

THERCAST

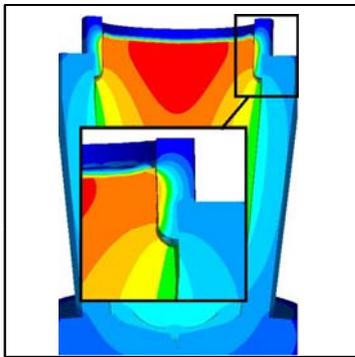
Transvalor THERCAST

Simulation software for ingot casting

Transvalor THERCAST is a 3-D finite-element software system that simulates, predicts, analyzes and optimizes ingot casting of steel and other metals. It reduces the time and cost of planning, optimizing, starting up and running a new casting process, or of optimizing an existing one.

THERCAST provides unmatched information on the temperature over time, stresses and other attributes of any point on or within the produced part, providing useful insights for later users of that part, or data for simulation of later manufacturing steps.

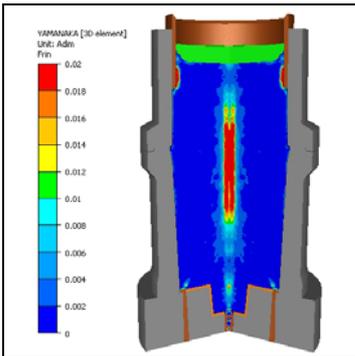
Key features



In this ingot casting application, THERCAST predicts the occurrence of air gaps that appear between metal and mold, and shows how the air gap in turn impedes the flow of heat from the metal to the mold.

Proven real-world accuracy

An important advantage of THERCAST is its ability to simulate every aspect of your casting process with great accuracy. With it, you can model new or planned casting processes with confidence, essentially "seeing inside the process" with even greater clarity than if you had actually built and run the process. You can also model and experiment with processes already in operation, in order to run "what-if" analyses of how you can boost production, improve quality, reduce cost, reduce energy consumption and preserve safety.



This THERCAST ingot casting example accurately shows the Yamanaka criterion result. Areas shown in red are at high risk for internal tears as the metal cools, and those in green and light blue are at risk for excessive porosities.

Thermo-mechanical foundation

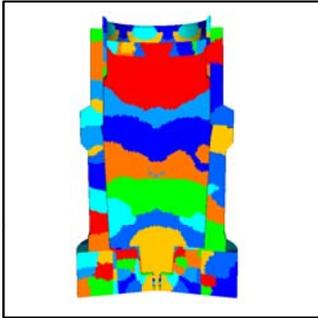
THERCAST software fully integrates the many thermal and mechanical attributes of your casting process into a single model and single set of algorithms, based on a non-stationary 3-D finite element method. This provides dramatic increases in accuracy in many ways, and provides the information you need to correctly design or optimize your casting process.

This thermo-mechanical model allows THERCAST, for example, to accurately predict the occurrence of air gaps and many other fault conditions that would otherwise cause voids, cracking, hot tearing or other metal defects.

Benefits of THERCAST for ingot casting

- **Prediction of air gaps** in order to minimize their impact
- **Prevention of voids** that would otherwise yield unusable ingots
- **Simulation of exothermic powders** so they can be applied properly to prevent rapid or uncontrolled loss of heat
- **Prediction of ingot shape** to avoid surprises and accurately control ingot dimensions
- **Optimization of strip-out times** allowing removal of ingot at earliest possible moment while maintaining quality

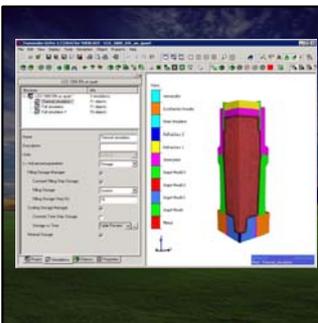




This image shows a THERCAST ingot casting simulation running on eight processor cores. It has been color-coded to show how different zones of the metal and mold are automatically simulated by different processors in parallel, providing dramatic increases in performance.

Performance and scalability

The architecture of THERCAST is optimized for very fast vector and matrix calculations, and has been designed to exploit very fast transfers between processors and memory. THERCAST also includes a powerful parallel processing capability, allowing it to benefit from the power of unlimited numbers of core processors. Parallelism is based on the SPMD (single process, multiple data) technique, and it means that increases in performance, and reductions in simulation run time, substantially improve as additional processors are applied.

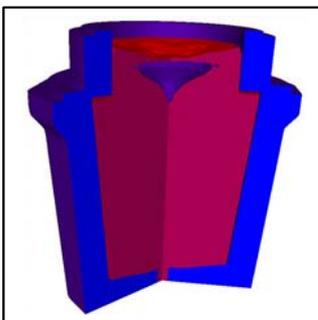


THERCAST helps you set up your simulation environment by addressing settings, object manipulation, remeshing and other factors.

Easy setup and exploration

A key enabler of useful, practical simulation is the ability to easily and quickly create a model of your existing or planned casting process.

THERCAST features a powerful, intuitive user interface that minimizes training time. In most cases, useful defaults are set, allowing you to proceed as quickly as possible through the setup process. Templates also facilitate easy modeling of existing or planned casting processes. The architecture and licensing of THERCAST make it easy to deploy it in ways appropriate to your environment and your users.



In this simulation of a bottom-filled ingot casting process, THERCAST demonstrates that insufficient amounts of exothermic powder have resulted in too-rapid cooling of parts of the ingot, producing a void that will make the ingot unusable.

Start-to-finish simulation

A key advantage of THERCAST is its ability to accurately simulate every step from the beginning to the end of the casting process.

Alternative approaches typically involve software tools from different vendors, presenting you with training, licensing, maintenance and compatibility challenges.

Deployment features of THERCAST

Pre-processor for data preparation

Solver for computation

Post-processor for results analysis

Direct connection with JmatPro software for material data

Efficient job scheduler and queue management

Comprehensive set of tools

Licensing features of THERCAST

License includes:

Simulation of casting processes without restriction

Full 3-D capabilities

Unlimited use of pre- and post-processors

Job scheduler and queue manager

Optimization module

Node-locked for use of one workstation, or floating licensing for use across several sites

Sharing of all or part of the token with metal forging simulation software Transvalor FORGE

Please contact us to schedule a telephone or on-site consultation. Depending on your needs, we may be able to reference other customers using THERCAST in environments like yours, or to perform a benchmark simulation of your own planned or existing operation.

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