

ECCA Case Study

Chrome-free Corrosion Protection for Aluminium Coil

Aluminium surfaces must be protected against corrosion prior to painting by a suitable chemical treatment. For this surface treatment, chromate containing chemicals have been in use for decades. The discussion on environmental and health risks has encouraged the coating industry's search for „cleaner“ solutions. In particular, the implementation of the new chemical policy REACH will boost the replacement of the chromate processes that are hazardous to human health and environment.

Nonetheless, up to now, chromates have appeared to be irreplaceable for their anti-corrosive performance in the industrial painting of metal coil (coil coating). For this application that is used for e.g. the coating of sheet metal for large wall claddings or roofing, garage doors or sun blinds and roller shutters, chromium-free technology was required similar to the chrome-free pre-treatments that had been introduced earlier into the single work piece market in Europe (batch painting, e.g. window frame profiles and façade parts).

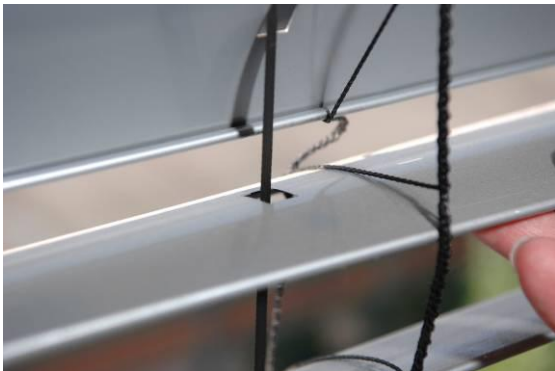
With Alodine® NR 1453, an aqueous, chrome-free pre-treatment chemical which is applied in a no-rinse process by means of roller coaters, a solution was at hand as early as the 1990s. When some of Henkel's laboratory buildings were refurbished in 1998, a project was born to create a reference object also for the new chrome-free coil pre-treatment. In cooperation with VAW of Grevenbroich (today Hydro Aluminium Deutschland GmbH), aluminium coil stock for wall cladding and sun blinds was treated with Alodine® NR 1453 and top-coated with a single-layer, high-durable polyester paint. V-groove façade sheet and sun shades (so-called stores) were made from this coil material, and mounted in October 1998 on the walls of the staircases and the south-facing rows of windows of both buildings. The surface area amounted to some 400 square metres of V-groove sheet and 800 square metres of sun stores. The façades have been in use now for 10 years, facing sun, wind and rain in this industrial environment, and also encountering mechanical damage around the loading areas. The silver metallic paint coating, however, does not show any corrosion even at critical points like punch-holes, bolt and screw joints or dripping edges. This demonstrates the high performance standard of chrome-free pre-treated, coil coated aluminium sheets for building applications.

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Photos



Chrome-free coil coated V-groove sheet performing well after 10 years service, even at its most sensitive point – the dripping edge.



Batch-coated wall cassettes and sun stores made from coil coated stock – chrome-free pre-treatment technology provides reliable protection for coated aluminium.



Chrome-free pre-treated aluminium sheet used on façades at Henkel's Headquarters in Düsseldorf, Germany.