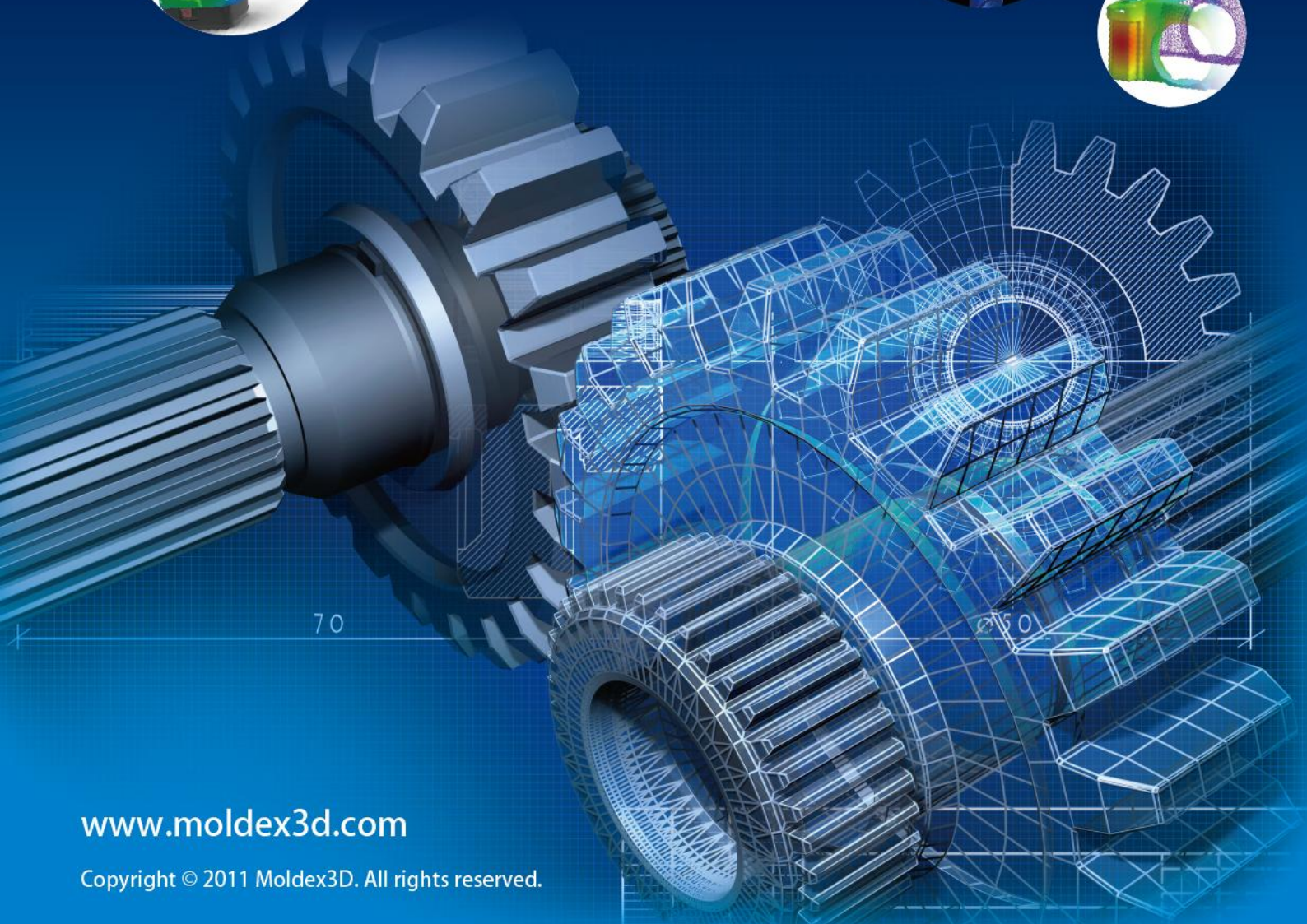
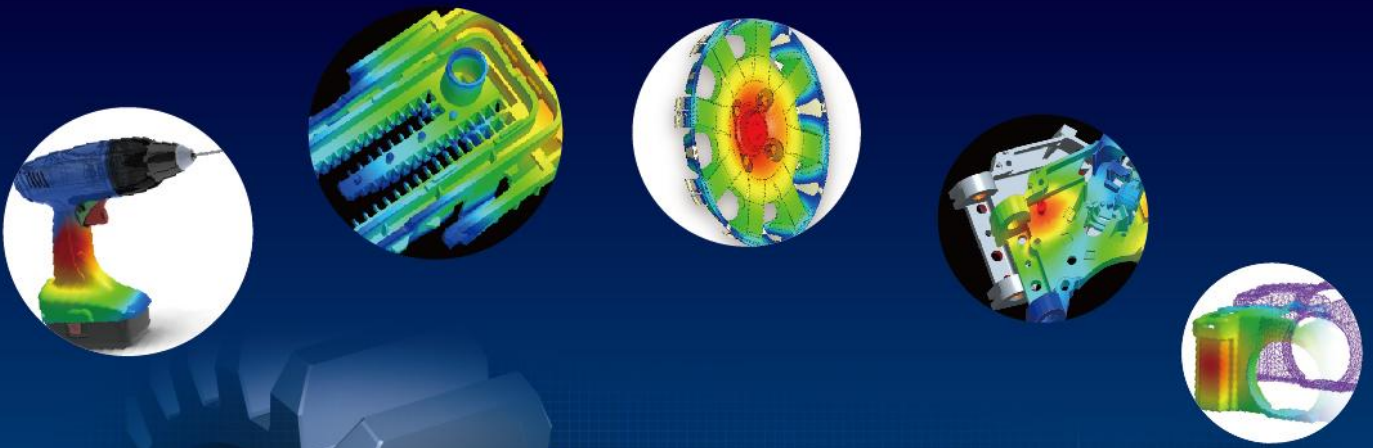


Moldex3D R11.0

What's New, an Overview



Moldex3D R11.0

What's New, an Overview

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Moldex3D is a suite of professional CAE tools that enable more accurate and more efficient plastic part verification and mold optimization. It helps global designers create better products to meet market demands. It also helps manufacturers produce high-quality plastic parts at lower cost. Moldex3D leads users to overcome severe industrial challenges and strengthen core competitiveness.

Moldex3D R11.0 brings several breakthroughs on solver enhancement and user friendliness. It now provides the most complete industrial processing simulations, including advanced hot runner optimization, co-injection molding, microcellular molding, underfill encapsulation, etc. It also continues improving pre-processing and post-processing functionalities that help users acquire optimal solutions more easily and more efficiently.

Moldex3D R11.0 builds its outstanding capabilities on past releases and adds innovation for better performance and user experience, offering the following new features and benefits:

- Advanced Support for Pre-Processor
- Accuracy Improvements for Simulations
- Enhanced Efficiency for Simulations
- New Simulation Capabilities
- Material Database Updates
- High Performance Computing

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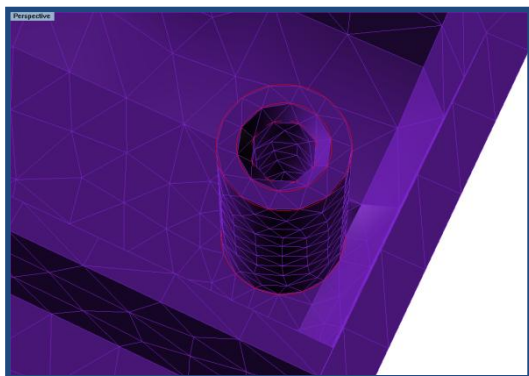
What's New, an Overview

Advanced Support for Pre-Processor

Moldex3D R11.0 has improved its exclusive pre-processors, Moldex3D Mesh and Designer, to help users avoid most difficulties in the pre-processing preparation.

Quality Improvements in Moldex3D Mesh

Moldex3D Mesh highly improves the quality of solid mesh and surface mesh. Aimed to circular features, the meshing processor will assign at least six node seeds automatically in a circular region, which means a better node density distribution to describe a circular feature. It will avoid common geometric distortion in circular surface mesh and bring more accurate simulations.



A specific geometric feature can be perfectly portrayed

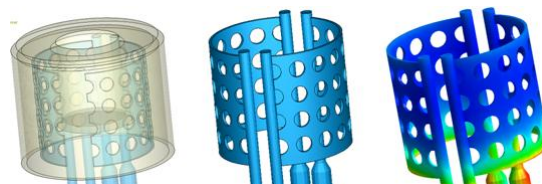
An enhanced function has also been added for users to find a region with small edge length on one mesh edge. Users can setup ideal minimum edge length to identify disqualified surface elements for further improvements. It will help users enhance mesh quality.

Features and Enhancements in Designer

Moldex3D Designer develops several new features:

- Enables users to directly modify local geometric thickness on a 3D model. It is more efficient for users to run simulations for thickness changes.
- Provides a user-friendly tool to draw an arc curve and attribute it as a runner or a cooling channel. It allows users to design feeding or cooling systems depending on individual needs.

- Supports to import 3D models of cooling channels in STL format directly from CAD software. Users can build up complex cooling systems more easily.



Users can create a complex cooling system in STL

- Enhances the meshing performance especially for models with large runner volume. Its function of auto grid distribution will automatically distribute more elements in cavities than that in runner. It will lead to an increase on mesh and result resolutions in critical regions.
- Supports to specify symmetric settings of models that contain STL and line-mixed runners. Compared to a full model, a symmetric model provides higher mesh resolution under the same meshing level. Therefore, it will reduce the memory required for multi-cavity analyses.
- Provides advised runner diameter for each part in a family mold depending on part volume. When the first diameter value changes, other diameter values will be modified accordingly. It will provide a good reference for users to evaluate the filling balance of a family mold.

Accuracy Improvements for Simulations

Moldex3D R11.0 has improved and expanded its solver capabilities to help users acquire more accurate advanced CAE solutions and overcome molding challenges.

Auto HTC Modeling

Moldex3D R11.0 has expanded the feature to evaluate the effect of Heat Transfer Coefficient (HTC) in a filling analysis. Users no longer need to assume the HTC value for each

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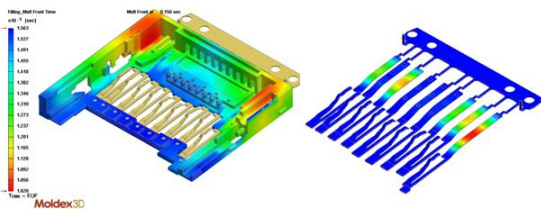
analysis. The new approach can automatically determine the HTC value based on molding processes, material properties, and model geometry, then providing a HTC distribution.

Venting Analysis

The initial air pressure in cavity will affect the filling pattern and result in potential incomplete fills. Moldex3D R11.0 enables users to specify the initial air temperature and pressure in cavity. Considering the venting effect when running injection molding simulations, users can specify multiple venting regions and gap sizes and predict air traps more accurately.

Core Shift Analysis

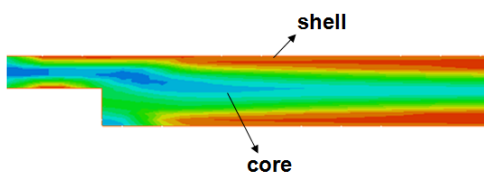
Core Shift Analysis enables users to simulate the deflection of part inserts due to imbalanced pressure in the filling process. Under the auto defined boundary conditions, users can evaluate the filling conditions of part inserts and revise their design of part inserts.



Evaluation for the design of part inserts

Improved Analysis for Fiber Orientation

Moldex3D R11.0 enables users to predict fiber orientation for both short and long fiber-filled materials. It supports the proprietary iARD-RPR model to enhance the analysis accuracy. The iARD-RPR model consists of only three parameters, so it will be much easier for users to get better defined material parameters compared to other models.



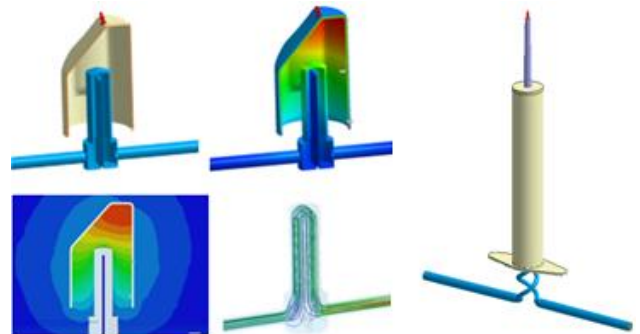
iARD-RPR prediction for fiber-filled materials

Improved Analysis for Transient Cool

Transient Cool Analysis in Moldex3D R11.0 takes the effect of mold open behaviors into consideration. It also employs air boundary conditions instead of just metal. Therefore, the simulations for temperature distribution will become much closer to a real case, which helps users evaluate the cooling efficiency more accurately.

Enhanced Simulation of 3D Cooling Channels

Moldex3D Standard Cool supports the simulation of 3D flow behaviors in cooling channels in Moldex3D R11.0. It visualizes coolant pressure loss, coolant streamline and flow field in cooling channels and helps evaluate the interactive effect between moldbase temperature and coolant flow rate. Additionally, baffle, bubbler and conformal cooling designs can be simulated by this 3D approach. Therefore, users can predict the required coolant flow rate to reduce cycle time. It also helps users prevent possible pressure loss and stagnations occurring in cooling channels to enhance the cooling efficiency.



3D cooling analysis supports baffle, bubbler and conformal cooling designs

Improved Analysis for Reactive Injection Molding (RIM)

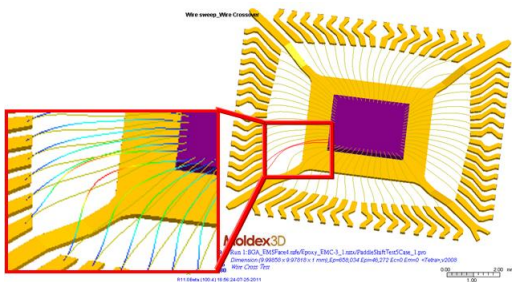
Moldex3D R11.0 supports PVTC models in Encapsulation and RIM projects. Considering shrinkage dependency on the conversion rate, it improves the prediction accuracy of thermal stress and warpage. Users can evaluate the curing contribution to shrinkage and warpage and avoid higher volumetric shrinkage due to the PVTC effect during the molding process.

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What's New, an Overview

Improved Analysis for Chip Encapsulation

Users can analyze wire crossing models in Moldex3D R11.0. The regions with crossed wires will be highlighted in order to prevent unreasonable wire definitions. Besides, it employs wire deformation and diameters to show crossed wires after molding. Therefore, users can identify potential wire crossing troubles more clearly and more efficiently.

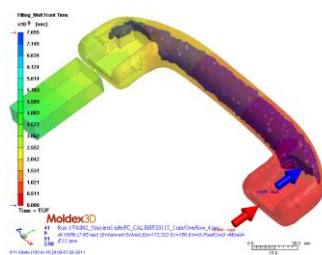


The wire crossing region will be highlighted

Additionally, material nonlinearity has a significant effect on large deformation of wires. Moldex3D R11.0 also takes nonlinear wire material properties into calculation when running a wire sweep analysis. Although it increases the calculation time, it will highly improve the analysis accuracy of wire sweep prediction.

Improved Analysis for Gas Injection and Water Injection

Moldex3D R11.0 allows users to define an overflow region. Users also can turn on or turn off the overflow region in the molding process. It will bring more realistic simulations for gas-assisted and water-assisted injection molding processes. Additionally, users also can visualize the unbalanced distribution of skin thickness and revise gas and water channel designs.



Simulation for water-assisted injection molding

Improved Analysis for FEA Interface

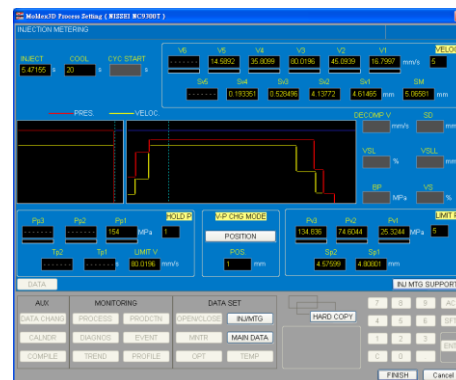
Moldex3D FEA Interface adds several new features:

- Supports to output LS-DYNA dyn files as mapped mesh file format and to export data into ANSYS workbench.
- Preserves the original mesh topology if the mesh elements are in high order.
- Supports to output temperature distributions of parts and part inserts after a cooling analysis
- Option to use the EOC temperature to analyze a tempering process.
- Evaluates the influence of anisotropic material properties of fiber orientation for part inserts, which will enhance structural analysis accuracy.
- Provides options to output part density distribution and the strength in the weld-line region. This will allow users to acquire more accurate results.

Enhanced Efficiency for Simulations

Machine-like Process Interface

The user interface of Process Wizard has been designed as the real control panel on an injection molding machine from selected vendors. It will guide users to identify and setup processing conditions more easily.



Injection Molding Machine-like User Interface

Moldex3D R11.0

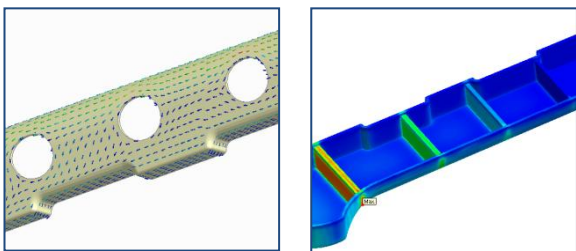
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Enhanced Gate Contribution Prediction

Moldex3D Project adds the prediction of gate contribution. Users are able to evaluate the flow from each gate as a reference for optimizing the designs of gate locations.

More Result Displays on Surface

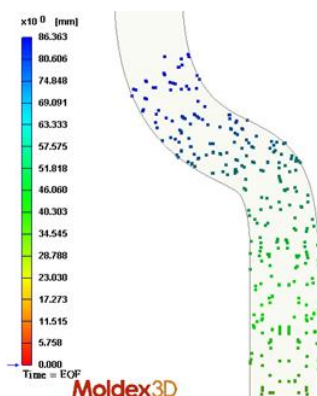
Two result displays have been taken into visualization on surface in Moldex3D Project. One is the result of average velocity across the thickness during the filling and packing phases. The other is the result of maximum volumetric shrinkage across the thickness. It will be easier for users to evaluate 3D analysis results on surface.



Velocity Vector Display and Volumetric Shrinkage Display

Particle Tracking

Moldex3D Project supports the particle tracking feature for filling and packing analyses. Users are able to visualize three-dimensional flow paths by tracking particles until these particles reach boundaries. It also provides options to show flow length, velocity, pressure, temperature, or elapse time on particles.



Visualizes the filling behavior of polymer particles

XY Curve Comparison

Users can compare XY curves between different selected run results in Moldex3D Project. It enables users to evaluate multiple analysis results more efficiently. Users also can save XY comparison plots and import or export data curves as a CSV file.

Outputs to CATIA's RSO File

Moldex3D Project supports to output an rso file with geometric deformation data into CATIA. It offers designers feedback to revise model designs in the CAD environment.

New Collaboration Tool, Moldex3D Viewer

Moldex3D R11.0 enables users to export selected result items with a very compact file size to be conveniently transferred over Internet. The team members, suppliers and customers can communicate easily using this free collaboration tool. Moldex3D Viewer is developed with a high-performance graphics rendering engine for visualization of large 3D simulation results. It will enhance communication efficiency and reduce development cost significantly. Moldex3D Viewer is available for beta testing now.

New Simulation Capabilities

Moldex3D R11.0 has developed new modules to meet the demands for simulating specific molding processes from a variety of industrial customers.

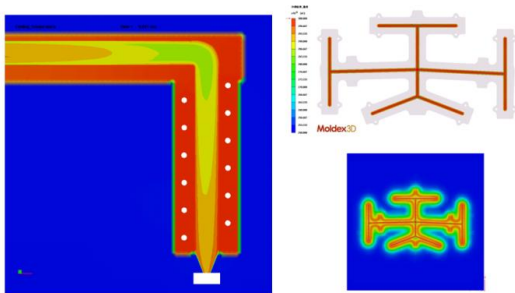
Advanced Hot Runner

Moldex3D Advanced Hot Runner helps users evaluate the designs of hot runner systems. It visualizes temperature distributions and variations in hot runner systems and measures heating efficiency of hot runner components, including heater manifold, heating coils, hot runner nozzle, and hot runner bushing, etc. Users also can calculate pressure drop and predict imbalanced filling behaviors due to different temperature control of heating coils.

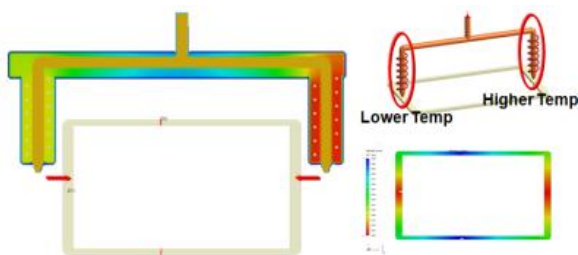
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Moldex3D Advanced Hot Runner helps users optimize the designs of hot runner systems to enhance molding efficiency and achieve cost reduction.



Temperature distributions in the manifold plane and the hot runner metal



Predicts the region of weld lines

Co-Injection Molding

Moldex3D Co-Injection simulates the sequential molding process that injects two materials with different properties into a mold cavity. It helps users evaluate shrinkage and warpage results affected by the interaction between skin and core materials. Users also can investigate part skin thickness distribution and predict potential defective locations under high temperature and stress. Therefore, users are able to find out the optimal material mix and avoid unnecessary material waste.

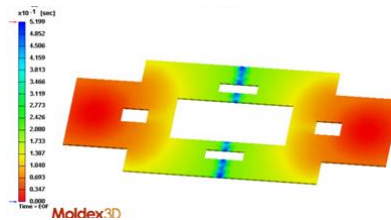


Visualizes core material penetration inside skin material

Microcellular Foaming

Moldex3D MuCell® simulates the growth behavior and the nucleation rate of microcellular bubbles. It helps users control the use of the gas on creating a foamed part and predict volumetric expansion and shrinkage compensation during the molding process. It also visualizes the results of cell number and cell size distribution, density distribution, etc. Moldex3D MuCell® assists users to decide the optimal mold design and processing parameters more efficiently and reduces product defects.

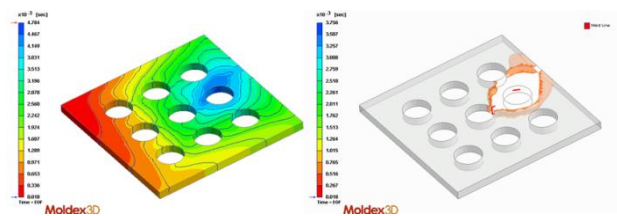
** MuCell® is a registered trademarks of Trexel, Inc.



Visualizes the filling behavior of microcellular foaming

Underfill Encapsulation

Moldex3D Underfill visualizes the filling behavior driven by the capillary force between chips and the substrate during the encapsulation process. It specifies dispensing passes and evaluates contact angle effects among encapsulants, bumps, and substrates for flip chip underfill. Moreover, it helps users predict the locations of voids and optimize process designs.



Predicts potential void locations by the melt front flow

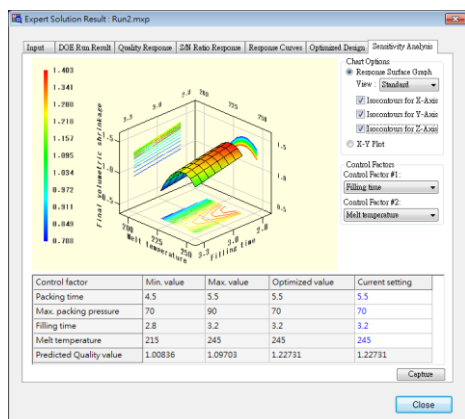
DOE for Process Optimization

Moldex3D Expert allows users to evaluate optimal analysis results systematically instead of using the conventional trial-and-error method. Designers can improve part quality within a few automatic iterations, further optimizing the

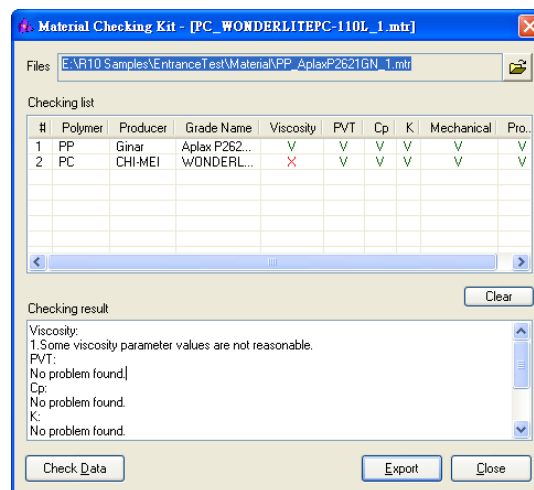
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molding process more efficiently and more systematically.



User Interface for DOE simulations



Auto Material Checking System

High Performance Computing

Support for Intel® MPI

Moldex3D R11.0 uses Intel® MPI Library as the parallel processing communication protocol instead of MPICH2. Its computing speed will be increased by 5-10% in comparison with Moldex3D R10.0.

Support for GPU calculation

Moldex3D R11.0 supports the parallel processing capability of Graphics Processing Unit (GPU) from NVIDIA. It applies the Compute Unified Device Architecture (CUDA) in Flow solver, which will significantly accelerate the computing speed by 10-20 times for a Standard Flow analysis and by 2-4 times for an Enhanced Flow analysis.

Material Database Updates

Moldex3D material database in R11.0 has been updated with 411 materials added and 143 materials modified. It also provides a tool for users to check the correctness of material parameters. Users can check multiple materials simultaneously. If users select an unreasonable material file or input unreasonable values for a new material, the Material Wizard will detect it automatically before running an analysis.

Your Feedback Is Important to Us

Thank you for your continuous support of Moldex3D. We sincerely invite you to provide feedback to Moldex3D for further research and development. Please do not hesitate to talk with Moldex3D support team or your local certified resellers. Alternatively, you always can send your feedback to mail@moldex3d.com.

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