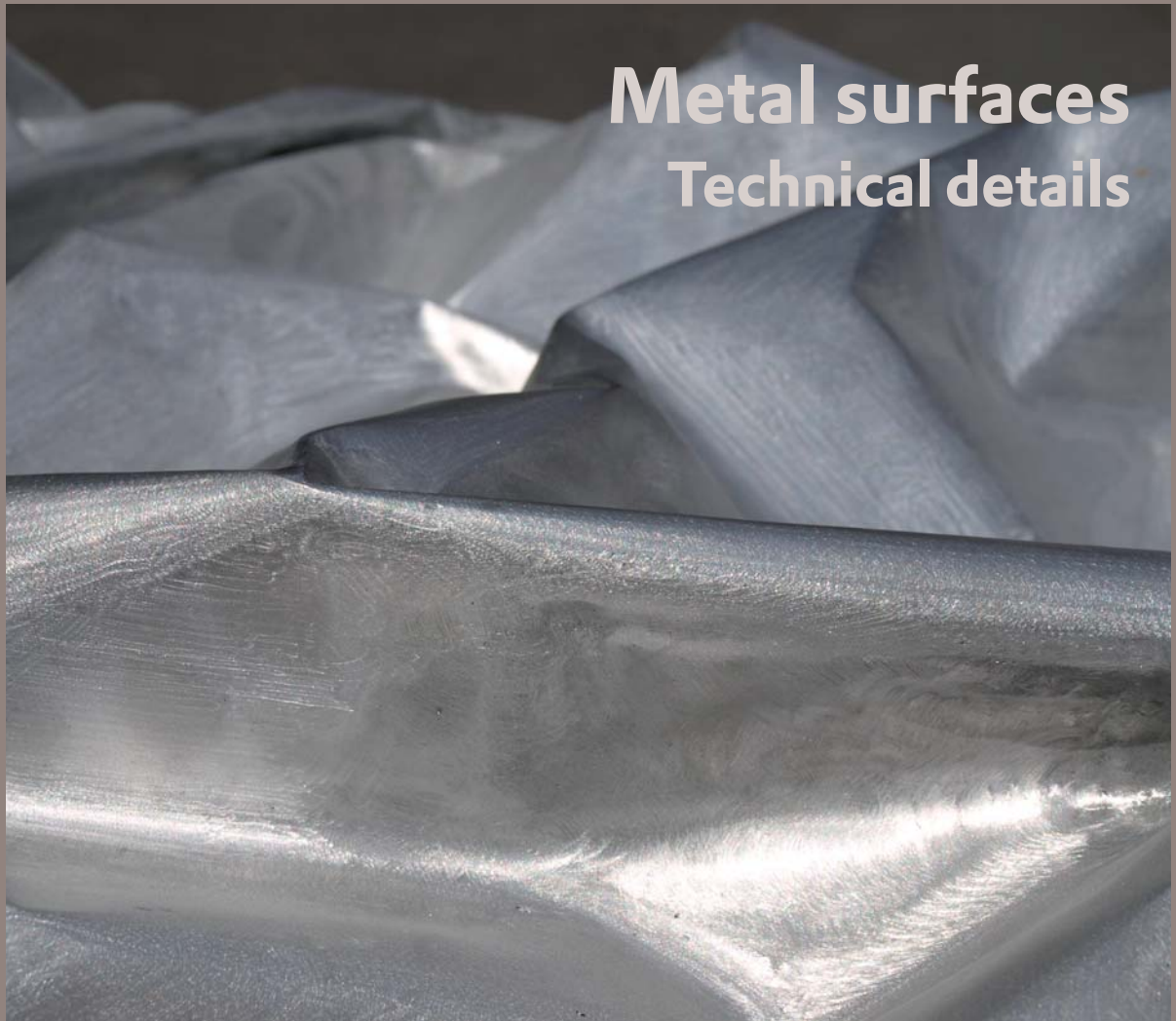




Coatings and  
special surfaces

# Metal surfaces Technical details

for  
Prototyping  
Mass production  
Design  
Objects of art  
Motorbikes  
Cars





Oberflächen &  
Lackierungen

for  
Prototyping  
Mass production  
Design  
Objects of art  
Motorbikes  
Cars

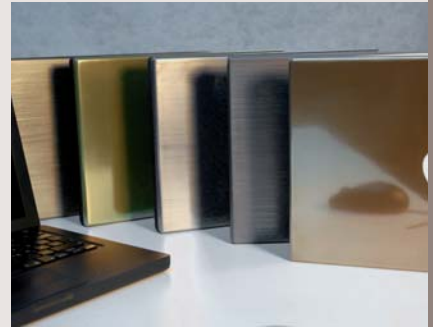
## Real-metal coatings manufactured by injection molding at room temperature

**P.S. Lackierungen** manufactures metal surfaces, applied by spraying, which consist up to 95% of metal powders. A mixture of metal powder and binder + hardener is resulting in a cold liquid metal (composite metal) which can be applied by a special spray process to nearly every surface. After the drying process the surfaces show similar properties as cast metal. As a matter of fact: it is real metal.

Through our process you realize a strong and durable metallic surface. Shape and design details of the coated objects remain as the original pieces show them. The object however shows metallic structures. As real metal the coating is long-lasting and resistant to wear.

### Metallsorten

- Aluminium
- Iron
- Nickel-Silver
- Stainless Steel
- Brass
- Bronze
- Copper
- Special alloy: X-metal
- Special alloy: Z3
- Special alloy: Gunsmoke





Coatings and  
special surfaces

for  
Prototyping  
Mass production  
Design  
Objects of art  
Motorbikes  
Cars

## Properties and applications

### Properties:

- thermal conductivity
- magnetic (iron)
- anti-microbial (copper, alloys)
- **NO electrical conductivity**
- surface qualities: glossy, mat, brushed
- reactivity: corrosion (rust), patina, etc. – can be created artificially
- partial surface coatings are possible
- micro layers allow the coating of fine structures
- resistant to impacts and stress, no peeling
- for suitable long-term usage outside and inside
- hermetic sealing and UV protection can be obtained by application of a clear lacquer

### Applications:

#### Design oriented:

- prototypes and models
- product design for all areas of application
- replacement of casted pieces
- mass production
- exhibition and fairs
- architecture
- interior design
- objects of arts

#### Function oriented:

- copper and alloys in ship building and offshore technologies (anti-fouling)
- copper and alloys for hygienic applications (anti-microbial)
- copper and alloys with biocide effect





Coatings and  
special surfaces

for  
Prototyping  
Mass production  
Design  
Objects of art  
Motorbikes  
Cars

## Base materials

The right choice and application of the most suitable surface pre-treatment is essential for the quality of the final metal coating. Basically a metal surface can be sprayed nearly on every type of substrate:

### Organic/ Inorganic materials:

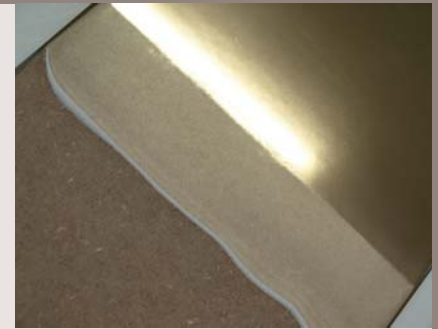
- wood
- cardboard
- paper
- terracotta
- gypsum
- ceramic
- others

### Metals/ construction materials:

- all metals
- carbon/carbon fibre/glass fibre
- glass
- plaster
- cement
- others

### Plastics:

- foam
- GFK Glass fibre reinforced plastics
- ABS acrylonitrile-butadiene-styrene
- PA Polyamide
- E Polyethylene
- PP Polypropylene
- PUR Polyurethane
- PF Phenolformaldehyde
- UF urea-formaldehyde resin
- others





Coatings and  
special surfaces

for  
Prototyping  
Mass production  
Design  
Objects of art  
Motorbikes  
Cars

## Process description

### A. Pre-treatment of the substrate

**P.S. Lackierungen** manufactures composite metals which bond with the substrate in a very elastic way. The strength of the bond and therefore the quality of the final piece depend on the correct pre-treatment of the surface of the work piece.

With the pre-treatment we want to achieve a smooth, dry and residue-free surface. Processes like degreasing, grinding, tumbling and blasting can help to remove surface impurities like dust, humidity, oil or solvents.

In case of porous substrates like wood or gypsum cavities or holes can be treated with fillers in order to reach a better surface quality. Borders and edges should be ground in order to allow a better polishing of these areas later which will improve the desired decoration effect.

### B. Spraying of the composite metal

The composite metal consists of three different ingredients: metal powder, binder and hardener. The mixture of the ingredients is sprayed on the substrate at room temperature. The desired effect and the necessary final treatment define the thickness of the layer, which normally varies between 70 and 150  $\mu\text{m}$ .

After the spraying process the work piece should rest for approximately 60 minutes. Then the work piece is dried for 6 - 12 hours at a temperature of 20-60 °C. Afterwards the surface is ready for the next treatment steps.





Coatings and  
special surfaces

for  
Prototyping  
Mass production  
Design  
Objects of art  
Motorbikes  
Cars

### **C. Surface treatment**

The dry substrate has a mat surface which shows eventually some uneven parts and an oxide layer, which is due to the chemical reaction during the hardening process. Blasting or grinding will remove the reactive layer as well as uneven surface areas. The function of the mat metal surface is now perfect.

The composite metal can be treated with various processes: additional blasting, grinding, polishing (high gloss or mat), semi-bright brushing, oil grinding, machine treatment or engraving result in surfaces of a different smoothness, brightness and structure.

An acid treatment with different solutions causes a chemical change of the metal surface within a few hours. The following effects are possible:

- blackening of bronze, brass and copper
- corrosion of bronze, brass, copper, nickel-silver and iron
- corrosion (rust) of iron

### **D. Sealing or natural surface changes**

The condition of the final metal surface can be maintained for a short period using a special sealing. The application of a clear lacquer results in a long lasting UV protection.

If the surface is only cleaned after the final treatment the metal is changing in a natural way. A less smooth surface will show corrosion and reactions much faster than a smooth one.





Coatings and  
special surfaces

for  
Prototyping  
Mass production  
Design  
Objects of art  
Motorbikes  
Cars

## Technical properties

### Physical properties

Layer composition:

- |                                |                                |
|--------------------------------|--------------------------------|
| 1. composite metal:            | approx. 70 - 150 $\mu\text{m}$ |
| 2. treatment: decrease of      | approx. 20 - 60 $\mu\text{m}$  |
| 3. if required, clear coating: | approx. 80 $\mu\text{m}$       |



### Functional effects

1. ongoing studies on anti-microbial effects in hospitals
2. physical stress resistance by KTA-TATOR Inc., Pittsburgh/PA, USA, May 2008:
  - abrasion resistance
  - adhesion (tape/knife/tensile)
  - impact resistance
  - solvent resistance
  - hardness (pencil/Barcol)
3. General information and publications with respect to clinical studies on the anti-microbial effects of copper and alloys can be found in the internet, for example on:
  - <http://www.ps-lack.de>



Coatings and  
special surfaces

for  
Prototyping  
Mass production  
Design  
Objects of art  
Motorbikes  
Cars

## Contact:

### **Peter Stücker, managing partner**

R&D, Customer Relationship, Marketing & Sales

### **Moritz Haring, managing partner**

Plant management, HR Development, Metallisation

### **P.S. Lackierungen GmbH**

Schloßstr. 1

D-48336 Sassenberg

Phone: +49 (0) 2583 4304

Fax: +49 (0) 2583 3597

Email: [info@ps-lack.de](mailto:info@ps-lack.de)

Internet: <http://www.ps-lack.de>

