1982](#).

The efficient use of “O”-rings depends upon the ability of the elastomeric “O” ring to resist extrusion through the working clearances between mating parts. Under certain circumstances it is necessary to increase the resistance to extrusion by the use of back-up rings. This British Standard specifies requirements for a range of spiral back-up rings that are compatible with “O” rings manufactured in accordance with [BS 4518](#).

The width and radial depth of the grooves specified here are such that the spiral back-up rings, by virtue of their coiling action, may be fitted in assemblies in which the internal or external diameter is a rounded metric dimension.

It is stressed that the dimensions specified in this British Standard, although providing the necessary basis for standardization in the manufacture and application of spiral back-up rings, should not be regarded as providing all the information required for design purposes. Attention is drawn to the desirability of consultation between users and manufacturers of “O”-rings and spiral back up rings, when a particular application is being considered.

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Where websites and webpages have been cited, they are provided for ease of reference and are correct at the time of publication. The location of a webpage or website, or its contents, cannot be guaranteed.

Presentational conventions

The provisions of this document 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 smaller italic type, and does not constitute a normative element.

Where words have alternative spellings, the preferred spelling of the *Shorter Oxford English Dictionary* is used (e.g. “organization” rather than “organisation”).

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1 Scope

This British Standard specifies requirements for the design and dimensions of a range of spiral anti-extrusion back-up rings that prevent “O”-rings, manufactured in accordance with [BS 4518](#), from extruding under pressure or where extrusion clearances are in excess of those specified in [BS 4518](#).

NOTE 1 These spiral back-up rings are particularly suitable for use in hydraulic diametral sealing applications where the pressures exceed 100 bar and are generally less than 200 bar, where 1 bar = 10^5 N/m² = 10^5 Pa.

Annex B provides guidance on obsolete series of spiral back-up rings.

This British Standard also specifies the shape and dimensions of housing grooves to accommodate one or two spiral back-up rings and their associated “O”-ring.

NOTE 2 The range of spiral back-up rings specified in this British Standard is intended for use with “O”-rings selected from [BS 4518](#).

NOTE 3 [Annex A](#) provides guidance for the assembly of spiral back-up rings.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes provisions of this document¹⁾. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

[BS 4518](#), Specification for metric dimensions of toroidal sealing rings (“O”-rings) and their housings

[BS ISO 3320](#), Fluid power systems and components – Cylinder bores and piston rod diameters and area ratios – Metric series

3 Terms and definitions

No terms and definitions are listed in this document.

4 Spiral back-up rings

4.1 Dimensions

The dimensions and tolerances of the back-up rings shall be in accordance with [Table 1](#) and [Figure 1](#).

¹⁾ Documents that are referred to solely in an informative manner are listed in the Bibliography.

Table 1 — Dimensions of spiral back-up rings

Back-up ring ref. no. ^{A)}	Nominal diameter, <i>A</i> mm	Radial width, <i>W</i>		Thickness, <i>T</i>		Gap, ^{B)} <i>Z</i>	
		Max. mm	Min. mm	Max. mm	Min. mm	Max. mm	Min. mm
B0031-16	3.5						
B0041-16	4.5						
B0051-16	5.5						
B0061-16	6.5						
B0071-16	7.5						
B0081-16	8.5						
B0091-16	9.5						
B0101-16	10.5						
B0111-16	11.5						
B0121-16	12.5						
B0131-16	13.5						
B0141-16	14.5	1.26	1.22	1.4	1.2	1.5	0.8
B0151-16	15.5						
B0161-16	16.5						
B0171-16	17.5						
B0181-16	18.5						
B0191-16	19.5						
B0221-16	22.5						
B0251-16	25.5						
B0271-16	27.5						
B0291-16	29.5						
B0321-16	32.5						
B0351-16	35.5						
B0371-16	37.5						
B0036-24	4						
B0046-24	5						
B0056-24	6						
B0066-24	7						
B0076-24	8						
B0086-24	9						
B0096-24	10						
B0106-24	11						
B0116-24	12	1.99	1.94	1.4	1.2	1.5	0.8
B0126-24	13						
B0136-24	14						
B0146-24	15						
B0156-24	16						
B0166-24	17						
B0176-24	18						
B0186-24	19						
B0196-24	20						
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