Moldflow Plastics Insight® | Design Validation and Optimization

Moldflow Plastics Insight (MPI®) is a comprehensive suite of software tools for simulating, analyzing, optimizing, and validating plastics part and mold designs.

Powerful and easy to use, MPI offers a state-of-the-art solution that can be used to simulate nine unique molding processes, and is currently used by top manufacturers in the automotive, medical, consumer, electronics and packaging industries.

The Benefits of Predictive Analysis

To avoid high costs and time delays when problems are discovered during manufacturing, we must uncover the effect of material, part geometry, mold design and processing conditions on the manufacturability of a part. Using predictive analysis tools to simulate the injection molding process, MPI users can evaluate and optimize interactions among these variables before production begins, minimizing time and expense.

With MPI, you can simulate the filling, packing and cooling phases of thermoplastics molding processes using materials with or without fillers and fiber reinforcements, as well as predict post-molding phenomena such as part warpage. You can also simulate material flow and cure of reactive molding processes.

MPI also offers a material database (the world's largest) of more than 7,800 thermoplastic and thermoset materials, all characterized for use in plastics CAE analysis, in addition to detailed information on coolants, mold materials, and analysis capabilities of leading brands and models of molding machines.

MPI is widely acclaimed for its speed and accuracy and addresses the broadest range of design geometry types and manufacturing issues associated with plastics molding processes.

Buy Only the Modules You Need

Nineteen separate modules allows you to maximize your investment, so you can focus on plastic flow, molding process, structural integrity, or reactive molding simulations, according to your needs. Moldflow offers superior customer service, training and technical support should you need it.

The Best Gets Even Better

Version 6.0 delivers new technologies and key enhancements that help users work more efficiently, significantly reduce solution time, interact better with CAD, structural analysis and other Moldflow applications, and better understand and communicate analysis results.

MPI Features

Thermoplastics Injection Molding processes:

- Insert overmolding
- Two-shot sequential overmolding
- Hot runner systems
- Dynamic Feed® systems
- Gas-assisted injection molding
- Co-injection molding
- Injection-compression molding
- Microcellular (MuCell®) injection molding

Reactive processes:

- Thermoset injection molding
- RTM/SRIM processes
- Microchip encapsulation
- Underfill encapsulation

New Features in version 6.0:

- Enhanced user interface to improve efficiency and productivity
- New and expanded product integration with industry standard FEA products as well as Moldflow manufacturing solutions
- 3D solutions that are faster, more accurate and increased capacity
- More informative results from warpage, cooling, overmolding, core shift, etc. analyses
- Streamlined diagnostic and communication tools including Moldflow Communicator™

MPI Users

- 60% of Fortune 500 manufacturers
- Companies in 39 countries
- Automotive, Medical, Consumer products Electronics and Packaging industries

moldflow® plastics made perfect™

Unmatched Geometry Support

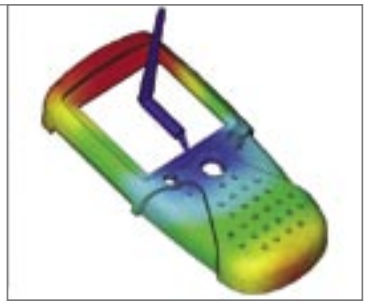
Only Moldflow Plastics Insight supports all three analysis model solution methods. MPI allows you to directly analyze traditional midplane finite-element mesh models, solid models of thin-wall parts using MPI/Fusion solvers, and solid models of thick parts using MPI/3D solvers.

Traditional Midplane Solutions

A midplane mesh represents a three-dimensional part with a two-dimensional, planar surface plus a thickness assigned to this surface. Midplane meshes work best for traditional, thin-walled injection molding applications. To increase your productivity when creating and analyzing such models, the MPI/Midplane Generator can automatically generate a midplane mesh and assign proper element thickness to ensure accurate analysis results.

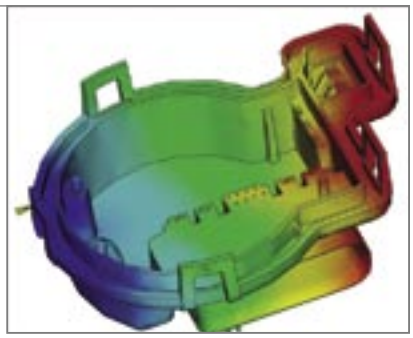
MPI/Fusion Solutions

Based on Moldflow's patented Dual Domain™ technology, Fusion adds a boundary or skin mesh on the outside surfaces of a 3D CAD translation model (STL, IGES, etc.). This allows you to analyze solid models of thin-walled parts directly. With no need for further model preparation, you can analyze more design iterations or perform more in-depth analyses.



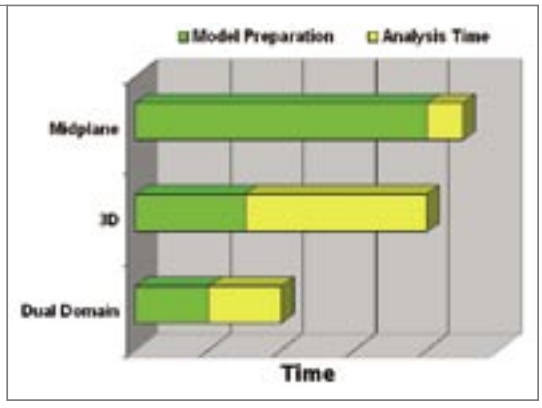
MPI/3D Solutions

Using a proven technique based on a solid, tetrahedral finite-element volume mesh, MPI/3D solutions allow you to perform true, three-dimensional simulations on geometries that do not qualify as traditional, thin-wall designs. MPI/3D works well with electrical connectors and thick structural components, even those with extreme thickness variability.



Reduced Total Solution Time

Total solution time includes both model preparation and analysis run time. These factors are highly dependent on the complexity of part and mold design as well as user-selected analysis options. Moldflow products offer you a wide range of software solutions so you can obtain the most accurate results possible in the shortest period of time for each unique application.

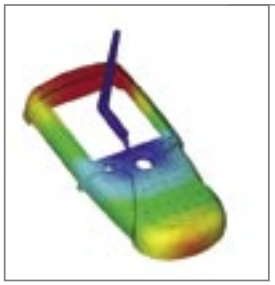


Complex Simulations Made Easy

Predict and eliminate potential manufacturing problems and optimize part design, mold design and the molding process itself. MPI addresses virtually all plastics molding processes and state-of-the-art process applications.

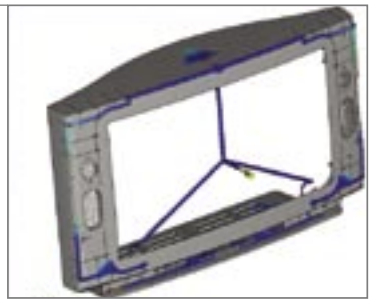
MPI/Synergy is the pre/post-processor that supports all MPI analysis modules, providing powerful workflow and productivity tools for modeling, meshing, mesh editing, model validation, job setup and control, results visualization and report generation in a single, easy-to-use environment.

Plastic Flow Simulation



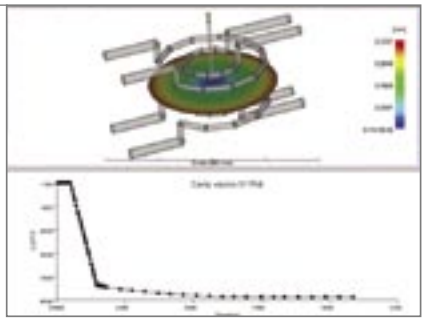
MPI/Flow simulates the filling and packing phases of the thermoplastics injection molding process to predict the flow behavior of plastic melts so you can ensure manufacturability. Using MPI/Flow, you can optimize gate locations, balance runner systems, evaluate processing conditions to provide a robust molding window, and determine and correct potential part defects; Simulate insert overmolding and two-shot sequential overmolding processes; Analyze the effects of non-uniform mold temperatures, optimize valve-gate timing, compare flow through hot versus cold runner systems, and analyze Dynamic Feed applications. With optional modules MPI/Flow can simulate more complex thermoplastics molding processes.

MPI/Gas simulates the gas-assisted injection molding process, where gas, usually inert nitrogen, is injected into the polymer melt. The gas drives the polymer through the mold cavity to complete mold filling and create a network of hollow channels throughout the component. MPI/Gas results help determine where to position polymer and gas entrances, how much plastic to inject prior to gas injection, and optimal size and placement of gas channels.

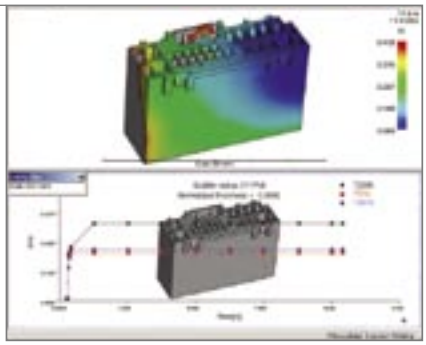


MPI/Co-Injection simulates the sequential co-injection process, where a skin material is injected first, followed by the injection of a different core material. You can view the advancement of the materials in the cavity and see the dynamic relationship between skin and core materials as filling progresses. Use results to optimize the combination of two materials while maximizing the overall performance/cost ratio for the product.

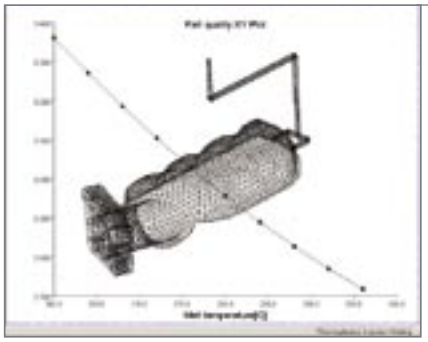
MPI/Injection Compression simulates processes where polymer injection and mold compression occur simultaneously or sequentially and allows you to program the compression phase to begin anytime before, during, or after polymer injection. Use results to comprehensively evaluate candidate materials, part design, mold design, and process conditions.



MPI/MuCell simulates the microcellular (MuCell®) injection molding process, in which a supercritical fluid such as carbon dioxide or nitrogen is mixed with molten polymer and injected into the mold to produce microcellular foam. With MPI/MuCell, you can evaluate the feasibility and benefits of using this process versus traditional injection molding. Additionally, you can optimize the part design and the process settings by reviewing the various analysis results.

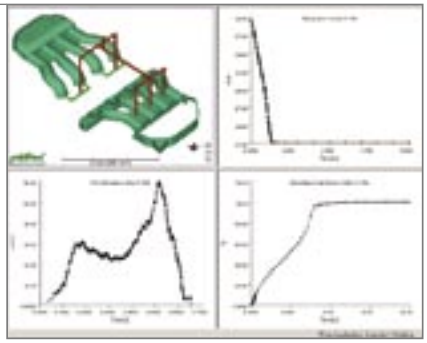


Molding Process Optimization Simulations

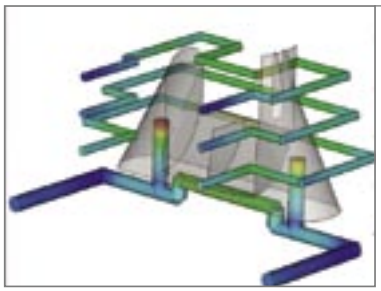


MPI/Design-of-Experiments lets you perform a sequence of automatic analyses, varying parameters you specify, such as mold and melt temperatures, injection time, packing pressure and time, and part thickness. The program analyzes the results to help you optimize processing parameters and ultimately, the molded part. Results include single-point quality indicators such as volumetric shrinkage, injection pressure, clamp force and flow-front temperature, as well as displays of fill time, pressure, and temperature distributions.

MPI/Optim allows you to analyze for specific injection molding machines, looking at machine response time, maximum injection velocity, and velocity and pressure programmability of the machine controller. Use the results to achieve uniform flow front velocity and temperature profiles through the injection molding machine nozzle, the mold feed system, and the part cavities.



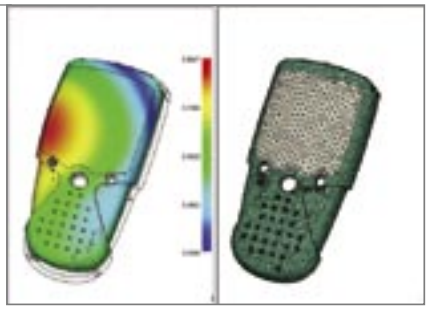
Mold Cooling Simulations

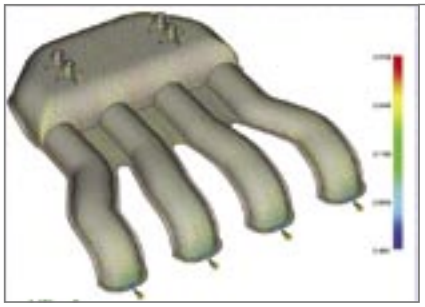


MPI/Cool provides tools for modeling mold cooling circuits, inserts, and bases around a part and analyzing the efficiency of the mold's cooling system. MPI/Cool simulations allow users to optimize mold and cooling circuit design to achieve uniform part cooling, minimize cycle times, eliminate part warpage due to cooling factors, and decrease overall manufacturing costs.

Structural Integrity Simulations

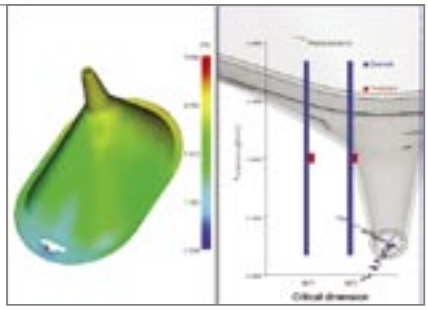
MPI/Warp helps predict shrinkage and warpage of plastic parts from process-induced stresses, as well as spatial deviation of an injection mold core due to non-uniform pressure distribution. Uncover causes of warpage, see where it will occur, and allow you to optimize your design, material choice and processing parameters to control part deformation before the mold is built.

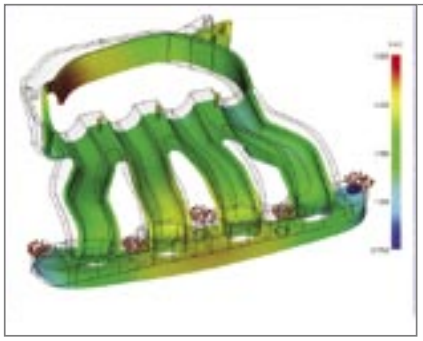




MPI/Fiber helps predict the fiber orientation due to flow in fiber-filled plastics and the resultant mechanical strength of the plastic/fiber composite. It is important to understand and control the orientation of fibers within fiber-filled plastics to reduce shrinkage variations across the molded part to minimize or eliminate part warpage.

MPI/Shrink predicts polymer shrinkage based on the effects of processing and grade-specific material data and offers a true prediction of linear shrinkage independent of warpage analysis. Because plastic parts shrink as they cool, it is essential to accurately account for this shrinkage in the design of the mold so that critical product tolerances can be met.





MPI/Stress predicts the post-molding performance of plastic parts when subject to various forms of external loading. The analysis considers the effects of plastic flow during injection molding and the resultant mechanical properties on the component's structural integrity.

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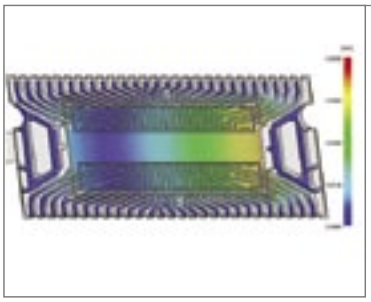
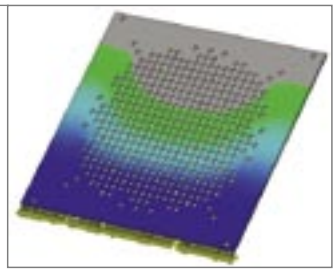
Reactive Molding Simulations

MPI/Reactive Molding simulates the flow and curing of thermoset resins in a variety of reactive molding processes, including thermoset and rubber injection molding and RTM/SRIM applications. Use results to evaluate manufacturability, minimize cycle times, and optimize processing conditions.



MPI/Microchip Encapsulation simulates the encapsulation of semi-conductor chips with reactive resins, including paddle shift and wire sweep predictions. Analysis results help you design the encapsulation package, tool, leadframe and wires, as well as optimize processing conditions, including mold temperature, filling time, ram speed profile, and curing time.

MPI/Underfill Encapsulation simulates the pressurized underfill encapsulation process (also called flip-chip encapsulation) to predict the flow of the encapsulant material in the cavity, between the chip and the substrate.



Technical Specifications

To install and run Moldflow Plastics Insight software, your computer should have at minimum a 500-MHz processor with at least 2 GB of free disk space and 256 MB of RAM. Actual requirements to achieve optimal performance may increase significantly depending on the size of models you are analyzing, the type of analysis and the number of simultaneous analyses being run.

Operating System: Microsoft Windows

Processor	Operating System Levels
AMD Athlon/Duron (or) Intel Pentium/ Xeon	Windows 2000 Windows XP Professional Windows 2003 Server Standard & Enterprise
64-Bit AMD Opteron (or) Intel X86_64 (EM64T)	Windows XP Professional (64-Bit Edition)

Operating System: UNIX

Processor	Operating System Levels
HP PA-RISC 8000 or later	HP-UX 11.0
64-Bit Intel Itanium 2	HP-UX 11i vers. 1.6
SGI MIPS R8000 or later	IRIX 6.5
Sun UltraSPARC II or later	Solaris 9 (2.9)

Operating System: LINUX

Processor	Operating System Levels
64-Bit AMD Opteron™	SUSE 9.2 Professional
64-Bit Intel Itanium 2	Red Hat Enterprise Linux AS 3 for IA64
Intex X86_64 (EM64T)	SUSE 9.2 Professional

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