HART-COAT®-GLATT

hard anodizing of aluminum alloys
especially smooth and wear resistant

aalberts surface technologies

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The process:

HART-COAT® or HC to be short is an hard anodic oxidation which protects aluminum materials against wear and corrosion with a hard ceramic-like layer.
HART-COAT®-GLATT (HC-GL) is a process variant of HART-COAT® which result is the forming of very smooth and very wear-resistant layers onto aluminum materials. HC-GL coatings are obtained through anodic oxidation in a specially formulated cooled, acid electrolyte. This type of coating has an extremely low pore volume and pore diameter compared to the protective coatings obtained with conventional anodizing processes. The designer has to bear in mind, that the dimensions of a component only change by 1/3 of the total layer thickness.

Base materials for the HC-GL coating:

HC-GL surface coatings can be used wherever corrosion protection, wear resistance, dimensional accuracy, anti-friction properties or insulation is required for aluminum materials. HC-GL layers distinguish themselves for a good adhesion on the base material. Nearly all wrought, cast and die-cast aluminum alloys destined for industrial use are suitable for treatment with HC-GL, but the content of copper, silicon and lead has to be limited.

Color of the HC-GL layer:

The color of the HC-GL layer depends of the alloy of the base material. With pure aluminum (Al 99.5) it is golden yellow. The more alloying elements are added the more changes the color into grey yellow.

Layer thickness and tolerances:

Typical layer thickness: 10 µm up to maximum 25 µm. Layer thickness and layer thickness tolerance depend on the alloy, bath capacity and other parameters.

Roughening:

In comparison to conventional hard anodizing, the HC-GL process stands out with respect to its very low rate of roughness, which according to the substrate used varies between R_a = 0.1–0.2 µm. The increase is less if there is considerable surface roughness to begin with.

Hardness:

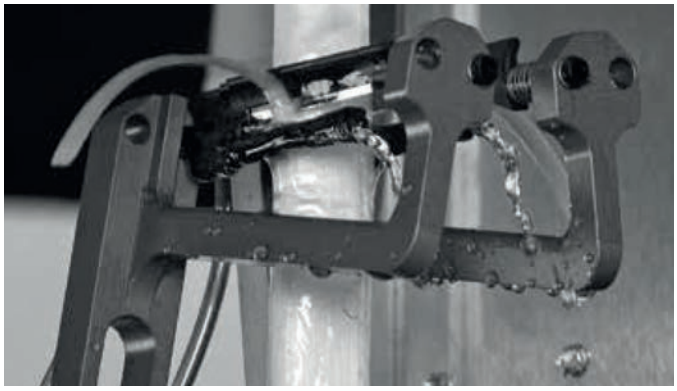
The hardness of the HC-GL layer depends on the alloy and amounts at least to 400 $HV_{0.025}$.

Anti-friction properties:

The friction coefficient of HC-GL determined in an anti-friction test carried out with a pin-disc-tribometer had an average value of 0.73 (F_N = 5 N; v = 6 m/min; 9,000 revolutions).

Wear resistance:

Performance with regard to abrasive wear is especially good. Results of the Taber-Abraser measurements can be seen in the diagram on page 6 (brief information HART-COAT®).



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.

Electric strength:

The electric strength depends on the type of alloy and amounts to approx. 30 V/µm.

Surface impregnation:

Depending on the roughness of the initial surface and on the application, respectively, an impregnation of the layer with PTFE can be useful in order to reduce friction (e.g. stick-slip effect) and wear additionally.

Corrosion resistance:

Even without sealing, the corrosion resistance of an HC-GL-treated surface is excellent. It can withstand a test period of well over 2,000 hours in the DIN EN ISO 9227 salt spray chamber test (e.g. 0–2 spots of corrosion on 25 µm HC-GL applied to EN AW-6082 (Al-Si1MgMn)).

Consultation with Aalberts surface technologies:

It is recommended to make decisions on construction and material selection in consultation with Aalberts surface technologies in an early stage of the planning phase.