

WÖRWAAG

Farbe. Beschichtung. Kompetenz.

Presentation Wörwag Eurocar 2014

Innovative coating technologies for the commercial vehicle market



Agenda

1. Short introduction of Wörwag
2. 2p- Ultra high solid technologies for car bodies and driver cabins
3. UV- Coatings for metal add on parts
4. Painted Films (foil)

Short company Introduction

WÖRWAG
Farbe. Beschichtung. Kompetenz.

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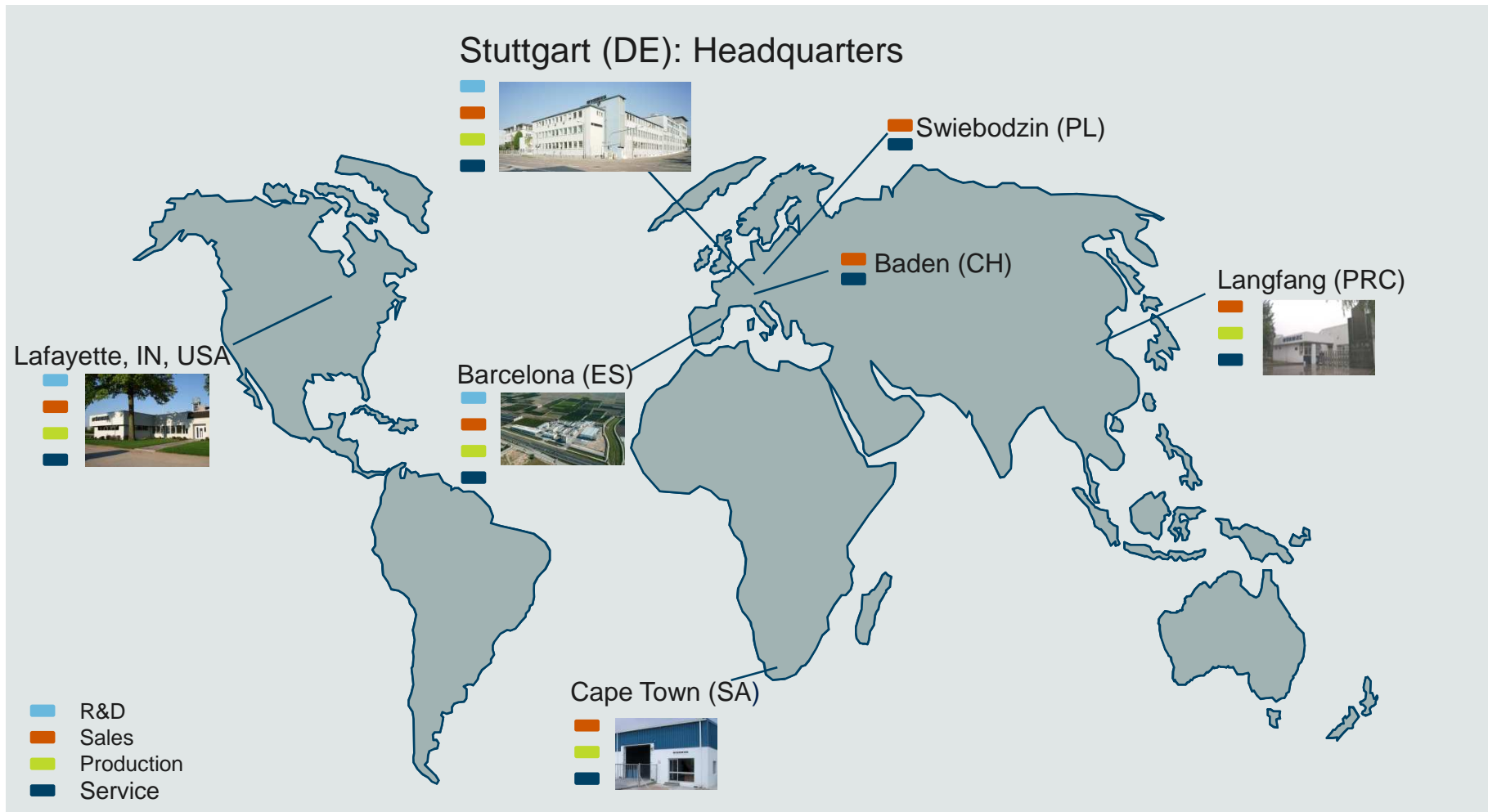
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About us

- Family business since 1918 in the fourth generation
- Producer for Powder- and liquid coatings and painted films for general industry and automotive suppliers
- Turnover 2013 190 Mio. €
- employees 680 in Germany, total of 800 worldwide
- Strengths: innovation, product quality, engagement of employees

International Sites



Our market segments

Liquid, powder and film coatings for



Vehicle exteriors & interiors



Car bodies, commercial vehicles



Automotive components



Construction & agricultural machinery



Household appliances



Plant engineering



Furniture



Building equipment

Our Services



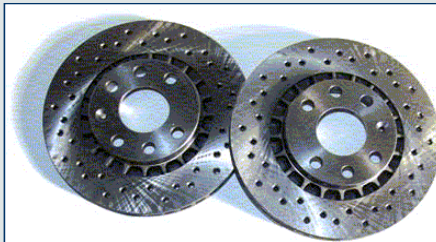
- Technical application support
- Accredited testing laboratory
- Consulting for new coating concepts and facilities
- Consulting in process oriented coating analysis
- Development of VOC compliant coating processes
- Seminars and trainings



Awards



Dr.Rudolf Eberle Innovation Preis 1998
Daimler Global Environmental Leadership Award 2000
Smart
- Acrylic powder and liquid coatings-



SAE / PT2 Environmental Leadership Award 2003
„Engineering Excellence in Transportation + Materials Development and Usage”
- Zinc dust primer-



Daimler Chrysler Environmental Leadership Award 2003
Sprinter Daimler Düsseldorf
- 1p- Hydro- Topcoats-



Environmental Award Daimler AP-Axles 2009
- UV-Coating Technology-

ultra-high-solid coatings

high quality, environmentally friendly
coating systems

Field of ultra high solid applications

solid content 80% in handling

Topcoats for
commercial vehicles
building machines

Filler/ Primer for
commercial vehicles

Chassis coating for
commercial vehicles

Technical Goal:
Realization of a wet
in wet application

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graph LR; A["Topcoats for commercial vehicles building machines"] --- B["Technical Goal:  
Realization of a wet in wet application"]; C["Filler/ Primer for commercial vehicles"] --- B; D["Chassis coating for commercial vehicles"] --- B;
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Wörwag UHS Concept

Ultra-high-solid technology W758 / W759

UHS- Base Platform

2p-System

- Acrylic/
Polyisocyanate
- Solid content
approx. 80%
- drying condition
30 min. 80 °C
- Gloss
high-, semi-, mat

- Acrylic/
Polyisocyanate
- Solid content
approx. 80%
- drying condition
30 min. 130 °C
- Gloss
high-, semi-, mat

1p-System





- Acrylic/
Melamin
- Solid content
approx. 80%
- Curing temperature
30 min. 130 °C
- Gloss
high-, semi-, mat

quality properties UHS Mono-Layer

Parameter	Property
corrosion resistance	<ul style="list-style-type: none">- up to 504 h humidity- and salt spray test- 10 cycles VDA- Wechseltest- stone ship- resistance with 72 h salt spray
weatherability	<ul style="list-style-type: none">- up to 2000 h WOM
cupping test	<ul style="list-style-type: none">- > 10 mm
stone ship	<ul style="list-style-type: none">- note Soll 2 Ist 2
rust grade	<ul style="list-style-type: none">- note Soll 1 Ist 1
steam jet test	<ul style="list-style-type: none">- according to the spec.
chemical resistance	<ul style="list-style-type: none">- according to the spec.
recoatability	<ul style="list-style-type: none">- technically feasible
possible application	<ul style="list-style-type: none">- high- and low pressure application- ESTA / high rotation bells

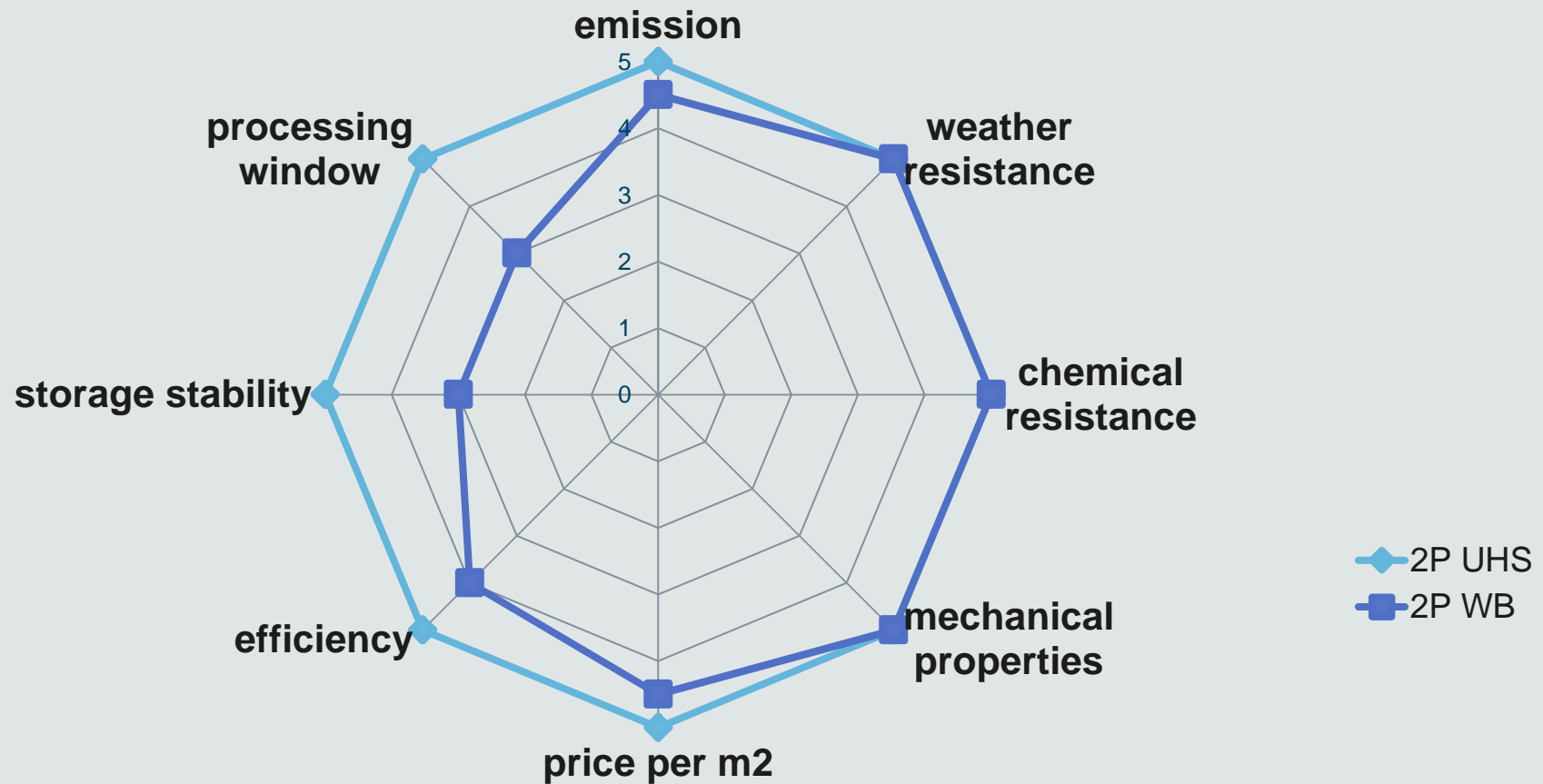
Comparison

2p- Ultra high solid (UHS) vs. 2p- Water based paint (WB)

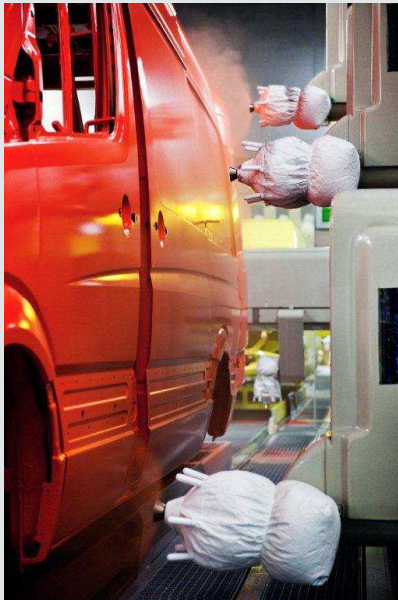
System	2p- UHS	2p- WB
colour	white	white
solid content	80 %	54,5 %
amount of org. solvents	20 %	14,5 %
amount of water	0 %	31 %
efficiency at 50 µm layer-thickness	9,7 m ² /kg	6,5 m ² /kg
price per kg		
price per m ²		
amount org. solvents at 100 m ²	2,1 kg	2,25 kg

Comparison

2p- Ultra high solid (UHS) vs. 2p- Water based paint (WB)



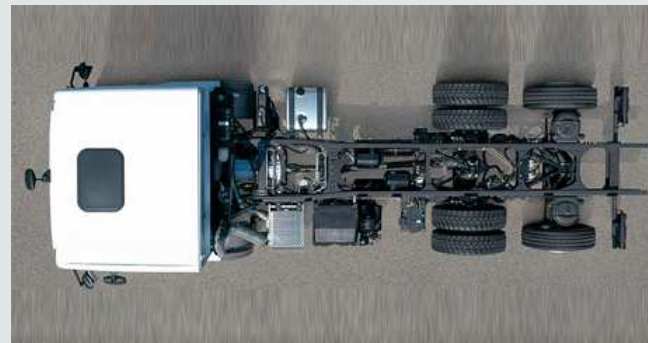
examples for applications of UHS coat



monolayer topcoats for trucks, vans & buses



Topcoats for truck-chassis



examples for applications of UHS coat



Transporters &
construction machineries



Conclusion

1. By using –ultra high solid UHS- solvent-based paints the VOC emission will fall much below the level of water- based paints
2. The solvent-based paint process needs 25-30 % less energy in comparison to the optimized water based paint process, which results in equivalent less CO2 emission
3. High surface quality , high technical performance, easy in handling, long shelf life, wide and variable application window are further benefits for the use of the UHS technology

For ecological as well as economical reasons the introduction of the – UHS- solvent based paints is beneficial

Wörolux UV-paint

UV coatings for vehicel components

reasons for using UV-curable coatings

Extreme durability
Dual-Cure-Clearcoat

High production speed
Mono-Cure-System

Innovation
Painted films

reasons for using 100% UV-curable coatings

- Monocure technology direct to metal for fast industrial appliance
- solid content 100%
- quick curing speed / quick cycle times
- low energy consumption while curing process
- no organic solvent required
- recyclable
- excellent chemical resistances
- low space required for UV curing equipment
- same application properties/appliances as for conventional coatings

Wörwag UV Concept

UV- Base Platform

W010 / W030

W010

- epoxy-acrylate
- Solid content approx. 100%
- UV curable
- transparent corrosion protective coating
- direct to metal

W030

- epoxy-acrylate
- Solid content approx. 100%
- UV curable
- pigmented corrosion protective coating
- direct to metal

W031

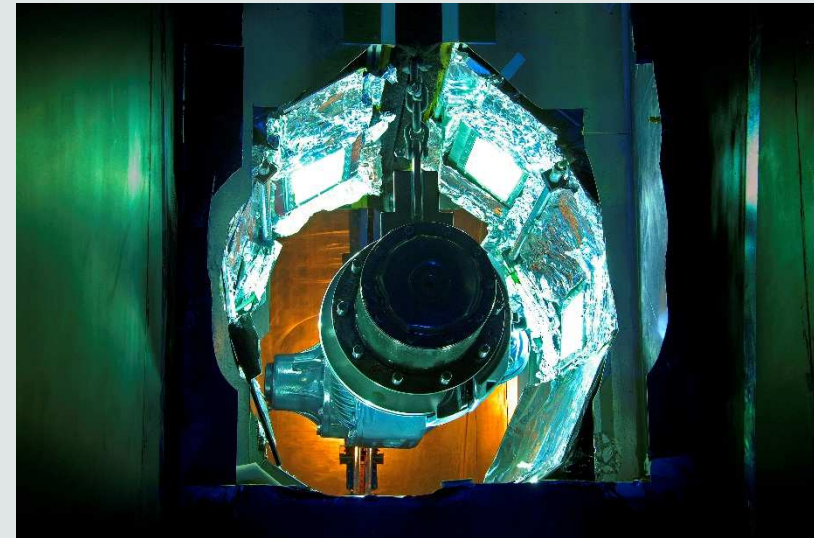
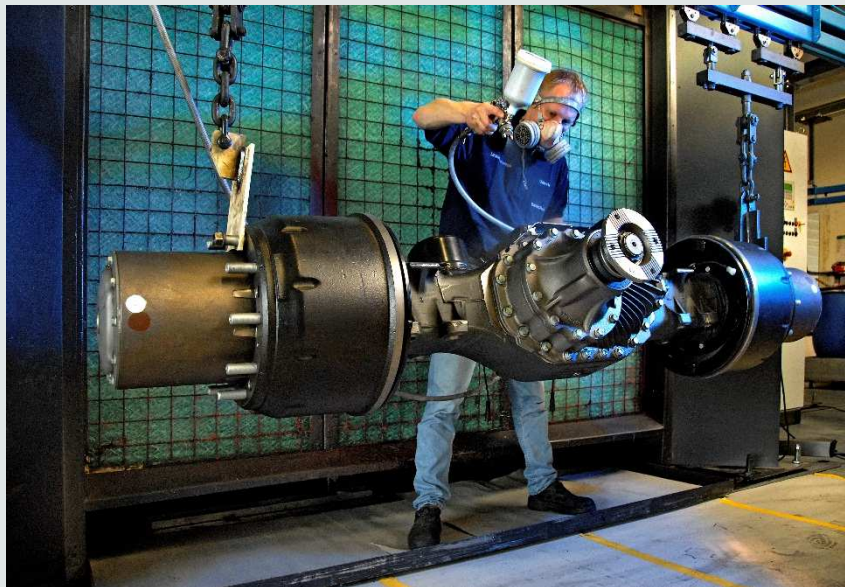
W031

- Epoxy-polyester-acrylate
- Solid content approx. 100%
- UV curable
- pigmented corrosion protective coating
- direct to metal
- Moderate weatherability

examples for applications of UV-coat

application of truck-axles

(in this case manual application
- usually by robot application)



curing of an axle in a
UV-radiation tunnel,
filled with nitrogen.

examples for applications of UV-coat



wheel hubs



break discs



diesel injection pumps



drive shafts

Environmental Leadership Award 2009



The companies STURM and WÖRWAG won the prize together with the team members of Daimler for the UV-coating of truck axles

Conclusion

UV- Monocure paint solid content 100%

Environment

- 100% solid content
- low energy demand.

Fast curing

- 7-15 sec. curing time
- immediately chemical and mechanical load capacity
- no storage needed

Costs per m²

- high productivity
- low energy demand
- low process costs



Minimum Energy demand

- 10kW with conv. UV-Lamps
- LED- technology possible

High mechanical and chemical properties

Low space required

- Integrated paint process possible

Painted Film Technology



Transfer Paint



Decorative painted films

Short introduction of this technology

Worwag provides two different types of painted film technologies

1. Transfer Paint / Paintfilm without permanent carrier film

The Transfer paint is a flexible, free transferable paint film placed between two removable films. It is designed to bond to PVC.

Wörwag transfer paint is a high performance film for interior and exterior applications in automotive or other industries.

2. Decorative painted Films /Carrierfilm + paintfilm

The Worwag decorative painted film is a flexible 3 layer – system based on a PP foil , coated with a waterborne basecoat and a high flexible UV-cured clearcoat (dual cure). The decorative film has a good scratch resistance and a excellent weather stability. Different surface finishes (glossy till matt as well as structured) can be produced.

Transfer Paint

example for Application

Lamination during extrusion of water deflector Daimler – serial production



Serial delivery for Daimler

C-class (BR 204)

A-class (W 176; C117)

B-class (BR 246)

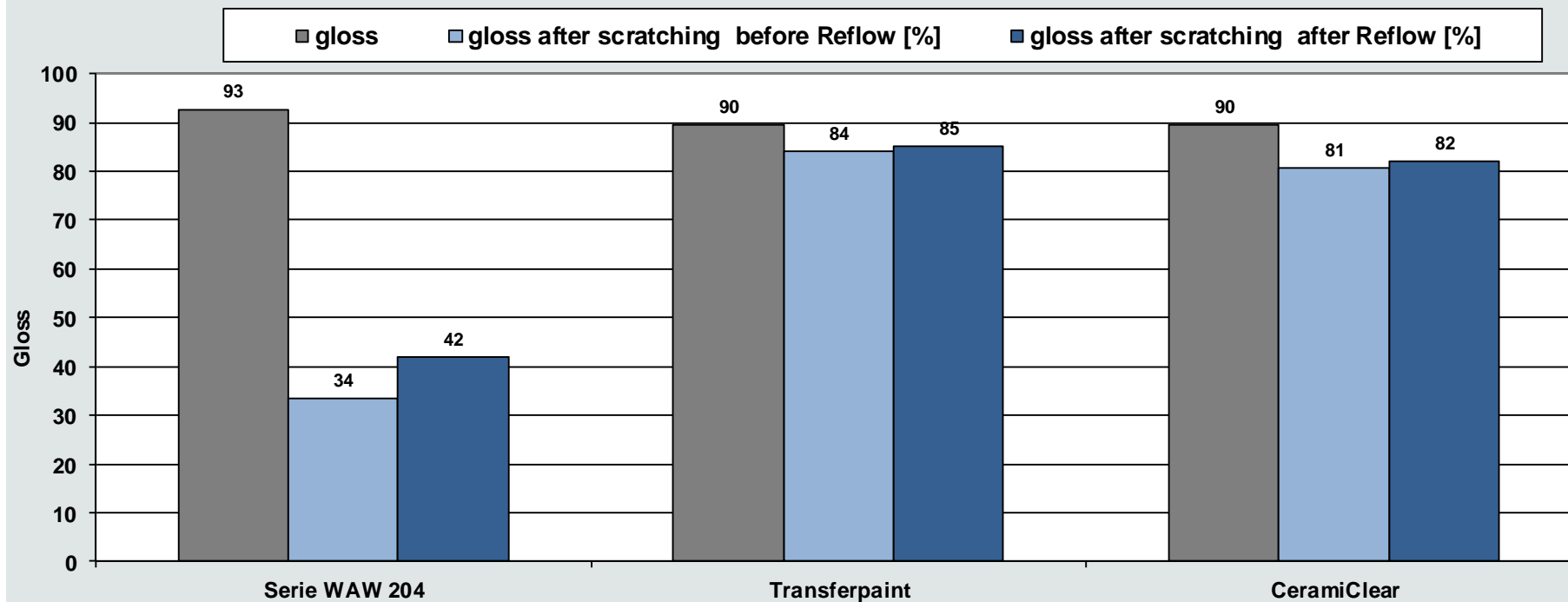
Application for new project:

W 205 (replacement BR204)

Scratch Resistance

Daimler Amtec Kistler

Scratchresistance of different surfaces
Amtec - Prüfung 10 DH , 1,5 g/l Sikron SH 200



Decorative Painted Film

example for Application

Profile lamination with hot melt adhesive



Laminated component
e.g. window profile



Exclusiveness at company Schüco for construction components
Product-description „Automotive Finish“



Awards Painted Film

2012: Award „Oberfläche 2012 in Gold“ – IPA Fraunhofer Institut for production technic and automatisisation for the Wörwag-transferfilm



2012: SPE Automotive Innovation Award - „Exterieur“ for the production Daimler and Silvatrim of water deflectors C-class Mercedes-Benz with Wörwag- transferfilm

Conclusion

Preferred applications

- Endless processes like extrusion lamination or profile lamination with hot melt adhesive
- Shorter process times than liquid paint application because of application two layers with one process step
- Environment-friendly because no waste of paint or solvents occurs during film-application
- Flat, uncomplicated parts with easy geometry
- Manageable amount of different colours and glosses

thank you for your attention

