

The Coating Laboratory

From small parts to automobiles

Practice-driven research and development services

The equipment available in the institute's own coating laboratory, including painting robots, enables us to carry out practical tests and apply known and new types of coating materials. We analyze, further develop and test coating processes under realistic production conditions. Since the coating laboratory was opened at Fraunhofer IPA, we have carried out numerous projects for diverse branches of industry and companies of all sizes, both in Germany and abroad.

Our wet painting pilot plant is an "experimental playground" that plays a key role when it comes to looking at painting processes from a holistic perspective. The large-scale pilot plant includes a variable painting line on an automotive scale, various spray booths and an air-conditioned spray booth. This allows us to map application, pretreatment and drying processes under near-real production conditions.

Equipment

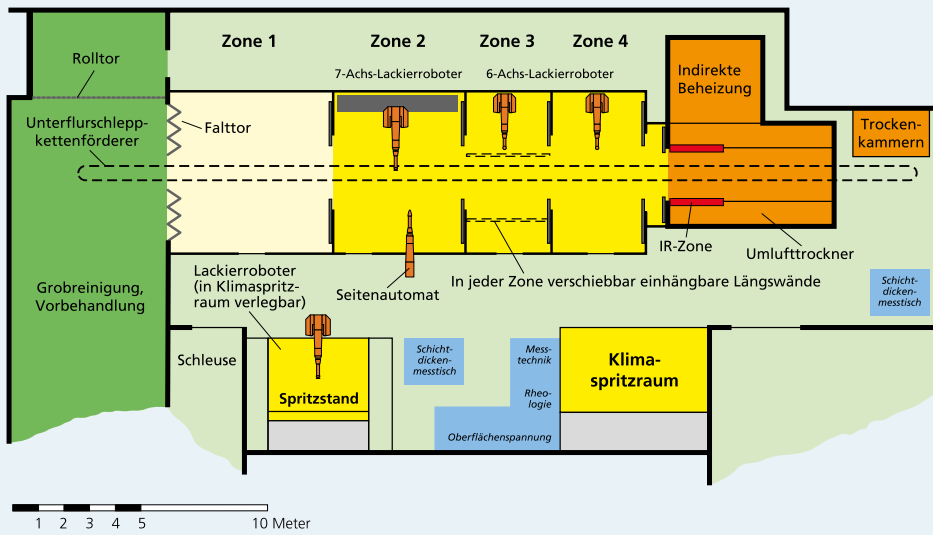
The painting line meets the cleanliness, climate and airflow requirements of the automotive industry. The various painting zones are fitted with independent ventilation units and over-spray scrubbing systems. They can be operated together or can be separated from each other by sliding doors. There is also the option of altering the width of the zones with walls that can be hung from the ceiling to simulate smaller painting booths.

All liquid coating materials (solvent-based coatings, 2-component coatings, water-based coatings, powder slurries, UV-curing systems, nano-materials, even suspensions such as enamel slurries) can be processed. The available equipment, including modern painting robots, allows us to gain practical information about the functions of the paint shop systems, about the operating behavior of application equipment, and about the properties of functional and decorative paint films. For powder coating applications, Fraunhofer IPA also has a powder coating pilot plant. Furthermore, we can combine this with our micro-coating system to conduct tests on process chains with over-spray-free coating processes. Appropriate measuring and testing instruments round off our range of services.

Booth technology

- Painting line: automotive scale, air down draft 0.1–0.5 m/s, adjustable temperature and humidity, approx. 18–30 °C, 30–80% RH (dew point control system; dependent on outdoor conditions)
- Air-conditioned spray booth: fully controllable air-conditioning, air downdraft 0.1–0.3 m/s, 15–30 °C, 30–80% RH





Manipulators

Off-line programming and the conversion of robot programs (in each case via external service companies) are possible, as is also teach-in. The robots are fully equipped with process technology. A range of adaptable lifting devices and other manipulators is also available.

Application technology

Additional mobile, modular application equipment (dosing technology, also 2-component, process ventilation, speed control, etc.) enables rapid adaptation to the respective task. The spectrum ranges from simple process control valves to PLC-controlled application equipment and bus-compatible systems.

Services

- Determination and evaluation of various application-specific parameters for process optimization, as well as input variables for numerical process simulation, also by means of statistical test planning – layer thickness distribution, coating efficiency, appearance, etc.
 - Determination of particle size distributions and particle velocities using laser-optical methods, visualization with high-speed camera
 - Characterization of paint materials; parameters such as density, solids, rheology
 - Preparation of samples for advanced technology tests
 - System for fast and synchronic acquisition of process parameters

- Reproduction of complete painting processes, incl. pre-treatment and drying
 - Use of original workpieces possible. Project examples: car bodies or body components (e.g. doors), windscreen wiper arms, engine blocks, shock absorbers, aircraft interior parts, television housings, crane segments, small parts such as mobile phone shells, filters, roof tiles
 - Development of atomizers, system components and application concepts
 - Validation of assemblies (cleaning equipment, etc.)
 - Feasibility studies (innovative technologies, new production processes)
 - Demonstration of alternative processes taking all relevant general constraints into account (cycle times, material and energy requirements, cost calculation, etc.)

Contact partners

Dr. Oliver Tiedje
 Phone +49 711 970-1773
 oliver.tiedje@ipa.fraunhofer.de

Dipl.-Ing. (FH) Philipp Knee
 Phone +49 711 970-1265
 philipp.knee@ipa.fraunhofer.de

Dipl.-Ing. (FH) Stephan Paustian
 Phone +49 711 970-1781
 stephan.paustian@ipa.fraunhofer.de

www.ipa.fraunhofer.de/lackiertechnik

Fraunhofer Institute for Manufacturing Engineering and Automation IPA
 Nobelstrasse 12
 70569 Stuttgart | Germany