



The coated ISC O-Ring –
Reliable assembly, better performance

simrit[®]

Simrit® , Your Global Technology Specialist for Seals and Vibration Control

Simrit, Your Global Technology Specialist for Seals and Vibration Control offers you a complete service package. A unique range of products and services guarantees you numerous advantages over the competition.

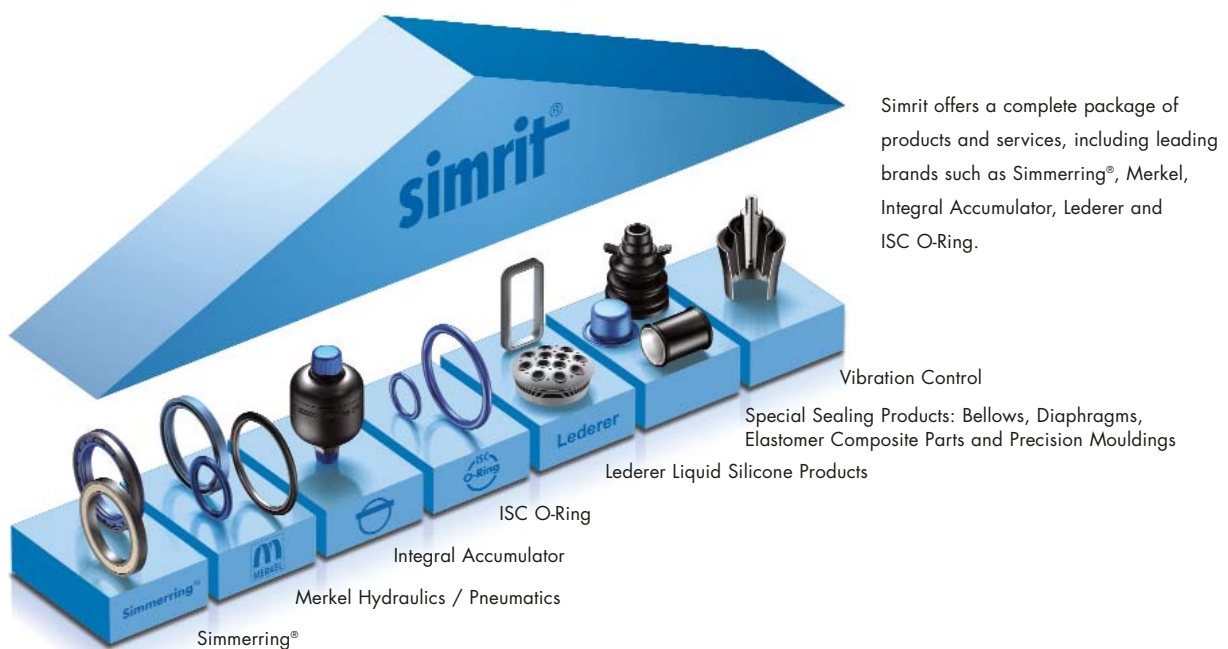
Simrit acts as a partner to general industry. Its position as a market leader is achieved through continuous research, development and manufacture. We have the world's widest range of seals and vibration control products, and can offer you solutions based on the demands of state-of-the-art-technology, solutions which set standards.

This way we secure competitive advantages for you based on experience all around the world: Simrit has a presence throughout Europe, America and Asia, either directly or through its affiliated companies NOK (Japan) or Freudenberg-NOK (USA). The transfer of knowledge between these markets is incorporated directly into the Simrit service package.

With our many Simrit Service Centres and Simrit distribution Partners, we serve and supply more than 100,000 customers worldwide. Our Simrit Partners ensure rapid availability from stock. This means spare parts quickly arrive when and where they are needed. There is a Simrit Partner near you as well.

Make the most of Simrit's service package and give yourself a real competitive edge:

- + Constant innovations
- + Uniquely wide range of products
- + Strong product brands
- + Unique materials expertise
- + A wide range of value added services



Simrit offers a complete package of products and services, including leading brands such as Simmerring®, Merkel, Integral Accumulator, Lederer and ISC O-Ring.



The coated ISC O-Ring from Simrit

The coated ISC O-Ring, X-Ring and special designs from Simrit are the optimal sealing solutions for meeting the customers technical requirements. This not only involves requirements regarding the actual use of seals but also demands on upstream processes such as handling, separation and the installation of sealing components.



Benefits of the coated ISC O-Ring:

- Simplified Assembly
- Reduced insertion force
- Suitable for dynamic Applications

Improved reliability in the assembly process

The resulting reduction in contact friction with a coated ISC O-Ring prevents the adhesion to machine parts during the feed process. Sticking of the individual O-Rings is also avoided in this process step.

Compared to oiled O-Rings, the possible introduction of contaminants to the subassembly by foreign particles is greatly reduced through the use of a coated ISC O-Ring. During assembly damage to the ISC O-Ring is avoided thanks to low friction coefficients as well as the ring's tendency to twist.

Overall the coated ISC O-Ring makes a major contribution to a smooth running production process.

The coated ISC O-Ring – Your benefits at a glance

Benefit 1 Simplified assembly

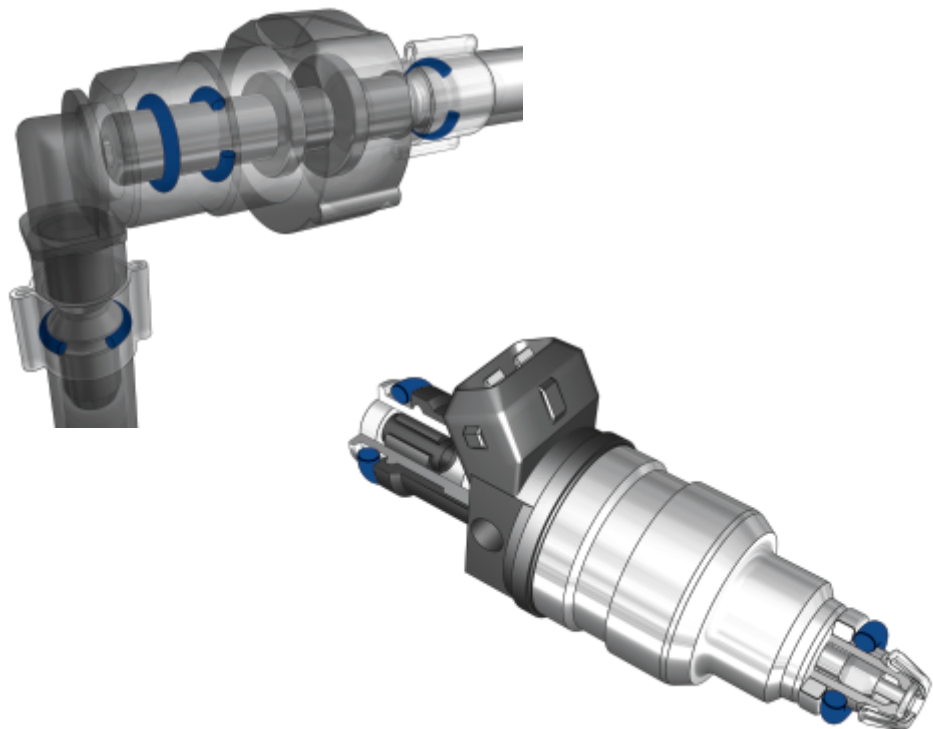
- Avoidance of damage during assembly
- No adhesion of the ISC O-Ring during feeding for assembly
- No twisting of the ISC O-Ring during installation
- No contamination of the assembly line through oiling

Benefit 2 Reduced insertion force

- Reduced worker-friendly insertion force
- Uniform insertion force with repeated installation and dismantling
- Reduced “shear-off” risk

Benefit 3 Suitable for dynamic applications

- Reduced O-Ring abrasion and wear
- Reduced friction in operating state
- Increased service life



Surface Coating (SC) families for the ISC O-Ring

Your benefit	SCA Slip coating	SCB Slip coating	SCC Halogenation
Simplified assembly	+++ No adhesion No stick-slip	+++ No adhesion	+
Reduced insertion force	+++ Highly reduced insertion force	++ Moderately reduced insertion force	+
Suitable for dynamic applications	++ Improved lubrication on start-up, dry-running characteristic	+++	+++ Dynamic applications only with greasing
Properties			
Layer property	Dry slip coating layer containing silicone	Dry slip coating layer not containing silicone	Structural coating with depot effect Dry surface
Layer thickness (typical)	black, 3–35 µm colourless, 3–15 µm	– SCB (PTFE): black, colourless, opal, tinted, 5–10 µm – SCB (MOS ₂): silvery, 5–20 µm	Changed surface characteristics
Suitable for following materials	EPDM, FKM, NBR	– EPDM, FKM, NBR, HNBR – SCB (PTFE) with FDA approval – SCB (MOS ₂) with KTW approval	NBR, HNBR
Resistance to media	– passes Labs test – DOT4 (brake fluid) – fuel-resistant	– passes Labs test – engine oil resistant	Only depending on elastomer material and additional lubricating medium
Operating temperature range	– approx. –40°C to +230°C (depending on elastomer material)	– SCB (PTFE): approx. –40°C to +120°C/+200°C – SCB (MOS ₂): higher (depending on elastomer material)	Only depending on elastomer material

+++ : highly suitable / ++ : quite suitable / + : suitable

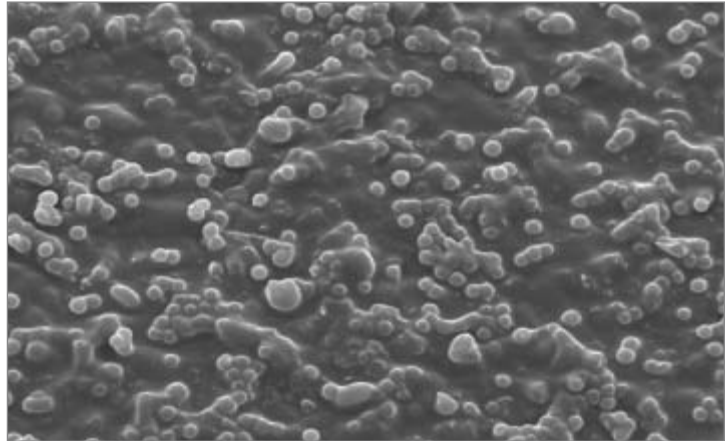
SCD Powder coating	SCE Oils	SCE Waxes	SCP Plasma treatment
+	++	++	+++
No stick-slip	No stick-slip	No stick-slip	No adhesion
+	+++	+++	+
Lightly reduced insertion force	Highly reduced insertion force	Highly reduced insertion force	Lightly reduced insertion force
+++	+	+	++
Lubrication on start-up, dry-running characteristic			
MOS ₂ , talcum	Oily layer, Oil film	Surface with lubricating and separating wax	Dry surface Antistatic
approx. 1–5 µm, silvery-grey	**	**	approx. 0.5–30 µm iridescent/matt
All materials	All materials with FDA approval	for certain EPDM materials	EPDM, FVMQ*
– Resistant to oil and grease – Not resistant to acids and alkalis	– does not pass Labs test – can be washed off with detergents	Can be attacked by solvents	Only depending on elastomer material
– –40°C to +250°C (depending on elastomer material)	approx. –0°C to +50°C (depending on elastomer material)	– best property at room temperature – not over +50°C for a lengthy period	Depending on elastomer material

* Soiling tendency of FVMQ greatly reduced by SCP treatment on a lasting basis.

** Because of the fluctuation in the coating thickness, the thickness of oil-waxes ist not measurable.

**Range of coatings:
Surface Coating (SC)
families of the ISC O-Ring**

The different SC families are geared to individual key requirements. Within every SC family there is a wide range of coating variants characterised by graduated modification. This allows application-specific requirements to be taken into account. There are also numerous standard approvals (KTW, FDA etc).

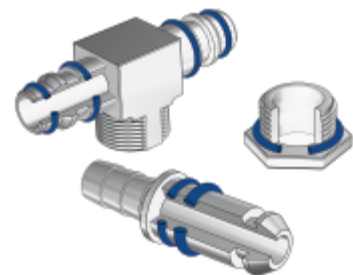
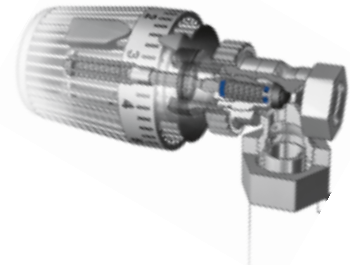


Surface of coated ISC O-Ring showing the example of the Surface Coating variant A (SCA)



Application example

- Valve
- Axial and rotating piston
- Brake
- Gearbox
- Air conditioning
- Food processing industry
- Engine
- Plug system/Quick Connector
- Pump



Benefits of coated ISC O-Ring

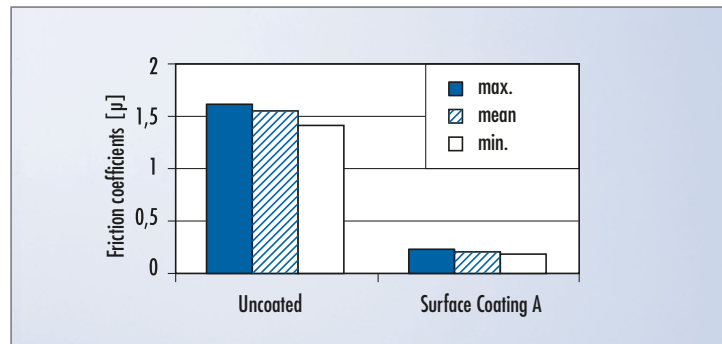
Reliable assembly through reduced friction

The friction forces occurring during assembly are greatly reduced with the coated ISC O-Ring. This means the risk of damage to the ISC O-Ring is much lower during assembly. Installation and dismantling also become faster thanks to the coating. When a coated ISC O-Ring is used for a plug system, very low forces are required for assembly. With Surface Coating A (SCA) for example, the low friction and insertion forces are reduced by approx. 85%.

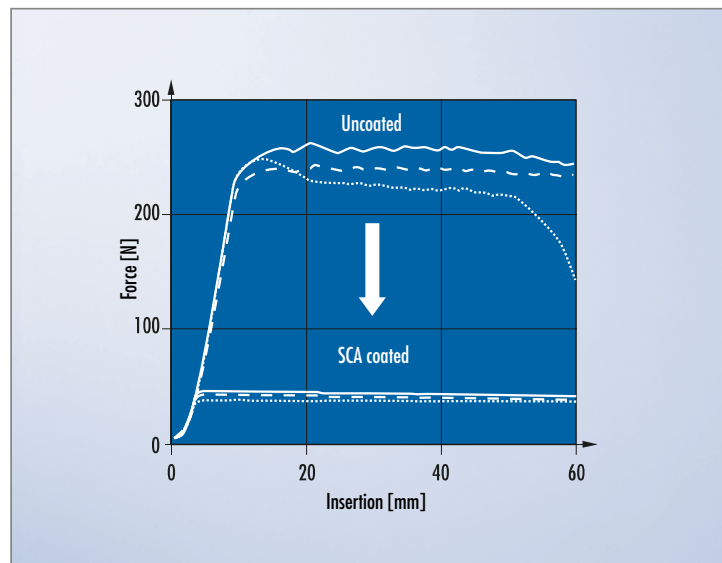
Low stresses on the ISC O-Ring and system

Low friction is very important for dynamic applications using ISC O-Rings. There is a marked reduction in friction on the O-Ring, thus increasing the service life to a major extent. For example, with Surface Coating B (SCB) the friction level in dynamic applications is reduced by some 75%.

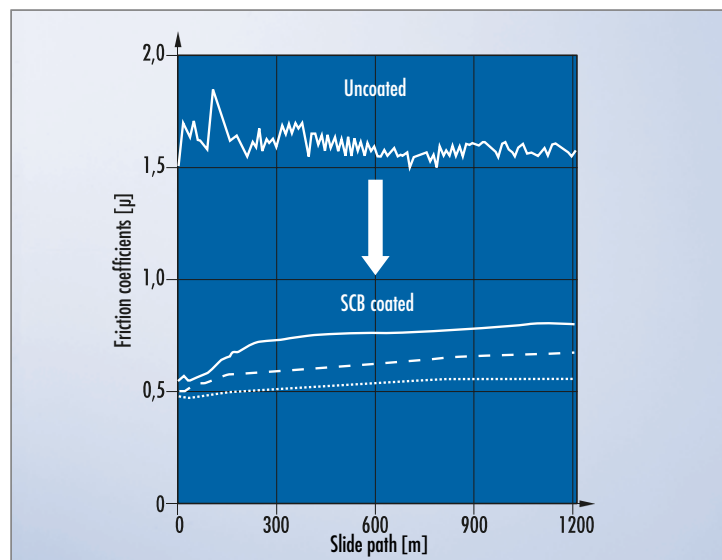
Reduction in friction



Reduction in insertion force



Reduction in friction coefficients in dynamic applications

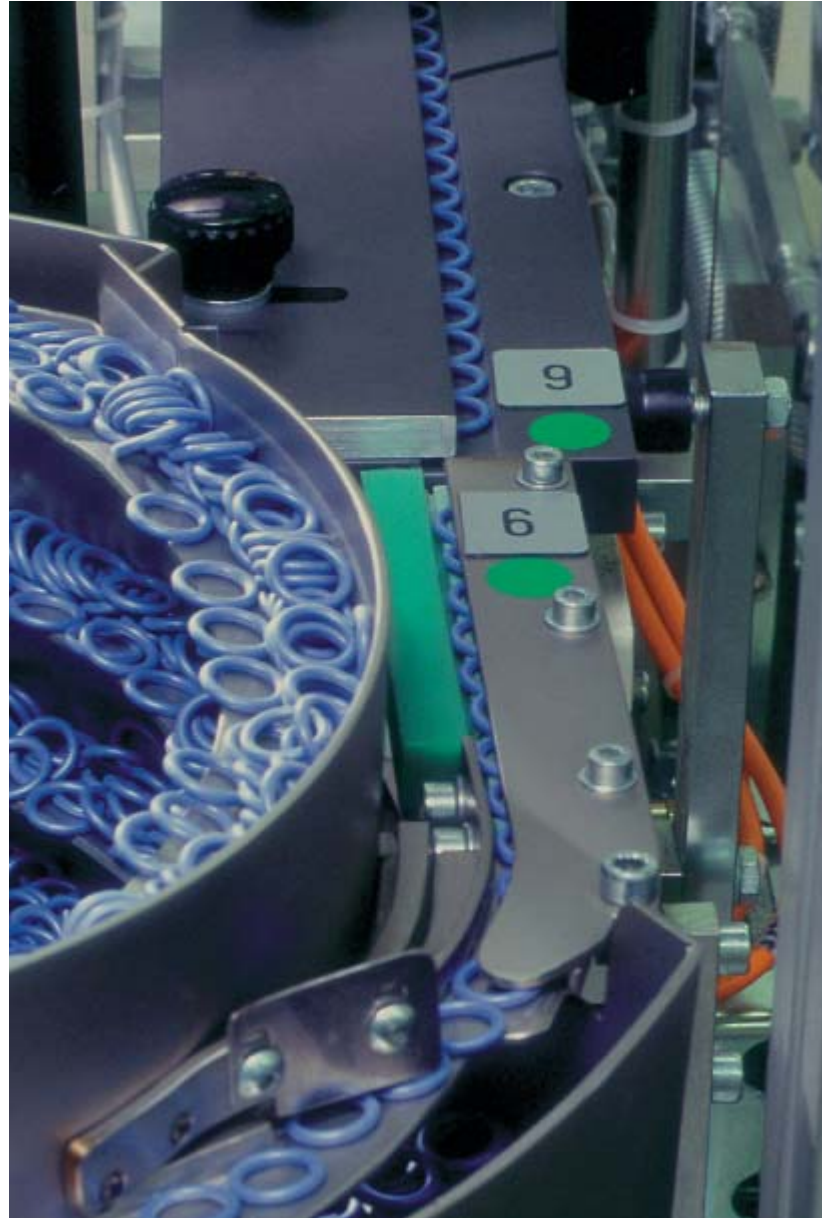


Economic benefits for the customer

Savings thanks to optimised assembly

Each year a customer fits 2.2 million O-Rings in his production facility. The fitting path for the O-Ring is 20 mm, which resulted in twisting, incorrect assembly and in certain cases damage to the O-Ring. The use of a coated ISC O-Ring allowed the assembly defect rate to be reduced from 3% to 0.02%. The result was a major fall in the number of defective components being detected during the final inspection. There was also a marked reduction in the inspection work involved for failure analysis as well as for the rectification of defective components through the dismantling and renewed performance of the assembly process. In addition to these improvements it was possible to reduce the assembly time by 4%. This was achieved via worker-friendly assembly with lower friction levels and a shorter time requirement for O-Ring separation.

Alone the direct economic overall benefit to this customer from the above effects amounted to 45,000 € per year.



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Simrit Services

- ▶ Constant innovations
- ▶ Uniquely wide range of products
- ▶ Strong product brands
- ▶ Unique materials expertise
- ▶ A wide range of value added services

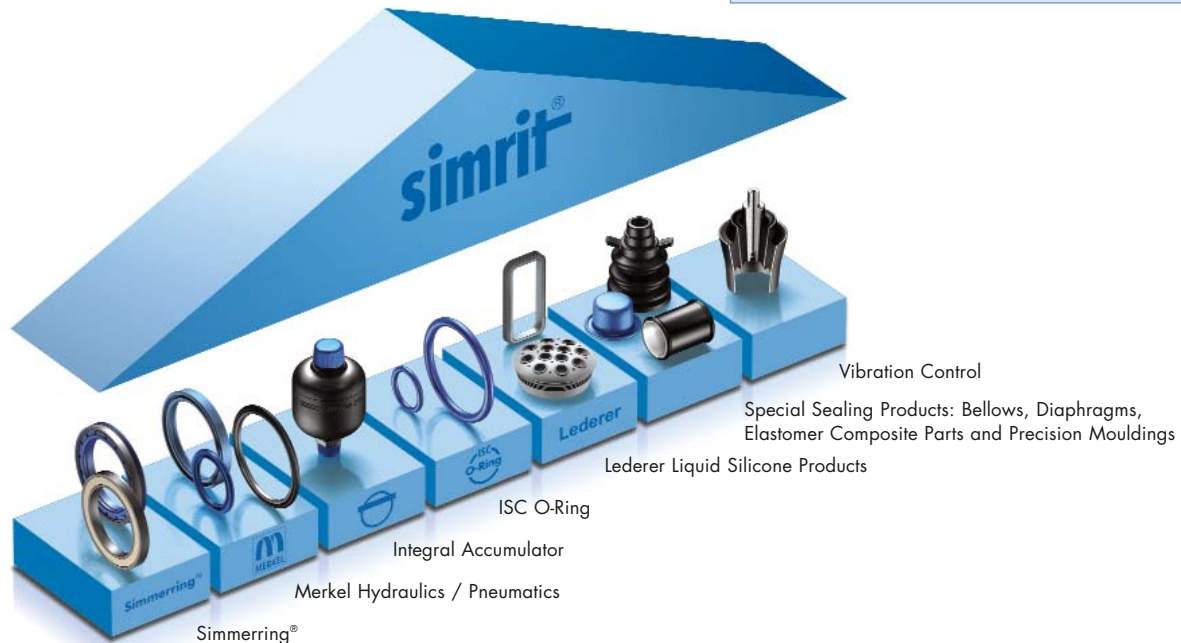
Your Benefits

- ▶ Technological edge
- ▶ All from one source
- ▶ Specialised technological expertise
- ▶ Longer unit service life
- ▶ Competitive advantages, efficiency and lower costs

e. g. — The coated ISC O-Ring

Your Benefits

- ▶ Simplified assembly
- ▶ Reduced insertion force
- ▶ Suitable for dynamic applications



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