



# Surface Solutions

Wim Geurts – Sales Engineer

**oerlikon**  
balzers

**oerlikon**  
metco

# Our main markets

**oerlikon**



**Automotive**



**Industrial**



**Aerospace**



**Oil & Gas**

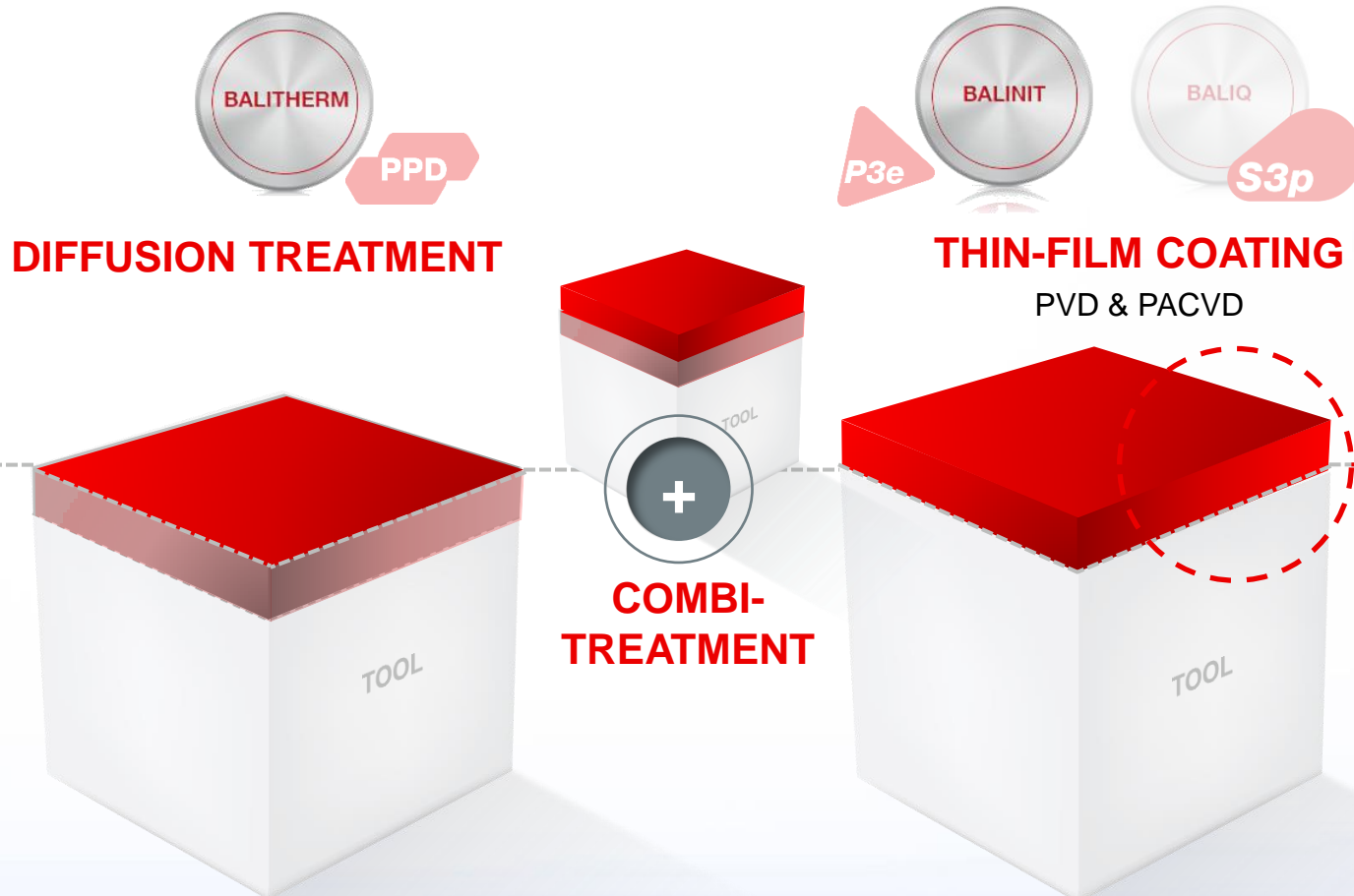


**Medical**



**Consumer  
Goods**

# Diffusion treatment & coating – Surface technologies for your tools



Coatings – thinner than a hair

0,1 mm

Human hair

0,0005 mm

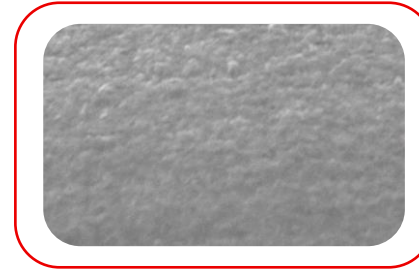
Thin-film coatings  
from Oerlikon Balzers



# From a system to a complete solution for all your coating needs



**Cleaning**



**Coating**

**Quality inspection**

**Pre-treatment**

**Post-treatment**



# Applications

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# We offer the ideal coating for your tools

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**Cutting**



**Metal  
Forming**

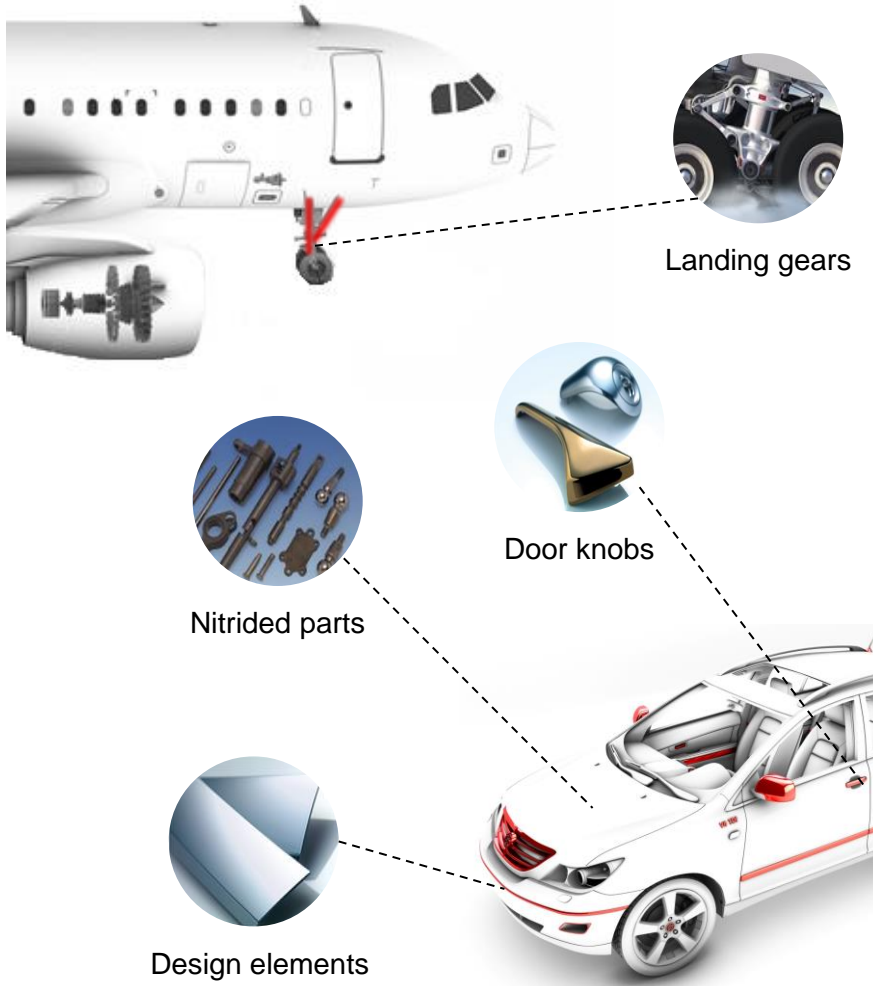


**Plastics  
Processing**



**Die Casting**

# Oerlikon's surface solutions as environmentally friendly alternative to Chrome Plating



## **Challenge:**

Hexavalent chrome (Cr IV) as a key ingredient in Chrome Plating process is of high concern for environment and operator health (carcinogen)

## **Solution:**

Environmentally friendly surface solutions based on Thin Film and Thermal Spray coatings

## **Oerlikon's contribution:**





The Surface Solutions Segment is a global technology leader in the major substitution technologies

- Thermal Spray technology
- Plasma Nitriding (e.g. PPD<sup>1</sup>)
- Thin Film
- ePD<sup>2</sup>

# Coating Solutions

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# BALINIT coatings (carbon-based) and BALITHERM treatments

	Cutting 	Metal Forming 	Plastics Processing 	Die Casting 
BALINIT® C			✓	
BALINIT® DIAMOND	✓			
BALINIT® DYLYN		✓	✓	
BALINIT® HARD CARBON	✓	✓	✓	
BALINIT® TRITON		✓	✓	
BALINIT® ARCTIC Series		✓	✓	
BALINIT® ADVANCED Series		✓	✓	✓
BALINIT® DUPLEX Series		✓	✓	✓
BALITHERM® PPD		✓		
BALITHERM® PRIMEFORM			✓	

# Forming tools treated with BALINIT and BALITHERM stay in good shape longer

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Reduced machine downtime means low production costs

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Longer tool lifetime means low tooling costs

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Higher workpiece quality means significantly less rework is required

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Enables the forming of high-strength steels

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**More productivity, efficiency and manufacturing reliability for your punching and forming tools**



**>> Go to the  
Coating Guide**

**Metal Forming**



# BALITHERM PPD: Lifetime wear protection for large forming tools



## Advantages

- **Easily maintained** diffusion process (Pulsed-Plasma Diffusion)
- Creates lifetime **hard, wear-resistant** forming surfaces
- No poisonous gases or chemicals are used
- High degree of automation for **increased efficiency and energy savings** in the entire process cycle
- Tool cleaning **integrated in process**
- **Environmentally friendly alternative** to the hard chrome plating



## Application

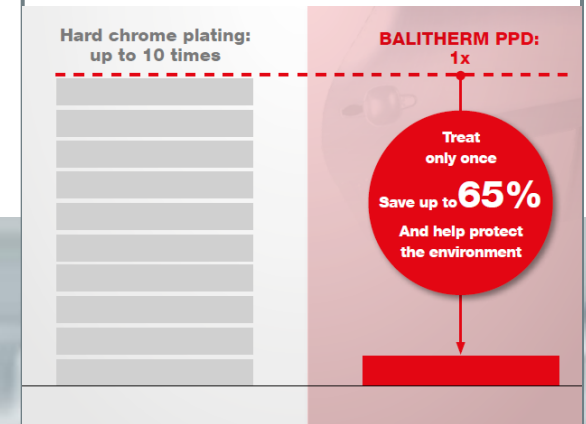
### Wear protection treatment of stamping tools for various car body parts

- Engine bonnet
- Side skin parts
- Boot lids
- Mudguards
- Doors
- Roof



## Application example

### Surface treatments for production of 1 million side skin parts



# Significant cost savings and higher productivity with BALITHERM PPD



PPD

- ▶ Hard chrome plating has been completely replaced
- ▶ 25% productivity increase
- ▶ Lower maintenance costs
- ▶ Improved part quality
- ▶ Environmentally friendly solutions and REACH compliant
- ▶ The Hyundai and Kia group has implemented BALITHERM PPD treatment globally



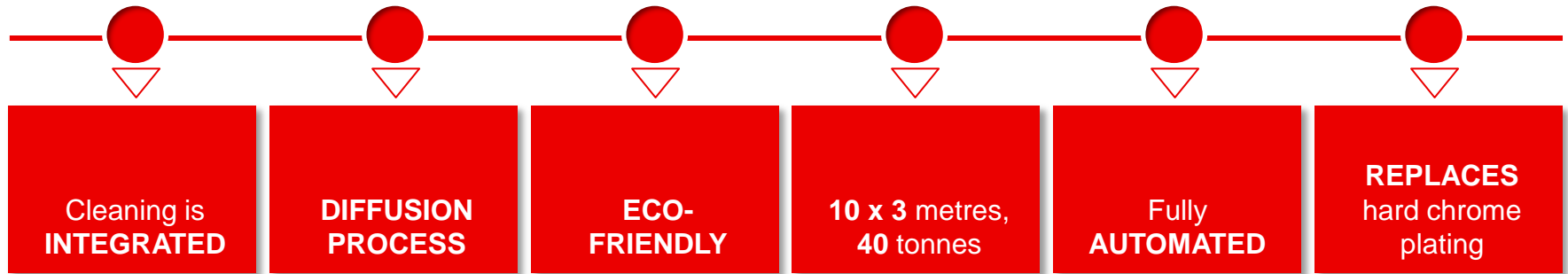
**“Thanks to the high quality of the BALITHERM PPD surface treatment used for our forming tools, we are able to produce the best quality vehicles.”**

In-Kyu Bae, früherer Präsident und CEO von Kia Motors Slovakia, Slovakia

**Metal Forming**



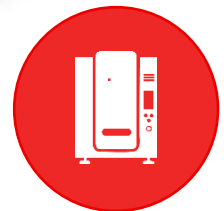
# INAURA – For PPD treatment of large forming tool surfaces



## INAURA

Pulsed-Plasma  
Diffusion

- Loading capacity of 10 x 3 metres and 40 tonnes
- The largest tools can be treated
- Hard, wear-resistant forming tool surfaces
- PRIMEFORM treatment available as well

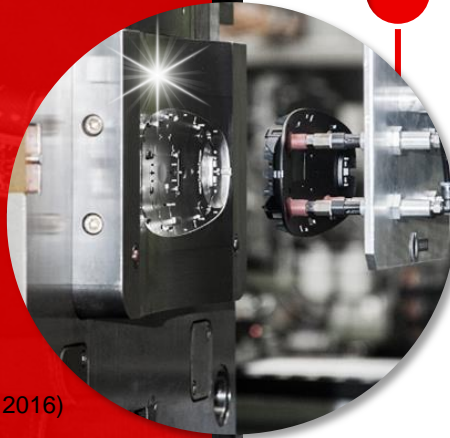


# Production of high-gloss components with BALITHERM PRIMEFORM



**Speed is a must: "90% of our customer orders must be delivered within three days."  
Tools treated with BALITHERM® PRIMEFORM enable the flawlessness and speed required in production.**

Stefan Schlottbohm, Head of Toolmaking at the Gigaset AG company, Munich.



- ▶ Scratch and wear-resistant tool surfaces thanks to plasma-assisted diffusion treatment
- ▶ Perfect high-gloss surfaces on the manufactured plastic parts
- ▶ Shortened maintenance and cycle times in production
- ▶ Cycle duration decreased by 10%
- ▶ Significantly improved tool lifetime

**Plastics Processing**



# BALITHERM PRIMEFORM: The innovative treatment for brilliant mold surfaces



## Advantages

- **Wear resistance** Increase in the surface hardness of up to 1400HV
- **Scratch resistance** Reduced mold sensitivity to improper handling
- **Very good polishing properties**  
Improved surface brilliance



## Application

- **Tool steels without dimensional change up to** temperatures of 450°C or 380°C, e.g. 1.2311, 1.2738, 1.2316, 1.2343, 1.2344, 1.2379, 1.2083 (secondary-heat-treated), 1.4112/1.4122, 1.8519/1.8550/1.7735
- **Polished surfaces: High gloss or brushed**
- **Textured surfaces:** shot-peened, etched, eroded



## Application example

**Problem until now:** Slight corrosion in hard-to-reach places despite TiN / CrN. Scratches caused while cleaning the mold – difficult or impossible to remove. Disadvantages: Multiple stripping and recoating or new hard chrome-plating, elaborate maintenance required.

**Solution:** BALITHERM® PRIMEFORM.

**Result:** More efficient, environmentally-friendly production. Reduced scrap costs. **Increase in productivity by 60%**

Plastics Processing



# An example



## **Problem so far:**

Scratches caused while cleaning the mould – difficult or impossible to remove. Disadvantages: Multiple stripping and recoating or new hard chrome-plating, elaborate maintenance required.

## **Solution:**

PRIMEFORM™. For noticeably improved demoulding, optimised process reliability, enhanced component quality.

## **Result:**

Improved production efficiency and reliability. Reduced scrap costs. Productivity gain in the magnitude of 60%.

# CrN Multilayer: Extrusion Die for Pipes

## Dimensions:

Diameter: 1400 mm

Length: 800 mm

Weight: approx. 4000 kg

## Application

Extrusion die for PVDF flexible pipes for Oil, Gas, Chemical or water fluids

## Why coating

Corrosion resistance (due to the “F”) and a better flow of the plastic resin.

Combination of stainless steel (1.4125: 17% Cr) and the PVD coating makes the success



# CrN Multilayer: Flat Extrusion Die for Sheets

## Dimensions

Width: 500 mm

Depth: 150 mm

Length: 4.400 mm

Weight: approx. 2000 kg

## Application

PE foils for agricultural applications.

## Why coating

Due to the coating the build ups are reduced and a better flow of material. Maintenance is facilitated and the times between maintenance intervals are increased. Base material is a tempering Steel (1.2311: 2% Cr).



# Aluminium die casting production costs cut in half with combi-treatment



- ▶ Nitriding and coating with BALINIT® LUMENA DUPLEX
- ▶ The pre and post-treatment are also of key importance
- ▶ Significantly delayed development of wear and sticking
- ▶ Easy removal of alloying
- ▶ Tool life more than 3 times longer for cores
- ▶ Reduction of production costs by more than half due to coating

**Tool treatment is not just a problem solver for the DGH Group: “Now we include it right from the start in the development and engineering of some moulds.”**

Michael Nitsch, Job Preparation and Tool Testing at the DGH Group, Germany



**Die Casting**







**Close to you –**  
Anywhere in the world

**THANK YOU.**

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