



Fraunhofer
IPM

Research collaboration

Shot by shot:
Measuring release
agent application

Measurement data instead of empirical values

The optimal application of release agents in die casting processes still depends on the skill of experienced casters. With our innovative F-Scanner technology, we are paving the way for the controlled application of release agents in aluminum and magnesium die casting processes. Measurement data instead of empirical values provide the basis for a better understanding of the process and the optimization of release agent application. The data is also valuable for introducing new die casting processes.

As much as necessary, as little as possible

The purely optical method uses the autofluorescence of organic components in process additives for detection and provides a detailed representation of the quantitative release agent coverage on the molding tool. In the future, the measurement data should be used to specifically control the release agent dosage. Optimizing the dosage ensures the economical use of process aids, reduces production waste and stabilizes the casting process.

Looking for cooperation partners

We are convinced that fluorescence laser scanning can improve the efficiency of die casting processes. Our goal is to integrate the technology into the production process to enable true control. At the same time, we want to further develop the process to optimize the cleaning process for die-cast parts.

**Would you like to collaborate with us?
Please feel free to contact us!**

In process: tool testing

Optimal application of the release agent is crucial for demoldability and thus for the quality of the component. Tool life and process stability also benefit in the long term.

Scanning after each release agent application

A fluorescence laser scanner captures the mold surface after each release agent application. To achieve this, the measuring system is moved between the open mold halves along with the spraying head, while the UV laser scans the surface. The scan image shows the release agent distribution on the tool. The stronger the glow, the more release agent has been deposited on the surface. With an aperture angle of 60° , the scanner captures a field of view of almost 60 cm from a distance of 50 cm. The system is compact and robust, which makes it suitable for the specific conditions in a die casting plant.

The goal: Intelligent spray head for a controlled release agent application

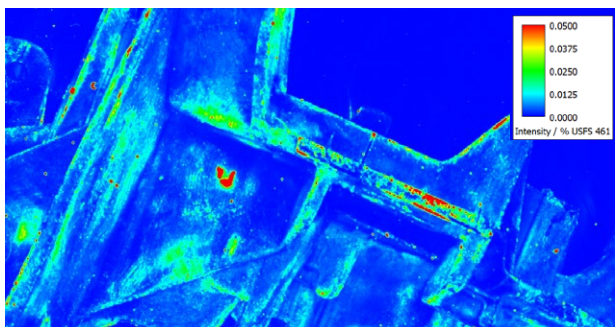
The measurement data provides visual support for precisely adjusting the release agent application. In the future, the system will undergo further development for true process control. For this purpose, measurement signals will be transmitted in real time to the fully automatic spraying system, enabling precise adjustment of the release agent quantity based on a spatially resolved scan.

Post-process: component testing

Residues from release agents on die-cast parts can impair subsequent processing steps such as coating, bonding, or painting the components. Multi-stage, energy-intensive cleaning processes are currently standard practice for removing all residues.

Adapting cleaning to contamination

Fluorescence measurement technology can be used not only to measure the release agent coating on the tool, but also to identify unwanted residues on die-cast parts. Taking measurements before and after cleaning can help define the tolerance range for residual contamination. Complete removal of the release agent is not always necessary. The question is, what level of residual contamination can a die-cast part tolerate for further processing? Combining residual contamination measurements with quality checks can help answer this question and optimize cleaning procedures according to the specific requirements of subsequent processes.



*Detail of a scanned image of a die-cast part after demolding:
The stronger the glow, the more release agent has been
deposited on the surface.*

InMoDie project

The development of the demonstrator system was funded by the German Federal Ministry for Economic Affairs and Energy as part of the InMoDie project.

Development partners

- **University of Kassel, Department of Foundry Technology (GTK):** Casting tests (laboratory conditions)
- **Fraunhofer IPM:** Fluorescence scanner
- **Institut für Korrosionsschutz Dresden GmbH (IKS):** Analytics
- **Chem-Trend (Germany) GmbH (project coordination):** Supply of various release agents
- **Wollin GmbH:** Spraying technology
- **HDO Druckguß- und Oberflächentechnik GmbH:** Field tests
- **Oberflächentechnik Uwe Graubmann:** Industrial cleaning and coating
- **SurTec Deutschland GmbH (associated partner):** Cleaning (laboratory conditions)
- **Federal Association of the German Foundry Industry (associated partner)**



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F-Scanner technology by Fraunhofer IPM

Fraunhofer IPM develops fluorescence laser scanners to inspect surface cleanliness and coatings. These F-Scanners generate high-resolution images of surface contamination or coatings. Around 50 F-Scanner systems are used worldwide for surface and coating inspection in industrial applications.



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