MPI/Flow

MPI/Flow simulates the filling and packing phases of the injection molding process to predict the flow behavior of thermoplastic melts so you can ensure parts of acceptable quality can be manufactured efficiently.

Using MPI/Flow, you can refine part and mold designs, material choice, and processing conditions to achieve the optimum balance between quality, cost, and time.

Capabilities

MPI/Flow allows you to:

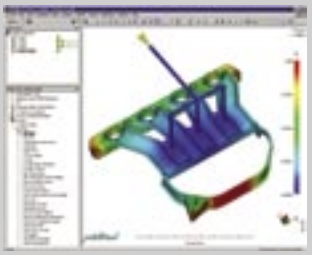
- Predict and visualize the flowfront progression to see how the mold fills
- Determine injection pressure and clamp force requirements
- Optimize part wall thickness to achieve uniform filling, minimize cycle time, and reduce part cost
- Predict weld line locations and either move, minimize, or eliminate them
- Identify potential air traps and determine locations for proper mold venting
- Optimize process conditions such as injection time, injection velocity profile, melt temperature, packing pressure, packing time, and cycle time
- Determine areas of high volumetric shrinkage that could cause part warpage problems
- Determine gate freeze time
- Simulate the Synventive™ Molding Solutions Dynamic Feed® system, a hot runner system which provides independent melt pressure-based process control for up to 32 nozzles in a single mold
- Simulate the part insert overmolding and two-shot sequential overmolding processes
- Optimize the pressure profile at individual hot gate pressure controllers on midplane and Fusion models to improve productivity and quality of family, precision and large part molds
- Simulate the opening and closing of sequential valve gates controlled by time, by melt front node, by pressure, by screw position, and by percent volume filled

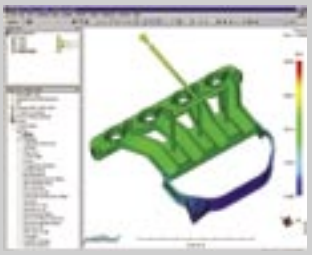
Supported Model/Mesh Types:

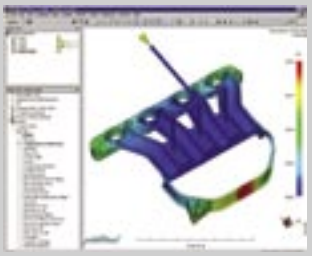
- Finite-element midplane models
- Solids-based Fusion models (add-on option)
- True 3D solid models (add-on option)

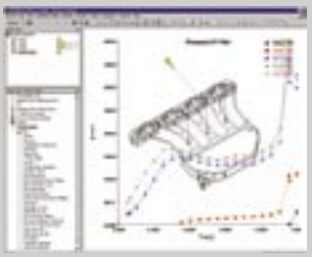
Add-on Options Extend Simulation Capabilities:

- MPI/Fiber
- MPI/Optim
- MPI/Co-injection
- MPI/Injection Compression
- MPI/Gas
- MPI/Mucell®









MPI/Flow Features

Plastic Flow Analysis:

- Hele-Shaw flow of a viscous polymer melt under nonisothermal conditions
- Hybrid finite-element/finite-difference method for solving the pressure, flow, and temperature fields
- Control-volume method to track moving flow fronts
- Asymmetric analysis
- Restart various packing analyses from the end of a single filling analysis

Filling and Packing Analysis:

- Velocity profile input methods:
  - Percent shot volume vs. percent flow rate
  - Percent stroke vs. percent ram speed
  - Stroke vs. ram speed
  - Stroke vs. percent maximum ram speed
  - Stroke vs. flow rate
  - Stroke vs. percent maximum flow rate
  - Time vs. ram speed
  - Time vs. percent maximum ram speed
  - Time vs. flow rate
  - Time vs. percent maximum flow rate
- Fill/pack switch-over input methods:
  - Automatic (default)
  - Percent volume filled
  - Injection pressure
  - Hydraulic pressure
  - Clamp force
  - Pressure control point
  - Injection time
- Results include:
  - Fill time
  - Injection pressure
  - Pressure at transfer
  - Melt-front temperature
  - Bulk temperature
  - Weld lines
  - Air traps
  - Shear rate
  - Shear stress
  - Report on filling

Packing Analysis:

- Conjugate-gradient pressure solver
- Determine ideal packing time when gate freezes off
- Pressure profile input methods:
  - Hydraulic pressure vs. time
  - Injection pressure vs. time
  - Percent maximum machine pressure vs. time
  - Injection pressure factor vs. time
- Results include:
  - Volumetric shrinkage
  - Pressures
  - Temperatures
  - Velocity
  - Freeze times

Automatic Runner Balancing:

- Automatic runner balancing ensures the runner system is designed to:
  - Fill all cavities at the same time
  - Minimize stress levels
  - Minimize the volume of material
- Supports hot and cold runner systems
- Supports single cavity, multi-cavity, and family mold layouts

Automatic Gate Location:

- Automatically determines ideal gate locations

Molding Window Optimization:

Quickly provides recommendations for the injection time, mold temperature, and melt temperature values that should be used as preliminary input for a full flow analysis.

Design of Experiments (DOE) Manager:

Performs a DOE using filling and packing analyses.

- Types of DOEs:
  - Taguchi
  - Factorial
  - Taguchi then factorial
- Input variables:
  - Mold temperature
  - Melt temperature
  - Injection time
  - Injection profile multiplier
  - Thickness multiplier
  - Packing time
  - Packing profile multiplier
- Quality criteria:
  - Melt-front temperature
  - Injection pressure
  - Clamp force
  - Volumetric shrinkage
  - Sink-mark depth
  - Part weight
  - Part quality
- Supports midplane and Fusion models

Global Headquarters
Moldflow Corporation
492 Old Connecticut Path
Suite 401
Framingham, MA 01701
USA
Tel: +1 508 358 5848
Fax: +1 508 358 5868

For further information about Moldflow®
Design Analysis Solutions, Manufacturing solutions, services and global office locations, visit www.moldflow.com.

D E S I G N A N A L Y S I S S O L U T I O N S

www.moldflow.com