

# Colored PU and spray painted surfaces

What is different?

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Lüdenscheid 25.02.2026





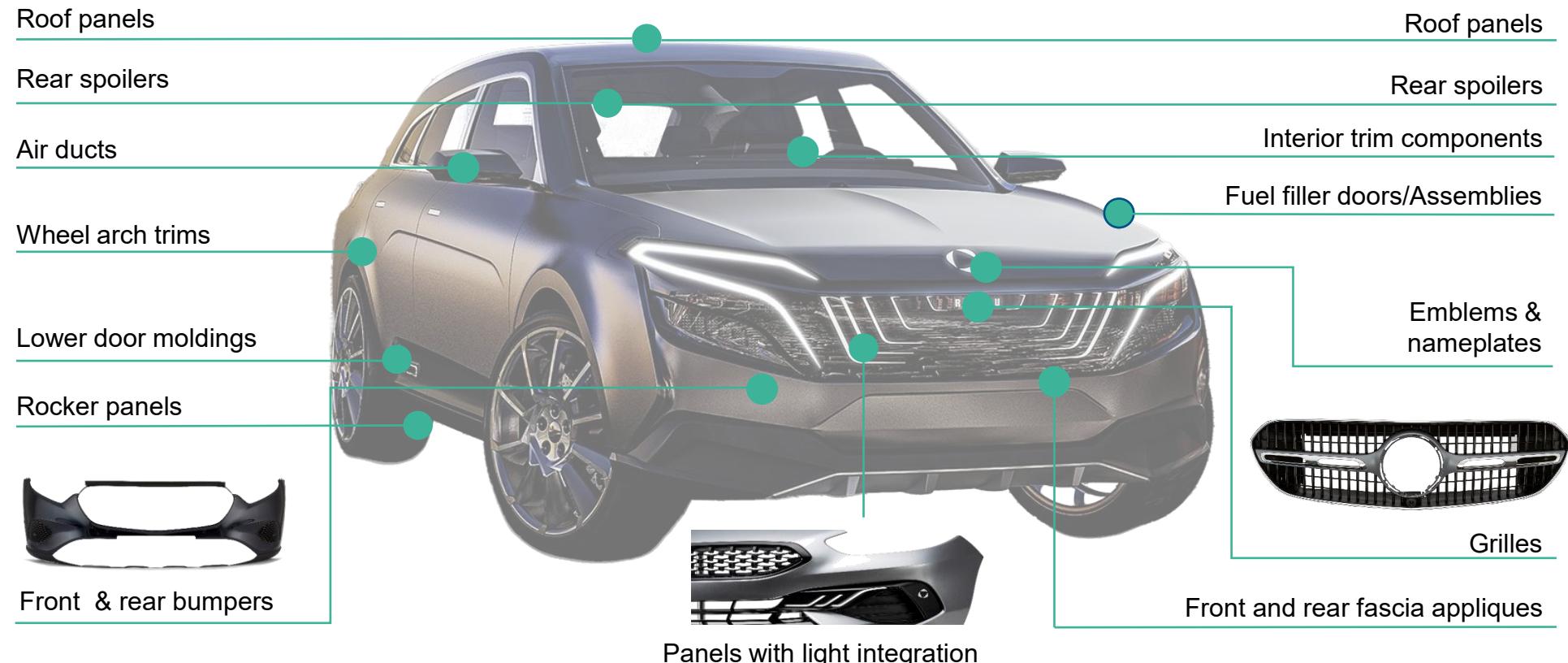
Two legacies. One road forward.



TOGETHER TOWARD TOMORROW.

# Product Portfolio

- Wider product range through combined product portfolio.



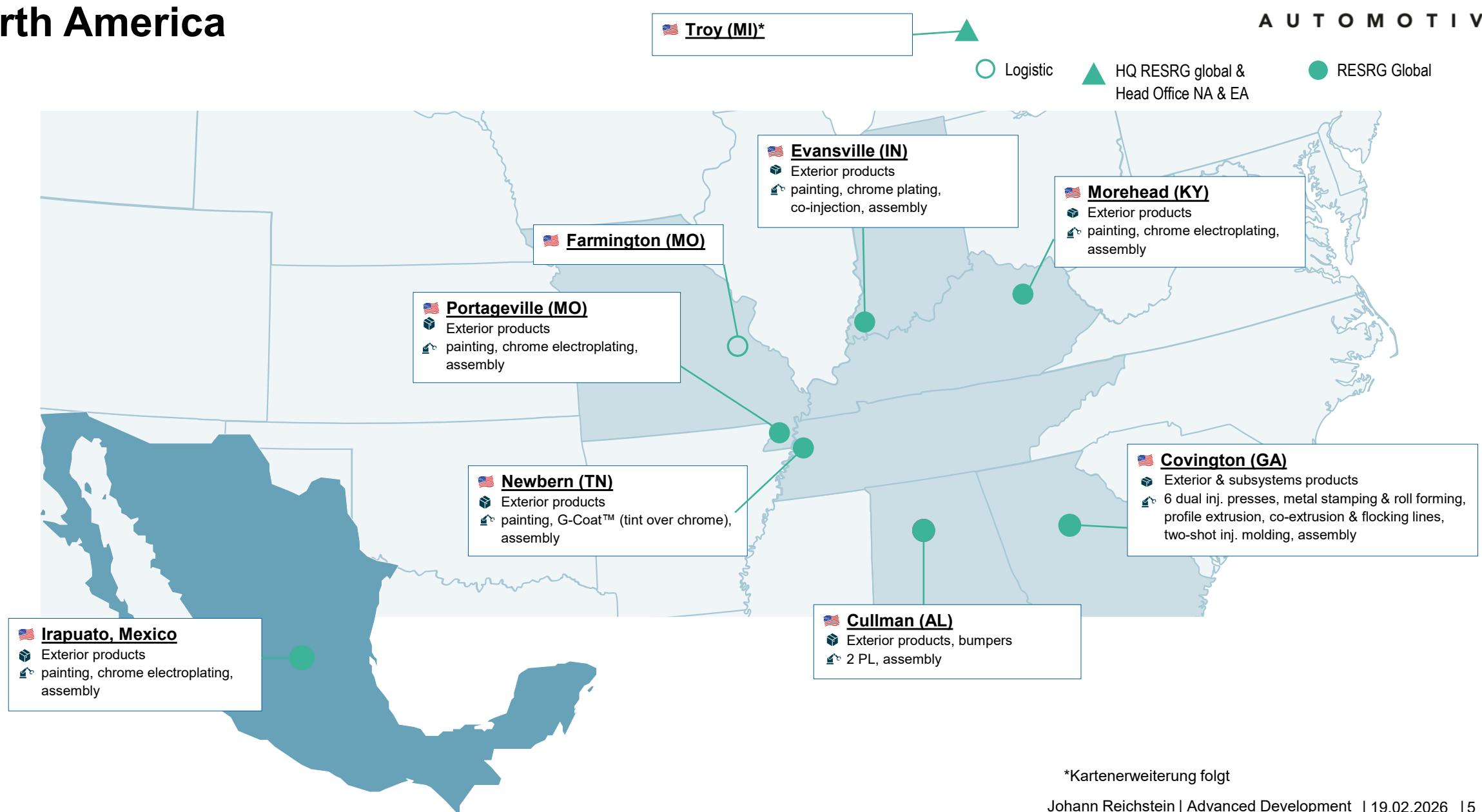
# Our Customers



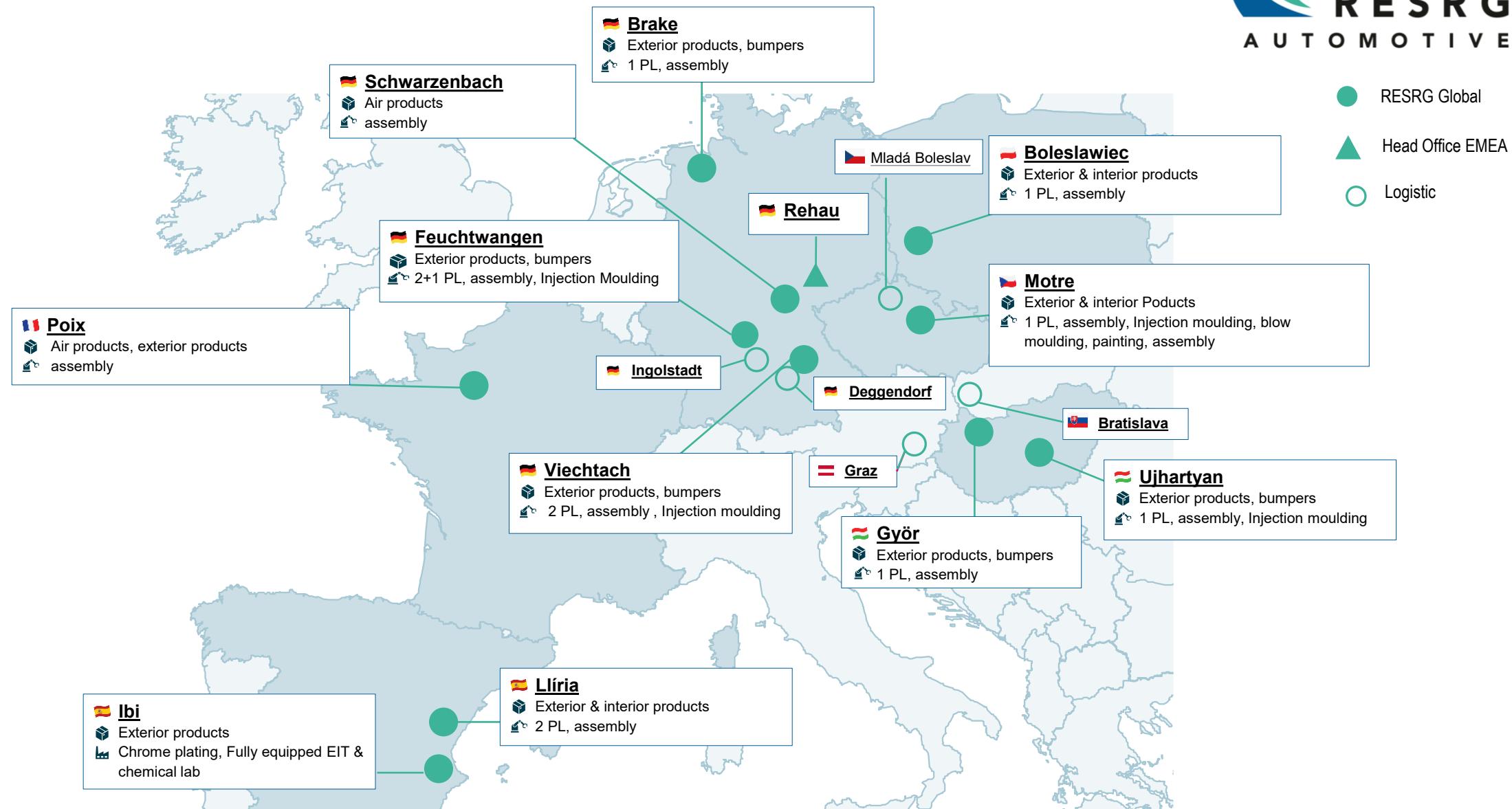
**OEMs:** Audi | BMW | Ford | General Motors | Honda | International | Jaguar Land Rover | Mazda | Mercedes Benz | Mini | Mitsubishi | Nissan | Porsche | Renault | Rivian | Rolls Royce | Seat | Skoda | Stellantis | Toyota | Volkswagen | Volvo | Zoox

**TIERS:** A.P. Plasman | Automotive Lighting | Cooper Standard | Dongfeng Visteon | Faltec | Flex N Gate | Gearchief | Eissmann | Henniges Automotive | Kasai Kogyo | Magna | Magneti Marelli | Novem | Plastic Omnium | SMP | Valeo

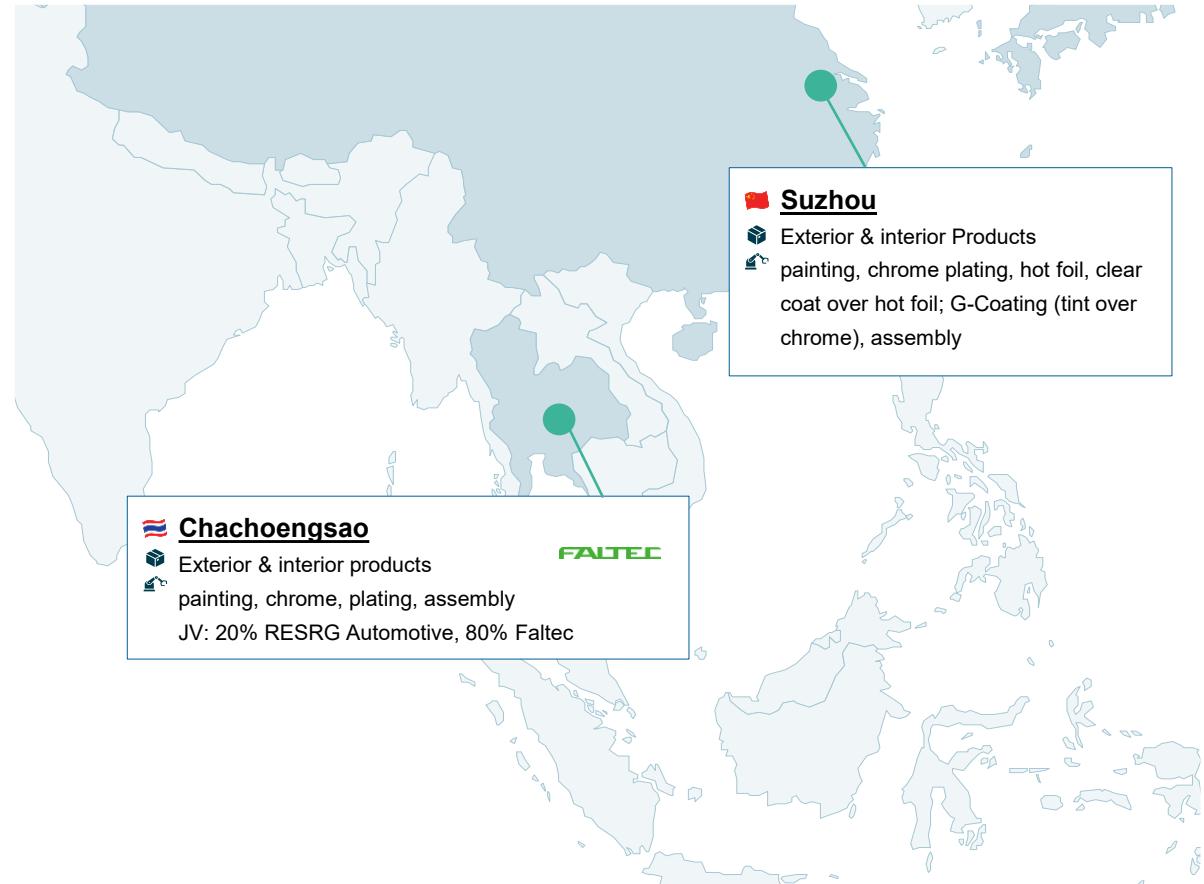
# North America



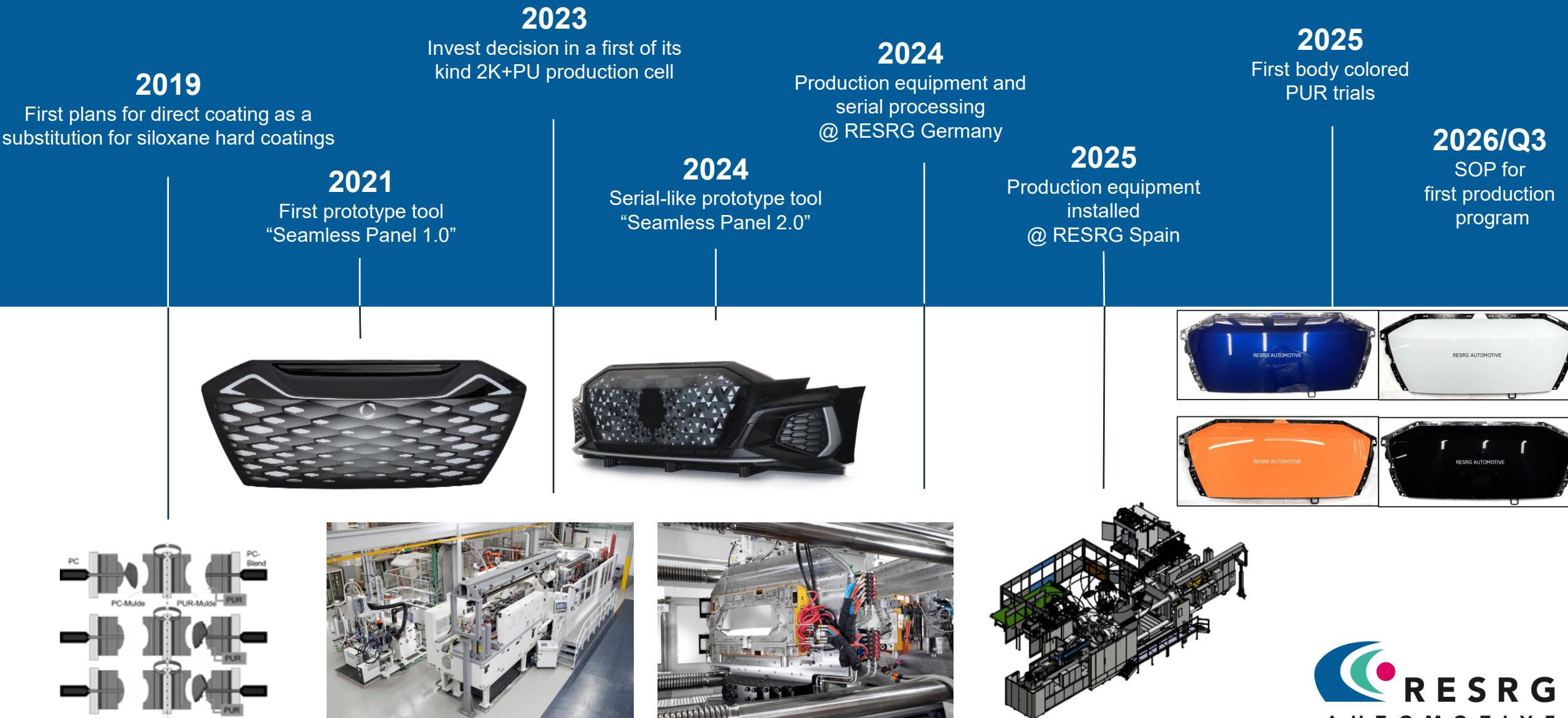
# Europe



# South Africa / Asia



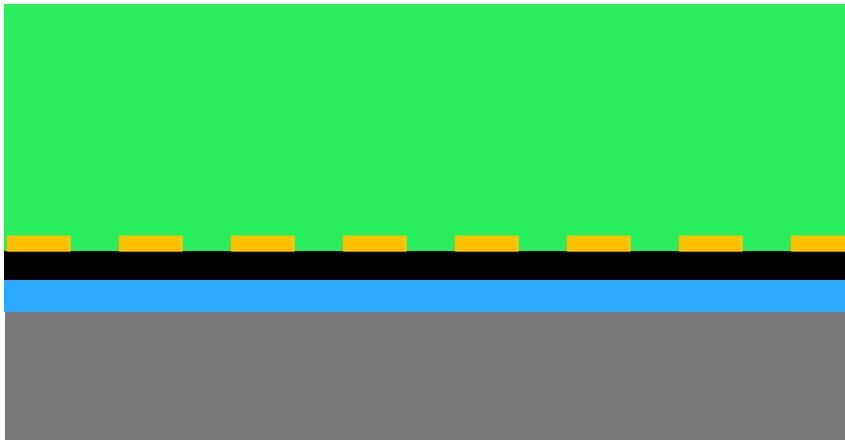
# Direct Coating at RESRG Automotive



# Colored PU or PU over color?



Schematic section

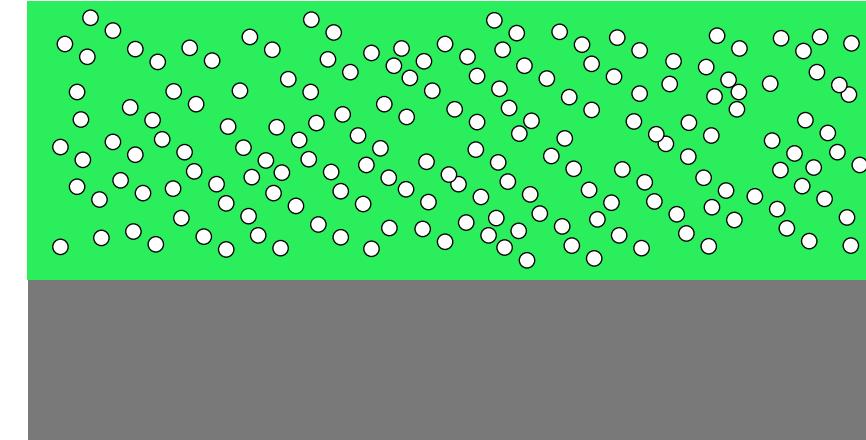


Transparent PU

Film with colored print

Substrate

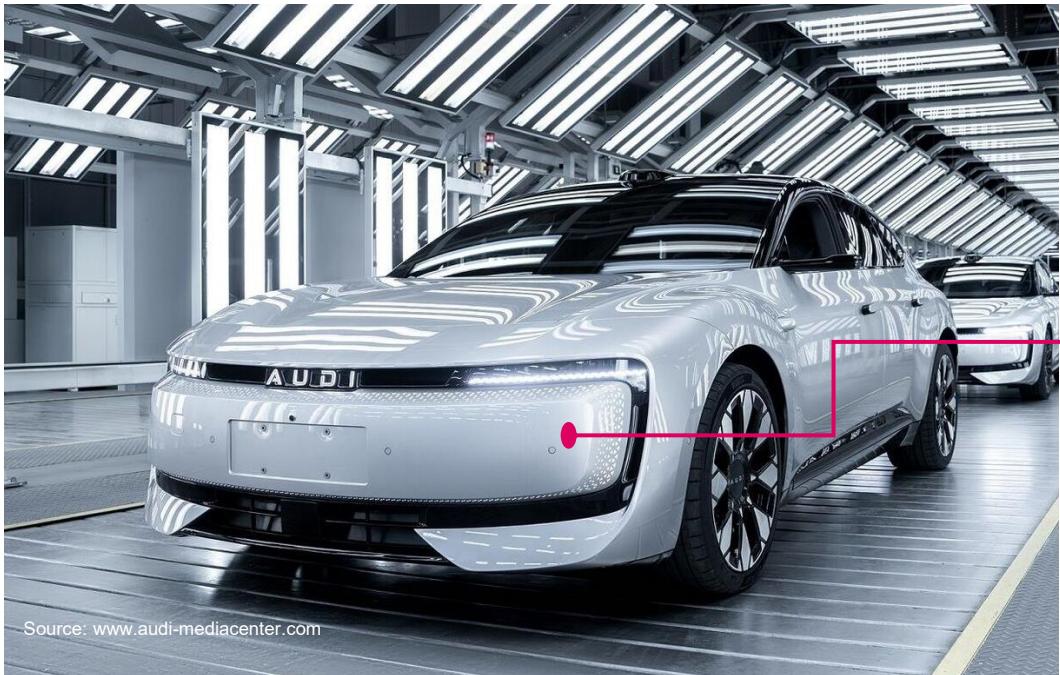
Schematic section



Colored PU

Substrate

# Requirements for colored surfaces



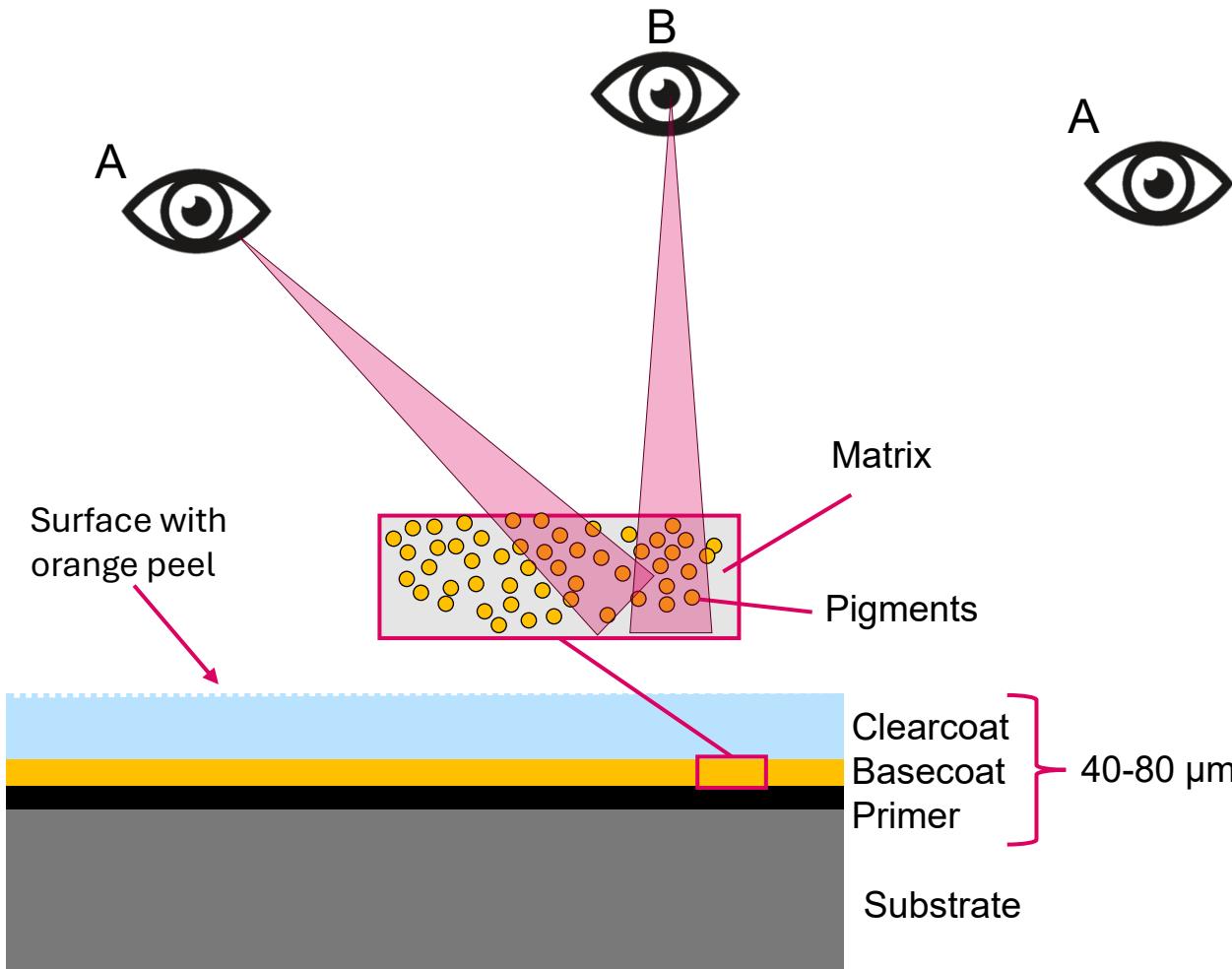
Requirement	Spray Painting	PU Direct Coating
adhesion to substrate		
surface appearance		+ self healing
mechanic durability		
chemical resistance		
thermal aging stability		
UV aging stability of color pigments		?
color match to metal chassis		?

How do we evaluate colors?  
Human      or      machine?

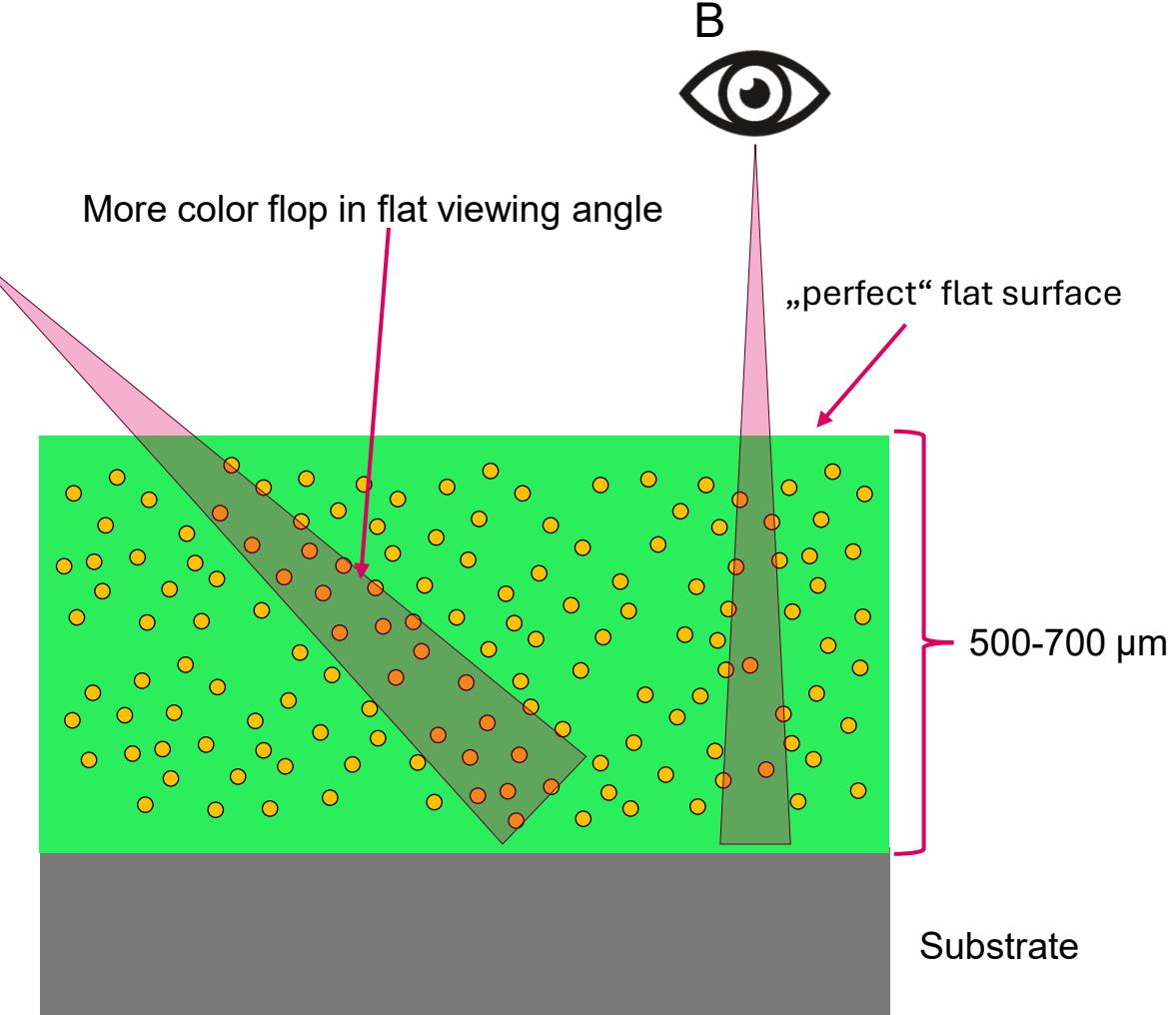


# Color - assessment by humans

## Traditional spray painting



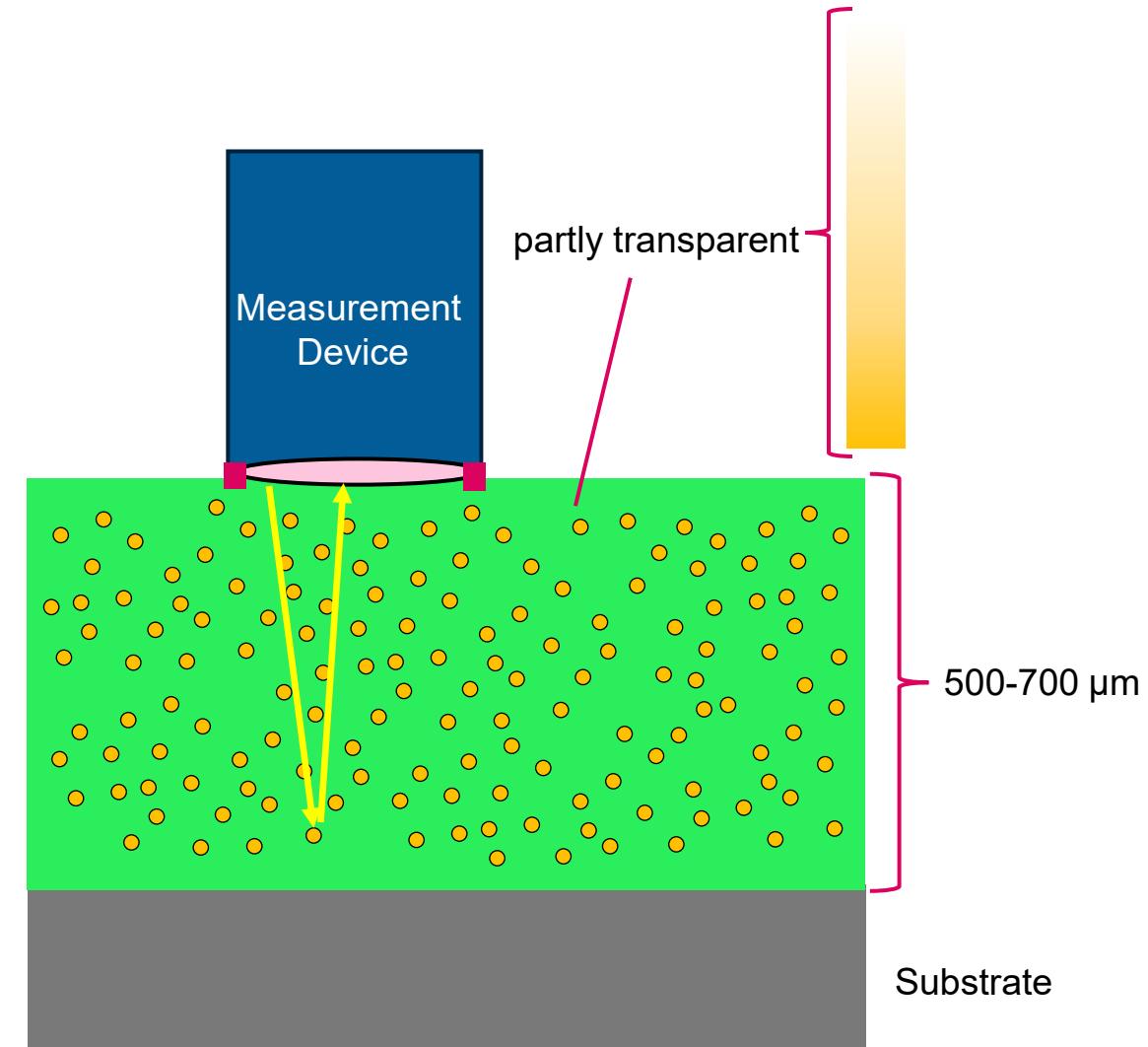
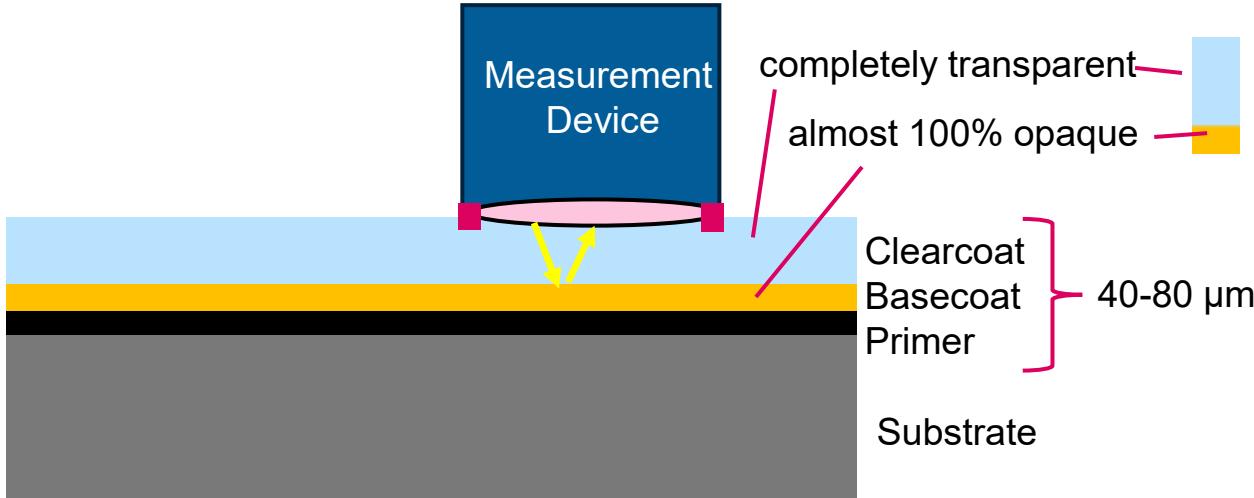
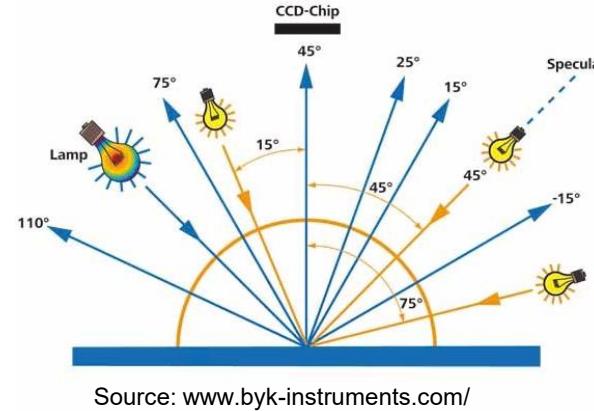
## PU In-Mold Coating



# Color measurement – suitable for PU-DC coatings?

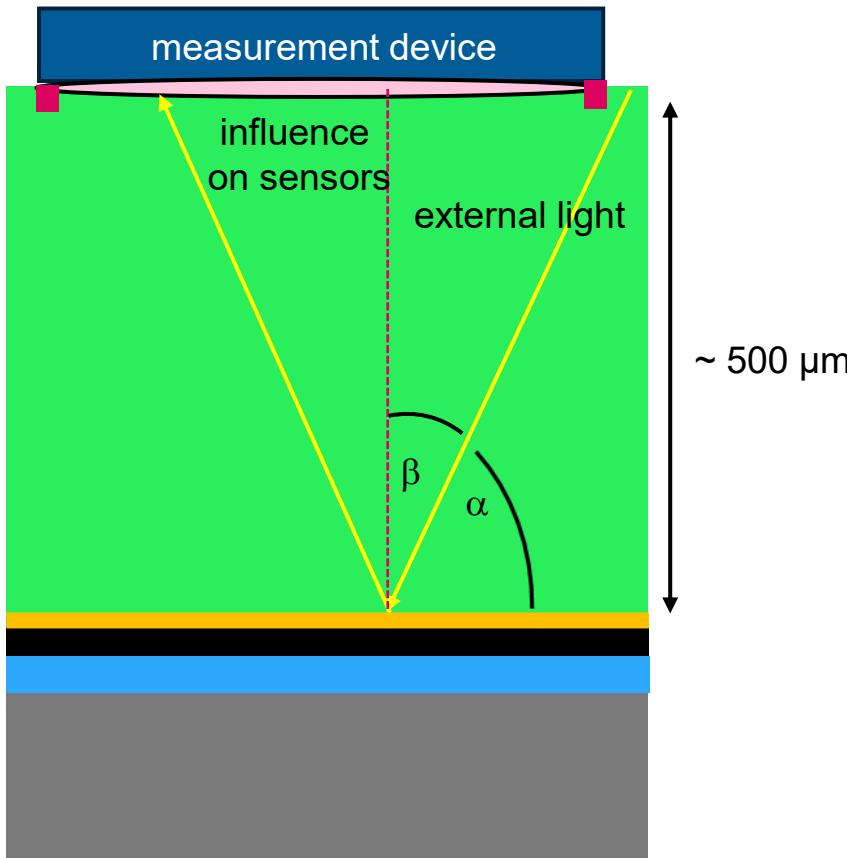


Source: [www.byk-instruments.com/](http://www.byk-instruments.com/)



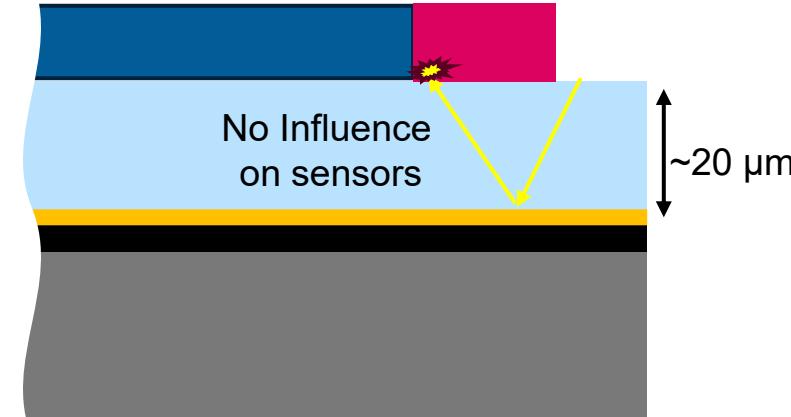
# Deviation 1 – stray light and total reflexion

Schematic section  
PU In-Mold Coating



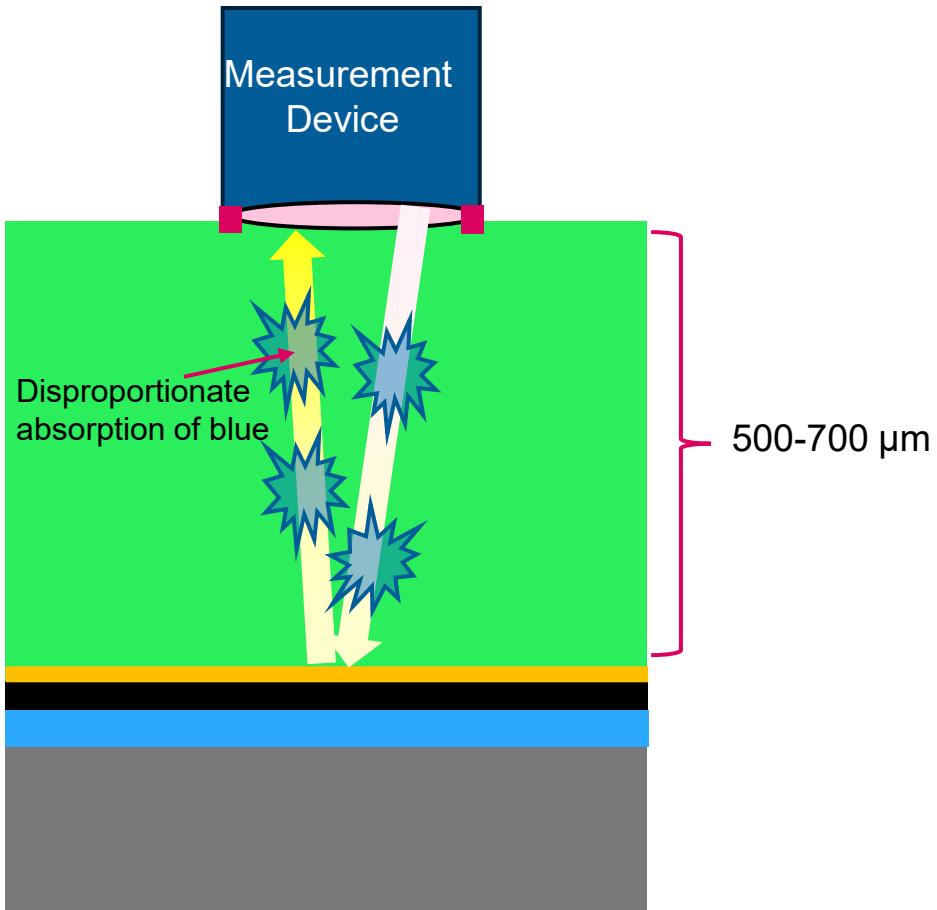
- The thickness of PU enables it to act as “lightguide”
- The distance between measurement device and color layer enhances the influence of external stray light
- Measurement must be performed without external light source

Schematic section  
Traditional spray painting



# Deviation 2 – absorption by longer pathlengths

## Schematic section



- The transmission of light is described by the (simplified) Beer–Lambert Law

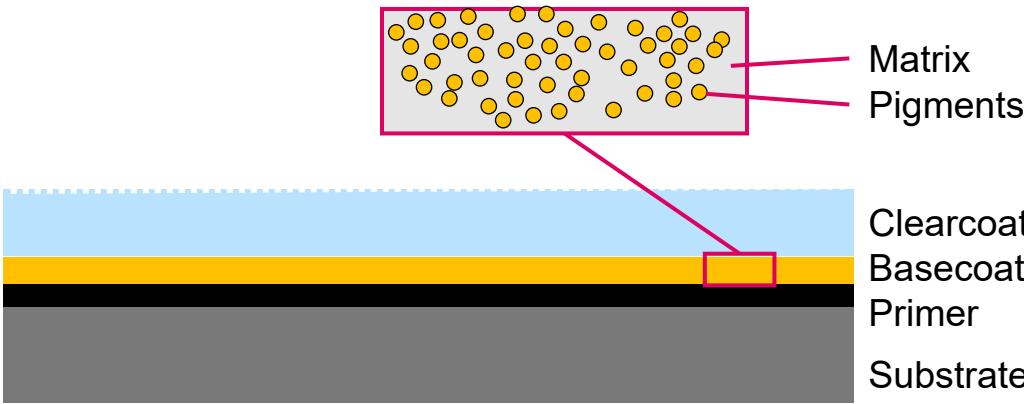
$$I_1 = I_0 \cdot e^{-pathlength \cdot decadic\ extinction\ coefficient^*}$$

\*simplified assumptions

- The extinction coefficient is highly linked to wavelength
- In general most polymers have higher absorption in the blue wavelength region
- The result is a blue shift for the reflected wave
- The loss of intensity is linked exponentially
- The thinner the PU layers are, the more similar are the measurement results
- For “thicker” PU layers a new “golden sample must be defined

# UV aging of Colors

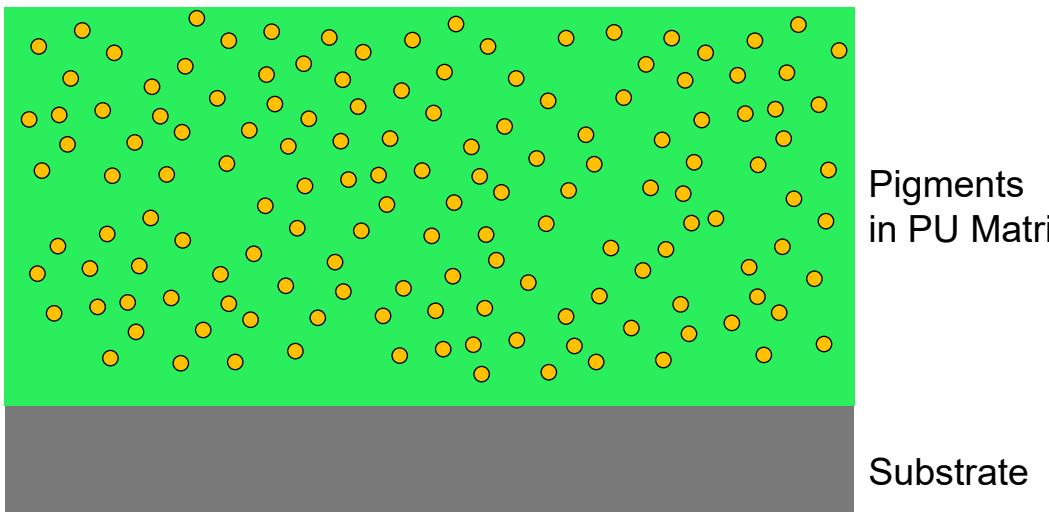
## Traditional spray painting



- For traditional spray painting all pigments have nearly the same UV protection by the clearcoat layer

- For colored PU the pigments near the surface get a much higher UV exposure

## PU In-Mold Coating



- For spare parts service an individual color adjustment like it is normal today is for PU parts not possible and must be kept in mind

- There will be differences – but do they matter?

# The first results - showcase blue



- Metallic blue as a “complex” pilot color
- Color measurement were performed
- Visual appearance is shown on picture
- There are still differences – but:
  - how good can we get with loop 2 ?
  - do they matter ?



## Summary

- Due to higher thickness, surface and layer set up PU direct coating surfaces must be tested and judged differently
- Depending on the accuracy and tolerances of the customers a separate master sample *for measuring* might be needed
- A color match for uni colors is easier to achieve than for effect colors
- The orientation of pigments and particles will be different between spray coating and direct coating
- The UV aging will be different

➤ **To involve different experts and departments by the OEM early is of great importance!**

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**THANK  
YOU**

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