

# Seal-Glide®

REDUCING FRICTION WITH NANOSCALE TREATMENTS



# Innovative Process Engineering

**Seal-Glide® is a specially formulated surface treatment that offers improved benefits when compared to standard PTFE-based coatings, delivering optimal performance on a nanoscale by using an innovative thin-film process.**

Testing and research have shown Seal-Glide® increases durability and significantly reduces friction during assembly and operation, even in light dynamic applications. As a nanoscale surface treatment, it is up to 50 times thinner than many conventional coatings, making it ideal for parts with complex geometries or features such as undercuts.

**Increases lifetime  
of complete  
sealing system**

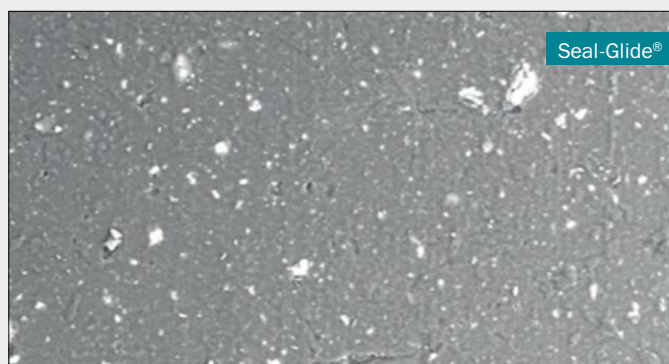
**Boosts  
assembly and  
operation**

**Improves performance  
through significant  
reduction of friction and  
stickiness**

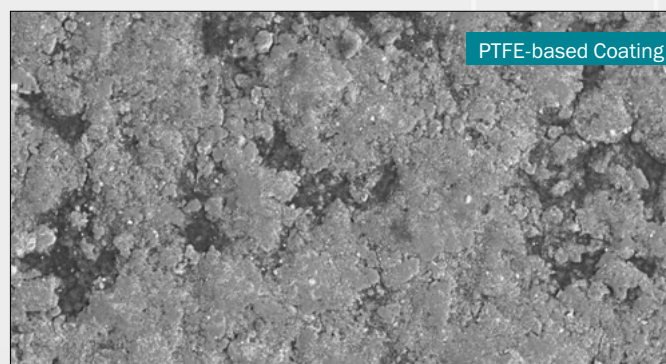


A very homogeneous and even surface positively affects the ability of an elastomer to slip or glide. The Seal-Glide® surface technology can reduce required assembly forces by up to 75% and effects like stick-slip. This technology can be applied to

numerous elastomers, including silicones like LSR (Liquid Silicone Rubber), EPDM (Ethylene Propylene Diene Monomer) and FKM (Fluoropolymer).



Even surface with Seal-Glide® compared with a standard PTFE-based coating.



#### Features

- Surface modification for **reduced friction** and a simplified, **cleaner assembly**.
- **Ultra-thin** surface modification that is up to 50 times thinner than many conventional coatings with **no change to seal geometry** - thus, no change of groove design needed.
- **Can be applied to virtually any material**, including EPDM, NBR, HNBR, FKM, FFKM, VMQ, FVMQ and AEM.

#### Benefits

- Ideal for parts with complex geometries or features, including under-cuts, where other coatings are unsuitable
- Simplifies assembly of seals, in both manual and semi-automated processes
- Reduces insertion forces and prevents parts sticking together
- Improves supply and separation in (semi-)automated assembly lines
- Extends the use of elastomer seals in dynamic applications
- Reduces "stick-slip" effects, decreasing the tendency of elastomer seals to stick to mating surfaces - even after extended periods of rest
- Clean process reduces manufacturing time, enhances safety and lowers maintenance costs
- Extends service life due to better wear properties and increased assembly safety
- Excellent adhesion to the substrate allows dilation during assembly and multiple assembly

## Improved Friction Characteristics

### Initial Coefficient of Friction

Friction performance is dramatically improved when using Seal-Glide® compared with uncoated components. The initial Coefficient of Friction is significantly lower with Seal-Glide® for all tested materials (Figure 1).

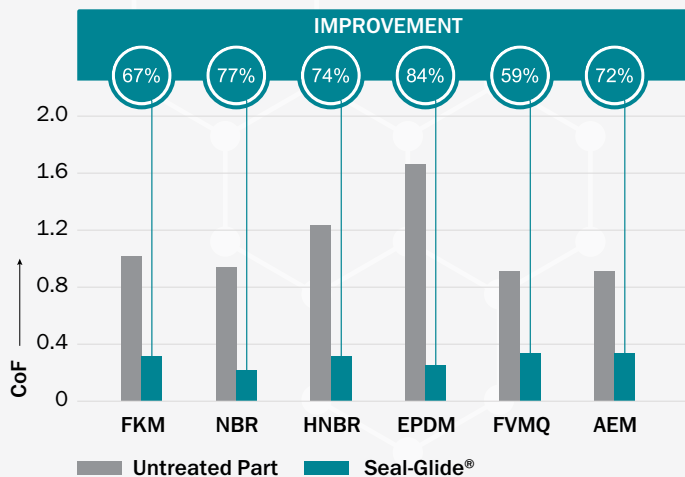
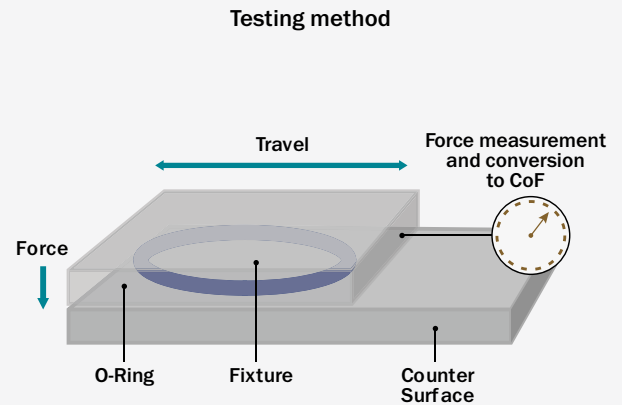


Figure 1: Comparison of initial Coefficient of Friction (CoF) value of Seal-Glide® with uncoated parts



### Dynamic Applications

Compared to many standard coatings, Seal-Glide® significantly reduces friction forces (Figure 2) in dynamic applications. Due to its excellent adhesion properties, this surface technology sticks to the elastomer material while minimizing friction between the seal and the counter surface. This reduces stick-slip and extends the lifetime of the sealing system.

### Friction Force in Dynamic Test

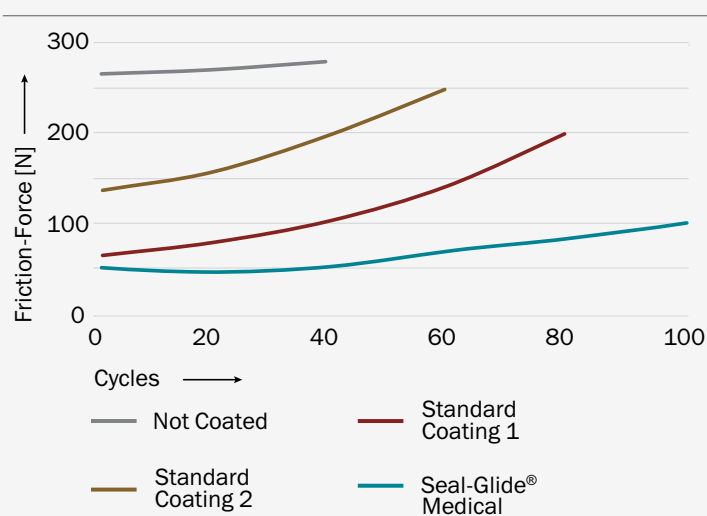
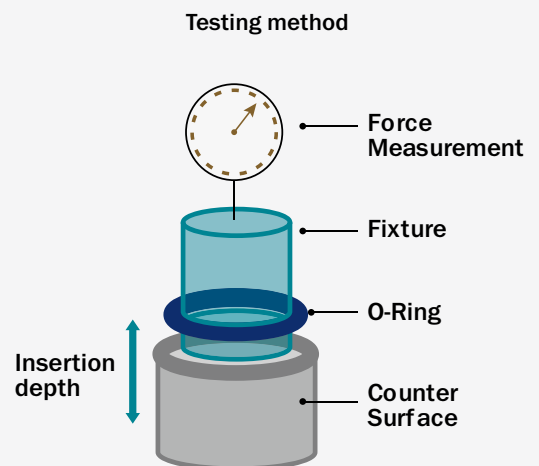


Figure 2: Frictional force comparison between untreated O-Rings and O-Rings with standard coatings and Seal-Glide® (10 % installed compression)



## ■ Higher Durability

When compared with standard PTFE-based coatings, Seal-Glide® reduces friction and increases performance, keeping machinery running for longer, regardless of the underlying seal material.

### Coating durability on NBR

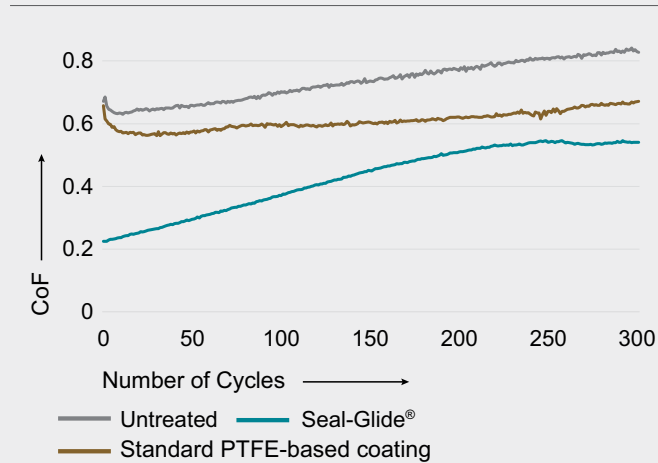


Figure 3: Comparison between Seal-Glide® and standard PTFE-based coating on NBR (NDT30)

### Coating durability on FKM

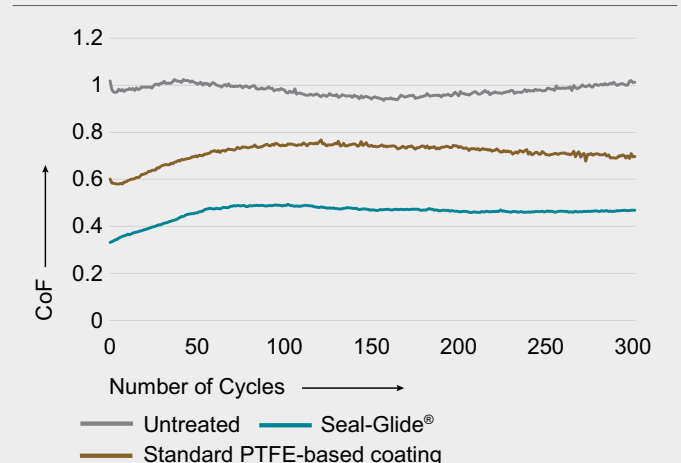


Figure 4: Comparison between Seal-Glide® and standard PTFE-based coating on FKM (VCT14)

### Coating durability on EPDM

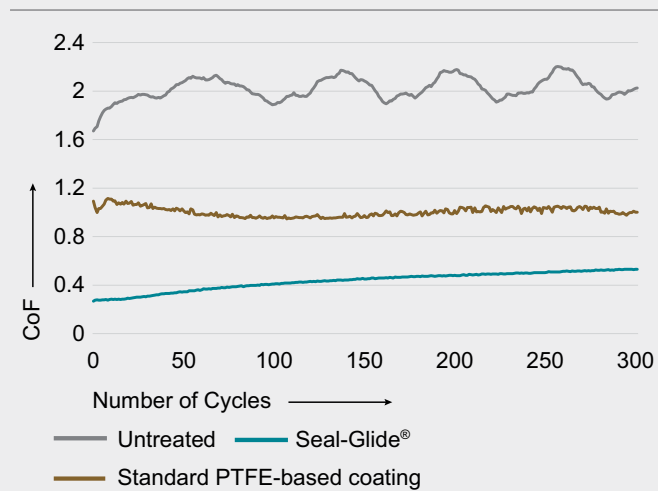


Figure 5: Comparison between Seal-Glide® and standard PTFE-based coating on EPDM 3507 (ECT8V)



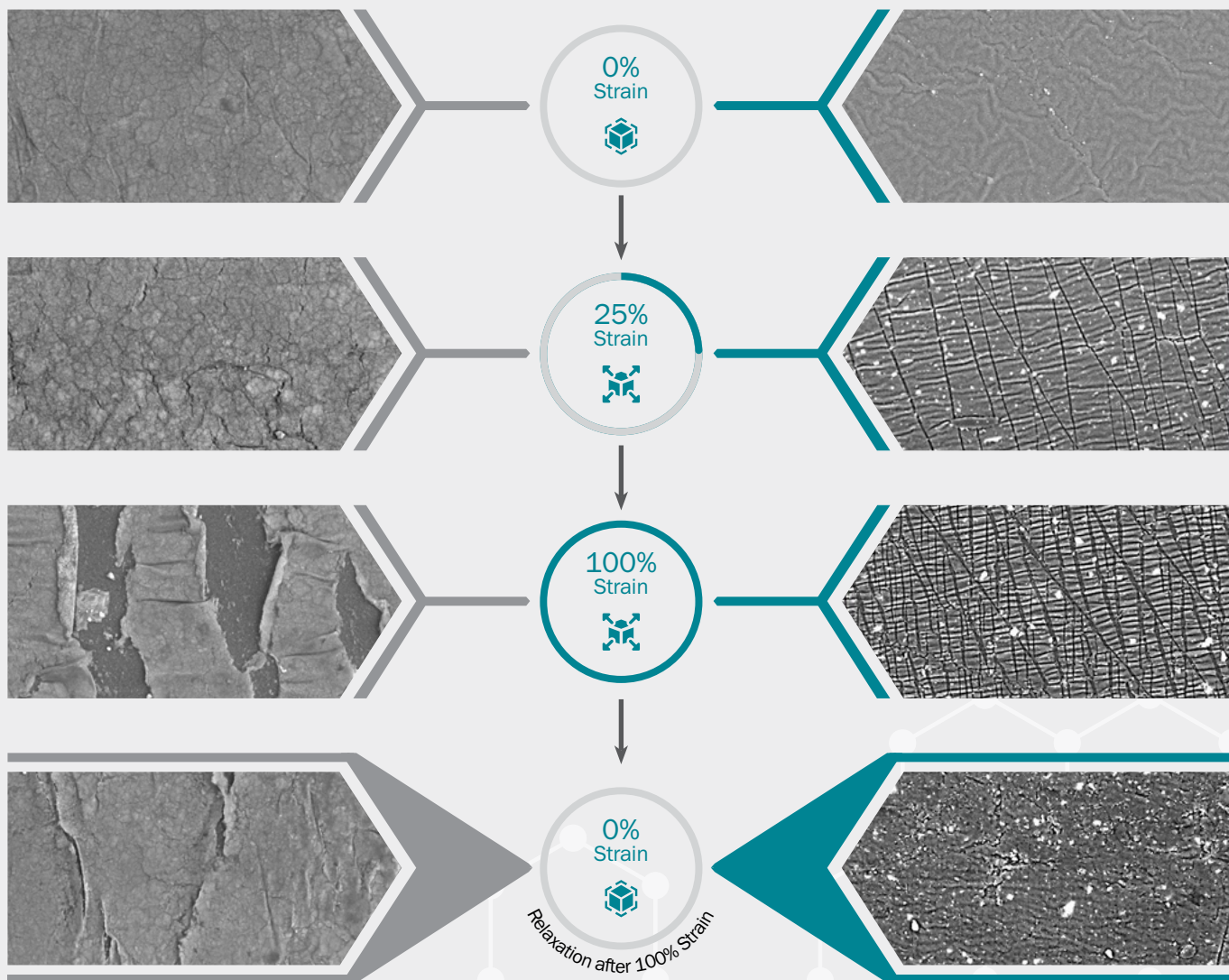
# Under the Microscope

To understand how Seal-Glide® achieves such low friction, microscopic analysis of the surface texture is required. Up close, and especially during and after stress, the behavior and structure of coatings can differ greatly.

Seal-Glide® is more resistant to large-scale fissuring, doesn't suffer from breakouts, and returns to a more even surface after stress - improving friction characteristics for longer.

| PTFE-based coating                                                                                                                                           |                                                                                   | Seal-Glide®                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• Many very fine fissures</li><li>• Breakouts within the coating</li><li>• Broken surface increases friction</li></ul> |  | <ul style="list-style-type: none"><li>• No breakouts</li><li>• Improved sliding properties</li></ul> |

Q Magnification - x350



# Seal-Glide® Medical

## Specially engineered surface technology for medical and food processing applications

To meet the unique needs of the medical, pharmaceutical and food processing industries, Trelleborg Sealing Solutions has formulated a specialized version of Seal-Glide® that can be used for medical devices and food contact materials.

Elastomeric surfaces modified with **Seal-Glide® Medical** meet **biocompatibility standards ISO 10993-5 and USP 87**, as well as **food contact material requirements, European Regulation (EC) 1935/2004 and US FDA Code of Federal Regulations 21, §175.300\***. See our Material Declaration of Compliance for details.

Medical technologies in particular place high demands on the robustness of materials. During sterilization, these undergo frequent, sometimes repeated, and extremely aggressive treatments.

Seal-Glide® Medical is optimized for resistance against common sterilization processes, like gamma radiation, ethylene oxide and steam treatments, without impairing the function.

Meets the  
biocompatibility  
requirements of  
ISO 10993-5 and  
USP 87

Compliant  
with EC  
1935:2004

Withstands  
aggressive  
sterilization  
procedures

Conforms to  
US FDA CFR  
21, 175.300

## Assembly Force of a Piston O-Ring with Seal-Glide® Medical

Figure 6 shows greatly reduced initial assembly forces required for Seal-Glide® compared with uncoated parts under various sterilization regimes. Lower assembly forces reduce the required installation pressures, reducing the chances of damaging delicate seals for medical applications.

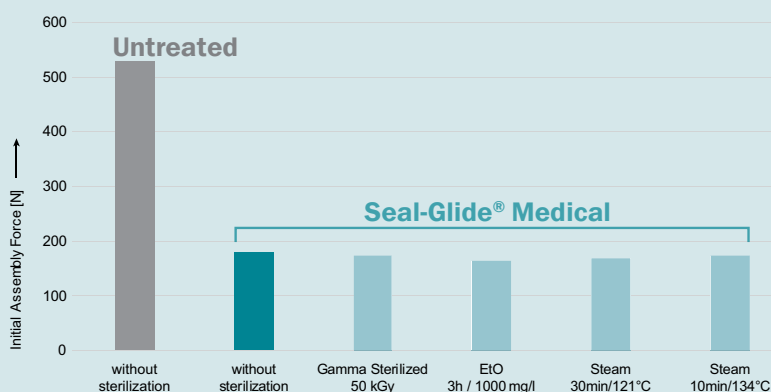


Figure 6: Assembly force of a piston O-Ring (20% installed compression) with Seal-Glide® Medical



### Contact your Customer Solution Center

Does your application have unique requirements? Is the operating environment of your application especially challenging or does it need to comply with multiple medical or food contact regulations? Reach out to your local Trelleborg Sealing Solutions Customer Solution Center for support.

[www.trelleborg.com/seals/worldwide](http://www.trelleborg.com/seals/worldwide)

\* The base elastomer material must already comply with the applicable regulatory and biocompatibility requirements prior to treatment. The Seal-Glide® Medical surface modification does not, in itself, make a material compliant with regulatory requirements or render it biocompatible.

Trelleborg is a world leader in engineered polymer solutions that protect essential applications in demanding environments. Its innovative solutions accelerate performance for customers in a sustainable way.

Trelleborg Sealing Solutions combines deep materials and applications expertise with close customer collaboration to fulfil our mission as a leading provider of precision seals, bearings and custom polymer components. We focus on meeting the most demanding needs of aerospace, food and beverage, semiconductor and general industrial customers.

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