



## **Passivation Based on Trivalent Chromium**

**Peter Volk, Dr. Karl Brunn • SurTec Deutschland GmbH • Zwingenberg**



Research, Development,  
Production,  
Sales, Services



Cleaning



Passivation



Phosphating



Corrosion Protection



Coating



Micro Technology



Pickling



Delacquering



Aluminum



Stainless Steel

# SurTec in Germany



**Peter Volk**

SurTec Deutschland GmbH

Employed since 1998

Function: R&D and Product Management

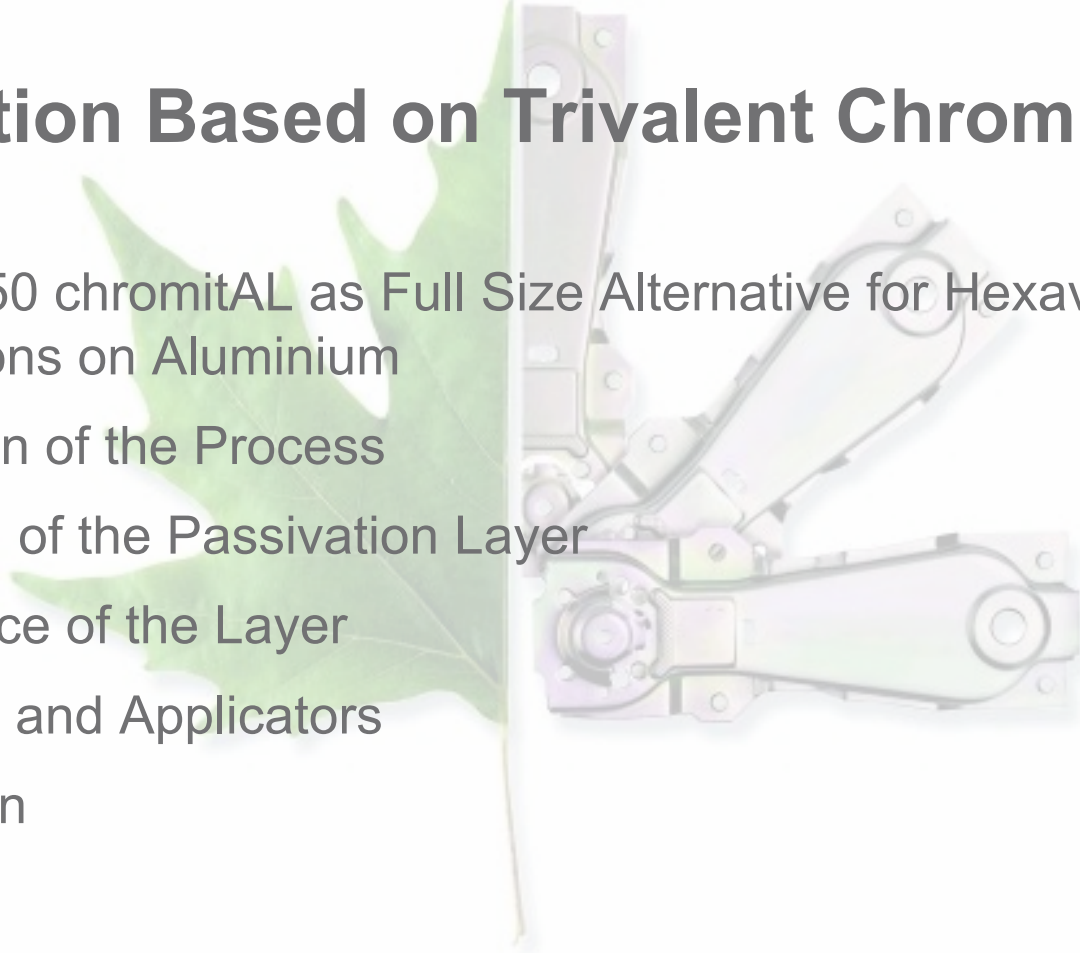


China

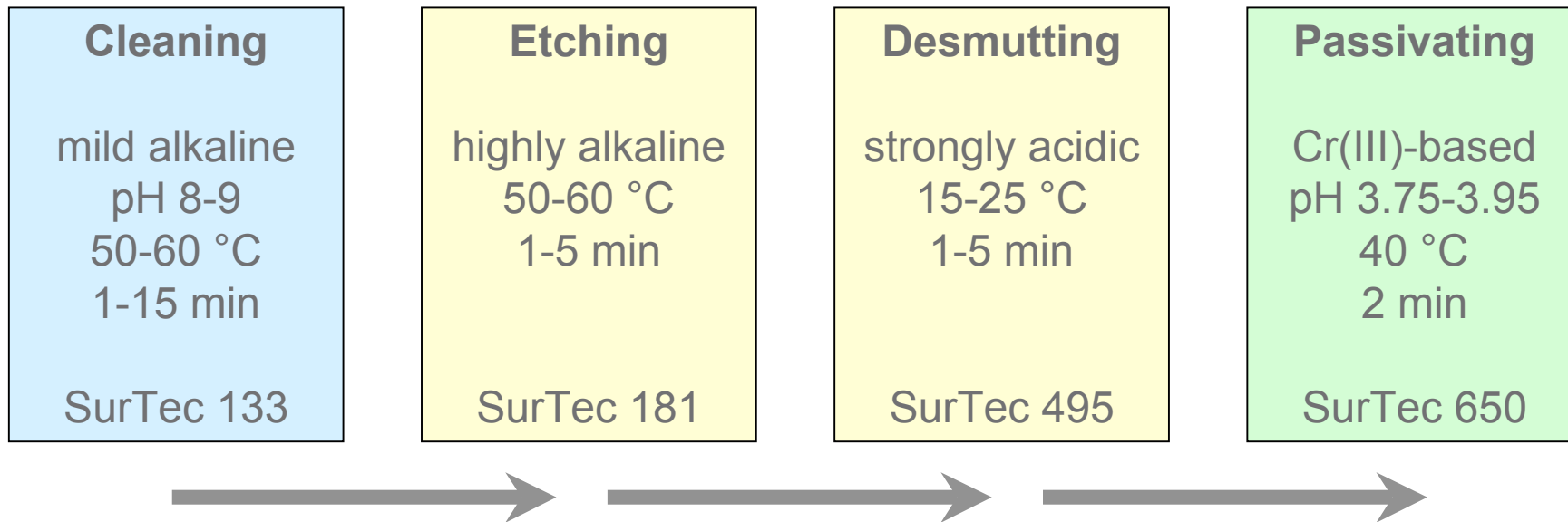
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## Passivation Based on Trivalent Chromium

- SurTec 650 chromitAL as Full Size Alternative for Hexavalent Passivations on Aluminium
- Description of the Process
- Formation of the Passivation Layer
- Appearance of the Layer
- Approvals and Applicators
- Conclusion



# Passivation Process



Between each step, the surface must be rinsed.

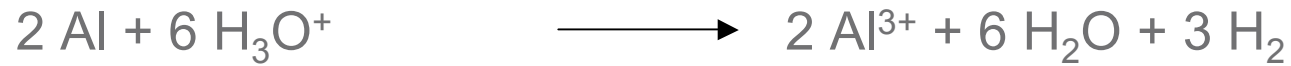
In case of laquering: Conductivity of the last rinse <30  $\mu\text{S}/\text{cm}$

Drying temperature: <65 °C surface temperature of the part

# Passivation Process – Layer Formation

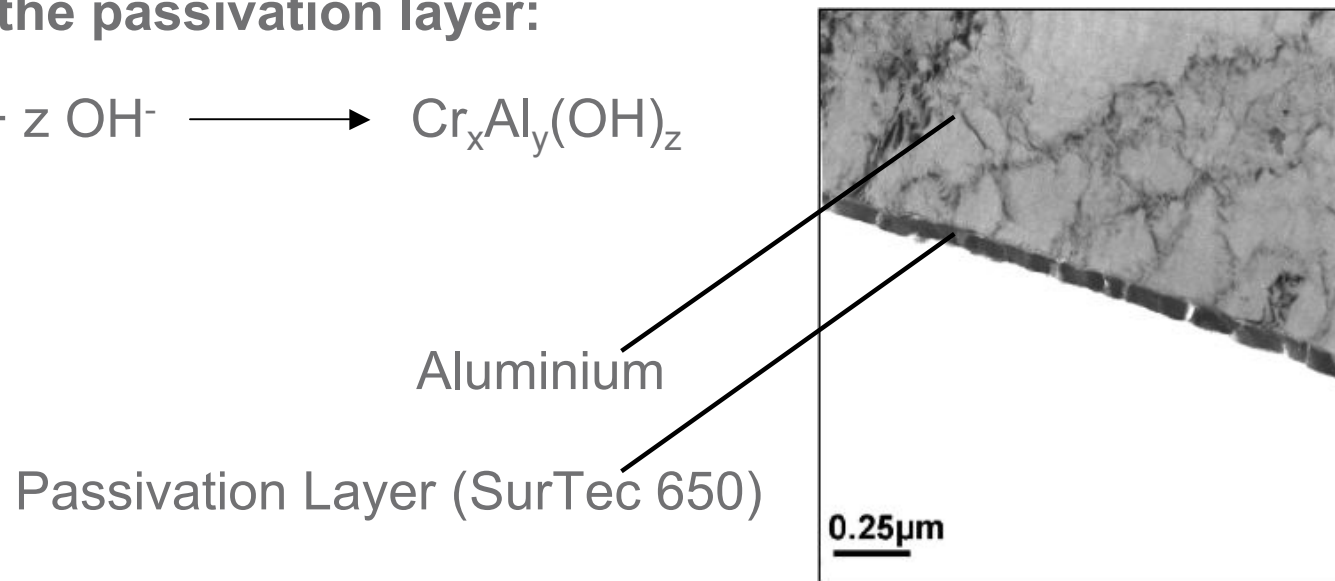


## Activation of the surface:



The activation is assisted by fluorides.

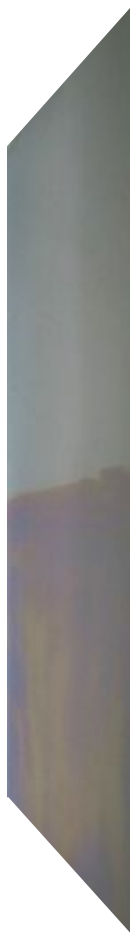
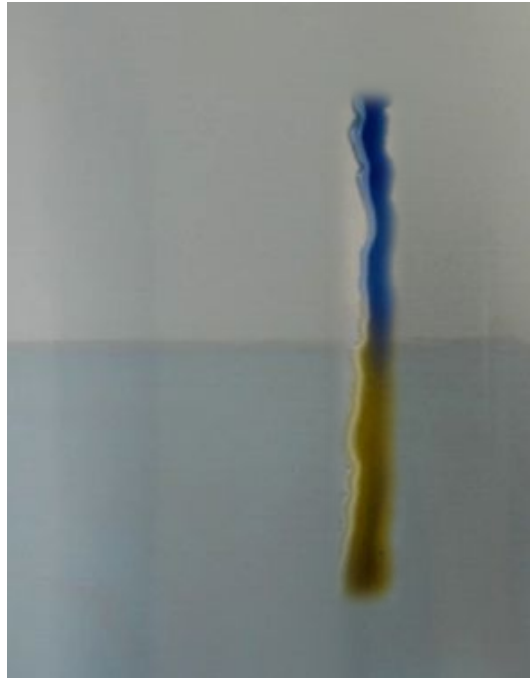
## Deposition of the passivation layer:



# Colour of chromitAL

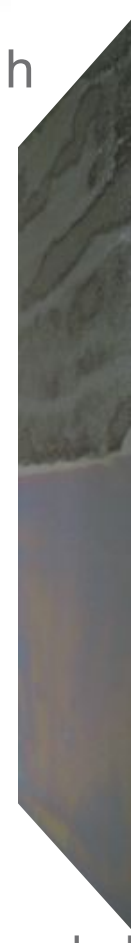
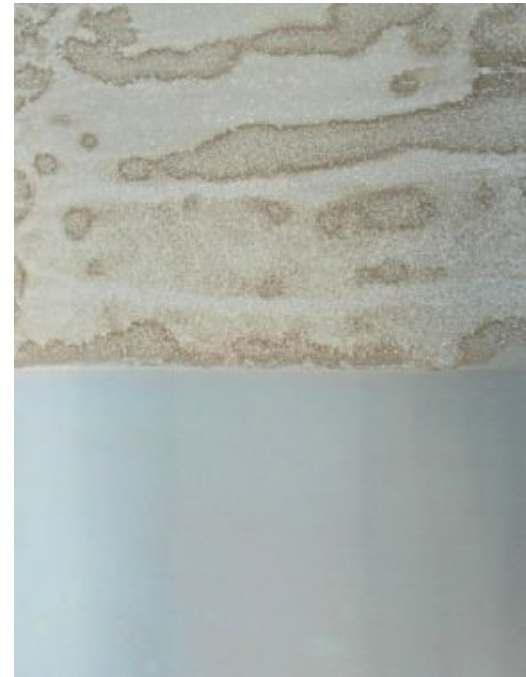


After passivation



The layer is faintly blue-yellow. At a sharp angle the iridescence is visible.

After salt spray test, 168 h



The untreated surface is corroded, the chromitAL - layer is unchanged.

# Approvals of SurTec 650 chromitAL



## MIL-DTL-81706B

Type II - coating: Cr(VI)-free

Approved for *Class 1A*:

- 336 h NSS
- Paint adhesion
- Coating weight >107.5 mg/m<sup>2</sup>

**AND** for *Class 3*:

- <5000  $\mu$ Ohm per square inch (directly after passivation)
- <10000  $\mu$ Ohm per square inch (after 168 h NSS)

## GSB and Qualicoat

Qualification as pretreatment before (powder) coating

*Mechanical tests*

- Impact
- Adhesion
- Bending
- Cupping

*Corrosion tests*

- Condensation water climate
- Humid SO<sub>2</sub>-atmosphere
- Acidic acid salt spray test
- Pressure cooker test

# SurTec 650 chromitAL in Industry



**HONDA**



**HYUNDAI**



**BOSCH**

**DELPHI**



**WABCO**



**NOKIA**  
Connecting People



**ERICSSON**



**KATHREIN**

**SONY**

Aluminal Oberflächentechnik GmbH & Co. KG  
 Friedrich Haug GmbH & Co. KG  
 Galvano Weis GmbH & Co. KG  
 Gerhard Heiche GmbH  
 GIATI Oberflächenveredelung  
 GOT mbH Jena  
 Dekotec GmbH  
 Dittes Oberflächentechnik GmbH  
 Eloxal-München Heinitz GmbH  
 Eloxalwerk Perital Baum GmbH  
 Rüge Galvanotechnik  
 S. Hoffmann GmbH  
 LKM Lübecker Metallveredelung  
 Südeloxal GmbH  
 Münchner Galvanische Werkstätte  
 Oberflächentechnik Neidhardt GmbH  
 Vogel & Schworm GmbH

Franz Oberflächentechnik GmbH  
 AOS GmbH  
 BINE GmbH  
 Blewa Metallverarbeitung GmbH  
 BWB Flugzeuggalvanik Dresden GmbH  
 Harri Müller GmbH Eloxal  
 Heyer & Martin GmbH  
 HFJ Galvano Kiel GmbH  
 Hohl GmbH  
 Holder Oberflächentechnik GmbH  
 Karl Zitt GmbH & Co.  
 Karmoli Oberflächentechnik  
 Spinner GmbH  
 Süß Oberflächentechnik GmbH  
 Südbayrische Oberflächen GmbH  
 Rohde AG  
 Jösel Metallveredelung



**SIEMENS**



**SCHLEIFRING**



## Conclusion



- SurTec 650 chromitAL is a Cr(VI)-free alternative for the yellow passivation.
- Equal properties (corrosion protection, adhesion of paints and contact resistance).
- The trivalent passivation is somewhat more heat resistant.
- Same pretreatment before SurTec 650 as before Cr(VI)-containing passivations.
- Approved by QPL, Qualicoat and GSB.
- SurTec 650 chromitAL is used by several companies and was adopted to intern normings.
- In Germany, SurTec 650 is used in 50 production sites.