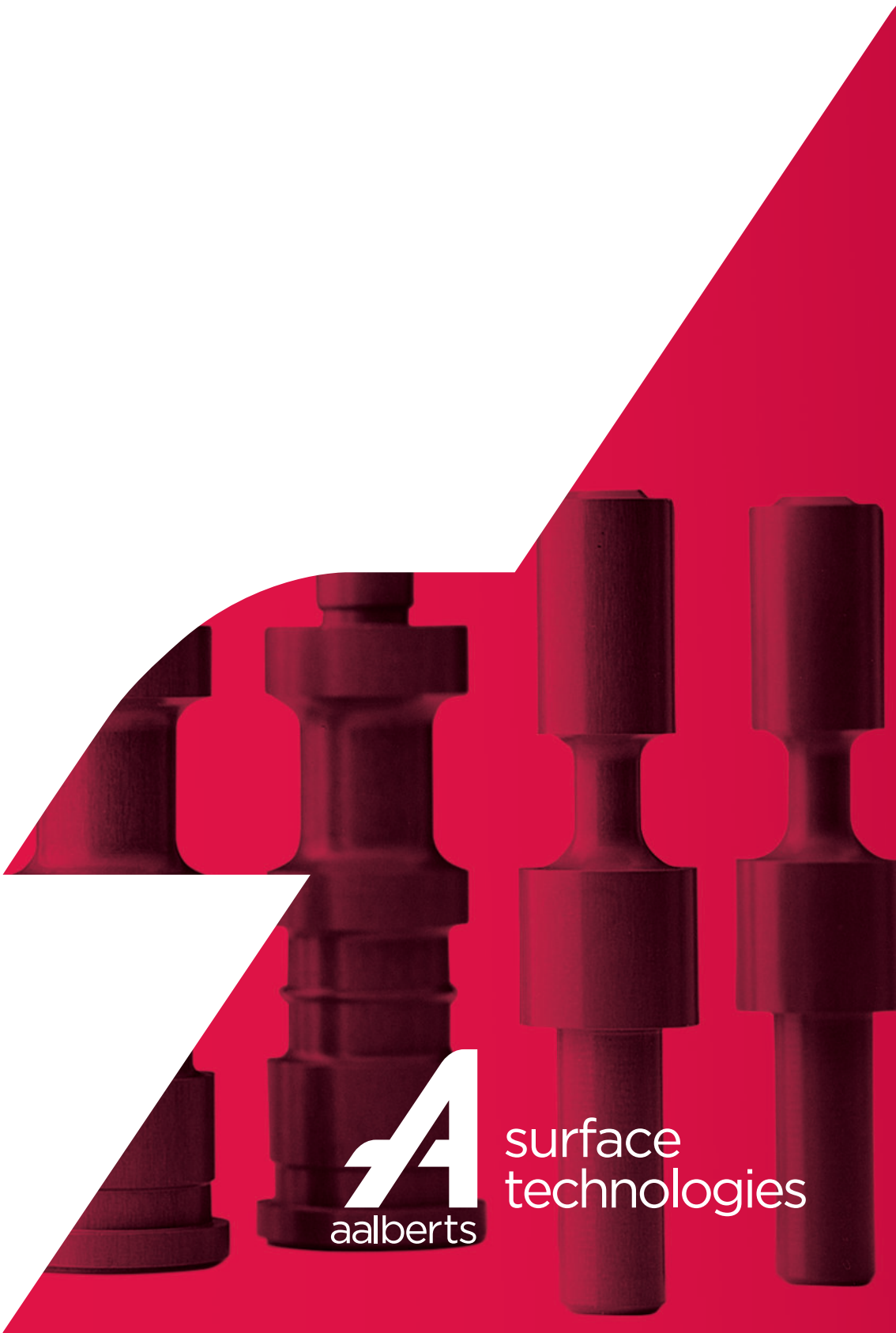
HART-COAT®-Glatt

hard anodic finishing of aluminum materials (hard anodic oxidation) - particularly smooth as well as corrosion and wear resistant



aalberts surface technologies

HART-COAT®-GLATT

The process:
HART-COAT® (HC) is our process for producing hard anodic coatings on aluminum materials. During the electrolytic oxidation process, ceramic protective coatings are produced to specifically functionalize and enable the intended use of the aluminum materials. HART-COAT®-GLATT (HC-GL) is a process variant of HART-COAT® which forms a very smooth and, for example, highly corrosion- and wear-resistant functional layer. Anodization takes place in a cooled electrolyte, but with a specifically modified electrolyte composition compared to HC.

Base materials for HC-GL finishing:
Surface finishing with HC-GL is the right choice when there are high requirements for aluminum components in terms of corrosion protection, wear protection, dimensional stability, roughness, or electrical insulation. Almost all technically relevant wrought aluminum alloys can be anodized with HC-GL, whereby typical for conversion coatings the individual coating properties depend on the base material and thus on the content of alloying elements - especially copper, zinc and silicon. Cast alloys with high silicon contents can also be refined with HC-GL. Regarding dimensional accuracy and tolerances, it should be noted that 1/3 of the desired target layer thickness is applied to the outside, i.e., there is a dimensional increase.

Color of the HC-GL layer:
In pure wrought aluminum materials (e.g., EN AW-1050A) the color is golden yellow. If the number of alloying elements and their content increases, the color changes towards grayish yellow.

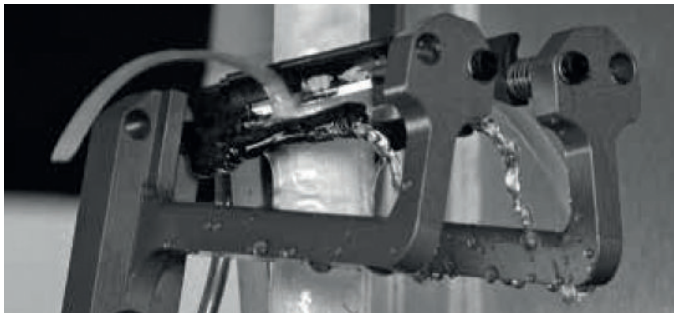
Layer thickness and tolerance:
The typical coating thickness is in the range of 10 to 25 µm.

Roughening:
HC-GL is characterized by a particularly low roughness. Depending on the substrate used, this is Ra = 0.1 - 0.2 µm.

Hardness:
The hardness of the HC-GL layer depends on the alloy and is, for example, at least 450 HV 0.025 for EN AW-6082. For other common aluminum alloys, the hardness of the HC-GL layer is lower or is at most 550 HV.

Wear resistance:
HC-GL has a particularly high wear resistance. By means of the Taber Abrasion Test, the wear rate of HC-GL on EN AW-6082 up to 100,000 revolutions is lower compared to hard chrome coatings (see diagram on page 12 in the HART-COAT® brochure).

Coefficient of friction or sliding properties:
Depending on the surface pressure, the pairing of two HC-GL layers results in friction values in the range of 0.5 - 0.6. Depending on the initial roughness and the application, additional impregnation (PTFE/PFA) may be useful to further reduce friction (e.g., stick-slip effect) and wear, resulting in friction values of 0.1 - 0.2.



HART-COAT®-GLATT coated (25 µm) lever and knife carrier for asparagus peeling machines. The layer protects against corrosion and provides improved cleaning and wear properties.

Corrosion resistance:
The corrosion resistance of HC-GL is already excellent without sealing and reaches, for example, values of more than 1000 h in the neutral salt spray test (DIN EN ISO 9227 - NSS; 25 µm HC-GL on EN AW-6082) without any signs of local corrosion (Rp = 10 according to DIN EN ISO 10289). With additional hot water sealing of the above-mentioned layer, even well over 2000 h with the same findings are achieved.

Electric breakdown voltage:
The breakdown voltage depends on the alloy and increases with increasing coating thickness. 25 µm HC-GL incl. hot water sealing on EN AW-6082 can reach a breakdown voltage of almost 2,000 V (DIN EN ISO 2376).

Thermal conductivity:
The thermal conductivity of HC-GL on EN AW-6082 is about 33 to 27 W/mK in the range between room temperature and 200 °C, which is on average about 50% higher than the values of HART-COAT®.

The values stated are empirical values of Aalberts surface technologies. The individually deviating coating properties must be determined on the respective customer component under production conditions.