

Specification for

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

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Committees responsible for this British Standard

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- British Compressed Air Society
- British Fluid Power Association
- British Hydromechanics Research Association
- British Industrial Truck Association
- British Rubber Manufacturers' Association
- Engineering Equipment and Materials Users' Association
- Ministry of Defence
- Society of British Aerospace Companies Limited
- Society of Motor Manufacturers and Traders Limited

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Foreword

This revised British Standard has been prepared under the direction of the Machinery and Components Standards Committee. It was developed from, and is complementary to, BS 4518 *“Specification for metric dimensions of toroidal sealing rings (“O”-rings) and their housings”*. It supersedes BS 5106:1982, which is withdrawn.

In this revision the range of back-up rings has been extended to encompass corresponding “O”-rings specified in BS 4518 in the range up to and including 300 mm nominal diameter.

Because of 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 Appendix B 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.

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.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 14, 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.

1 Scope

This British Standard specifies the design and dimensions of a range of spiral anti-extrusion back-up rings that prevent “O”-rings, which are manufactured in accordance with BS 4518, from extruding under pressure or where extrusion clearances are in excess of those specified in BS 4518. These spiral back-up rings are particularly suitable for use in hydraulic diametral sealing applications where the pressures exceed 100 bar¹⁾ and are generally less than 200 bar.

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

The range of spiral back-up rings specified in this standard is intended for use with “O”-rings selected from BS 4518.

Appendix A provides guidance for the assembly of spiral back-up rings.

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

2 Spiral back-up rings

2.1 Dimensions

The dimensions and tolerances of the back-up rings shall be in accordance with Table 1 and Figure 1.

2.2 Material

The back-up rings shall be manufactured from polytetrafluoroethylene (PTFE).

2.3 Reference number

The back-up rings shall be identified by a reference number consisting of the relevant “O”-ring reference number specified in BS 4518, preceded by the letter B.

¹⁾ 1 bar = 10⁵ N/m² = 10⁵ Pa.

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.	min.	max.	min.	max.	min.
B0031-16	3.5	1.26	1.22	1.4	1.2	1.5	0.8
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						
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	1.99	1.94	1.4	1.2	1.5	0.8
B0046-24	5						
B0056-24	6						
B0066-24	7						
B0076-24	8						
B0086-24	9						
B0096-24	10						
B0106-24	11						
B0116-24	12						
B0126-24	13						
B0136-24	14						
B0146-24	15						
B0156-24	16						
B0166-24	17						
B0176-24	18						
B0186-24	19						
B0196-24	20						
B0206-24	21						
B0216-24	22						
B0246-24	25						
B0276-24	28						
B0296-24	30						
B0316-24	32						
B0346-24	35						
B0356-24	36						
B0376-24	38						
B0396-24	40						
B0416-24	42						
B0446-24	45						
B0456-24	46						
B0476-24	48						
B0496-24	50						
B0516-24	52						
B0546-24	55						
B0556-24	56						
B0576-24	58						
B0586-24	59						
B0596-24	60						
B0616-24	62						
B0626-24	63						
B0646-24	65						
B0676-24	68						
B0696-24	70						

^a The reference number consists of the "O"-ring reference number as specified in BS 4518, preceded by the letter B.

^b When measured on a mandrel, $A \begin{smallmatrix} +0 \\ -0.05 \end{smallmatrix}$ mm diameter.