



# Fraunhofer

IPA

FRAUNHOFER INSTITUTE FOR MANUFACTURING ENGINEERING AND AUTOMATION IPA

# BUSINESS UNIT PROCESS INDUSTRY





## INDUSTRIAL SOLUTIONS

The process industry is different from other industries in that its manufacturing and value-added processes are continuous and involve flowing materials or media. It forms the counterpart to the general cargo industry. Individual production steps are often performed in sequence, with the result that (intermediate) products are located in reactors and continuously transported in pipelines from one place to the next.

Most companies focus not only on product development but also more and more on process development. This mainly concerns the optimization or flexibilization of production, logistics and energy efficiency. In addition, German and European legislation constantly present companies with new challenges, for example in waste recycling and chemical substance management (REACH Regulation EG/1907/2006, RoHS Directive 2011/65/EU).

The services offered by the business unit "Process Industry" at Fraunhofer IPA are aimed at the chemical, pharmaceutical, food and steel industries. Ten specialist departments and the expertise of more than 290 scientists are brought together in this one business unit. Interdisciplinary teams develop solutions tailored to specific requirements along the entire value chain – from planning and development through to validation and quality assurance.

### Chemical industry



The business unit "Process Industry" assists companies in the chemical industry with individual solutions for both product and process innovations in the areas of basic chemicals, polymers, fine chemicals and specialty chemicals.

### Steel industry



Today, the demands placed on metallic materials go far beyond the capabilities of conventional steel. Metals are used in material composites together with other metals, with ceramics or with polymers. They not only have to possess properties such as resistance to corrosion and improved stability but must also be lighter in weight at the same time.

### Pharmaceutical industry



The pharmaceutical industry is an extremely research-intensive sector that is constantly confronted with new challenges associated with quality management and risk management. Furthermore, growing demands in production, such as high-tech air conditioning and cleanroom technology, result in high energy costs.

### Food industry



Industrial food production is dominated by highly-automated manufacturing processes. Our focus is on process or plant-related challenges; high standards must be met as far as hygiene requirements and quality are concerned.



## PLANNING

- Organizational development: smart organization and processes
- Digital business models and business ecosystems
- Analyses of Industrie 4.0 potential
- Lean production: value stream design
- Planning tool for painting processes
- Development and optimization of coating processes
- Process optimization
- Factory planning
- Waste heat technologies
- Thermal and electrical energy storage

## DEVELOPMENT

- Development of generative manufacturing processes
- Support for business model innovation
- Supply chain adaptation and optimization
- Paint shop planning and optimization
- Bulk solids handling, liquid handling
- Electroplating concepts
- Numerical process simulation
- Synthesis and characterization of particles and material functionalization
- Energy supply concepts

## VALIDATION

- Strategic planning of digitization/production processes
- Product and process FMEA
- Maintenance management
- Management of chemical substances
- Resource-efficient material flows
- Development and implementation of corrosion resistance tests and surface protection tests
- Selection of inline testing systems
- Support in dealing with customer-specific restrictions governing chemical substances (REACH)
- Technology assessments

## QUALITY ASSURANCE

- Quality assessment concepts and systems
- Signal analysis in process control
- Risk assessment
- Automated optical quality control
- Damage assessment and analysis of coating materials and coatings
- Detection of foreign objects with thermography
- Solder and fill level measurements



## COOPERATION FORMATS

The business unit “Process Industry” offers support both with product and process innovations. Our interdisciplinary teams develop processes, machines and plants, plan and optimize production and processing sequences and advise on-site on strategies through to implementation.

### INDUSTRIAL CONTRACT RESEARCH

Our name stands for applied research. Together with companies, we transform original ideas into innovations and develop integrated solutions to ensure their long-term success.

### STUDIES AND ANALYSES

- Potential analyses and feasibility studies
- Site analyses

### R&D SERVICES

We carry out accredited test procedures in our physical-chemical test laboratories

### INDUSTRY ON CAMPUS

We offer companies access to our laboratories in the form of temporary strategic cooperations. In project groups, employees from companies and IPA work together to develop innovative solutions for the project concerned. The developed solutions and findings are only available to project participants.

### JOINT RESEARCH

Joint research projects are funded by public institutions such as the German Länder, the German federal government or the EU. Industrial partners and research institutions jointly apply for funding. The results of these projects are universally-applicable findings and methods with a wide range of use. These can, for example, be adapted and transferred to your company-specific needs and applications within the scope of contract research.

### TRAINING AND CONSULTING

Seminars and in-house training programs

## YOUR ADVANTAGES

We work closely with you and all specialist companies involved in the process chain to develop solutions tailored to your requirements: on a strategic, tactical and operational basis.

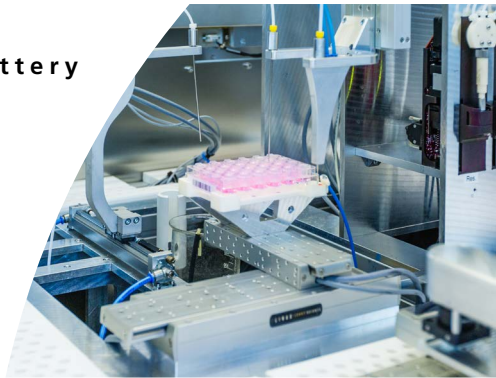
- Efficient and independent advice
- Clear goal-oriented approach
- Access to our experts and facilities as required

# INFRASTRUCTURE

**Vision Lab –  
Machine Vision and Signal Processing**



**Center for Digitized Battery  
Production**



**Additive Manufacturing**



**Electroplating  
Laboratory**



**Coating Laboratory**



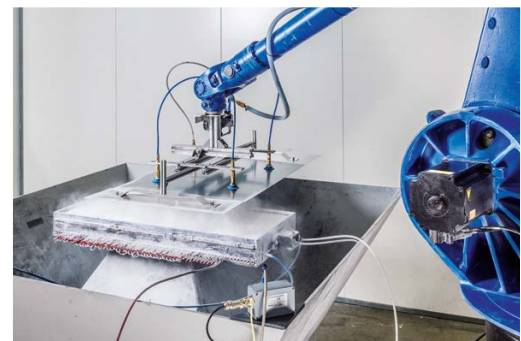
**Cleanrooms & Clean  
Zones**



**DC Laboratory**



**Liquid Handling Lab**



**Center for  
Dispersing Technology**



**Center for Particle Technology**

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