

SurfaPlus surface treatment is the solution for the high frictional resistance of elastomers

Rubber (also classified as an elastomer) plays a leading role in the fascinating world of sealing. And with good reason - this material has a large number of excellent characteristics. Rubber is flexible and resilient, strong, easy to manufacture and to use, resistant to a wide range of media and temperatures and attractively priced.

One disadvantage is that the frictional resistance of rubber, particularly in dynamic applications, can lead to wear and the generation of (excessively) high frictional heat at the seal. Also the sticking of O-rings in the packaging causes a lot of problems in automatic assembly. The introduction of ERIKS new 'SurfaPlus' surface treatment programme for rubber products relegates these problems to the past.

This brochure introduces the most common surface treatment products for rubber products. Each is capable of making a significant contribution to the improved performance of your seals. We will also inform you about the early stages of a new development and explain that specific targets can be attained via the use of various treatments. Thus it is of great importance that the surface treatment chosen for your specific application is tested in advance. Contact your nearest ERIKS branch for advice without obligation about an ERIKS 'SurfaPlus' surface treatment for rubber products. Our specialists will be happy to explain all the various options. Material specifications are available for all the surface treatments.

The extensive ERIKS 'SurfaPlus' surface treatment programme for rubber products offers you countless ways of improving your seals for specific applications. We will explain the most frequently used treatments here.

1. Lowering frictional resistance in dynamic applications

We use a spray applied PTFE based coating to lower the frictional resistance of rubber. The use of this coating involves a complex pre-treatment process ranging from cleaning to sintering. This must be carried out with great care. The coating thickness for use in dynamic applications is 0.020 mm. The level of adhesion of the PTFE layer to the mother material is particularly high.



SurfaPlus surface treatment

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2. Problem free automatic assembly with O-rings

To avoid O-rings in bulk packaging sticking to each other (possibly causing problems to arise when the rings are used for automatic assembly in mass production) we coat these seals with a thin layer of PTFE. Because large numbers are involved in this type of application price plays an important role. Thus ERIKS has selected dip-spin application and a thickness of approximately 0.005 mm. The coating dries to a splotchy, milky appearance. This coating (SP 10105) is FDA approved in conformance with HHS 21 CFR 175.300 and 177.1520.

A polysiloxane coating can also be chosen for this application. However this coating must be spray applied and sintered, so the price is somewhat higher than the thin the PTFE coating mentioned above. On the other hand the polysiloxane provides the smoothest surface. We are continuously developing new coating systems such as our PTFE based SP 10107 - a fully transparent coating for coloured rubber components.

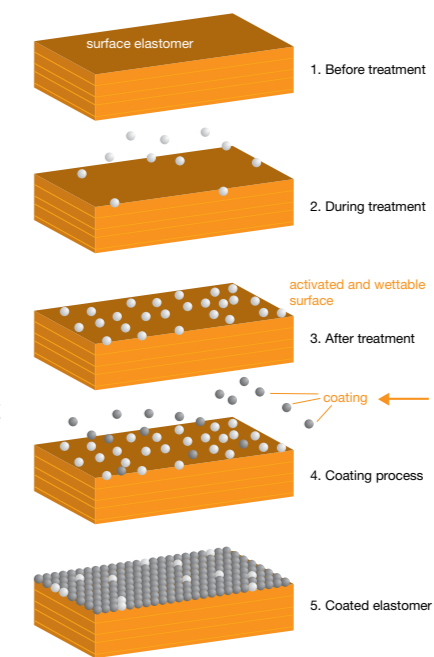
3. Increasing chemical resistance

In many applications PTFE seals are used to resist chemicals in the medium to be sealed. A big disadvantage of PTFE is that it is not resilient and is not always suitable as a sealing material. In many instances the solution is a rubber seal coated with a 0,02 up to 0,03 mm thick PTFE layer. By doing this you combine the outstanding properties of an elastomer (such as the good compression set, tensile strength etc) with those of the chemical resistant PTFE. Products coated with this PTFE based ERIKS 'SurfaPlus' coating have an elongation of at least 100%!

In addition to this frequently used PTFE treatment, a fluoroelastomer coating may also be applied to rubber products to increase chemical resistance. This method is mainly used on very large rubber products made of NBR or EPDM, because it is cheaper than making the entire product from fluoroelastomer. The coating thickness is approximately 0.050 mm.

4. Surface cleaning ('labsfrei')

In many applications no contamination is allowable, including that from rubber seals. For applications such as the semiconductor industry, food and pharmaceuticals and the automotive industry, seals are thoroughly cleaned using a plasma treatment. Here the surface of the seal is subjected to an ultra-fine cleaning process using a reactive gas under vacuum. Incidentally this process can also be used for treating synthetic materials and metals.



6. Preventing ageing

NBR products that are coated with PTFE are resistant to the penetration of ozone and UV radiation and thus are very suitable for use in the open air and in electrical equipment.

5. Easy cleaning

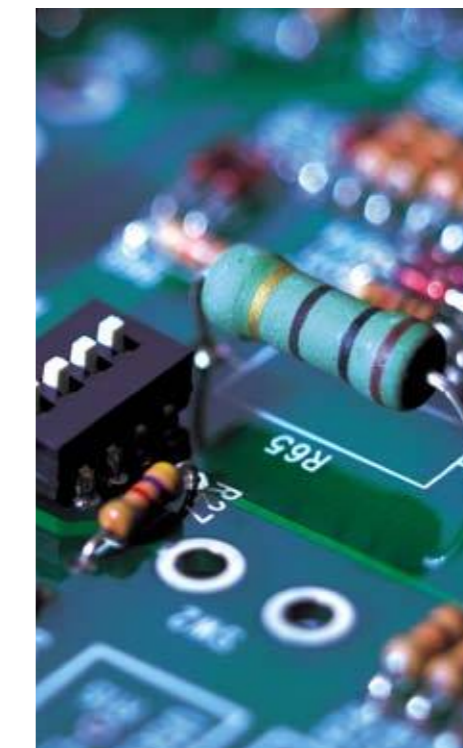
CIP or SIP are used for cleaning in many processes. Rubber seals coated with 0.020 mm thick PTFE from the ERIKS 'SurfaPlus' rubber surface treatment range are recommended for these methods.

Advantages:

- The product that is to be sealed adheres less strongly to the PTFE surface, making cleaning the machine quicker and easier.
- The seal is not damaged by low-pressure cleaning and/or hot water with a cleaning agent.

7. The right colour, easily recognisable and visually attractive

A number of the coatings described can be manufactured in the RAL colour of your choice. This applies particularly to a number of our PTFE coatings and for our fluoroelastomer treatment. These are mainly used in decorative applications.



The many advantages of SurfaPlus surface treatment for rubber products

- aids assembly: eases assembly of all rubber products; ideal for automatic assembly of O-rings.
- dry lubrication: improves running characteristics in cases of poor lubrication - even dry running is possible.
- better cleaning: no clinging of product making cleaning easier. Good resistance to SIP and CIP.
- chemical resistance: PTFE based coatings increase the chemical resistance of rubber sheet.
- stops ageing: slower rate of ozone influenced ageing.
- colour: coating with the colour you require is possible if volumes are sufficient.
- FDA approval: PTFE based coatings with FDA approval for food and pharmaceutical products.
- 'clean room': including making rubber products 'Labsfrei' for automotive, semiconductor and food & pharmaceutical applications.
- flexibility: rubber products with a 'SurfaPlus' coating have 100 to 150% elongation.

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Surface treatment for rubber products

Brief summary of the available 'SurfaPlus' surface treatments for rubber products

ERIKS designation	coating thickness	most common applications	remarks
PTFE	5 mu	to aid assembly, friction reduction for light applications	FDA approval, dries splotchy
PTFE SP 10020	20 mu	to aid assembly, friction reduction in general applications, improving chemical resistance other colours possible	particularly strong coating; for general use; standard colour grey,
Polysiloxan SP 30605	5 mu	to aid assembly, particularly for O-rings and moulded products	provides smoothest surface
Plasma SP 24000	na	cleaning of rubber products, for clean room production, food and pharmaceutical	making 'labsfrei', increases surface hardness by a few Shore points
FKM SP 83050	50 mu	increasing chemical resistance	only viable for very large moulded shapes or profiles, available in several colours
MOS, SP 40505	5 mu	to aid assembly, mainly for O-rings	powder coating, easy to apply and economical. Chalks.

Disclaimer:

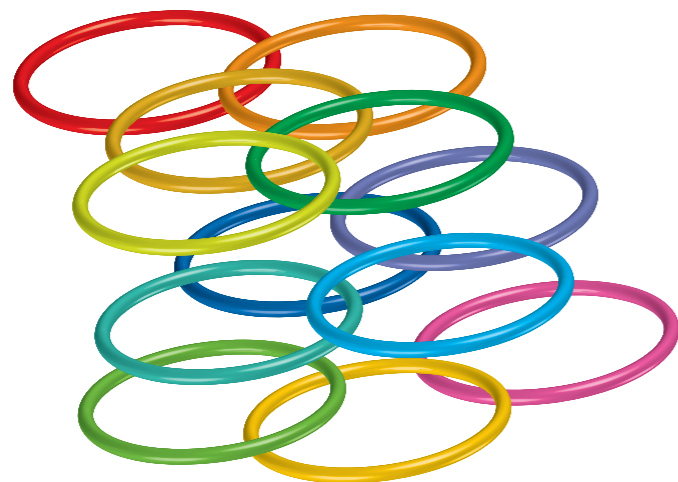
Not all of the above mentioned surface treatments will show all their benefits on every elastomer. As with any material, evaluation of any compound and their surface treatment under end-use conditions prior to specification is essential. Since conditions of product use and disposal are outside of our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information. Do not hesitate to contact your local ERIKS application engineer – we will be delighted to be of assistance to you.

8. NEW: SurfaPlus® NANO-F:

ERIKS latest technique is a constant further development of already existing surface treatments under consideration of latest technological advances. This innovative treatment made it possible to engage with the molecular structure of the surface of elastomers. ERIKS is able to change the properties of the surface permanently without alloying the physical properties.

Due to the fact that SURFAPLUS NANO-F is not a coating, the dimensional tolerances of the treated part do not change according to the thickness of a certain coating. This innovative technique is as well suitable for automatic mounting as for reducing the coefficient of friction. Even undercuts or complex geometries are no problem – that's why SURFAPLUS NANO-F is also suitable for moulded parts. This treatment can also be executed on plastics. At the same time SURFAPLUS NANO-F activates the surface of the treated part – that leads to better results at later glueing, flocking or painting.

Although this is a new and complex technology, ERIKS is able to offer this treatment on a equal price-level in comparison to common coatings and treatments – for low as well as for high volume applications.



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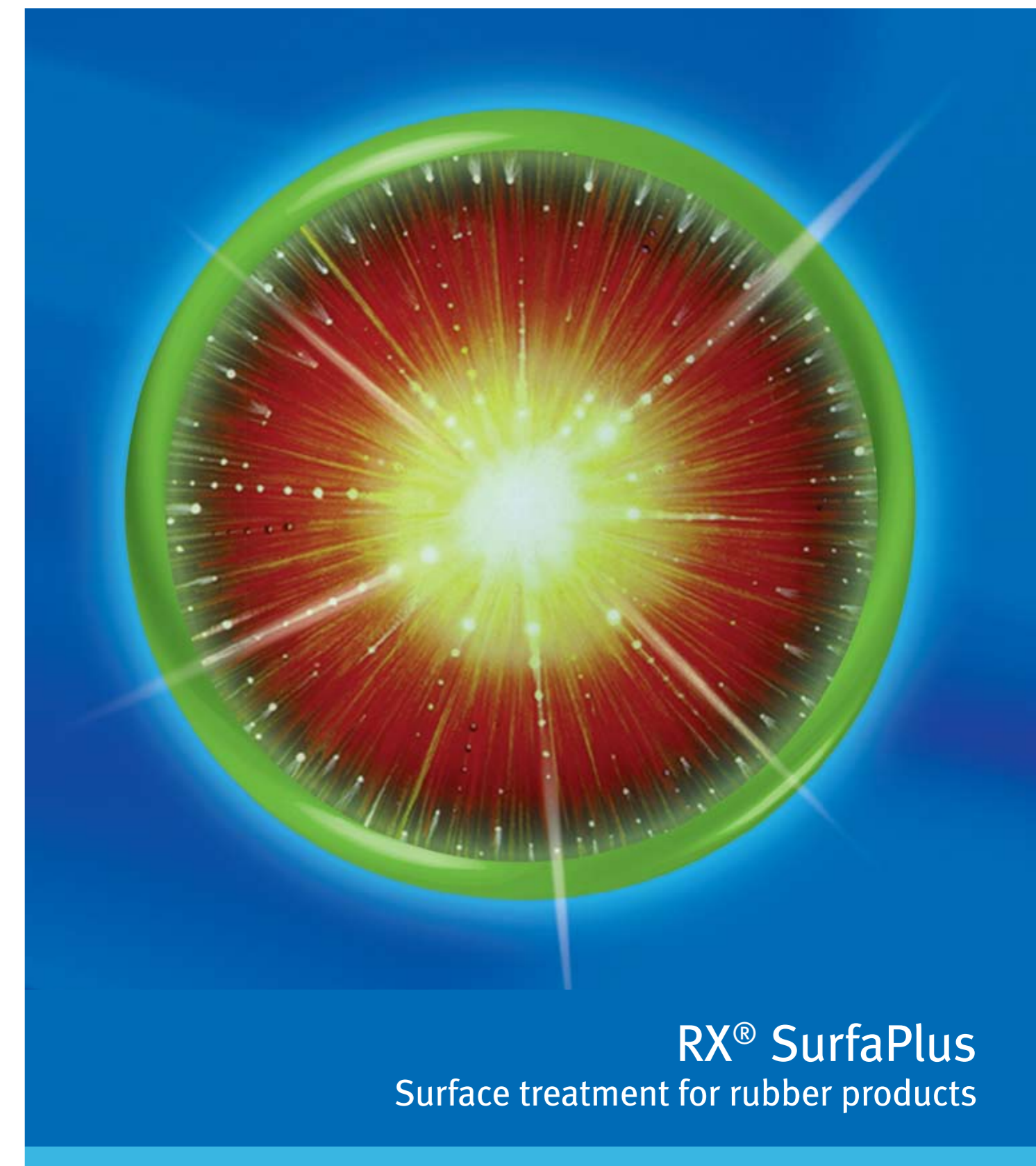
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