

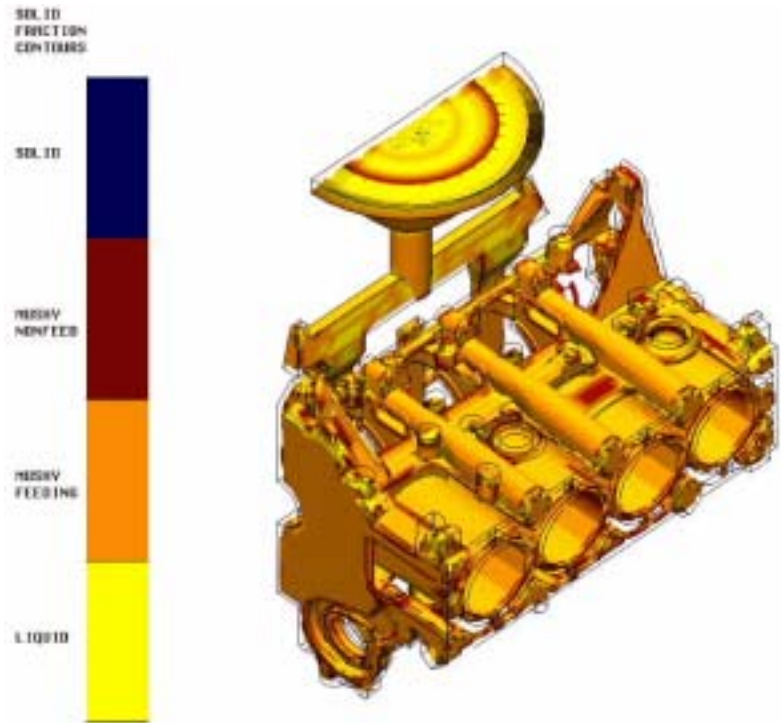
# PASSAGE®/PowerCAST

## OVERVIEW

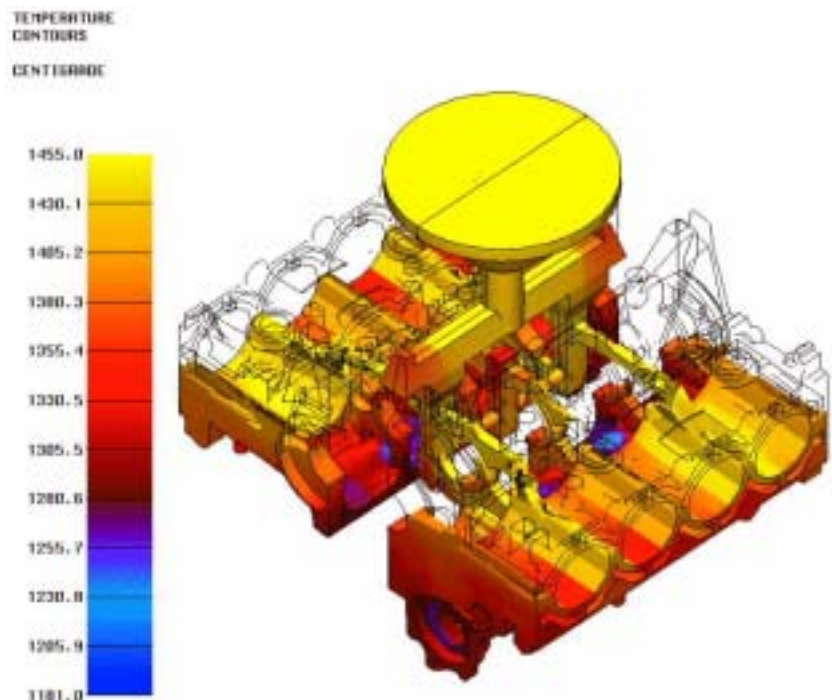
- **PASSAGE®/PowerCAST** software is a 3-D Finite Element program for predicting the manufacturability of cast parts.
- Convective and conductive energy equations, and the Navier-Stokes equations are solved for the **filling** and **solidification** processes, allowing engineers to analyze design parameters from concept to production without being finite element experts.
- A user-friendly, pre-processor with mesh generation and capability to read meshes from other mesh generation codes, permits the entering of material properties, process conditions and numerical control parameters interactively.
- The interactive, dynamic post-processor displays interpreted color graphics of standard casting variables in contour, vector and x-y graph forms.

## APPLICATIONS

- Sand Castings
- Permanent Mold Castings
- Die Castings
- Lost Foam Castings
- Automotive Parts
- Appliances



*Solid Fraction Distribution after Filling of an Engine Block*



*Temperature Distribution during Filling of an Engine Block*

## PASSAGE<sup>®</sup>

- **PASSAGE<sup>®</sup>** software is a collection of finite element programs for flow, heat transfer and related analyses in 3-D geometries.
- **PASSAGE<sup>®</sup>** software consists of the following stand-alone programs:
- **PASSAGE<sup>®</sup>/FLOW** flow and heat transfer analysis.
- **PASSAGE<sup>®</sup>/DUCT** flows through complex passages.
- **PASSAGE<sup>®</sup>/WHEEL** flows through rotating/stationary blade passages.
- **PASSAGE<sup>®</sup>/SYSFLOW** one-dimensional simulation of flow networks.
- **PASSAGE<sup>®</sup>/DEM** flow of small particles in electrical and magnetic fields.
- **dieCAS<sup>®</sup>** filling, solidification, and distortion analysis of die-cast parts.
- **PASSAGE<sup>®</sup>/PowerCAST** filling and solidification of casting processes.
- **PASSAGE<sup>®</sup>/COMPRESSION** compression molding analysis of thin-walled plastic parts.
- **PASSAGE<sup>®</sup>/FreezeDrying** primary and secondary freeze-drying modeling using coupled mass and heat transfer analyses.
- All programs are supported by pre-processors for geometry, mesh, flow/process conditions definition; and post-processors for color results display as x-y graphs, vector and contour plots.

## FEATURES

- Coupled flow and energy equations.
- Prediction of temperature distribution of the casting and mold at every time step.
- Prediction of solid/liquid fractions.
- Prediction of porosity/shrinkage.
- Hot cracking prediction.
- Convection/diffusion phase-change:
  - \* solid region
  - \* liquid region
  - \* mushy region
- Interface with thermal stress analysis programs for:
  - \* elastic strains
  - \* thermal strains
- Interface with stress analysis for structural integrity of parts under external static and dynamic loads.
- Materials database - metals, cores, risers and sand types.
- Provides mesh generator, a 3-D CAD interface module, and accepts meshes from other mesh generators.
- Runs on most UNIX workstations and supercomputers.
- **PASSAGE<sup>®</sup>/PowerCAST** software was developed and is offered exclusively by Technalysis.

## BENEFITS

- **PASSAGE<sup>®</sup>/PowerCAST** software can minimize the cost and time of traditional prototype building and testing, thus shortening product design cycles.
- Designs can be analyzed and modified on the computer before expensive and time consuming design decisions are finalized.
- Technalysis offers customization of **PASSAGE<sup>®</sup>/PowerCAST** software to meet specific customer needs.