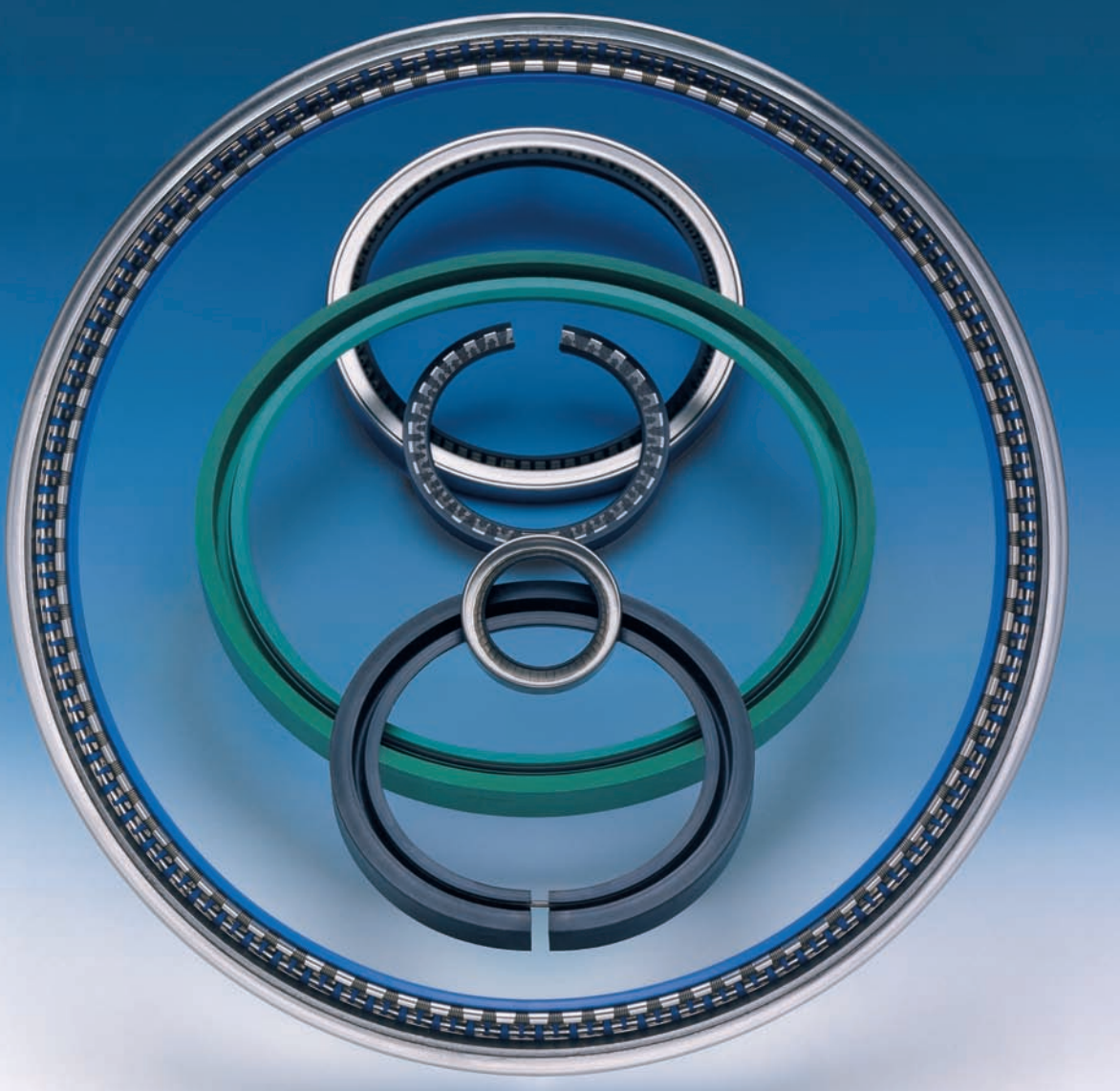


Garlock

KLOZURE Oil Seals

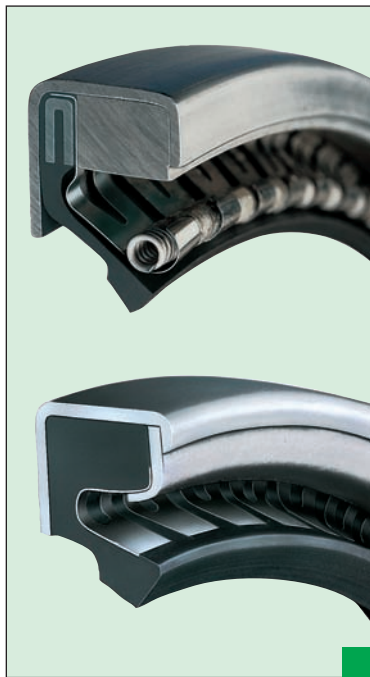


Garlock
SEALING TECHNOLOGIES®

an EnPro Industries company

KLOZURE-Oil Seals from Garlock

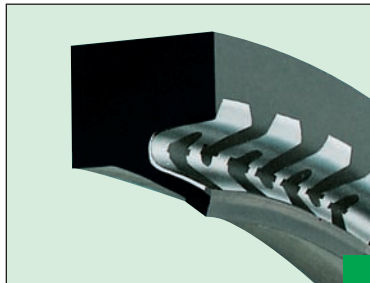
Model 64 and 59



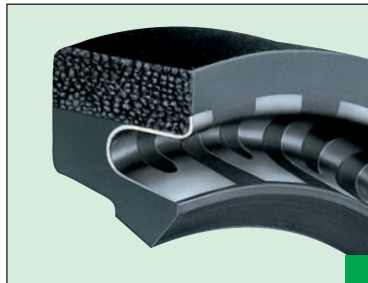
Model 53 and 63



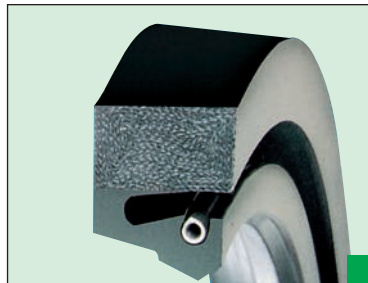
Model 23



Model 26 EU



Model 154



Coping with really demanding conditions

With or without a metal case, with special garter springs or finger springs, and in a broad range of materials ideally adapted to all sorts of operating conditions – the result of decades of experience that Garlock has accumulated in this field – our KLOZURE oil seals are the preferred choice worldwide.

Garlock's KLOZURE seals can handle extreme operating conditions – from small devices right through to very heavy machinery. For more than 60 years KLOZURE seals have been used with great success world wide in the pulp and paper industry, aluminum and steel industries. KLOZURE seals, with their carefully selected materials and user-friendly design, combine high functional reliability with long useful life. The extensive KLOZURE range has, repeatedly, provided the ideal solution for a wide variety of customer specific applications – not only for new systems but also providing alternatives to plant upgrades.

KLOZURE technology provides the answer in difficult operating conditions.

Garlock KLOZURE seals 23, 26 EU, 151, 154 and 161 are manufactured without a metal case. They are intended for applications where use of metal cased shaft seals with a metal case is not possible. All of these models are available either in split (except for model 161) or solid (endless) versions. They are, by virtue of their simple design, universally suitable for various applications and have proved their reliability in all sectors of industry.

The sealing lips are made from high-quality lowfriction elastomeric compounds, providing truly outstanding performance and are highly resistant to the adverse effects of chemicals and corrosives.

KLOZURE Model 64, 53, 63, 59

KLOZURE 64

Garlock's KLOZURE 64 is specially designed for use in particularly difficult operating conditions. It has proved indispensable in the pulp and paper, aluminum and steel industries worldwide. KLOZURE model 64 has proven its particular value in all applications involving large shaft-to-bore misalignment and high

peripheral speeds that still require high performance and reliability. The stainless heel finger springs hold the sealing lip uniformly onto the rotating shaft. Shaft-to-bore misalignment and dynamic runout are absorbed by the finger spring. The garter spring which is integrated in the finger spring only responds in the

event of extreme misalignment or runout. In conjunction with this spring assembly, the sealing lip generates a low radial force. The sealing lip is clamped in position together with the finger spring in a heavy-duty metal-case making the sealing ring dimensionally very stable, suitable for large diameter bores, and easy to install.



KLOZURE 53, KLOZURE 63

Garlock's KLOZURE 53 and KLOZURE 63 cover the requirements spectrum for smaller diameters. They share the same design as the KLOZURE 64 except that these models, intended for smaller diameter applications, incorporate the finger spring only (the garter spring is not needed). Within the

range of applications for which they are intended these seals offer similar advantages as the KLOZURE 64, functional reliability and performance.



KLOZURE 59

Garlock's KLOZURE 59 successfully combines the excellent qualities of the KLOZURE 64 model with special assembly and installation advantages. Otherwise identical to the KLOZURE 64 in terms of basic design and structure, the only difference is that the KLOZURE 59 does not operate with the KLOZURE 64's

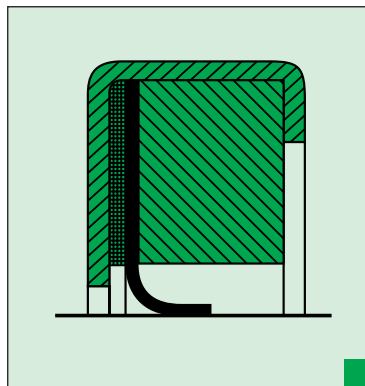
finger spring and garter spring combination but with a vulcanized finger spring instead.

Thanks to its structural design the KLOZURE 59 is easy to install – even when blind-mounting. The KLOZURE 59 is available for shafts of 150 mm diameter and above.

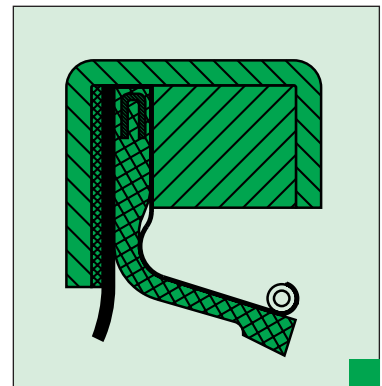


KLOZURE Specials

The highly successful Garlock KLOZURE concept can also, on request, be modified for unusual needs (e.g. peripheral speeds up to 35 meters per second and temperatures above 200 °C). The two examples show the full breadth of our spectrum of KLOZURE special solutions. For further details please contact us at Garlock. We shall be pleased to give you more information.



KLOZURE case with assembled GYLON lip



KLOZURE Model 64 with GYLON dustlip

KLOZURE Model 64, 53, 63 and 59

Technical data Model 64, 53, 63, 59

Model	Case	Spring	Shaft Diameters (mm)	Maximum Shaft Speed (m/s)	Maximum Shaft Misalignment and Runout (mm)	Available Lip Material	Installation
64	steel*	Stainless steel garter and finger spring	200 - 2300	25 35	3,0 2,4	MILL-RIGHT® N, MILL-RIGHT® ES, MILL-RIGHT® V, Silicone	press-fit
53	steel*	Stainless steel finger spring	75 - 1000	5 10 15	0,4 0,25 0,13		press-fit
63	steel*	Stainless steel finger spring	6 - 75	5 10 15	0,4 0,25 0,13		press-fit
59	steel*	Bonded in stainless steel finger spring	150 - 2300	25	2,0		press-fit

*Other materials are available on request

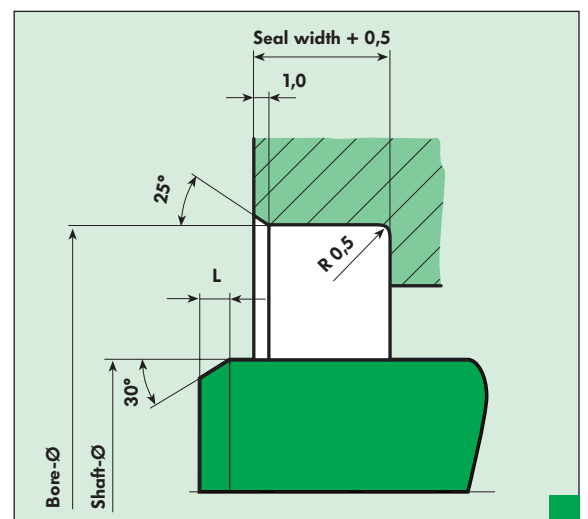
Tolerances and assembling dimensions

Shaft Diameter (mm)	Tolerances (mm)	Bore Diameter (mm)	Tolerances (mm)	Shaft Diameter (mm)	Shaft Lead Corner 'L' (mm)
up to 100	± 0,08	up to 76	± 0,025	up to 20	2,0
101 - 150	± 0,1	77 - 150	± 0,04	21 - 40	3,0
151 - 250	± 0,13	151 - 255	± 0,05	41 - 70	4,0
over 250	± 0,15	256 - 510	+ 0,05/- 0,10	71 - 130	6,0
		511 - 1015	+ 0,05/- 0,15	131 - 240	7,0
		over 1015	+ 0,05/- 0,25	over 240	12,0

Sealing surface requirements

Shaft Speed (m/s)	Surface Finish		min. Surface Hardness (HRC)
	Ra (µm)	Rmax (µm)	
up to 10	0,5 - 0,6	2,0 - 3,0	30
11 - 16	0,3 - 0,5	1,0 - 2,0	40
over 16	0,2 - 0,3	0,8 - 1,0	40

Obtained by plunge grinding



KLOZURE Model 23, 26 EU, Universal Oil Seals Model 151, 154, 161, 154-M



Model 23 Split

Certain situations where installation is particularly difficult may require a split sealing ring.

This is where Garlock's KLOZURE 23 Split comes into its own. It is manufactured from homogeneous rubber compound and incorporates stainless steel fingers springs vulcanised into the lip. Thanks to this finger spring design the KLOZURE 23 Split sealing ring can be easily installed and will operate reliably and trouble-free. Garlock's KLOZURE 23 has proven its value in the construction of heavy machinery, in rolling mills, paper-making machines, marine motors, earth movers, gear systems, and as wipers in hydraulic applications. The KLOZURE 23 must always be installed with a cover plate. It is suitable for non-pressurized applications only.



Model 26 EU

Garlock's KLOZURE 26 EU is a sealing ring without a metal-case. Its homo-

geneous elastomer compound and reinforced heel ensure that the ring is axially stable. Thanks to its structural design the KLOZURE 26 EU is easy to use and install, even in difficult positions where it has to be blind-mounted, the sealing lip cannot flip over and the spring be dumped. In cases where a split sealing ring is used, a cover plate is required. The KLOZURE 26 EU is used predominantly in the pulp and paper, aluminum, and steel industries. In the steel industry in particular it has proved indispensable for working rollers. Other applications include blowers, pumps, mining machinery, general mechanical engineering and machine construction. When installed together with its cover plate the KLOZURE 26 EU can be used with pressures up to 1 bar.

Range of applications and design features

The cross-section of KLOZURE sealing rings is comprised of three elements. The heel is substantially dimensioned, with fabric-reinforced elastomer for supporting the sealing ring against the housing bore (not on model 23). The sealing lip with its integrated stainless steel garter spring (models 151, 154, 161) ensures that this design can also cope with large shaft-to-bore misalignment and dynamic run out. These Garlock sealing rings are used predominantly in the pulp and paper, aluminium, and steel industries, in the construction of heavy machinery, and particularly in gear boxes and pumps. KLOZURE sealing rings have been used with great success for many years and the variety of seal has grown in response to customers' special requirements.

Technical data Model 23, 26 EU, 151, 154, 161, 154-M

Model	Spring	Shaft Diameters (mm)	Maximum Shaft Speed (m/s)	Maximum Shaft Misalignment and Runout (mm)	Available Lip Material	Installation
23	Bonded in stainless steel finger spring	75 - 3050	5 10	0,25 0,13	MILL-RIGHT® N, MILL-RIGHT® ES, Silicone, MILL-RIGHT® V	Cover plate recommended
26 EU	Bonded in stainless steel finger spring	20 - 1500	25	0,5	NBR, MILL-RIGHT® E, Silicone, Fluoroelastomer	Cover plate required
151	stainless steel garter spring	up to 2400	25	1,5*	NBR, MILL-RIGHT® E, Silicone, Fluoroelastomer	Cover plate required
154	stainless steel garter spring	up to 2400	25	1,5*	NBR, MILL-RIGHT® E, Silicone, Fluoroelastomer	Cover plate required
161	stainless steel garter spring	up to 2400	25	0,25*	NBR, MILL-RIGHT® E, Silicone, Fluoroelastomer	Cover plate required
154-M	stainless steel garter spring	up to 2400	25	1,5*	NBR, MILL-RIGHT® E, Silicone, Fluoroelastomer	No cover plate required

All oil seals are available in split and endless version

Model 23 only in split version / Model 154-M and 161 only in endless version

* For more information please see the technical instruction on page 9

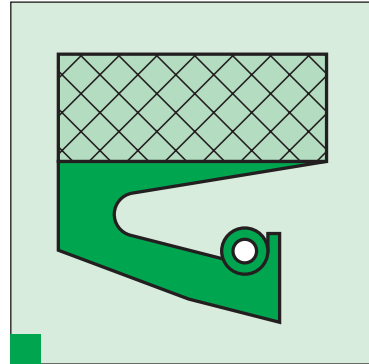
KLOZURE Universal Oil Seals

Universal Oil Seal

Garlock's Universal oil seals are not called this for nothing. They really can be used anywhere. They can also be supplied in many different materials and profiles. Your Garlock advisor will be pleased to give you further detailed information regarding application possibilities tailor-made for your specific conditions.

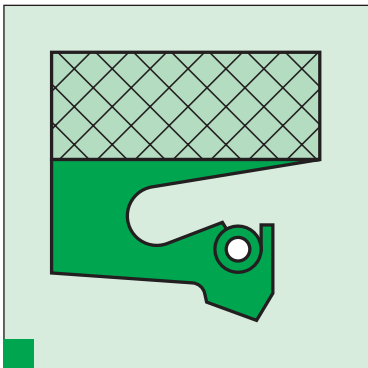
Model 151

Universal oil seal can be supplied in two versions, either split (151-1) or endless (151-2). This is an old and established sealing lip design.



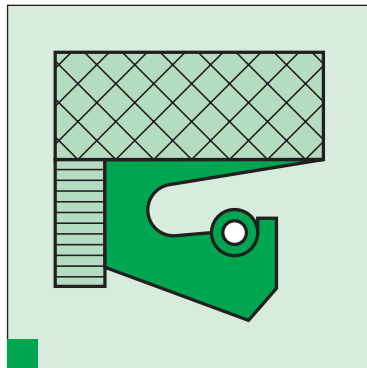
Model 154

Universal oil seal can be supplied in either split (154-1) or endless (154-2), and with a new enhanced sealing lip design.



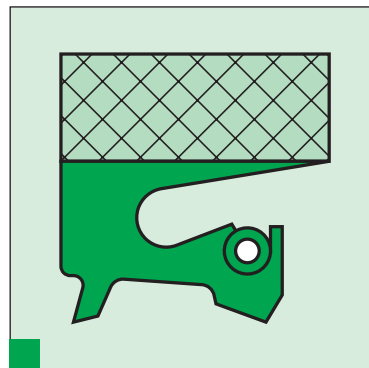
Model 161-0

Universal oil seal is available in an endless version only, with PTFE backup ring, for pressurised applications.



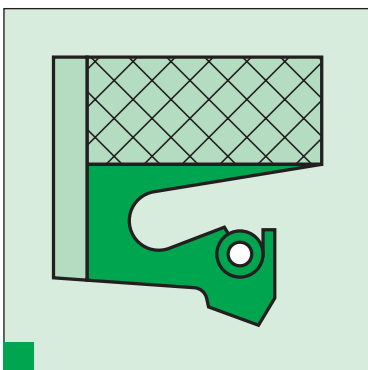
Model 154-DL

Universal oil seal 154-DL incorporates a dust lip.



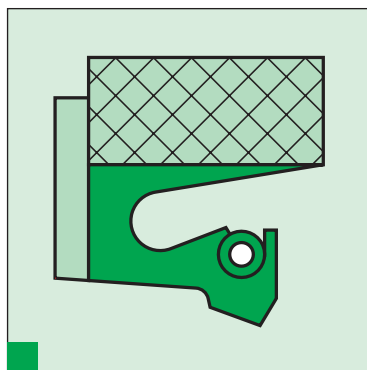
Model 154-P

Universal oil seal 154-P incorporates radial lubrication grooves.



Model 154-PG

Universal oil seal 154-PG incorporates radial and peripheral lubrication grooves.

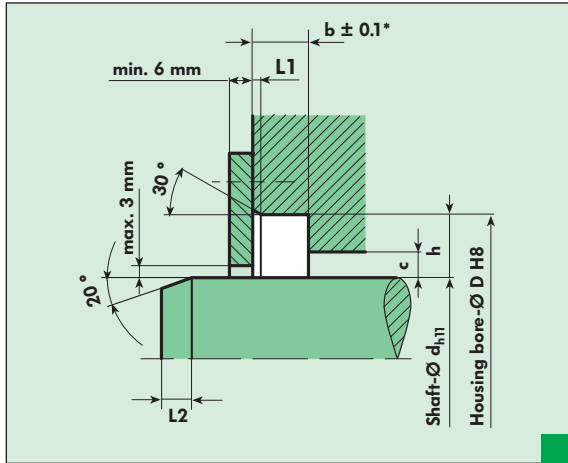


Model 154-M

Universal oil seal 154-M incorporates a metallic reinforcement ring moulded into the heel and can be installed without a cover plate.



KLOZURE 23, 26 EU and Universal Oil Seals



Model 23 split, metric dimensions

Shaft Diameter (mm)	Cross Section Radial Height h (mm)	Cross Section Axial Width b (mm)	Clearance c _{max} - c _{min} (mm)
70 - 250	12,5	12,5	3,75 - 6,25
120 - 350	15,0	15,0	4,5 - 7,5
250 - 500	20,0	20,0	6,0 - 10,0
400 - 1500	25,0	20,0	7,5 - 10,0

These metric cross-sections are the standard KLOZURE 23 series available from stock. On request the KLOZURE 23 version is also available measured in inches

Model 23, 26 EU, 154, 151, 161

Shaft Diameter (mm)	L1 (mm)	L2 (mm)
up to 50	1,1	5,0
51 - 100	1,6	6,0
101 - 250	2,0	7,5
251 - 400	2,2	9,0
401 - 600	2,5	11
601 - 1800	3,2	20

* This applies for one sealing ring. If two sealing rings are being used in one mounting recess, choose the tolerance +0.1/+0.3

Calculating the bore diameter

The bore diameter D is calculated as follows:

$$D = d + (2 \cdot h)$$

Clearance: max. $0,5 \cdot h$

min. $0,3 \cdot h$

Installation dimensions and tolerances

For the dimensions of Garlock universal sealing rings available, please refer to the tools lists.

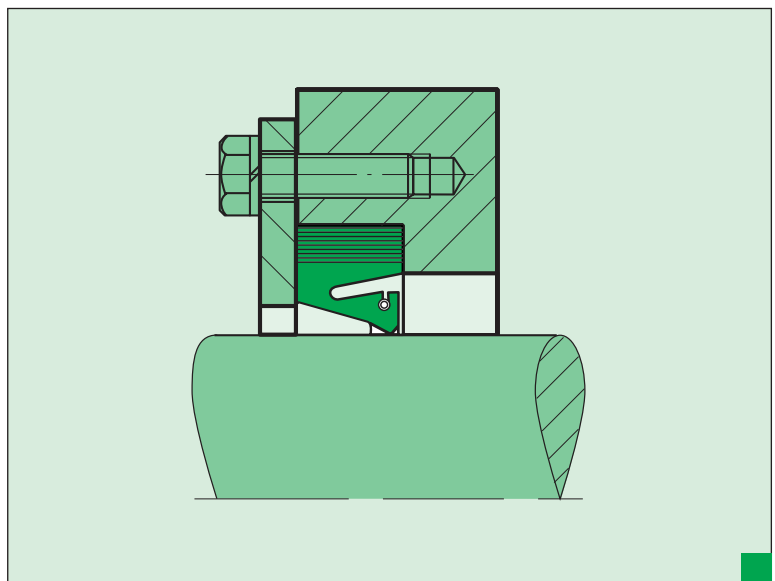
For KLOZURE 23 and KLOZURE 26 EU, please inquire separately.

Our installation diagrams and the associated tables contain all the data required to properly and reliably calculate the dimensions of a shaft seal using Garlock KLOZURE 23, 26 EU and Garlock Universal oil seals.

Sealing surface requirements

Shaft Speed (m/s)	Shaft Finish		min. Shaft Hardness (HRC)
	Ra (µm)	Rmax (µm)	
up to 10	0,5 - 0,6	2,0 - 3,0	30
11 - 16	0,3 - 0,5	1,0 - 2,0	40
over 16	0,2 - 0,3	0,8 - 1,0	40

The shaft surface must be ground smooth without any nicks, gouges, or other surface defects. Please refer to the list of sealing lip materials on page 11



KLOZURE Universal Oil Seals – Technical instructions

Shaft speed

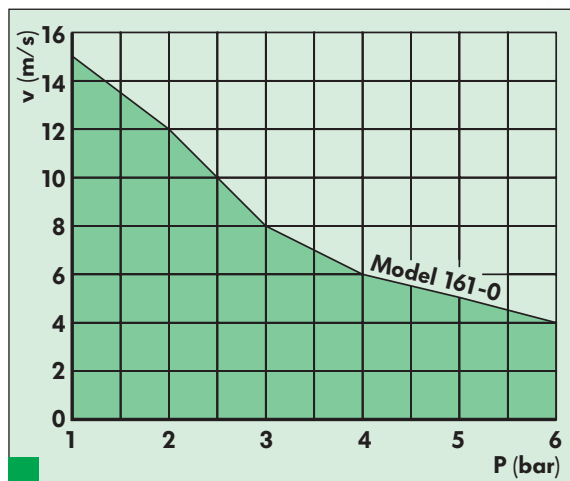
Garlock Universal Oil Seals Model 151 and Model 154 can, in otherwise ideal conditions, be used for peripheral speeds of up to maximum 25 metres per second. With Garlock Universal Oil Seal Model 161, the maximum permissible shaft speed depends on the pressure. For further details, please refer to the diagram in the section entitled "Pressure".

Pressure

Split Universal Oil Seals Model 151-1 and Model 154-1 are not designed for applications involving exposure to pressure. Models 151-2 and 154-2 can, depending on shaft speed, be used in applications involving pressure differentials as per DIN 3760.

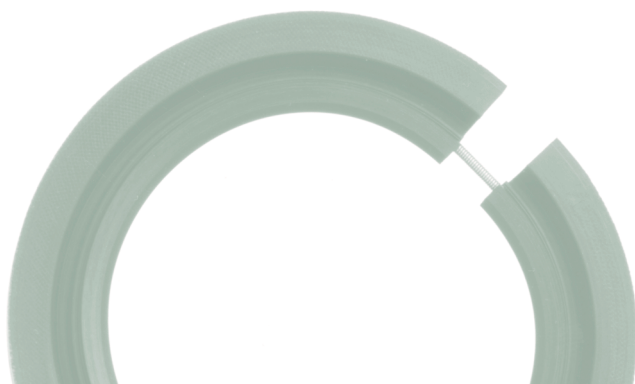
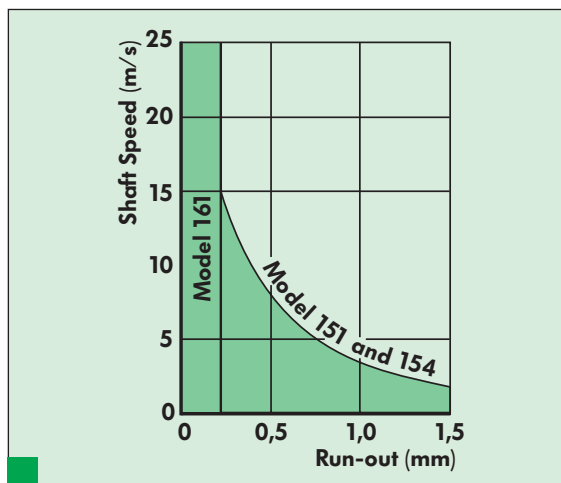
The maximum permissible pressure is 0.5 bar.

Model 161-0 is designed for higher pressure-applications. It can withstand pressures, depending on shaft speed, as shown in the pressure diagram.



Shaft-to-bore misalignment and dynamic runout

Thanks to their design and construction Garlock universal sealing rings can absorb considerable radial shaft-to-bore misalignment and dynamic run-out. The maximum radial play depends on the cross-section diameter of the sealing ring and the shaft speed. The maximum permissible radial excursion as a combination of shaft-to-bore misalignment and dynamic run-out is shown in the following diagram.



Model 23, 26 EU and 151, 154, 161 – Assembly and installation

Lubrication

The essential pre-requisite for a long useful life is to ensure that the sealing lip is always adequately lubricated. If lubrication is not provided by the medium itself then it must be supplied separately utilising the radial or peripheral grooves in the seals.

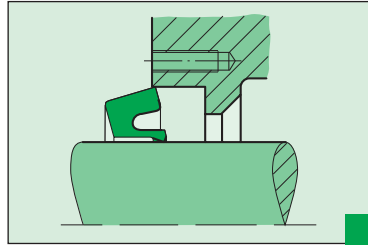


Fig. 1

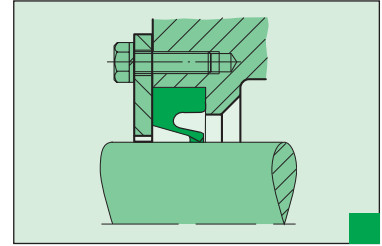


Fig. 2

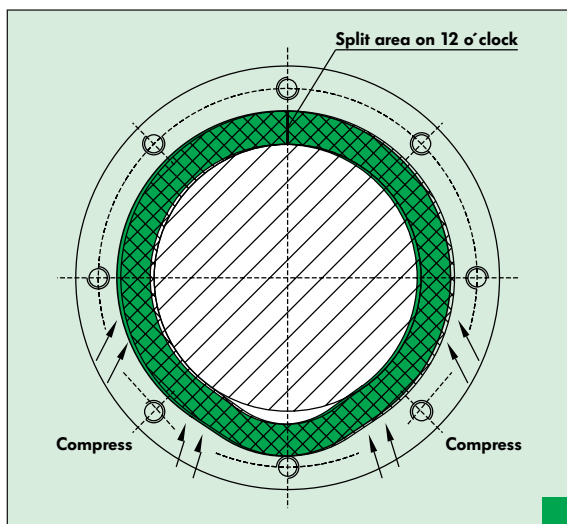
Installation instructions

- Garlock Universal Oil Seal Models' 151, 154, 161, 23 and 26 EU (split) must be installed with a retainer ring. Also with a view to achieving optimal sealing the external diameter of the sealing ring is made slightly larger than that of the housing bore. To facilitate installation the housing bore should be chamfered.

- Universal Oil Seal Models' 151, 154 and 26 EU are available in both split and endless versions. Before installing, check the sealing rings for signs of damage dust and dirt and apply lubricant to the sealing lip.
- Clean the housing recess.
- In the case of horizontal shafts the split must be positioned at 12 o'clock. In tandem arrangements the joint must be positioned at 11 o'clock / 1 o'clock. First the split must be placed in the housing recess (see Figure 1). Then the seal must be pressed slowly in to the housing recess. Then the retainer ring must be fitted and tightened (see Figure 2). After installation check that the sealing lip sits snugly in position all around the shaft.

Additional information for cover plates

The cover plate can be either split or solid. It should be a minimum thickness of 6 mm to avoid distortion that the sealing rings are correctly positioned.



All information and recommendations contained in this catalogue are based on many years of experience and the current state of technology.

Unknown factors may, however, limit generally accepted knowledge. Binding statements regarding the compatibility of our products are therefore possible only after practical onsite tests under operating conditions. Information contained in our catalogue does therefore not

constitute or imply any representation of warranty. While the utmost care has been used in compiling this catalogue, we assume no responsibility for errors. Specifications subject to change without notice. This edition cancels all previous issues. Subject to change without notice.

Our staff will be pleased to assist you in finding the optimum sealing solution. Use this offer and contact Garlock before your decision.

KLOZURE from Garlock – The comprehensive seal

Lip material selection chart

Material*	Areas of application	Operating temperature**
Nitriles NBR MILL-RIGHT® N	Lubricants, hydraulic oils, and greases based on mineral oil, water*, HFA-, HFB*, HFC-fluids, washing liquids.	-40 to +120 °C
MILL-RIGHT® E MILL-RIGHT® ES	Lubricants, hydraulic oils, and greases based on mineral oil, water*, HFA*, HFB*, HFC*-fluids, washing liquids. Higher temperature stability than nitrile rubber. Excellent resistance to wear.	-40 to +175 °C
Silicones VMQ	Vegetable oils, oils with a high aniline point, motor and engine oils, gear oils. Medium resistance to swelling in mineral oils and greases. Not suitable for aliphatic and aromatic hydrocarbons. Good temperature stability and cold flexibility.	-60 to +175 °C
Fluoroelastomers FKM MILL-RIGHT® V	Mineral fluids and lubricating greases, HFA-, HFB*, HFC*, HFD-fluids, water*, chemicals, solvents. Not suitable for some hardly inflammable, phosphoric-ester-based fluids (e.g. Pydraul 10E)	-30 to +205 °C

* Additional lubrication recommended

** Maximum temperatures for continuous operation are 15 % lower



Product Range



Hydraulic Components



Oil Seals



Compression Packings



Gasketing Products



Metallic Gasketing



Inflatable Seals



Mechanical Seals



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