

Bearings

Technical details

Operating Conditions

	Metric		Inch	
Temperature Range	-40°C +120°C		-40°F +250°F	
Limiting PV Values Lubricated*	Speed m/sec	Pressure MN/m ²	Speed ft/sec	Pressure p.s.i.
	0.1	10.0	0.3	1500
	1.0	6.0	3.0	900
	5.0	0.8	16.0	120

Typical Physical Properties

Specific Gravity		1.27		1.27
Compression Stress at Failure	(Temp 23°C)	450 MN/m ²	(Temp 73°F)	65,000 p.s.i.
Compression Stress at Yield*	(Temp 23°C)	115 MN/m ²	(Temp 73°F)	16,500 p.s.i.
Compression Stress at Yield*	(Temp 80°C)	58 MN/m ²	(Temp 176°F)	8,500 p.s.i.
Coefficient of Thermal Conductivity		0.27 W/mK		0.16 Btu/hft °F
Coefficient of Thermal Expansion	Length	Thickness	Length	Thickness
	9 X 10 ⁻⁵	13 X 10 ⁻⁵	5 X 10 ⁻⁵	7.3 X 10 ⁻⁵
	per °C	per °C	per °F	per °F
Coefficient of Dynamic Friction on steel surface (0.2 µm Ra) / (8 µin CLA)	Dry	Lubricated	Dry	Lubricated
	0.50	0.06	0.50	0.06
Surface Roughness	µm Ra	µm Rt	µin CLA	µin RMS
Dynamic Sealing Face Ød ₁ , ØD ₁	0.4	4 max	16	18
Static Sealing Face Ød ₂ , ØD ₂ , L ₁	3.2 max	16 max	125 max	140 max

Bearing Strip Tolerances

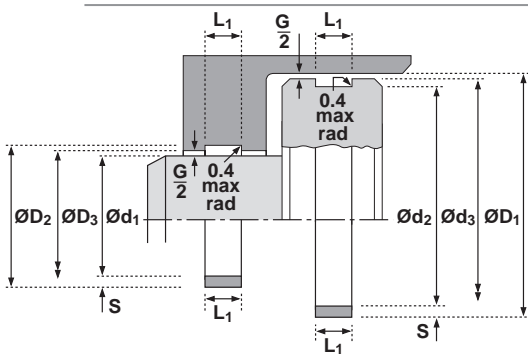
L ₁	S	L ₁	S
-0.1 to -0.6	-0.02 to -0.08	-0.005 to -0.025	-0.001 to -0.003

Width of Bearing Split – W

Ød ₁ / ØD ₁	W	Ød ₁ / ØD ₁	W
Up to 50	3.00 - 1.50	Up to 2"	0.12 - 0.06
Up to 120	5.00 - 3.50	Up to 5"	0.19 - 0.14
Up to 250	9.00 - 7.25	Up to 10"	0.35 - 0.29
Up to 550	17.00 - 15.00	Up to 22"	0.67 - 0.59

Housing Details & Tolerances

Rod	Ød ₁	f9	Ød ₁	f9
	ØD ₂ = Ød ₁ + 2S	up to : Ø80 H10 above : Ø80 H9	ØD ₂ = Ød ₁ + 2S	up to : Ø3in H10 above : Ø3in H9
	ØD ₃ = Ød ₁ + G	G min / max + 0.2 - 0 mm	ØD ₃ = Ød ₁ + G	G min / max + 0.008 - 0 in
Piston	L ₁	+ 0.2 - 0 mm	ØD ₁	H11
	ØD ₁	H11	Ød ₂ = ØD ₁ - 2S	f9
	Ød ₂ = ØD ₁ - 2S	f9	Ød ₃ = ØD ₁ - G	G min / max
	Ød ₃ = ØD ₁ - G	G min / max	L ₁	+ 0.008 - 0 in
	L ₁	+ 0.2 - 0 mm		



Design

Hallite 506 bearing strip is available in three forms: cut rings, spiral lengths and flat coils. Hallite 506 provides an extremely effective, hard wearing and easy to use bearing material.

Manufactured to very tight tolerances and providing bearing solutions for reciprocating, oscillating and slow rotary movement applications, Hallite 506 bearing strip is used in many of today's most arduous hydraulic applications around the world. Commonly fitted in reciprocating cylinders as rod and piston bearings, Hallite 506 is capable of withstanding extreme side-loads preventing metal to metal contact. The material's design incorporates micro indentations on the bearing strip's surface to trap fluid and provide built-in lubrication to the bearing. The 506 bearing strip is manufactured by a patented process, using a woven fabric reinforced polyester resin material and is proven to be compatible with a wide range of fluids, including mineral oils, water based fluids and phosphate esters, to produce a rectangular section strip which is available in a wide range of inch and metric sizes including cross sections specified in ISO 10766.

* Please note that for reciprocating applications, the compressive stress at yield should be used for design calculations. For rotary shafts use the limiting P.V. values. It is suggested that a 2:1 factor of safety is applied.

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Hallite 506 bearing strip is available in three forms:

Cut Rings

Ready made bearings, cut to size and to customer specifications, and ready for installation, Hallite 506 bearings have become an industry standard favoured by designers and specifiers alike. Generally produced for the medium to high volume user.

Spiral Lengths

Available in a wide range of preformed diameters, spirals are supplied in continuous lengths to suit a range of inside and outside diameters. Ideal for lower volume users requiring various diameters.

Flat Coils

Packaged in a dispenser for ease of storage and handling, flat coils are supplied in 10 metre lengths suitable for a wide range of diameters and are ideal for those using or supplying one off bearings for small volume requirements.

The ranges shown on the following pages are Hallite's most popular sizes. The section ranges identify section and groove width; from these nearly any diameter of cut ring or spiral length can be manufactured. If you cannot find the size you are looking for, please contact your local Hallite sales office for additional size information.

All standard bearing strip is printed with a size reference and includes distance marking every 100mm on metric size sections and every six inches on inch size sections for guidance only.

When ordering please clearly state whether cut rings, spiral lengths or flat coils are required. For cut rings and spiral lengths please state whether rod or piston application and provide inside ($\varnothing d$) or outside ($\varnothing D$) diameters, groove width (L1) and section (S) dimensions and where spiral lengths are ordered also specify length required. For flat coils please specify groove width (L1) and section (S) dimensions.

Cutting bearing strip to size

1. Select the groove width (L1) and section (S) required.
2. In the case of a rod bearing, position the bearing strip around the rod or in the case of a piston bearing, place it in the piston groove and mark the point of overlap. Determine the correct width of bearing split (W) for the $\varnothing d$ or $\varnothing D$ being used, as indicated in the technical details, and make a second mark.
3. Remove the strip and cut at the second marked position to the desired angle using secateurs or other similar cutting tool.

It is recommended that the standard cutting angle is used for the majority of applications.



Cut Rings



Spiral Lengths

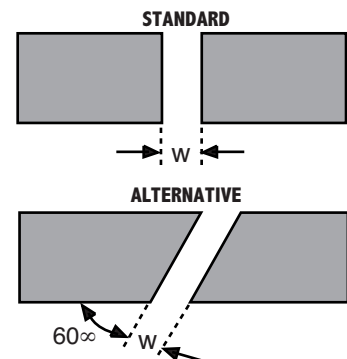


Flat Coils

Features

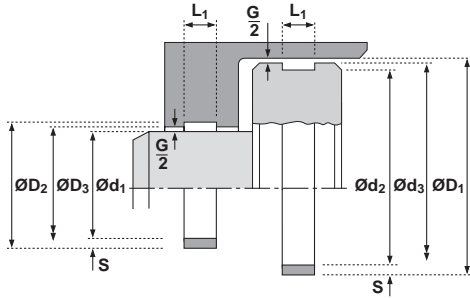
- High load capability
- Infinite length range
- Virtually zero swell
- Self lubricating
- Low friction
- Cut to length
- Very large range of sizes

Bearing split cutting angle



Bearings

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metric – section range

S	L ₁
1.50	5.6
2.00	9.7
2.00	10.0
2.00	15.0
2.00	20.0
2.00	22.0
2.00	25.0
2.50	5.6 ‡
2.50	6.3
2.50	7.0
2.50	8.0

S	L ₁
2.50	9.7 ‡
2.50	12.0
2.50	13.0
2.50	15.0 ‡
2.50	16.0
2.52	19.5
2.50	20.0
2.50	25.0 ‡
2.52	30.0
2.50	40.0
3.00	9.7
3.00	12.8

S	L ₁
3.02	15.0
3.00	20.0
3.00	25.0
3.20	9.7
3.20	19.7
3.50	25.0
4.00	6.1
4.00	9.7
4.00	20.0
4.00	25.0 ‡
4.00	30.0
4.00	40.1

inch – section range

S	L ₁
0.063	0.375
0.125	0.375
0.125	0.500
0.125	0.625
0.125	0.750
0.125	1.000
0.125	1.500

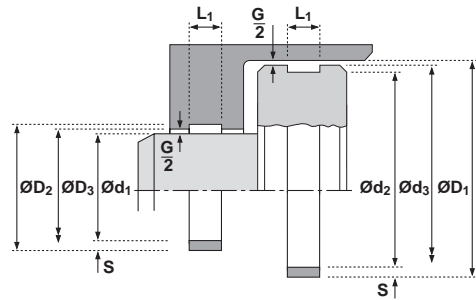
Within the size range, items suffixed ‡ indicate cross sections to ISO 10766.

metric – spiral lengths

Ø RANGE		S	L ₁	G MAX	G MIN	PART No.
Ød ₁	ØD ₁					
25 - 41	45 - 90	2.0	10.0	As required by the seal extrusion gap	0.7	8501310
35 - 70	74 - 160	2.0	10.0		0.7	8502610
70 - 155	159 - 310	2.0	10.0		0.7	8502252
35 - 50	54 - 110	2.0	15.0		0.7	8503357
50 - 100	104 - 210	2.0	15.0		0.7	8503175
90 - 180	184 - 370	2.0	15.0		0.7	8503358
25 - 30	35 - 70	2.5	5.6		0.7	8502000‡
25 - 50	55 - 110	2.5	5.6		0.7	8502020‡
50 - 100	105 - 210	2.5	5.6		0.7	8502040‡
25 - 40	45 - 90	2.5	9.7		0.7	8502100‡
35 - 70	75 - 150	2.5	9.7		0.7	8502120‡
70 - 150	155 - 310	2.5	9.7		0.7	8502140‡
40 - 50	55 - 110	2.5	13.0		0.7	8502200
50 - 100	105 - 210	2.5	13.0		0.7	8502220
90 - 180	185 - 370	2.5	13.0		0.8	8502230
40 - 50	55 - 110	2.5	15.0		0.7	8502300‡
50 - 100	105 - 210	2.5	15.0	0.7	8502330‡	
90 - 180	185 - 370	2.5	15.0	0.8	8502350‡	
50 - 80	85 - 170	2.5	20.0	0.7	8502400	
75 - 150	155 - 310	2.5	20.0	0.8	8502410	
125 - 250	255 - 510	2.5	20.0	0.8	8502430	

For applications not using a seal G MAX can be 1.6mm.

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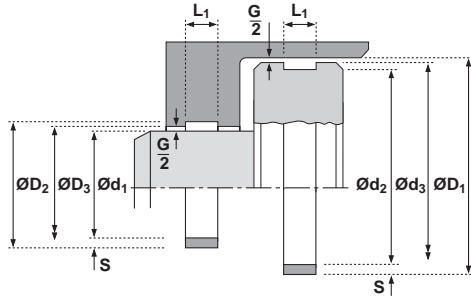


metric – spiral lengths

Ød ₁	Ø RANGE	ØD ₁	S	L ₁	G MAX	G MIN	PART No.	
70 - 150		155 - 310	2.5	25.0	As required by the seal extrusion gap	0.8	8502520‡	
125 - 250		255 - 510	2.5	25.0		0.8	8502530‡	
40 - 50		56 - 100	3.0	9.7		For applications not using a seal G MAX can be 1.6mm.	0.8	8503369
50 - 100		106 - 210	3.0	9.7			0.8	8503370
100 - 150		156 - 310	3.0	9.7			0.8	8503371
50 - 60		66 - 120	3.0	12.8			0.7	8503037
60 - 104		110 - 220	3.0	12.8			0.8	8503038
90 - 149		155 - 300	3.0	12.8			0.8	8503039
55 - 80		86 - 170	3.0	20.0			0.8	8503124
80 - 150		156 - 310	3.0	20.0			0.8	8502635
140 - 250		256 - 510	3.0	20.0			0.8	8503189
50 - 75		81 - 160	3.02	15.0			0.7	8502734
60 - 80		68 - 170	4.0	6.1			0.8	8503359
80 - 150		158 - 310	4.0	6.1			0.8	8503360
150 - 250		258 - 510	4.0	6.1			0.8	8503361
60 - 80		88 - 170	4.0	9.7			0.8	8503362
80 - 150		158 - 310	4.0	9.7			0.8	8503363
150 - 250		258 - 510	4.0	9.7			0.8	8503364
60 - 80		88 - 170	4.0	20.0			0.8	8503365
80 - 150		158 - 310	4.0	20.0			0.8	8503366
150 - 250		258 - 510	4.0	20.0	0.8		8503191	
120 - 150		158 - 310	4.0	25.0	0.8		8503367‡	
150 - 250		258 - 510	4.0	25.0	0.8	8503192‡		
120 - 150		158 - 310	4.0	30.0	0.8	8503368		
150 - 250		258 - 510	4.0	30.0	0.8	8503193		
170 - 200		208 - 410	4.0	40.1	0.8	8503179		
200 - 300		308 - 610	4.0	40.1	0.8	8503180		

Within the size range, items suffixed ‡ indicate cross sections to ISO 10766.

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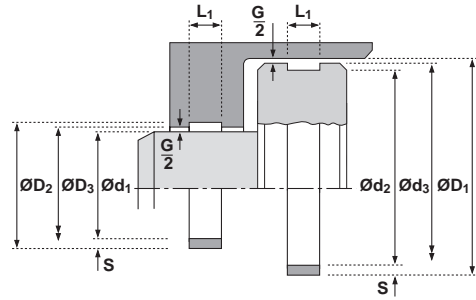


inch - spiral lengths

Ød_1	Ø RANGE	ØD_1	S	L_1	G MAX	G MIN	PART No.
1.000 - 1.375		1.625 - 3.500	0.125	0.375	As required by the seal extrusion gap	0.031	8502098
1.250 - 1.875		2.125 - 4.250	0.125	0.375		0.031	8502099
2.000 - 3.500		3.750 - 6.250	0.125	0.375		0.031	8502183
1.250 - 1.750		2.000 - 4.000	0.125	0.500		0.031	8502089
1.750 - 3.500		3.750 - 6.250	0.125	0.500		0.031	8502090
3.500 - 6.000		6.250 - 10.000	0.125	0.500		0.031	8502091
8.000 - 12.500		12.750 - 25.000	0.125	0.500		0.031	8502720
2.000 - 3.500		3.750 - 6.250	0.125	0.625		0.031	8502092
3.500 - 6.000		6.250 - 10.000	0.125	0.625		0.031	8502093
2.000 - 3.500		3.750 - 6.250	0.125	0.750		0.031	8502094
3.500 - 6.000		6.250 - 10.000	0.125	0.750		0.031	8502095
2.500 - 3.500		3.750 - 6.250	0.125	1.000		0.031	8502096
3.500 - 6.000		6.250 - 10.000	0.125	1.000		0.031	8502097
8.000 - 12.500		12.750 - 25.000	0.125	1.000	0.031	8502222	

For applications not using a seal G MAX can be 0.080 in.

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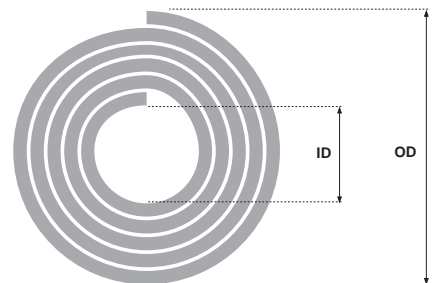
metric - flat coils

Ø RANGE ID	OD	S	L ₁	G MAX	G MIN*	PART No.
140	190	1.5	5.6	As required by the seal extrusion gap For applications not using a seal G MAX can be 1.6mm.	0.7	8581810
140	210	2.0	9.7		0.7	8581910
140	210	2.0	10.0		0.7	8584610
140	210	2.0	20.0		0.7	8582210
140	210	2.0	15.0		0.7	8581210
140	230	2.5	5.6		0.7	8580010‡
140	230	2.5	6.3		0.7	8581310
140	230	2.5	8.0		0.7	8581610
140	230	2.5	9.7		0.7	8580110‡
140	230	2.5	13.0		0.7	8581110
140	230	2.5	15.0		0.7	8580210‡
140	230	2.5	20.0		0.8	8580310
140	230	2.5	25.0		0.8	8580410‡
140	230	2.5	30.0		0.7	8582010
140	240	3.0	9.7		0.7	8581410
140	240	3.0	12.8		0.7	8581010
140	240	3.0	20.0		0.7	8581510
140	240	3.02	15.0		0.7	8581710
5.500	9.750	0.125	0.375	As required by the seal extrusion gap For applications not using a seal G MAX can be 0.080in.	0.031	8580510
5.500	9.750	0.125	0.500		0.031	8580610
5.500	9.750	0.125	0.625		0.031	8580710
5.500	9.750	0.125	0.750		0.031	8580810
5.500	9.750	0.125	1.000		0.031	8580910

Within the size range, items suffixed ‡ indicate cross sections to ISO 10766. ID and OD are indicated as approximate values for guidance only.

* This value can be reduced if required by the seal's maximum extrusion gap - see housing design page 5

If necessary coil diameters can be re-sized by curing on a suitable mandrel in an oven for 1 hr at 120°C 250°F and allowing to cool on the mandrel.



500 series

Hallite 500 Series

General

The Hallite 500 series is a family of high performance loaded 'U' cups are designed to interchange in standard North American housings. Since the launch in 1988, these seals have become accepted as the leading alternative choice for quality and cost effectiveness.

Hallite offer three profiles of single acting seals in the 500 Series (511,512,513). Covering most applications from mobile hydraulics to industrial cylinders, all have been well proven and are standard fitment in many of the leading cylinder and O.E.M. manufacturers worldwide. Each catalogue page outlines the operating condition parameters to give optimum performance and life. For applications outside, or at the extreme, of these figures, it is recommended that guidance is sought from Hallite Seals.

Material

All Hallite materials are subject to stringent quality controls to ensure consistency both in the manufacture and in use. The 500 series are manufactured, as a standard, in polyurethane / nitrile 'O' ring. Other materials are available for combating the effects of temperature extremes or fluid variations.

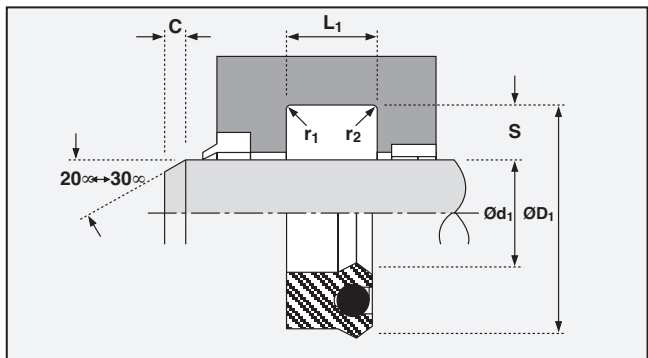
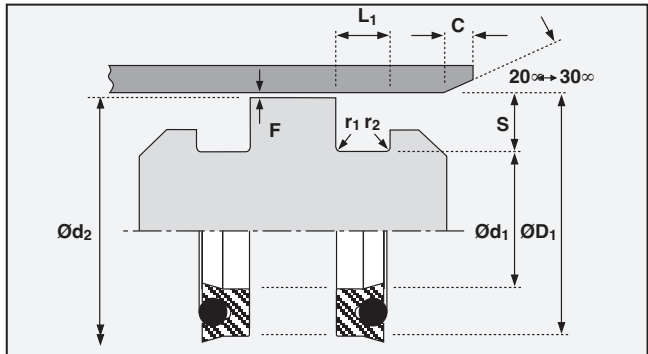
Media

All seals are suitable for mineral based hydraulic fluids. As the fluid can have enormous consequences for the life and performance, particularly at higher temperatures, it is advised that guidance is sought if non-standard fluid is used.

Extrusion Gaps

Extrusion gaps can be minimised by the use of glands or pistons with integral bearings. However, better bearing performance is often achieved by the use of remote bearings, which inevitably means that the extrusion gap is increased to achieve adequate metal to metal clearance, (refer to data sheets for individual seal types).

For this reason, guidance should be sought from the Hallite technical department if remote bearings are to be used with seals under 1/4" cross section.



500 series (inch) - specified tolerances for piston applications			
Seal Cross Section (S)	Bore Tolerance (Ød ₁)	Piston Spigot Tolerance (Ød ₁)	Groove Width Tolerance (L ₁)
1/8" (.125)	+0.002 -0.000	+0.000 -0.002	+0.015 -0.000
3/16" (.187)	+0.002 -0.000	+0.000 -0.002	+0.015 -0.000
1/4" (.250)	+0.003 -0.000	+0.000 -0.003	+0.015 -0.000
5/16" (.312)	+0.003 -0.000	+0.000 -0.004	+0.015 -0.000
3/8" (.375)	+0.003 -0.000	+0.000 -0.005	+0.015 -0.000
1/2" (.500)	+0.004 -0.000	+0.000 -0.007	+0.015 -0.000

500 series (inch) - specified tolerances for rod applications			
Seal Cross Section (S)	Rod Tolerance (Ød ₁)	Gland Bore Tolerance (Ød ₁)	Groove Width Tolerance (L ₁)
1/8" (.125)	+0.000 -0.001	+0.002 -0.000	+0.015 -0.000
3/16" (.187)	+0.000 -0.002	+0.002 -0.000	+0.015 -0.000
1/4" (.250)	+0.000 -0.002	+0.003 -0.000	+0.015 -0.000
5/16" (.312)	+0.000 -0.002	+0.004 -0.000	+0.015 -0.000
3/8" (.375)	+0.000 -0.002	+0.005 -0.000	+0.015 -0.000
1/2" (.500)	+0.000 -0.003	+0.007 -0.000	+0.015 -0.000