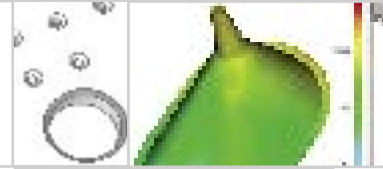


MPI/Shrink



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.

Capabilities

MPI/Shrink allows you to:

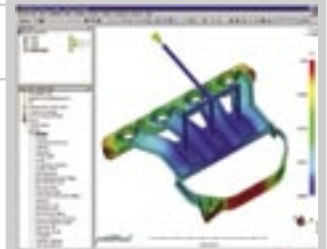
- Provide precise, optimum shrinkage values and predict shrinkage variations across the mold, so that mold design can be refined to compensate for these variations
- Enable control of molding conditions, gate location, and material grade selection to ensure specified part dimensions will be achieved
- Understand the effects of processing on shrinkage
- Replace the traditional “best-guess” approach for determining shrinkage values
- Eliminate the need to cut the mold under size and re-machine to finished size after mold trials
- Eliminate the need to push molding conditions to the limit to achieve the required dimensions
- Ensure the mold produces parts that are within critical tolerances, thereby reducing reject rates
- Eliminate the need to adjust molding parameters to give the required dimensions, which often results in molding far from optimum conditions, resulting in long cycle times and surface defects
- Decrease the need for prototype tooling
- Evaluate the performance of different materials

Supported Model/Mesh Types:

- Finite-element midplane models
- Solids-based Fusion models (add-on option)

Supported Analyses:

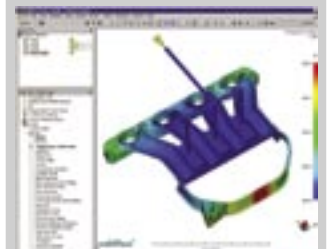
- Requires MPI/Flow



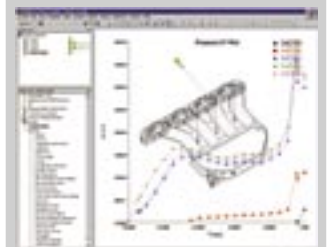
MPI Flow 1



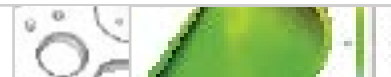
MPI Flow 2



MPI Flow 3



MPI Flow 4



- Uses results from MPI/Flow to ensure that MPI/Shrink results are based on a simulation of the complete injection molding process
- Calculates shrinkages at each element, including:
 - Equilibrium volumetric shrinkage calculated during packing
 - The cooling rate at each grid point at the instant of freeze
 - Shear stress at each grid point at the instant of freeze
 - The flow angle, relative to the element's local axis, at each grid point at the instant the grid point freezes
- From these shrinkages, MPI/Shrink determines overall shrinkage allowances for the entire model
- Variations in temperature across the mold surface can be taken into account by linking the MPI/Flow analysis with cooling information from MPI/Cool
- Calculates polymer shrinkages parallel and perpendicular to flow
- Uses grade-specific orthotropic material shrinkage data from the Moldflow Material Database
- Takes into account volumetric shrinkage, crystallization kinetics, and the effects of mold restraint, stress relaxation within the molding, and molecular orientation on shrinkage
- Determines the optimum single shrinkage value to ensure that critical dimensions are met

- In some applications, the use of a single shrinkage value may not be appropriate, so MPI/Shrink outputs a percentage tolerance on calculated shrinkage values to give a confidence level when machining cavities to a single shrinkage value
- Predicts shrinkage variations across the mold, so that mold design can be refined to allow for these variations
- Predicts component shrinkages along the x, y, and z axes to allow different shrinkages to be used in different directions
- To ensure specified part dimensions are achieved, MPI/Shrink considers molding conditions, gate locations, and material selection
- Different materials can be evaluated to select the material with the shrinkage characteristics to meet desired dimensions

Results:

- Shrinkage values along the x, y, and z axes
- Dimension tolerances and confidence intervals
- Shrinkage variation across the part
- Error distribution for shrinkage allowances
- Average shrinkage allowance
- Dimensional accuracy report
- Mold dimensions between any two points on the model

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