

EPMA Club Project “AddiMold”

Freeform Powder Injection Moulding - Evaluation of opportunities and challenges for prototype and small series production by MIM and CIM

Short description

Freeform PIM is the use of 3D-printed mould inserts that provide the part geometry in the injection moulding step. The feedstock-filled insert will be ejected after the injection moulding step, and the printed part then chemically dissolved to release the green part. Following this additional insert-removal step, the original processing route continues with the green part.

The project execution will be done by the two Fraunhofer institutes, IFAM and IKTS, that cover the required process chain.

Contents

General project scope

- Testing of feasible features (dimensions, tolerances, quality, etc.)
- Translation of print part properties to PIM part properties
- Implementation of process chain for several feedstocks, e.g. regarding green strength and compatibility with the chemical removal process of printed structures (depending on the number of participants and budget)
- Deduction of construction guidelines for print parts
- Development of an improved strategy for a base mould concept and possibly implementation of the mould concept (depending on the number of participants and their feedback)
- Implementation of moulding simulation for more efficient insert part production and shortening of setup time for injection moulding runs

Details setup strategy

- Interested parties will fill out a questionnaire in order to set some project details like material choice, analytical focus and overall scope dependent on and specified to participant preferences

Conditions

- The minimum required project budget to carry out the general scope is 50,000 €.
- All interested parties may contribute to the detail planning of the project via filling out a questionnaire.
- Levels of participation
 - Interested participant (7,000 €)
 - Kick-off meeting with critical in-deep analysis of the process as current state-of-the-art
 - Attendance of meetings
 - Presentation slides
 - Results as report
 - Active participant (10,000 €), additional to interested participant
 - Additional involvement via demonstration/testing of applying the process to a participant-specified part-material-combination
 - Part construction and material to be supplied by participant
 - Results as report and all respective demonstration parts
- Phases
 1. Basic evaluation of technologies
 - Feasible features with model geometry and a standard feedstock (e.g. Catamold 316L)
 2. Technological implementation
 - Evaluation of model geometry with more materials and possibly more analytical methods
 - Implementation of simulation

3. Demonstration with technical parts

- Part design and required material provided by participant
 - Application of process with a limited number of test prints and iterations

4. Management

- Development of guidelines, based on the "learned lessons" from all tests
- Assessment of opportunities and challenges on the basis of experimental and analytical results

Contacts

The contacts for the project proposal are the following:

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