COATING SYSTEMS AND PAINTING TECHNOLOGY

YOUR CONTACT PARTNER FOR IMPROVING PRODUCTIVITY AND QUALITY IN THE ENTIRE PROCESS CHAIN OF COATING TECHNOLOGY
Through the merger of the former department Coatings and Pigments with the department Painting Technology into Coating Systems and Painting Technology, the Fraunhofer IPA is ready to meet the scientific and industrial demands for innovation and problem solving in a targeted and forward-looking way.

From the development of new coatings and coating raw materials via paint application to the development, modelling and simulation of coating processes and systems suited for production processes and their implementation, the focus lies on the process chain of coating technology. Analyses, advancement of existing products, new developments as well as testing of painting processes are performed close to production at the Fraunhofer IPA.

The flexibly equipped institute’s in-house surface engineering facility, including paint application robots, enables practice-related investigation of the operating performance of pre-treatment, application and drying systems – as well as of their peripheral equipment – using different coating materials.

Due to its application-oriented research and its competitive neutrality, the department Coating Systems and Painting Technology closely aligns to the customers’ requirements and provides individually suited solutions as well in projects concerning materials optimization and adoption as in planning and optimizing facilities.

Process and failure analyses using further developed quality and testing methods by the use of state-of-the-art equipment, can be performed in a very short time and with great competence.

In close collaboration with you and all specialists from the entire process chain of coating technology we will design the best solution for you.

Our way of proceeding bases on comprehensive physical, chemical and engineering understanding of processes within the field of coating technology. This way, we have the proficiency to modify raw materials or paints and to develop and optimize coating processes with a high degree of process reliability and in close coordination between material development and coating technology.

Considering quality assurance measures, the implementation of cost-efficient and resource and energy saving painting processes will be achieved.

Projects, Products and R&D Services

- Contract research and development in the entire process chain of coating technology. From paint raw materials to painting processes suited for industrial application, including the necessary measurement and testing technology
- Planning and optimization of paint shops
- Quality optimization through analysis of coating defects and process errors as well as evaluation of failure mechanisms
- Measurement and testing services within the field of paint raw materials, paints, coatings and process engineering
- Implementation of accredited testing methods

Step 1

- Individual consulting for figuring out the task and establishing the procedure

Step 2

- Elaboration of a detailed offer including a clear description of our achievement and the anticipated cost frame

Step 3

- Development and implementation of solutions within confidential project work in close accordance with the customer

Your Benefits

- Goal oriented, transparent approach
- Flexible availability of our experts and facilities
- Efficient, knowledgeable and independent consulting

Your Contact Partner

Dr. Michael Hilt MBA

Your Contact Partner

Dr. Michael Hilt MBA
From the production of raw materials, e.g. pigments and binders, to the formulation of recipes and the coating of substrates with a suitable technique, a multi-step process takes place.

The permanent optimization of all these process steps aims at minimizing process costs while simultaneously maximizing the level of functionality during utilization.

**OUR SERVICES**

- Development of concepts for novel particulate materials and binders
- Surface design and engineering of nano scale fillers and pigments
- Novel binders and coatings with high weather and chemical resistance
- Short term tests for the property assessment of nano particles and binders
- New raw materials for coatings
- Novel coatings with special functions
- Investigation of structure/property relationships in coatings, paint raw materials and pretreated surfaces
- Development of appropriate testing methods for paints and coatings
- Testing and simulation of long-term behaviour of coatings
- Development of new concepts for corrosion protection in coatings
- Development of new concepts for self-cleaning facade-coatings
- Benchmark analyses for all stages of coating technology

**YOUR BENEFITS**

- Novel raw materials for coatings
- Novel surface pretreatment and coating systems
- Novel coatings with special functions
- Working out of scientific basics and solutions for usage relevant questions

**YOUR CONTACT PARTNERS**

Dr. Marc Entenmann
Dr. Ulrich Christ

Physical concepts of paint technology and the development and application of paint-related analytical testing methods constitute a further competence area within the department Coating Systems and Painting Technology.

**OUR SERVICES**

- Evaluation of physical properties for new functions in coatings
- Further development of physical measurement techniques
- Systematic research of physical mechanisms for functions of coatings
- Working out execution of physical-chemical testing programmes for the evaluation of paint raw materials, coatings, paints and plastics
- Failure diagnosis, explanation of failure modes
- Adaptation and further development of standardized testing methods for the coating area
- Development of new methods for quality assurance of paint raw materials, paints and coatings

**YOUR BENEFITS**

- Fast root cause analysis for coating problems
- Avoidance of coating defects and consequential complaints
- Variant reduction of comparable, parallel testing methods down to one generally accepted testing method

**YOUR CONTACT PARTNER**

Dr. Volker Wegmann
In our coating pilot units we develop individual system- and process-related solutions for the resource- and cost-efficient processing of liquid paints and powder coatings. For this purpose, flexible production-scale facilities for substrate pre-treatment, paint supply and application, paint overspray elimination and recycling, as well as for paint drying and curing – including IR and UV radiation – are available. Numerical process simulation is used increasingly. From the design phase on, the simulation provides important decision-making aids and advantages, for creation of the optimal customer-specific configuration of highly productive and high-quality coating processes and industrial paint shops.

YOUR SERVICES

- Characterization and optimization of paint atomization and of paint delivery units
- Systematic investigations concerning the influence of local, paint application, substrate and paint material parameters on coating quality
- Process comparisons
- Novel processes for selective coating without the need for masking
- Substitution of conventional powder coating facilities by ultra-compact, energy-efficient plants devoid of spray systems
- Development of solutions for time and energy saving paint drying and curing processes, e.g. IR or UV curing
- Online process measurement and controlling techniques
- Numerical simulation programmes for – Airflow optimization in spray booths and driers – Prediction of film thickness distribution – Optimizing paint curing by using IR or UV lamps – Paint film optimization for different substrate surfaces – Spray jet cleaning of 3D workpieces

YOUR CONTACT PARTNERS

Dr. Oliver Tiedje
Markus Cudazzo

Your benefits

- Early comparison of different process technologies and facility concepts
- Fast and cost-efficient development of individually tailored coating solutions
- Reduction of start-up times for new products and processes

The correct choice of process and facility will have a decisive impact on the profitability of the paint shop for many years. In its planning and optimization processes, the department Coating Systems and Painting Technology at the Fraunhofer IPA uses recognized calculation and assessment methods (including the Coatway® planning and forecasting system) and examines the processes, plant components and coating results in cooperation with the supplier firms. Requirements on installed coating plants are subject to change frequently, e.g. due to new legal regulations, paints, technologies or in need of higher efficiency. Continuous improvements in the painting process are regarded as the key to maintaining competitiveness.

YOUR SERVICES

- Planning of painting processes and facility design
- Process optimization (including simulation)
- Weak point analysis
- Technology assessment
- Expertises
- Evaluation and comparison of paints and painting facilities
- Concepts for production-integrated coating by local coating modules
- Design of parts with respect to paintability
- Optimization of working methods/workplace design
- Workshops and seminars

OUR LABORATORIES

We implement test procedures accredited according to DIN EN ISO/IEC 17025. We attach great importance to the reliability of testing and measuring methods as well as to fulfilling the expectations and demands of our customers.

YOUR CONTACT PARTNER

Ulrich Hoffmann
**Director**
Prof. Dr.-Ing. Thomas Bauernhansl

**Fraunhofer Institute for Manufacturing Engineering and Automation IPA**
Nobelstrasse 12  |  70569 Stuttgart (Vaihingen)
www.ipa.fraunhofer.de

**So you will get to our Institute**

**By car**
Motorway A 8 Karlsruhe – München or München – Karlsruhe until crossing Stuttgart, here on A 81/A 831, direction Stuttgart-Zentrum until exit Universität, there to the left into Universitätstrasse, this leads to Nobelstrasse.

**With public transport**
From Stuttgart-Hauptbahnhof (main station, with the directions Flughafen, Herrenberg, Vaihingen) or from Flughafen Stuttgart (airport) with the S-Bahn lines 1, 2 or 3 until station Universität, take exit “Wohngebiet Schranne/Endelbang”. Continue by foot, ca. 600 m or with busses 92 or 84 from the S-Bahn station (2 stations to Nobelstrasse).

**By Taxi**
From the airport to institute centre of Fraunhofer society ca. 13 km, from main station to institute centre ca. 12 km

---

**Head of Department**
**Coating Systems and Painting Technology**
Dr. Michael Hilt MBA
Allmandring 37  |  70569 Stuttgart (Vaihingen)
Phone  +49 711 970-3820  |  michael.hilt@ipa.fraunhofer.de
www.ipa.fraunhofer.de/coatings

**Group Managers**

**Analytics and Material Testing**
Dr. Volker Wegmann  |  Allmandring 37
Phone  +49 711 970-3832
volker.wegmann@ipa.fraunhofer.de

**Applied Coating Technology**
Dr. Ulrich Christ  |  Allmandring 37
Phone  +49 711 970-3861
ulrich.christ@ipa.fraunhofer.de

**Pigments and Coatings**
Dr. Marc Entenmann  |  Allmandring 37
Phone  +49 711 970-3854
marc.entenmann@ipa.fraunhofer.de

**Paint Process Engineering**
Ulrich Hoffmann  |  Nobelstrasse 12
Phone  +49 711 970-1753
ulrich.hoffmann@ipa.fraunhofer.de

**Wet Application and Simulation Technology**
Dr. Oliver Tiedje  |  Nobelstrasse 12
Phone  +49 711 970-1773
oliver.tiedje@ipa.fraunhofer.de

**Powder Application Technology**
Markus Cudazzo  |  Nobelstrasse 12
Phone  +49 711 970-1761
markus.cudazzo@ipa.fraunhofer.de