



MODIFICATION OF SIMMERRINGS®

Simmerring® features – flexible & application-oriented

The Freudenberg Sealing Technologies (FST) catalog program for Simmerrings® covers a wide range of sealing applications, including a variety of different dimensions, designs and materials. Nevertheless, specific operating conditions may require a seal that is tailored to the application in order to ensure a proper sealing function or to increase the service life of the sealing point. For this reason, we make it possible to optimize existing Simmerrings® from our extensive catalog range by making modifications to them.

[To the e-Catalog from Freudenberg Sealing Technologies](#)

Modification of the dust lip at high circumferential speeds

Simmerrings® from the catalog program equipped with a dust lip offer optimal protection of the sealing lip against light external contamination by dust or splash water, while the dust lip is in contact with the shaft. At circumferential speeds of the shaft > 8 m/s, suction of the sealing lip and dust lip on the shaft surface occurs, generating increased friction, thermal stress and premature wear. Therefore, depending on the operating conditions, we recommend using seals with a dust lip in contact with the shaft up to a maximum circumferential speed of the shaft of 8 m/s.

If, in an application, the circumferential speed of the shaft is > 8 m/s and an external dirt load requires a design with a dust lip, a modified component with a **vented dust lip** can offset the suction of the lips towards the shaft and at the same time provide protection against external contamination (Fig. 1).

The circumferential speed of the shaft > 15 m/s requires a modified catalog Simmerring® with a **shortened dust lip** without overlap to the shaft (Fig. 2). Small clearance between the dust lip and the rotating shaft does not generate any additional friction. At the same time, the dust lip offers a certain degree of protection against larger contamination particles, despite its slight shortening.

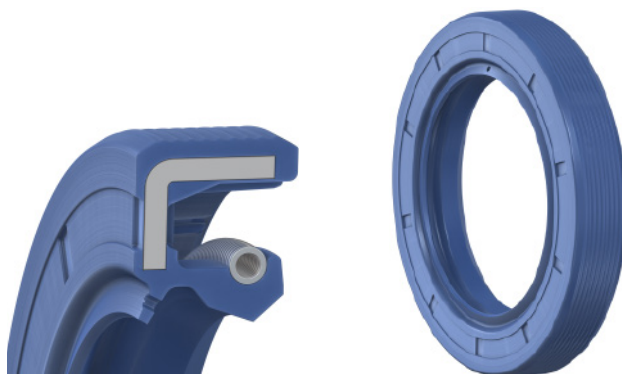


Fig. 1 BAUMSL with a vented dust lip

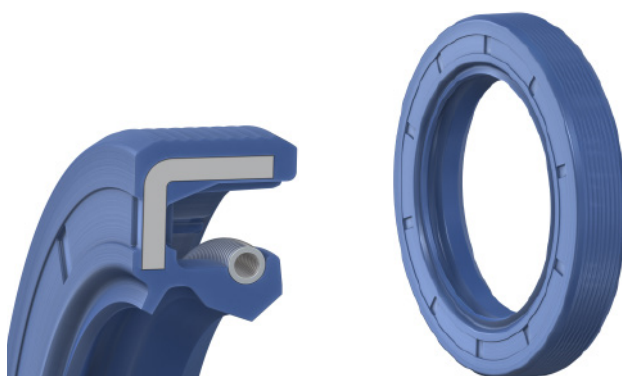
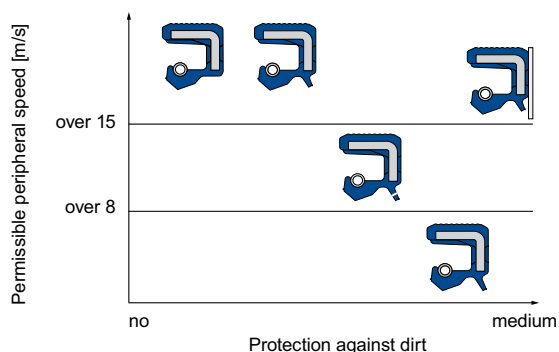


Fig. 2 BAUMSL with a shortened dust lip



Modified Simmerrings®

Simmerrings® with a modified spring

If an application generates an increased circumferential speed of the shaft, the elastomer material of the sealing edge and the lubricant may be subjected to high thermal stress, especially if the lubricant supply to the sealing point is insufficient. Depending on the technical conditions inside the unit, the friction and thus the temperature development can be significantly reduced by **reducing the spring force** resulting in a lower total radial force. This leads to a longer service life and energy efficient improvement in the system.

If there are high vibrations or there is a high radial runout of the shaft during operation, the **spring force** and thus also the total radial force generated can be **increased** in applications with limited circumferential speed. This improves the ability of the sealing lip to follow radial motions of the shaft.

If a rotary shaft seal is subject of a water or corrosive media ingress, it can cause corrosion, especially of the spring, if it is not made of a **corrosion-resistant material** (stainless steel). By replacing the standard spring with a stainless steel spring, the catalogue Simmerring® can be optimized to meet the specific requirements of the application.

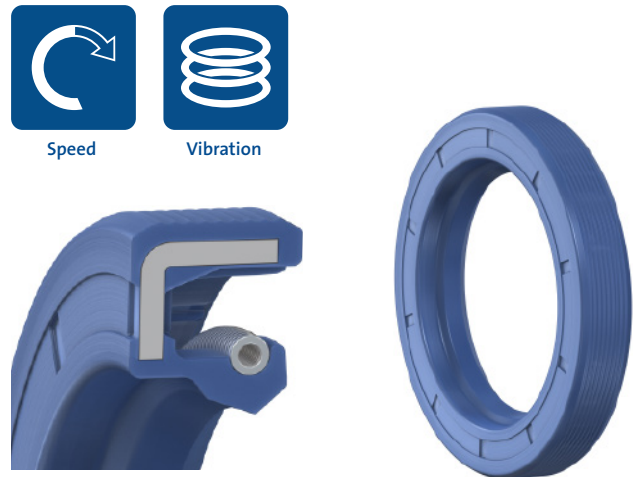


Fig. 3 Simmerring® with a reinforced spring

Technical specification	Modification	Benefit
Increased circumferential speed	Special spring with reduced spring force	Reduces friction and temperature inside the system
Vibrations and shaft runout	Special spring with increased spring force	Increases the robustness of the sealing system
Corrosion	Stainless steel spring	Ensures the functionality of the spring

Combination with a non-woven excluder lip for increased protection against external contamination

If there is a high contamination environment that exceeds the application limits of a conventional Simmerring® with a dust lip, a **modified catalog component combined with a non-woven excluder lip** from Freudenberg can be used (Fig. 4). The non-woven materials being used can hold back dry dust and/or damp dirt. At the same time, however, the open-pored structure of the material prevents the non-woven excluder lip and the seal edge from being sucked on the shaft at high peripheral speed. The non-woven excluder lips also generate low friction with the shaft. The installation height is only slightly affected by the use of a non-woven excluder lip. This means that smaller heights can be achieved than with special designs or in conjunction with additional sealing elements.

Technical specification	Modification	Benefit
Increased dirt impact due to dry dust or damp dirt	Combination with a non-woven excluder lip in application-specific material	additional protection against dirt wear resistant and low friction space-saving solution

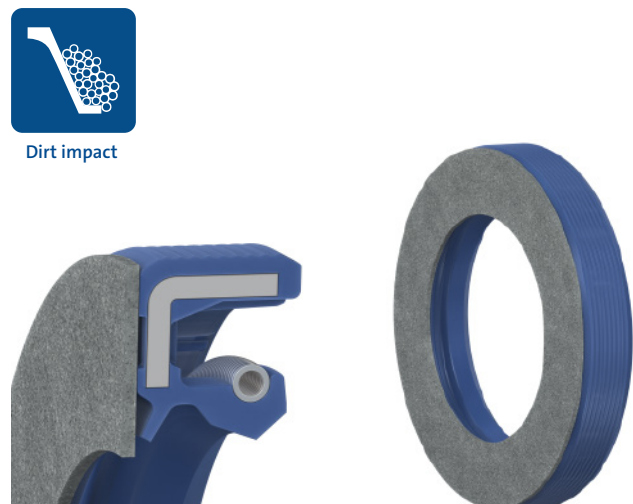


Fig. 4 BAUMSL combined with a non-woven excluder lip – for external loading of dirt

Combination with an eCON electrically conductive non-woven washer as an equipotential bonding element for protecting bearings

Potential build-up between the shaft and the housing during operation can lead to voltage flashovers and, damage to the surface of bearing shells, for example. An **electrically conductive non-woven washer** provides equipotential bonding between the housing and the shaft and helps to increase the service life of the bearing and the overall system in critical applications. The installation height is only slightly affected by the use of the eCON. This means that significantly smaller installation heights can be achieved than with conventional equipotential bonding elements.

More information: Sales Sheet eCON

Technical specification	Modification	Benefit
Different electric potential between the shaft and the housing	Combination with an eCON electrically conductive non-woven washer	reliable electric discharge between the housing and the rotating shaft low friction space saving solution



Electrical potential

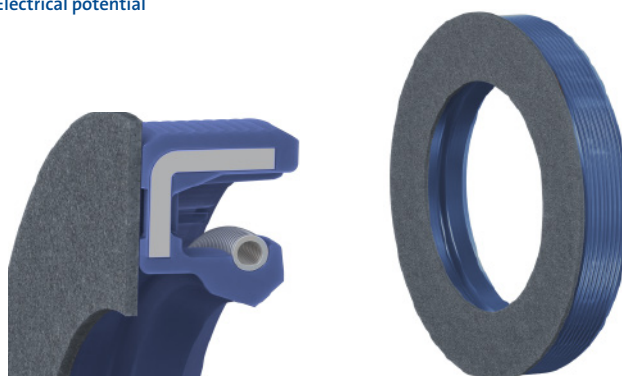


Fig. 5 BAUM with an eCON combined electrically conductive non-woven washer

Combination with a PTFE excluder lip for external contact with aggressive media

Contact with aggressive media can lead to chemical attack of the elastomer material. Particularly if systems need to be cleaned regularly, a **PTFE excluder lip** fitted onto the air side can protect the seal from contact with the aggressive cleaning media (CIP/SIP). Solutions with food-grade PTFE materials are also available for food & beverage applications. The installation height is only slightly affected by the use of a PTFE excluder lip. This means that smaller heights can be achieved compared to conventional solutions in conjunction with additional sealing elements.

Technical specification	Modification	Benefits
Increased external contamination due to aggressive media (e.g. cleaning media)	Combined PTFE sealing element	very high protective function very high chemical resistance space-saving solution application according to hygienic design, free from dead space food grade PTFE sealing element



Medium

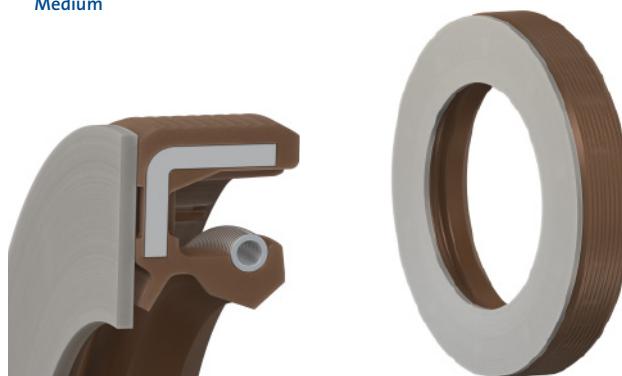


Fig. 6 Simmerring® combined with a PTFE excluder lip

Modified Simmerrings®

Pre-greased dust lip

Simmerrings® with a dust lip which has an overlap to the shaft must be lubricated by using a **grease pack** that is applied before assembly. The amount of grease used is extremely important. Too little grease leads to lubrication of the dust lip for a limited time only. If too much grease is applied before assembly, the grease can be forced out of the grease chamber between the shaft and the dust lip when the temperature increases. The escaping medium can then be interpreted by the end customer as oil leakage. This so-called false leakage can be avoided by greasing the Simmerring® properly.

Technical specification	Modification	Benefits
Pre-greasing	<p>Grease pack between the sealing lip and the dust lip</p> <p>Standard lubricant: Klüber Petamo GHY 133N</p> <p>High-performance lubricant: Klüber-synth R42-111</p> <p>Storage life 36 months</p>	<p>Know-how regarding compatibility of elastomer materials and lubricants</p> <p>Appropriate application of grease to avoid sources of defects</p> <p>Service support</p>

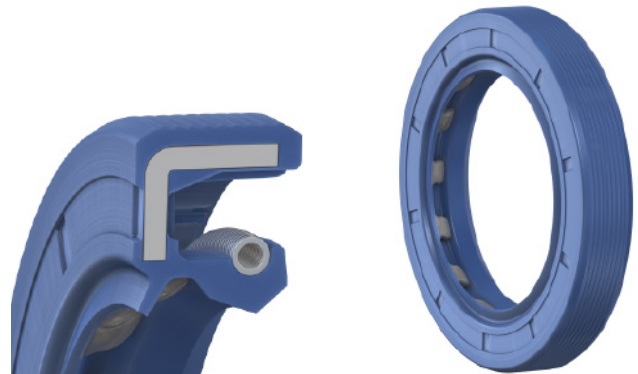


Fig. 7 BAUMSL with a greased dust lip

Simmerrings® with FKM plus coating

When sealing synthetic lubricants, such as modern polyglycol oils, partial deficient lubrication can occur in the contact zone between the sealing lip and the shaft in some applications due to the poor wetting properties of the lubricant. This can result in increased seal lip wear and shaft run-in.

The **75 FKM 585 plus coating** is an innovative technology for modifying the sealing lip surface. It improves the wetting behavior of the sealing lip of Simmerrings® made of 75 FKM 585 for use with synthetic oils.

More information: [Sales Sheet FKM plus](#)

Technical specification	Modification	Benefits
Use of synthetic lubricants with insufficient wetting properties of the sealing lip	FKM plus coating	<p>Improvement of contact lubrication</p> <p>Reduction of friction</p> <p>Reduced sealing lip and shaft wear</p> <p>Increased service life</p>

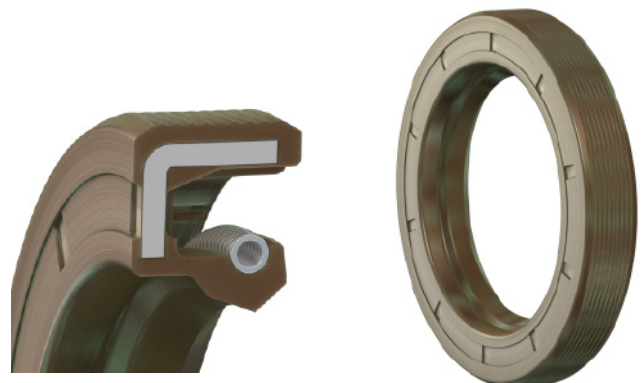


Fig. 8 Simmerring® with FKM plus coating

Modified Simmerrings®

Simmerrings® in combination with backup rings

Some applications require Simmerrings® that can withstand pressure loads, such as the standard BABSL design.

If no Simmerring® BABSL is available in desired sizes or if the pressure load is only applied for a short time, a BAUM profile without a dust lip that is supported by a **backup ring** can be used under certain operating conditions. As a rule, backup rings can be used up to a pressure of a maximum of 1-2 bar. This depends on the remaining operating conditions (temperature, speed, etc.), among other factors.

The design of the backup ring must be adapted exactly to the sealing lip profile. For this purpose, you can request the corresponding drawing of the backup ring from us by simply providing us with the exact article designation or article number.

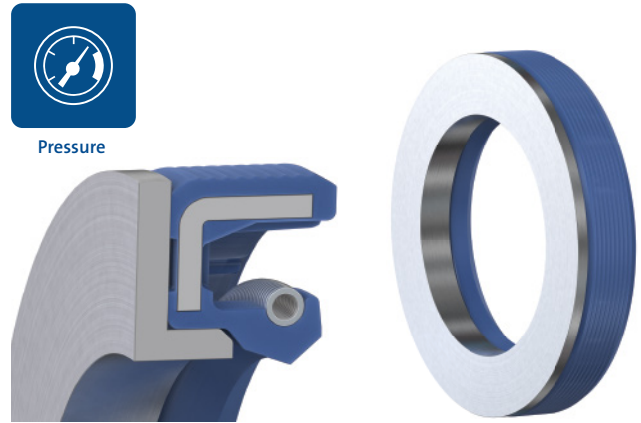


Fig. 9 Simmerring® with backup ring

USE OF THE EXTENSIVE SIMMERRING® CATALOG PROGRAM AS A BASIS FOR MODIFICATIONS

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