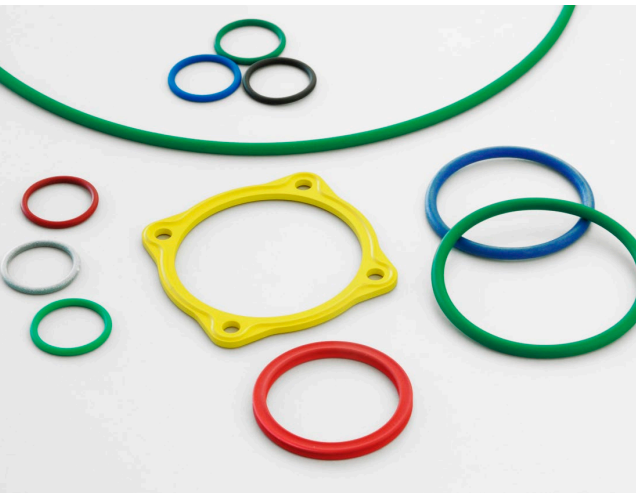
Angst+Pfister

# Surface Treatment Solutions



The need for more material reliability over longer periods and technological breakthroughs is strongly increasing due to always more stringent regulations. There are different ways for a reliable surface treatment. In addition to the classical solutions such as PTFE-coating, silicone coating, micro-talc-coating and MoS2 coatings, new surface treatments solutions have been developed over the years.

## Cleaning

Angst+Pfister offers various types of cleaning to remove production residues and other undesirable substances from seals. The most commonly used method is wet and plasma cleaning for laboratories or silicone free surfaces.

## Basic Coatings

This is an inexpensive alternative to sealing coating and the main application to separate seals. It also serves as assembly aid. These coatings can only be produced with limited process reliability.

## Advanced Coatings

Advanced coatings are used for water-based bonded resins in the form of PTFE or siloxane producing a dry, non-slip and clean surface on elastomer components. The coatings are transparent or coloured and, if required, FDA compliant and are especially suitable for ease of assembly, assembly aid, semi-dynamic and dynamic applications.

## Surface Modifications

During surface modification, a chemical reaction by a process gas modifies the surface structure in the nanometer range and achieves a slight improvement in hardness.

## High-Performance low friction Elastomer

With PERTEC® NP FKM Angst+Pfister developed a high-performance compound with a 30% PTFE content in the polymer which is perfectly suitable for dynamic applications without additional coating.

**Contact**

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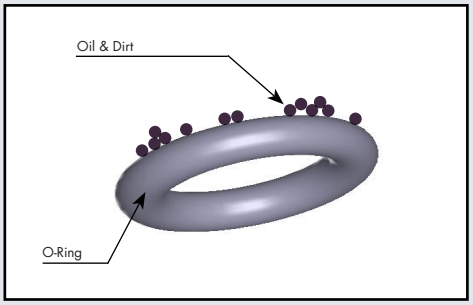
## Surface Treatment Table

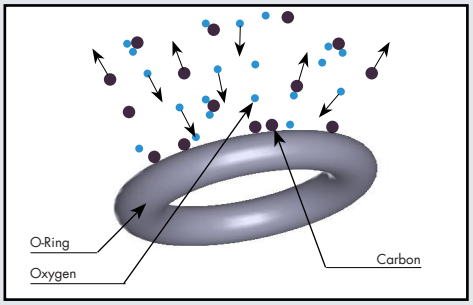
| Type | Description | Lubrificant | Colour | Hardness Change | Temperature range | Compounds | Autom. Feeding / Separation | Reduction of insertion forces | Slight dynamic application | Dynamic application | Approvals |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cleaning | Wet-Cleaning | | | No impact | Related to elastomer | All compounds | | | | | |
| | Plasma-Cleaning | | | No impact | Related to elastomer | All compounds (CR and VMQ have to be tested) | | | | | |
| Basic Coatings | Micro Talc Coating | Micro Talc | White | No impact | Related to elastomer | All compounds | ● | ○ | ○ | ○ | |
| | Silicone Coating | Silicone | Transparent | No impact | Related to elastomer | All compounds | ● | ◑ | ○ | ○ | |
| | Molybdenum Disulfide Coating | MOS2 | Gray-Black | No impact | Related to elastomer | All compounds | ● | ◑ | ○ | ○ | |
| | PTFE Coating | PTFE | Transparent | Increase possible up to 4 IRHD | -40°C to 150°C | All compounds | ● | ◑ | ◑ | ○ | |
| Advanced Coatings | Advanced easy-assembly-enabling PTFE Coatings | PTFE | Transparent or coloured | Increase possible up to 4 IRHD | -40°C to 150°C | All compounds (CR and VMQ have to be tested) | ● | ● | ◑ | ◑ | Specific FDA variation available on request |
| | Advanced slightly-dynamic PTFE Coatings | PTFE | Transparent or coloured | Increase possible up to 4 IRHD | -40°C to 150°C | All compounds (CR and VMQ have to be tested) | ● | ● | ● | ◑ | Specific FDA, W270, UBA and NSF variation available on request |
| | Advanced dynamic PTFE Coatings | PTFE | Transparent or coloured | Increase possible up to 4 IRHD | -40°C to 150°C | All compounds (CR and VMQ have to be tested) | ● | ● | ● | ◑ | |
| | Advanced conformal Coatings | | Transparent | Increase possible up to 4 IRHD | Related to elastomer | All compounds | ● | ● | ● | ◑ | USP Class VI |
| Surface modifications | Surface modification by process gas | | Transparent | Increase possible up to 4 IRHD | Related to elastomer | NBR | ● | ● | ● | ◑ | Depends on elastomer |
| | Surface modification by ionic implantation | | Transparent | Increase possible up to 4 IRHD | Related to elastomer | All compounds | ● | ● | ● | ● | Depends on elastomer |
| High-performance low-friction Elastomer | Alternative to surface treatment PERTEC® NP FKM | Nano PTFE | Black | | -30°C to 220°C | FKM | ● | ● | ● | ● | FDA |

## Core Steps in Advanced PTFE-Coating-Process



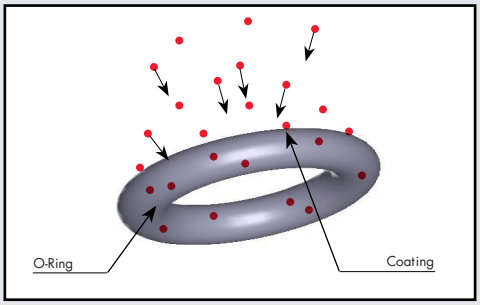

### Phase 1 : Wet Cleaning

- To remove oil & dirt contamination (e.g. residues from oil sprayed on tools during moulding) the material gets washed in a standard washing machine with the material-specific adjusted parameters like temperature, duration, chemicals, water, motion (speed) for 2 hours (order of magnitude). Very dirty (oily) parts require a longer (and more expensive!) cleaning.
- After the washing process the material gets dried in a standard dryer.



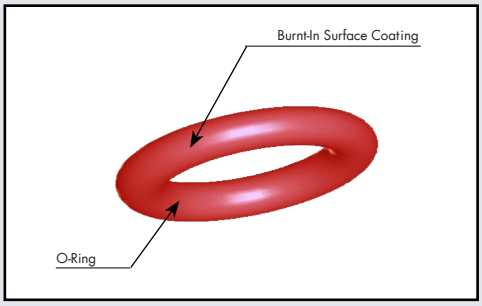

### Phase 2: Plasma Cleaning

- As preparation for the coating treatment the material is thoroughly cleaned of residues by oxidation for around 2 hours. This process can be extended to 8 hours and more depending on the application needs to ensure quality coating afterwards.




### Phase 3: Coating

- The deeply-cleaned parts get a spray coating manually or mechanically depending on size, compound & quantity and then are let to dry. This procedure takes only minutes and will be repeated around 10 until up to even 100 times depending on the application.
- The challenge here is to achieve the coating being thin enough to remain elastic. Otherwise there is the risk of breaking when the elastomeric part gets stretched. It takes a lot of experience and know-how to balance this out.




### Phase 4: Heating

- The coated parts get dried at 120°C for around 20 to 30 minutes. After this procedure they are ready for quality inspection and packaging.

Deviations from the initial part conditions (non-identical compound recipe, new tools, different deflashing, etc.) can affect the whole coating process!