MAGMASOFT® 5.5
autonomous engineering

Air is predictable

HIGHLIGHTS OF MAGMAhpdc 5.5

New possibilities to predict the transport of entrapped air during mold filling offering

- new algorithms for **air transport** in the melt and **quantitative air results**
- **curves** for predicting the **amount of air** and **evaluating the die venting**
- **vacuum** as a variable for **virtual DoE** and **optimization** of venting
- **extended feeding model** for die casting **considering the third phase**
- **evaluation** of all volume deficits (entrapped air and shrinkage porosity) in one result
- more accurate calculation of the **locking force**

YOUR BENEFIT

The new and enhanced capabilities of predicting entrained air and shrinkage defects in MAGMAhpdc

- **save time** and **effort** for the user in project design and evaluation
- make **predictions** of air entrapment and feeding porosity **more accurate** and **decisions** more **justifiable**
- shorten the **time** from **idea** to **series production** by optimizing venting and process
- lead to increased **safety** and **robustness** in the die casting process through common assesment of all volume deficiencies

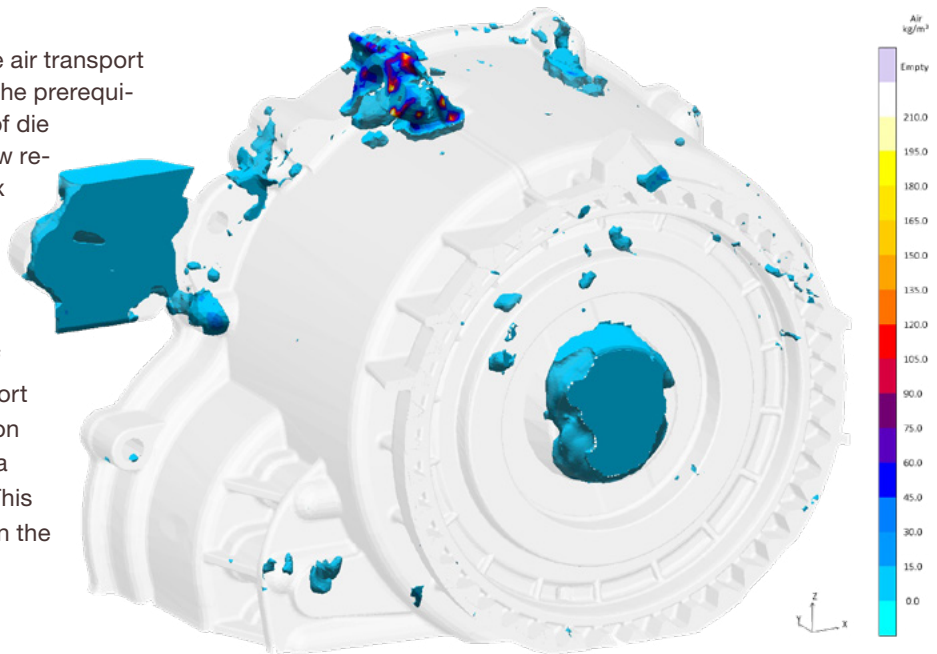
Accurate prediction of possible risks due to air entrapment is becoming increasingly important in die casting. This applies in particular to highly loaded die castings (durability) and large structural components (crash) which are to be heat treated and/or welded. This requires reliable assessment on quality prior to the start of production.

Newly developed models for predicting the air transport and feeding during the third phase create the prerequisites for accurate, quantitative evaluation of die casting layout and process conditions. New results simplify the evaluation of the complex interactions and the decision on necessary measures.

THE NEW „AIR“ RESULT

A new model allows tracking of all areas of trapped air in the melt as well as its transport during the entire die filling. The compression of air pockets and pores is determined as a function of the local pressure in the melt. This also applies to air pockets that smaller than the mesh cells.

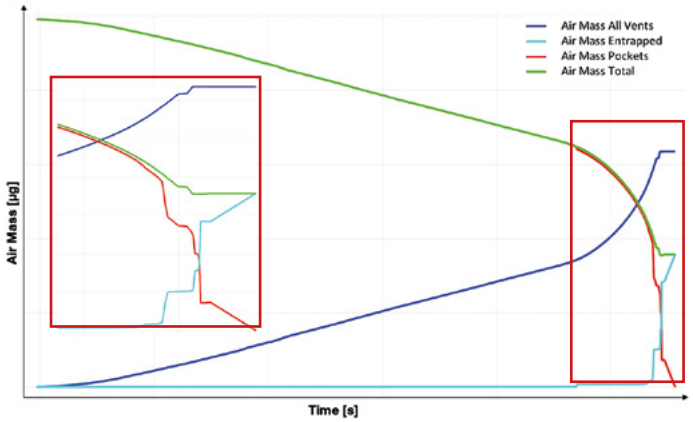
The new „Air“ result shows all risks for entrapped air. Air pockets from unfilled areas, trapped air and air components from partly filled mesh cells are displayed in one result with their mass or density.



Evaluation of the effectiveness of measures for venting.

NEW AIR CURVES

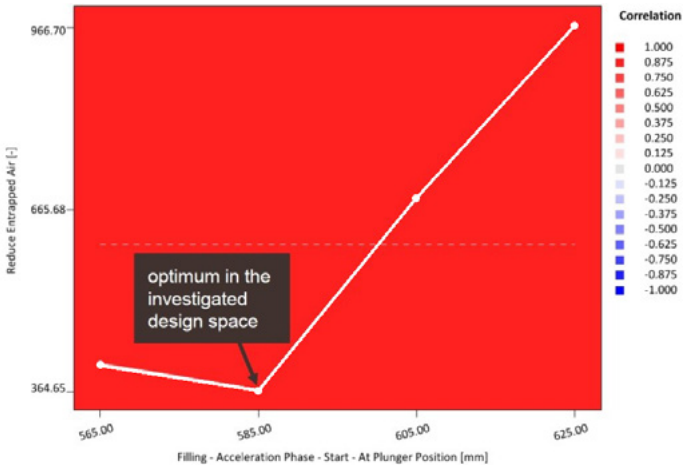
The new air curves enable the comprehensive evaluation of the amount of air present in the die and its changes during filling. The venting situation for different areas can be recorded at a glance, the effectiveness of the venting can be assessed, and the quality of different solutions can be compared quantitatively.



The curves show the amount of air in the system as well as the amount of escaping air. In addition to the amount of residual air, critical events during the shot (entrapment of larger air bubbles closure of vents) can be determined

SYSTEMATIC PROCESS ASSESSMENT

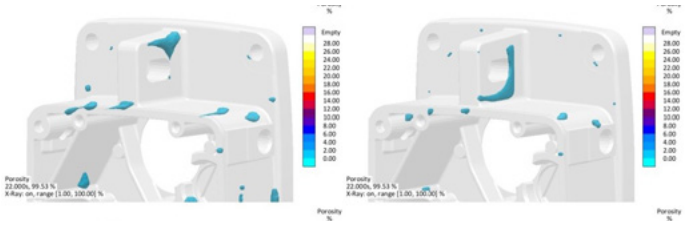
The pressure value required for the targeted vacuum can be used as a variable in virtual test plans and optimizations. The combination with other process variables thus enables both the determination of robust production windows and optimal operating points.



Virtual test plan for the amount of trapped air as a function of the switchover point.

EXTENDED FEEDING MODEL

The feeding model for die casting has been further developed. It considers better feeding paths and solidification as a function of the applied intensification pressure during the third phase. Defects caused during solidification can be predicted more accurately.

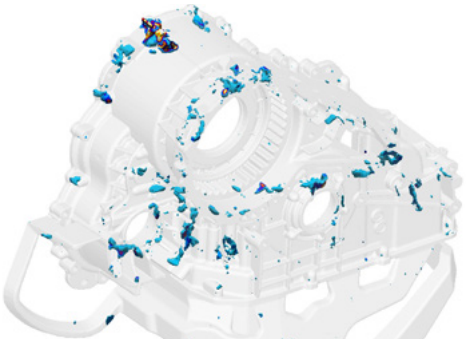


Consideration of pressures in the third phase for feeding errors

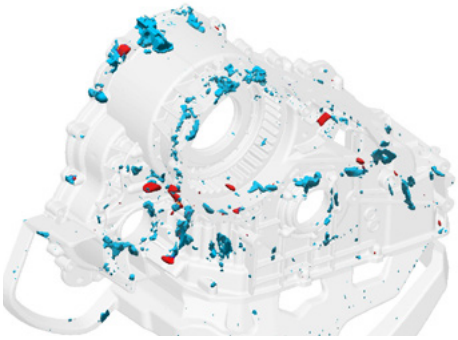
UNIFORM EVALUATION OF QUALITY

Volume defects from mold filling and solidification can be presented together uniformly in one result. The „PorIntAir“ criterion combines all volume defects. Different colors indicate whether the defect is related to filling, solidification or a combination of both.

The „TotalVolumeDeficit“ result provides a uniform and quantitative statement of all defects. With the aid of these two results, the user can evaluate the quality quickly and reliably. By adjusting the scales, the results can be adapted to the resolution of X-ray/CT systems, which enable a comparison with real measurements.



„TotalVolumeDeficit“ displays all defects uniformly in one result, regardless of their cause.



„PorIntAir“ shows risks from mold filling (in blue trapped air, in red risks from solidification porosity and in yellow areas where both defects overlap).