Powerful computational fluid dynamics software for accurate process modeling

Easy-to-use software to improve high-pressure die casting results

- More accurately simulate filling and solidification processes
- Pinpoint probable defects and problems – before casting
- Identify viable designs more quickly
- Decrease the number of design iterations
- Improve scrap rates
- Reduce overall casting costs
FLOW-3D: Designed for Exceptional Accuracy

A number of defects can occur during the filling and solidification of a die cast part. Without a clear understanding of potential problems before casting begins, you risk multiple die design iterations and high scrap rates, which can quickly drive up costs.

Optimize your designs before casting and lower your costs with FLOW-3D, powerful computational fluid dynamics software for more accurate modeling. This easy-to-use software takes the trial and error out of casting designs with advanced modeling techniques that precisely simulate the casting process, enabling you to refine designs, and reduce die iterations and resulting costs.

FLOW-3D applies unique modeling principles that differentiate it from other applications and enhance the accuracy of your results:

**Advanced fluid surface modeling**
Called TruVOF, FLOW-3D’s method for modeling moving fluids goes beyond the traditional Volume of Fluid (VOF) techniques to achieve the most accurate tracking of the jetting and splashing of metal as it fills a part.

**Better flow representation**
While traditional structured grid systems require cells to be either entirely blocked or entirely filled, leaving designs rough and imprecise, FLOW-3D’s FAVOR™ technique allows for partial filling of cells, creating a smoother and more accurate representation of the flow domain while making meshing fast and simple.

**Enhanced modeling of detailed regions**
With Multi-Block meshing capabilities in FLOW-3D, you can easily and efficiently capture complex geometries and apply varying degrees of resolution for sharper modeling of areas of particular interest.

**Thermal Die Cycling**
Model temperature distributions resulting from the combined effects of die heating, spraying and air blow-off, thermal die cycling, and the location of cooling channels and inserts.

“Simulation quickly helped us understand how molten metal moved through the cavity and pointed the way towards the improvements needed to solve the problems. The key to obtaining these benefits is accurate simulation and we have found that FLOW-3D consistently delivers the accuracy we need to solve real-world problems.”

Mark Littler, Mechanical Engineer, Littler Diecast Corporation
More Precise Simulation

Access a wide variety of models in FLOW-3D for high-pressure die casting with FLOW-3D’s all-inclusive package, including:

Defect Tracking and Air Entrainment
Predict where casting defects are most likely to occur and take steps to correct designs before the manufacturing process. FLOW-3D offers the most accurate defect tracking available with its advanced free surface modeling technology, enabling the prediction of trapped surface oxides and air pockets.

Solidification and Shrinkage
As metal cools and shrinks, the integrity of the part can be threatened by the appearance of porosity in key areas. FLOW-3D has a complete suite of tools for modeling solidification and pinpointing areas of excessive shrinkage or porosity, allowing you to add or modify cooling lines or adjust pouring temperatures.

Microporosity
Microporosity, the formation of small internal pores, is caused by a reduction in pressure as metal cools and shrinks. FLOW-3D has a model specially designed to predict the occurrence and location of microporosity. With this information in hand, you can make design adjustments and avoid these critical defects.

Thermal Stress
It’s important to understand how cooling-induced stresses can warp and possibly fracture metal parts. FLOW-3D’s thermal stress model enables you to predict precisely where stresses might occur and how a casting might distort.

Shot Sleeve Optimization
Help determine the optimum shot profile to fill your die – without trapping air – by modeling the interaction between the moving piston and the metal in the shot sleeve.

Cavitation Potential
Cavitation occurs when metal pressure drops below a critical level due to flow separation and high velocities. This unsteady flow can be very damaging to dies. FLOW-3D’s new Cavitation Potential model helps you determine where cavitation-induced die erosion might occur and make adjustments before actual casting.

“With the goal of compressing process and die cast die development time, modeling with FLOW-3D has become an integral part of Albany Chicago’s engineering department.”

Alex Reikher, Senior Design Engineer, Albany-Chicago Co.

FLOW-3D
from
www.flow3d.com
An All-Inclusive Application
From Model Set Up to Simulation to Detailed Results Analysis

FLOW-3D includes all the functionality you need in one simple-to-use application, driven by an intuitive graphical user interface. Easily set up a model and quickly mesh it through its graphical model builder, screen out model incompatibilities and configuration errors, and perform detailed analysis through extensive post-processing capabilities.

Dedicated Support
The professionals at Flow Science work closely with end users to understand their needs and ensure the software continuously meets their real-world challenges. Flow Science offers valuable training to help customers maximize their use of FLOW-3D. Most importantly, Flow Science provides accessible, responsive technical support when the need arises.

Flow Science, Inc.
For more than two decades, Flow Science has been an innovator in flow modeling software, serving a global clientele of business, government and academic institutions.

Call 505-982-0088 for more information about how FLOW-3D can enhance the reliability and quality of your casting designs and help you reduce overall costs.

FLOW-3D’s defect tracking capabilities help casting engineers predict where defects will most likely occur during the filling process. This series shows the filling of an aluminum transmission impeller, colored by surface defect concentration.

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