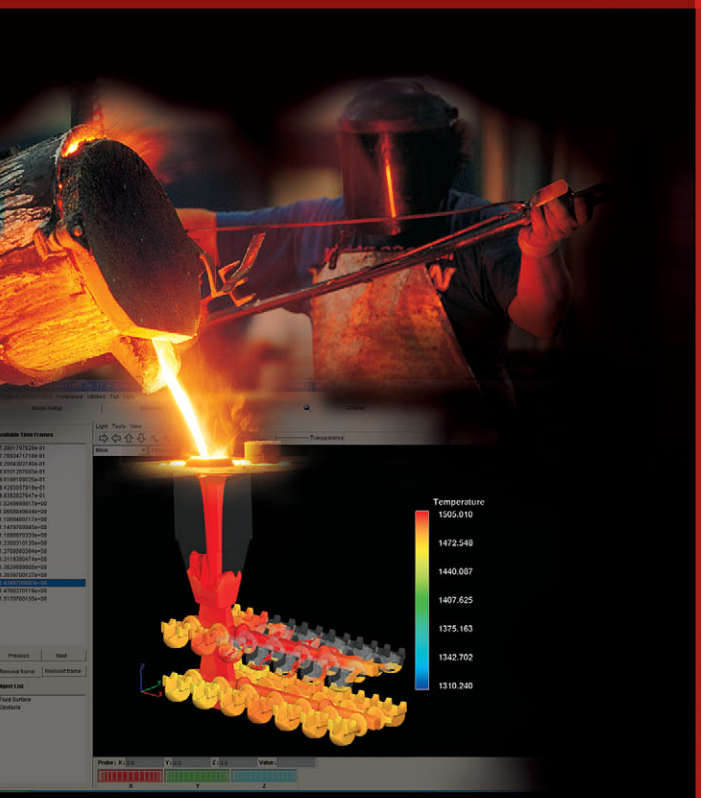
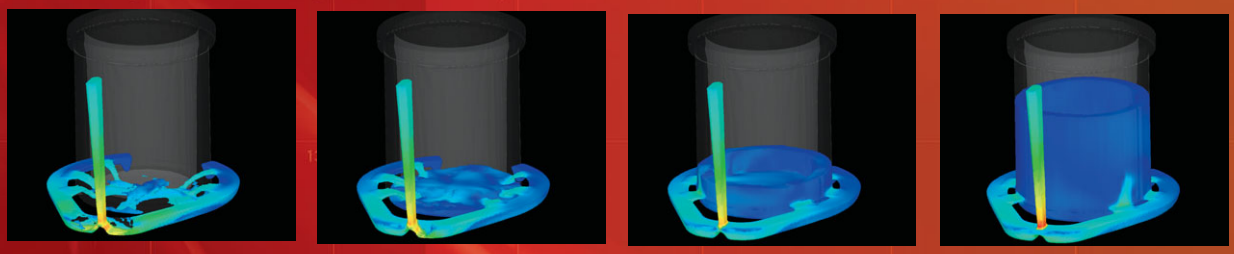



# FLOW-3D

**Powerful** computational fluid dynamics software for accurate process modeling



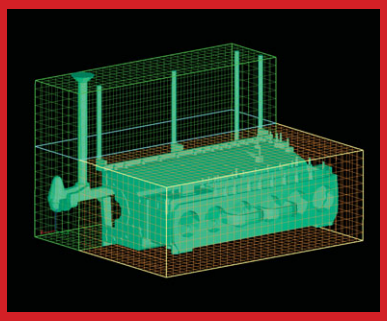
FOUNDRY

## Easy-to-use software to enhance the productivity and profitability of your foundry

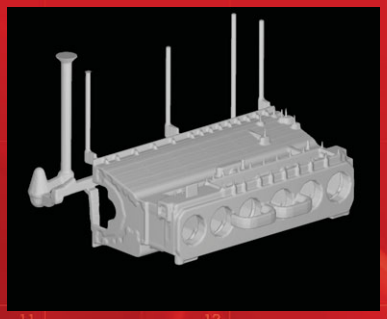
- **More accurately** simulate filling and solidification processes
- **Pinpoint** probable defects and problems – before casting
- **Identify** viable designs more quickly
- **Decrease** the number of design iterations
- **Improve** scrap rates
- **Reduce** overall casting costs

FLOW Science *Improving the World Through Accurate Flow Modeling*

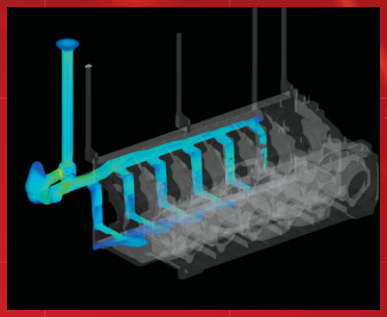
## Advanced Modeling Features



**Multi-block meshing is designed to add even more flexibility and efficiency to problem setup.**



***FLOW-3D's* FAVOR™ method makes accurate representation of very complex geometry a snap.**



***FLOW-3D*'s TruVOF technique allows for accurate representation of moving metal fronts.**

FLOW-3D
from
FLOW Science

www.flow3d.com

# *FLOW-3D:* Designed for Exceptional Accuracy

When casting a part, a number of defects can occur during the filling and solidification processes. Without a clear understanding of potential problems before casting begins, you risk multiple design iterations and high scrap rates, which can quickly drive up casting 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 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 location of moving metal fronts as a part fills.

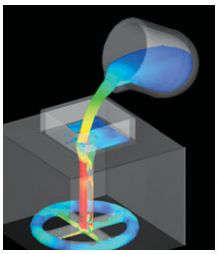
### *Better flow representation*

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 capture complex geometries and apply varying degrees of resolution for sharper modeling of areas of particular interest.

*The powerful new General Moving Objects model in **FLOW-3D** enables engineers to evaluate fluid sloshing and spilling in ladles and other moving parts.*

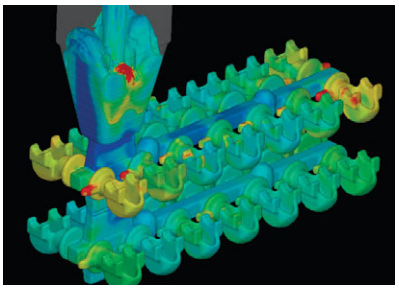


"We have had a great deal of success using ***FLOW-3D*** to predict casting performance, to optimize quality, and to reduce cost by reducing rework, scrap, and lead-time."

***Richard Emmerich**, Senior Metallurgical Development Engineer*
*MetalTek International/Wisconsin Centrifugal Division*

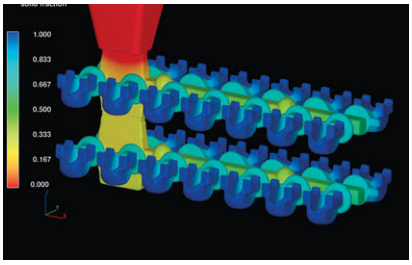
# More Precise Simulation

***Access a wide variety of models with FLOW-3D's all-inclusive package, including:***



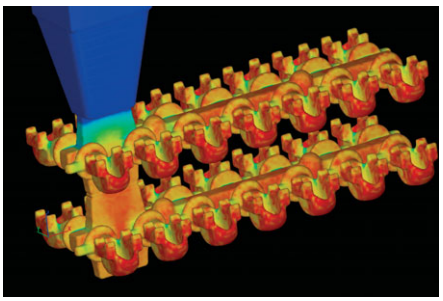
## *Defect Tracking and Air Entrainment*

Predict where casting defects are most likely to occur and take steps to correct designs before the production process begins. ***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.



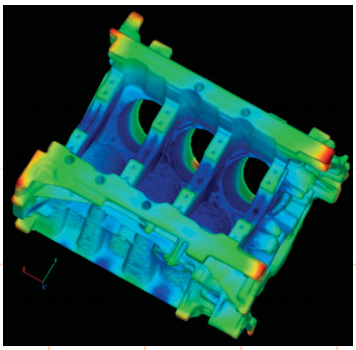
## *Solidification and Shrinkage*

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 chills and risers or adjust pouring temperatures.



## *Microporosity*

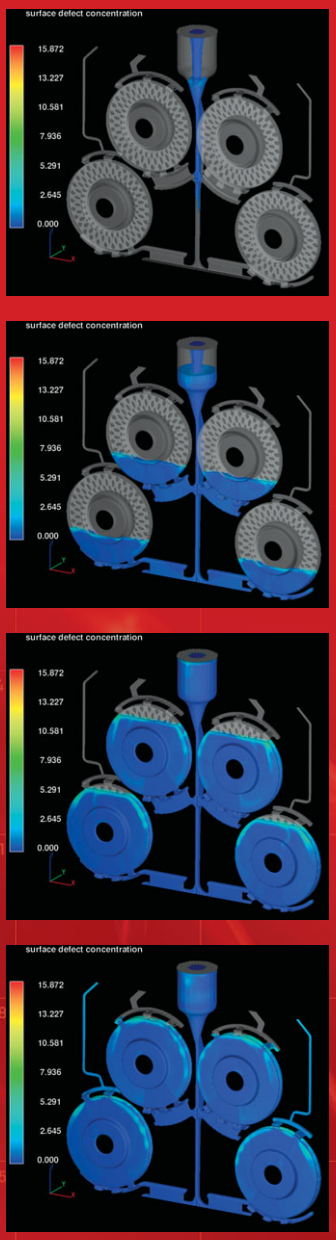
Microporosity, the formation of small internal pores, is caused by a reduction in pressure as metal cools and shrinks. ***FLOW-3D*** has a model specially designed to predict the occurrence and location of microporosity. With this information in hand, you can make design adjustments and avoid these critical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

## Accurate Filling Simulations




**Tracking flow patterns of metal inside a mold accurately is important to achieve optimal gating and runner designs.**

***Above:*** **Filling of a grey iron 4-cavity mold (metal colored by surface defect concentration).**

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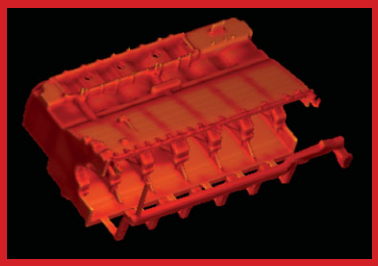
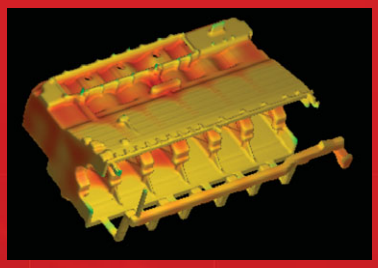
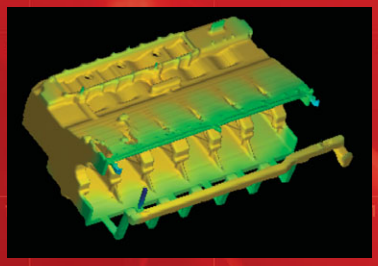
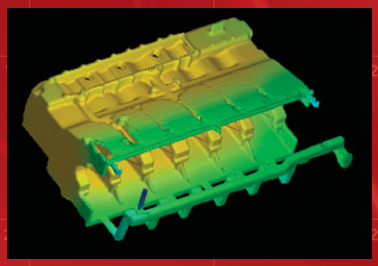
www.flow3d.com

## Solidification and Shrinkage









**In addition to its strength in modeling flow, *FLOW-3D* is equally strong in accurately predicting the formation of defects in the solidification of metal in a mold.**

***Above:*** **Time step series showing the cooling of a sand cast engine block.**

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**FLOW Science**

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# 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.

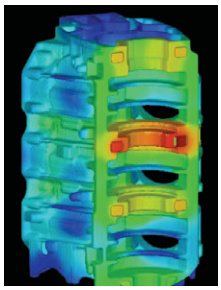
## *Dedicated Support*

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 has unique modeling capabilities to simulate the filling of a lost foam mold and for tracking the potential defects that can arise during this specialized process.*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**505-982-0088**