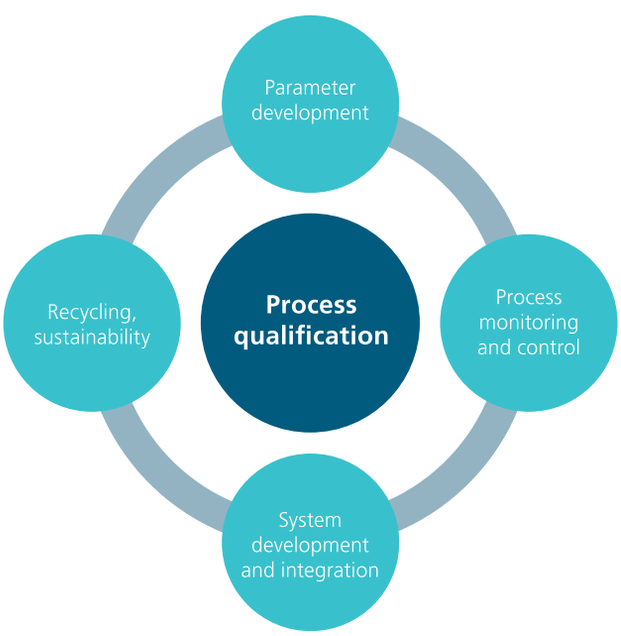
Fraunhofer IAPT

Fraunhofer Research Institution for Additive Manufacturing Technologies IAPT

Our Services in AM Process Qualification

We Add Value to Your AM Processes.

The Process Qualification team at Fraunhofer IAPT supports your industrial use of Additive Manufacturing by developing resource-efficient, stable, and productive AM processes and systems, from feasibility studies to the qualification of complete process chains. Our team's main focus is in developing industry-driven AM processes Laser Powder Bed Fusion (L-PBF), Directed Energy Deposition (DED), sinter-based metal AM processes, as well as polymer-based AM methods.



Qualifying Your AM Material and Process

Optimal manufacturing parameters improve material properties and enhance the sustainability, productivity, and cost-effectiveness of your processes. Based on a broad range of state-of-the-art equipment, we develop process parameters and qualify your materials and additively manufactured components. We can rely on a fully equipped materials laboratory for sample preparation and measurement technology to characterize microstructure, mechanical, and physical properties. This allows us to meet your requirements using the latest measurement and testing methods.

Enhancing Productivity and Process Stability

Securing and enhancing the stability and productivity of industrial AM processes is at the heart of all our process development activities. We integrate and qualify novel high-power, programmable lasers including beam shaping systems. We develop solutions for safe and productive manufacturing of demanding components, elaborate adaptive build strategies, and offer tailored in-process monitoring solutions for highly productive first-time right production.

In-Process Monitoring and Control

For all of our AM processes, we develop and test systems for in-process monitoring and control of your component during the manufacturing process. We implement and combine various systems such as optical cameras, thermography, optical coherence tomography (OCT), or eddy current sensors. We analyze the collected data using computer vision and machine learning to establish in-situ process control.

Your Partner for Bringing AM Processes to Industrial Production.

Fraunhofer IAPT stands out with its holistic view of the entire AM process chain. Our approach enables you to quickly and safely transfer our innovations and developments into industrial use.

DED

Whether you need to manufacture large structures or produce components outside your facilities, DED process types provide suitable solutions with high flexibility.

Our DED Expertise

- Laser-based DED with powder or wire (DED-LB/p and DED-LB/w)
- Arc-based DED (DED-Arc, also known as WAAM)

Highlights from our Research

- System development for mobile Additive Manufacturing
- Hybrid Manufacturing – DED and machining in one production cell
- Building large titanium structures with local shielding gas guidance

Polymer AM

Do you want to implement Polymer Additive Manufacturing for prototype or large-scale industrial production? We adapt design and process parameters for new materials and develop system components for industrial polymer AM processes.

Our Polymer AM Expertise

- Filament-based Material Extrusion (FFF / FDM®)
- Granulate-based Material Extrusion (FGF)
- Selective Laser Sintering (SLS)
- Silicone Printing

Highlights from our Research

- In-process smoothing of FFF components using laser-assisted material extrusion (LuMEx)
- Direct integration of electrical circuits into SLS and FFF components
- Processing of silicone for functional applications in medicine and robotics
- Sustainable polymer-based materials

L-PBF

Do you want to qualify or enhance your L-PBF process? We develop process parameters and bring your process productivity and process stability to the next level.

Highlights from our Research

- Productivity increase through beam shaping
- In-process monitoring and control
- Adaptive scan strategies

Sinter AM

Do you need specific material properties for sintered AM parts? Do you want to optimize the sintering process? We develop solutions for all questions from initial shaping to sintering.

Our Sinter AM Expertise

- Metal Binder Jetting (BJT/M)
- Cold Metal Fusion (CMF)
- Metal-based Material Extrusion (MEX/M)

Highlights from our Research

- Binder jetting of titanium alloys for medical technology applications
- Cost-effective prototype production using granulate-based material extrusion
- Automated prediction of the density of green parts using computer vision

Interested in Learning More?

Visit our website for additional information and to connect with our team.

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