

# Magnesium Injection Molding

## MAGNESIUM LIGHTWEIGHT CONSTRUCTION

The properties of magnesium are beneficial especially for automotive and electronical applications (Figure 1). Its use promises to be a good alternative to steel, Aluminium and polymers:

- Low density
- High specific strength and stiffness
- Good electromagnetic shielding
- High thermal conductivity
- High quality rating

## ADVANTAGES OF MAGNESIUM INJECTION MOLDING

An innovative casting process for serial production of magnesium parts is magnesium injection molding (Thixomolding®). Within the last years more than 400 machines have been installed all over the world. Similar to injection molding machines for plastics, magnesium granules are metered from a feeding hopper into the cylinder of the machine. Within the screw the magnesium material is heated up while it is transported to the nozzle. Typical ram speed ranges from 2 – 6 m/s. Semi-solid processing as well as casting in totally liquid state depending on the part dimensions (e.g. wall thickness) can be realized. In comparison to conventional die

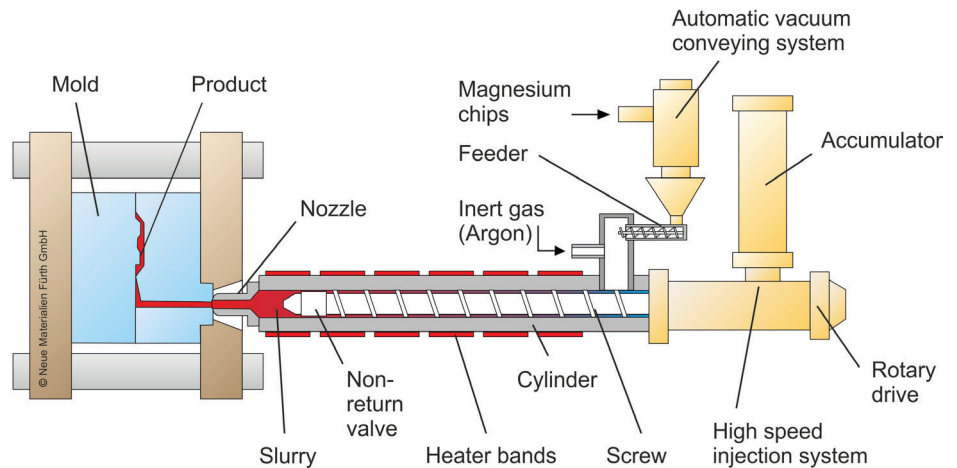


Figure 1: Schematic drawing of magnesium injection molding (Thixomolding®).

casting several advantages are apparent:

- Lower porosity and better mechanical properties
- Reduced wall thickness
- Improved tolerances
- Longer die life
- Reduced cycle times
- Wide range of alloys

In addition magnesium injection molding causes less impact on the environment than die casting. Due to the low proces-

sing temperatures energy consumption can be reduced up to 25%. In the future the use of hot runner systems allows further improvements and higher material efficiency. The use of climate-wrecking or toxic cover gases like  $\text{SF}_6$ , HCF-134a or  $\text{SO}_2$  can be omitted.

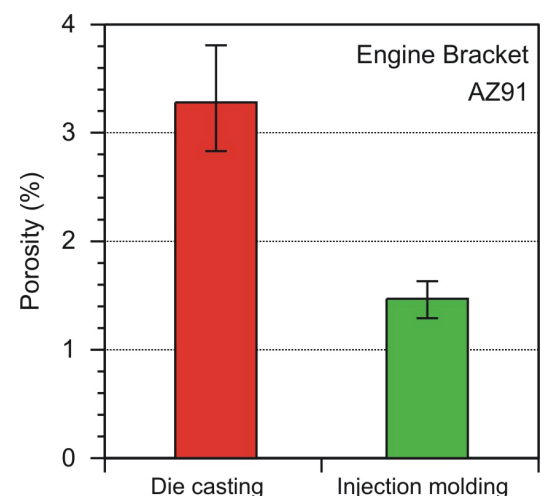


Figure 2: The porosity of thick walled parts like an engine bracket can be reduced significantly by using magnesium injection molding in comparison to die casting.

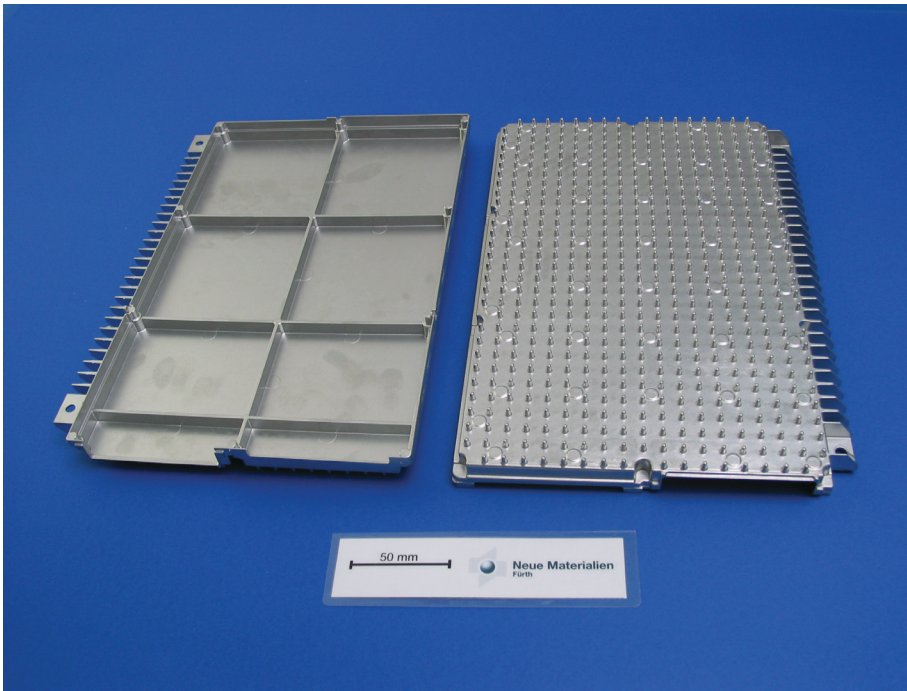


Figure 3: Thin-walled magnesium-housing (ca. 200 mm x 300 mm) cast at NMF with 0,9 mm wall thickness using magnesium injection molding with approximately 600 cooling pins on the outer surface and strong ribbings (~2,5 mm thick).

## NEUE MATERIALIEN FÜRTH GMBH – YOUR R&D PARTNER

Our company has the longest experience concerning magnesium injection molding in Europe. We are running a 220 t-Thixomolding machine from Japan Steel Works and a 650 t-machine from Husky. The maximum shot weight is 1,5 kg magnesium. Both machines are fully automated for

casting parts under industrial conditions. Process stability and economic efficiency are monitored. Our know-how comprises the entire process chain, e.g. mold filling simulation, mold design, casting and coating technology.

## OUR SERVICES

- Feasibility studies and mold proving
- Characterization of cast components
- Evaluation and consulting for selection of materials and process management
- Development of new magnesium alloys and composites
- R&D projects from the prototype up to the maturity phase
- Process and technology development

## Contact

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Figure 4: 220 t-Thixomolding-Maschine (JLM220MG, Japan Steel Works Ltd.) at NMF.



Figure 5: 650 t-Thixomolding-Maschine (HyMet650, Husky Injection Molding Systems Ltd.) at NMF.



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