

## Datasheet SIL for sealing (hard) anodic coatings

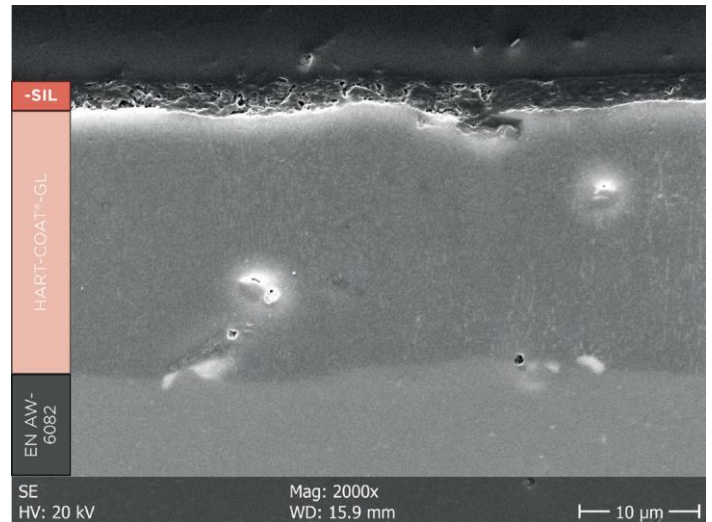
### PFAS-free sealing to improve sliding properties

In this process variant for our (hard) anodic coatings technical anodizing, HART-COAT®, HART-COAT®-GL, NUCOTEC® and NUCOCOMP® a subsequent sealing is applied. It essentially serves to reduce the friction coefficient and increase the non-stick effect. The already very good corrosion resistance is further increased by the sealing and the chemical resistance is also improved. In contrast to our HC-Plus, HC-Plus 2 and EloXseal variants, this sealing does not require per- and poly- fluorinated alkyl compounds and is therefore PFAS-free.

The transparent sealing, applied in the dipping process, consists of an organic polymer with inorganic silane groups. Due to its chemical characterization, the product belongs to the substance group of waxes. The downstream drying process results in crosslinking of the silane groups with simultaneous bonding to the anodized aluminum and subsequent curing of the polymer. The result is an adhesion-resistant layer that further improves the performance of our hard anodic coatings in their basic properties and leads to a verifiable reduction in the friction coefficient.

### Coating properties

The resulting layer thicknesses depend on the component geometry and the orientation during the dipping process and amount to about 0.2 to 3 µm. An exemplary layer formation of HART-COAT®-GL-SIL on the aluminum alloy EN AW-6082 can be seen in Figure 1. The temperature resistance of the sealing is a maximum of 150 °C or must be tested on an application-specific basis.

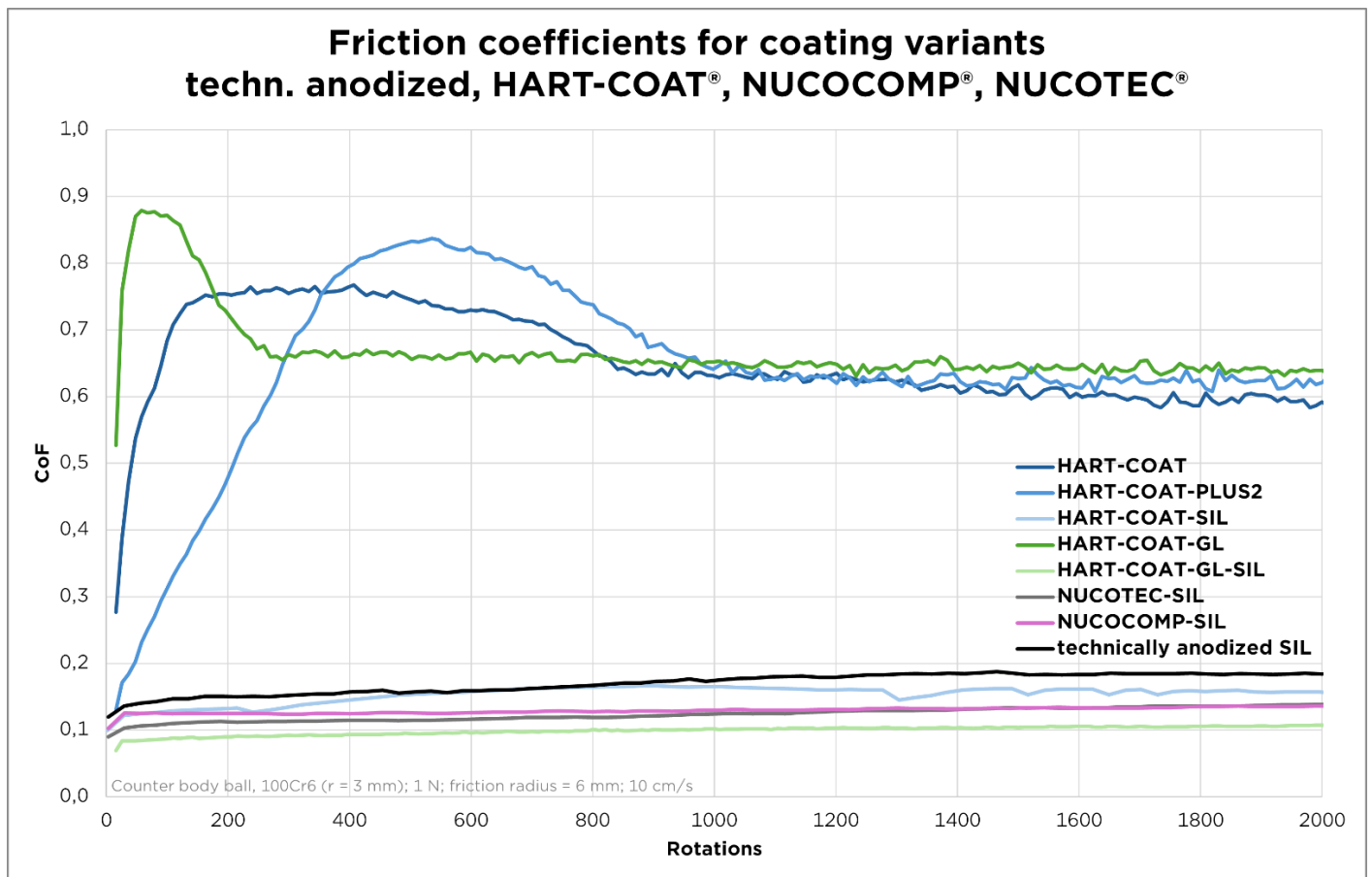


HART-COAT®-GL-SIL on EN AW-6082

The sliding properties were evaluated comparatively using a pin-on-disk tribometer based on ASTM G99. The friction coefficient curves of the different coating variants illustrate the reduction of the coefficient of friction (CoF) through the combination of the SIL sealing with the various anodic undercoats HART-COAT®, NUCOTEC®, NUCOCOMP® and technical anodizing, Fig. 2. The example of HART-COAT® also clearly shows the advantage of the PFAS-free SIL variant over the previous Plus 2 (PFA) variant. The most sustainable reduction in the friction coefficient under the test conditions mentioned above is achieved in the variant HART-COAT®-GL-SIL, according to which a constantly low friction coefficient of 0.1 is maintained over the entire duration of the test.

The already very good corrosion resistance of the base layers HART-COAT®, HART-COAT®-GL, NUCOTEC® or NUCOCOMP® in artificial atmospheres is also improved by the additional sealing.

For example, HART-COAT®-GL-SIL on EN AW-6082 shows no signs of corrosion after a period of 3000 hours in the neutral salt spray test according to DIN EN ISO 9227 (NSS) (rating grade Rp10). While the chemical resistance of anodic layers is in the pH range between about 4.5 and 8.5, extended chemical resistance in acidic and alkaline media can also be achieved with the additional sealing SIL.



Coefficient of friction measurements using a pin-on-disc tribometer on layer variants on EN AW-6082

### Coatable materials and dimensions

The focus of the application is on sealing the hard anodic layers, but in principle other metallic materials and sublayers can also be sealed. The feasibility and the achievable coating properties must be evaluated individually.

The maximum manageable component dimensions are based on the anodic processes and are as follows:

#### HART-COAT®-SIL

- max. dimensions: 7700 mm x 1800 mm x 1000 mm
- max. weight: 5000 kg

#### HART-COAT®-GL-SIL

- max. dimensions: 2000 mm x 650 mm x 1000 mm
- max. weight: 1000 kg

#### NUCOTEC®-SIL

- max. dimensions: 3500 mm x 1300 mm x 400 mm
- max. weight: 500 kg

#### NUCOCOMP®-SIL

- max. dimensions: 3500 mm x 1300 mm x 400 mm
- max. weight: 500 kg

#### Food sector

The sealing is made from raw materials which, according to the descriptions of the raw material suppliers, do not contain any substances that contradict food contact. A general suitability test (migration test) as a food contact item can be carried out individually by the customer at external testing institutes. A declaration of no objection is available for tests on sample sheets made of EN AW-6082 with HART-COAT®-SIL, according to which the SIL coating fulfills the requirements of Regulation (EC) 1935/2004. The technical suitability of the coating must be checked in each individual case.

#### Remark:

All specifications may vary depending on the base material, machining, surface and operating conditions. This must be checked for each use case. The results are only for guidance and do not form the basis for warranty claims or the like. The final performance depends on many more factors in the application, such as base material, roughness, temperature, application duration/type etc. Suitability must be assessed on customer parts and through tests to be defined by the customer.

