

That little bit extra: Surface treatment

Lubricant, self-lubrication, bonded coating, flock, fluorination, tempering

Important selection criteria for plastics include their mechanical and thermal properties, processability and price. Once a suitable material has been found, its surface often does not meet the respective requirements. But help is at hand – after all, the surface is the only material property that can be changed independently.

GfA offers a wide variety of surface treatments – tailor-made depending on the respective application. Each one with individual advantages, e.g. for handling and shelf life.

Liquid, silicone or silicone-free lubricant

A simple lubricant coating is available in both silicone and silicone-free versions.

Advantages:

- ▲ Facilitates the installation of seals
- ▲ Makes the surfaces smooth
- ▲ Provides a certain temporary protection of the surface, e.g. against environmental influences

Disadvantage: This can contaminate other surfaces on the component, in the workshop or on the construction site, making subsequent painting more difficult, for example.

Self-lubrication

A good alternative to treatment with lubricants is to provide sealing profiles with a type of self-lubrication. This additive is already added to the raw material in the basic mixture and develops during the extrusion process. A thin waxy layer then develops on the profile surface within the next 48 hours or so, resulting in easy gliding properties.

Advantages:

- ▲ Facilitates installation of the seals
- ▲ No contamination of adjacent areas

Disadvantage: A so-called "white crack" can form on the surface. This occurs when the self-lubrication – similar to a thin layer of candle wax – turns white under mechanical stress. However, this merely optical impairment of the surface is only visible with dark profile colours.

Bonded coating

A bonded coating is actually a painted surface on sealing profiles. The coating is applied very thinly and offers quite good mechanical adhesion. Depending on the requirements, various coatings with different options are available.

Advantages:

- ▲ Bonded coatings ensure durable gliding properties of the surface, even under mechanical stress.
- ▲ Other areas of the component are not negatively impacted.

Disadvantage: The lacquering and drying process is comparably complex. The set-up costs are considerable.

Flocktape

Flock tape is a self-adhesive strip that adheres to the sealing profile on one side and has a flocked surface on the other. This partial flocking is particularly suitable for sensitive applications, e.g. in sliding elements or at particularly sensitive pivot points of components.

Advantages:

- ▲ Frictional resistance is significantly improved.
- ▲ Moving parts and the rigid parts that interact with them remain largely dust-, noise- and watertight.
- ▲ Undesirable noises, e.g. when opening and closing, are reduced.

Disadvantage: The corresponding production tools are complex and cost-intensive to manufacture.



Tempering

Tempering intervenes in the molecular structure of the plastic. The molecular lattices that got "mixed up" during production are rearranged correctly during tempering and internal material tensions are relieved. In addition, all volatile substances are dissolved so that there are no more undesirable vapours in particularly sensitive components.

GfA will be happy to temper your silicone rubber sealing profiles on request.

Fluorination

A special case: Fluorination is not a coating in the true sense of the word, but rather a chemical reaction. Fluorination can be used to change surface properties in a targeted manner, while the properties of the base material and its dimensions remain entirely unchanged.

During the process, the surface of the plastic is exposed to a fluorine mixture. Due to its high degree of reactivity, fluorine partially replaces hydrogen atoms on the material surface – the penetration depth of the fluorine atoms into the substrate is within the molecular range.

Advantages:

- ▲ The wettability of surfaces is increased.
- ▲ Friction coefficients and stickiness are reduced.
- ▲ Adhesive and paint adhesion is improved.
- ▲ Permeation, diffusion and migration (barrier effect) can be reduced.



Still have technical questions about the surface treatment of seals? The experts at GfA will be happy to advise you!

