

The nanocomposite coatings can be flexibly adapted to accomplish a variety of functionalities:

- Anti-ice
- | Easy-to-clean |
- Anti-bacterial |
- Anti-fouling
- | Scratch-resistance

Industrial applications for the functional nanocomposite coatings include:

- Wind turbines
- | Aeronautics
- | Railway
- | Construction
- | Shipping and maritime technologies



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- Adhesive Bonding
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**PILOT LINE FACILITIES FOR
DEVELOPMENT OF CUSTOM-
MADE FUNCTIONAL
NANOCOMPOSITE COATINGS**

**Product: Functional coatings
for transport +
construction sector**

PRODUCTS AND PROCESSES

The pilot line production of functional nanocomposite coatings comprises several steps:

synthesis and functionalization of nanoparticles



- Synthesis of different inorganic or organic nanoparticles.
- Custom-made design of functionalization.
- | Batch sizes at kilograms scale.

Production of nanocomposites



- Dispersion of functionalized nanoparticles by high-performance bead milling.
- | Investigation of optimum milling conditions.
- | Batch size: up to 50 L.

Inline Characterization Of Particle Size

- Monitoring of particle growth during synthesis.
- Monitoring of dispersion progress
- Quality control of nanocomposite dispersion.

Coating Application And Testing



- Development/assessment of appropriate application technologies
- Design of experiments
- Preparation of coating samples at lab and demonstration scale
- Comprehensive testing of mechanical, technical, and functional properties

SERVICES OFFERED

- Developing innovative functional coatings.
- Exploring new coating formulations.
- Investigating upscaling requirements.
- Batch production (up to 50 L) of coatings.
- Market analysis and economic feasibility studies.
- Our services are individually adaptable to our customers' needs and may cover the whole production process as well as selected individual steps.

CHARACTERIZATION AND TESTING

A unique set of test facilities is available for material and surface characterization:

Particle characterization:

- Particle size and size distribution (e.g. ultrasound spectroscopy, dynamic light scattering).
- Particle morphology (e.g. scanning & transmission electron microscopy) | Particle surface chemical composition (e.g. energy-dispersive X-ray spectroscopy).

Characterization of nanocomposite dispersion:

- Viscosity and rheological properties (rheometer).
- Surface tension (tensiometer).
- Shear stability in closed circular pipeline.

Coating Characterization:

- Coating mechanical technological properties (e.g. cross-cut, pull-off test, microindentation, pendulum test, Taber abramer).
- Coating optical properties (e.g. gloss, colour).
- Coating physical and chemical properties (e.g. dynamic mechanical analysis, atomic force microscopy, contact angle).

Comprehensive facilities for lab and field testing of specific functionalities:

- Icing chamber and icing-wind tunnel.
- Antimicrobial and antifouling tests.
- Corrosion tests.