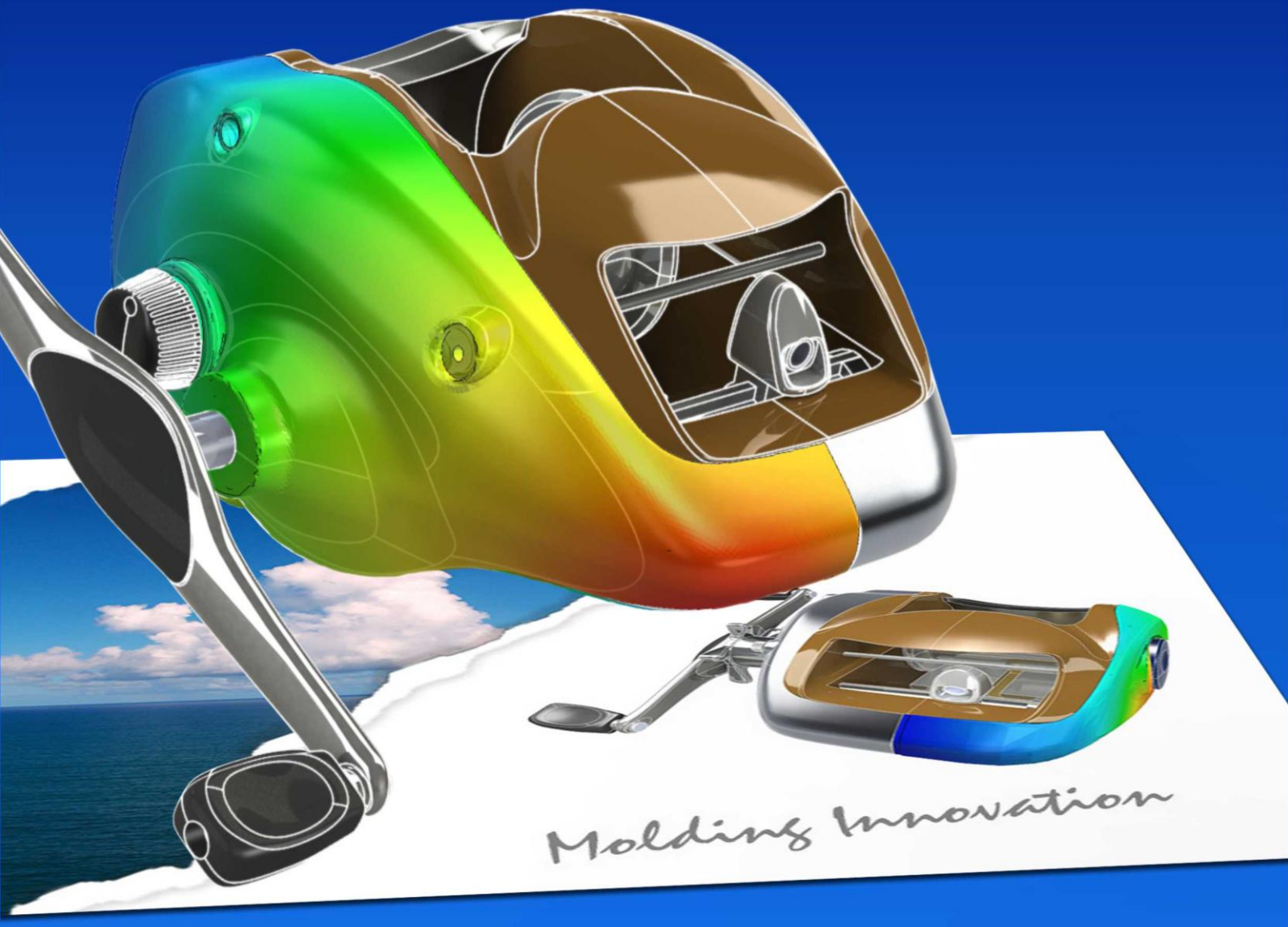
Moldex3D
MOLDING INNOVATION

Moldex3D R12.0 Release Note



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Release Note of Moldex3D R12.0

Release Version: R12.0

Release Date: 02-20-2013

Version Information

Module	Version	Shell Modules	Version	Solid Modules	Version
Project	100.4.1010.6121	Flow	100.5.1009.23100	Flow	100.20.1009.24134
Material Wizard	100.3.1004.1518	Pack	100.5.1009.23100	FlowE	100.20.1010.1101
Process Wizard	100.5.1009.2918	Cool	100.33.1009.23102	Pack	100.20.1010.1101
Designer	100.56.1010.1101	Warp	100.0.1009.23103	Cool	100.94.1009.29145
Translator	100.503.1009.23135	Fiber	100.5.1009.23100	FastCool	100.198.1009.29145
Plotkit	1.2.1.0	GasIn	100.5.1009.23100	FastCoolE	100.198.1009.29145
AnimationKit	1.0.0.1	RIM	100.5.1009.23100	Warp	100.44.1009.23102
MatData Bank	1010.10	FEA Interface	100.10.1009.23103	Fiber	100.1.1009.23100
Remote Computing	10.0.0.139				
Mesh	100.1.1010.7150			Encapsulation	100.21.1009.23102
				Optics	100.6.1009.23102
				Stress	100.1.1010.6114
				FEA Interface	100.40.1010.7150

Supported Operating Systems

Moldex3D R12.0 supports Windows versions which Microsoft provides mainly. **Windows Server 2008** and **Windows 7 Professional** are most recommended.

Moldex3D R12.0 also supports enterprise editions of Red Hat's Red Hat Enterprise Linux (RHEL) for remote computing node.

Platform	OS	Remark
Windows / x86-32	Windows 7 family Windows 8 family	
Windows / x86-64	Windows 7 family Windows 8 family Windows Server 2008 Windows Server 2012	
Linux / x86-32	CentOS 5 and CentOS 6 family RHEL 5 and RHEL 6 family	Pre and post applications do not support Linux platform
Linux / x86-64	CentOS 5 and CentOS 6 family RHEL 5 and RHEL 6 family	Pre and post applications do not support Linux platform

Module Name Changes in R12.0

- TP and RIM licenses are replaced by Injection license
- Injection molding application supports both thermoplastic and thermoset materials

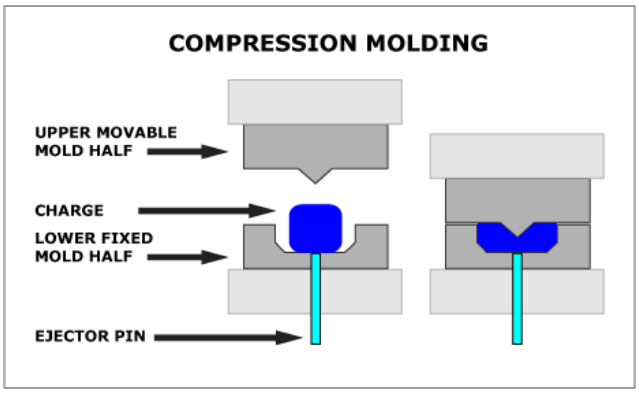
Moldex3D R12.0 New Features

1. Compression Molding Module

Compression Molding is the process in which a molding polymer, called charge or compound, is squeezed into a preheated mold to take the shape of the mold cavity with heat and pressure until the charge has cured. The process is a high-volume production and low-cost method of molding and suitable for parts with complex

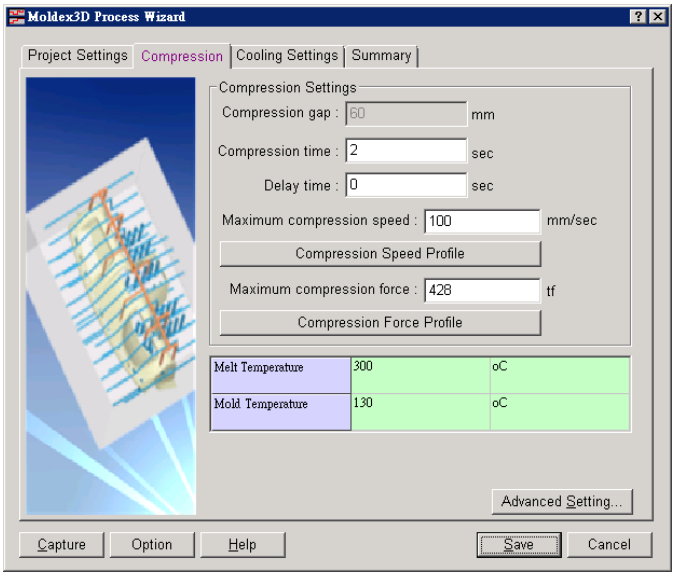
appearance, high strength and high impact resistance. Materials that are typically manufactured in compression molding are thermosetting resins with chopped fibers and particulate fillers, but some thermoplastic parts are also used. Although compression molding is one of the original processes for manufacturing plastic parts, there are still some characteristics and phenomena which affect yield rate and we don't have deep knowledge of.

The simulation of **Compression Molding** process is available in Solid project only. The filling, packing, cooling and warpage simulation tools for compression injection process are all provided. Both thermoplastic or thermoset material are supported for this molding simulation.

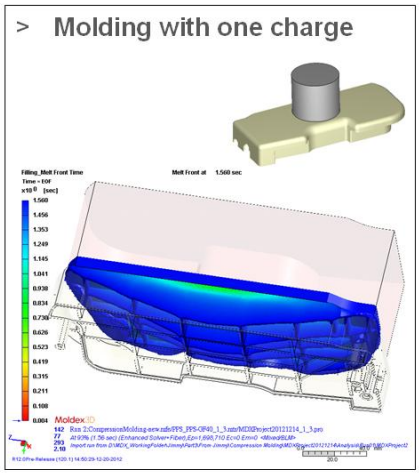


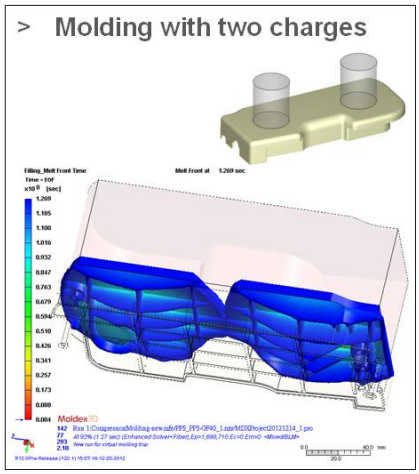
http://www.compressionmolding.com/compression_molding_the_process.html

Process Wizard provides complete compression molding condition settings, including mold compression speed, compression force, melt temperature, and mold temperature and so on.

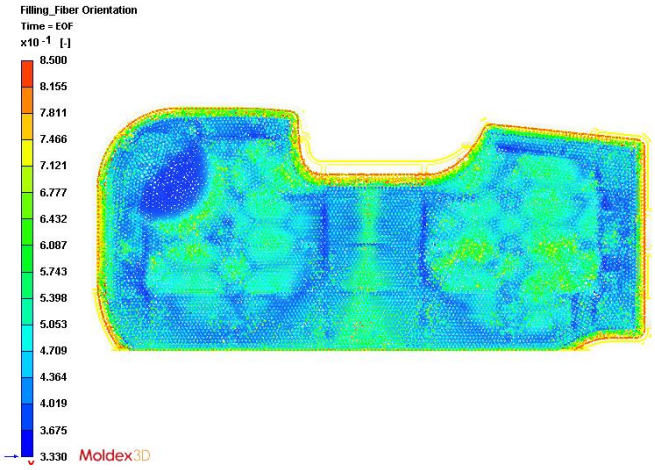


Program allows users to specify charge in any shape. In addition, single or multiple charges are supported for compression molding simulation.

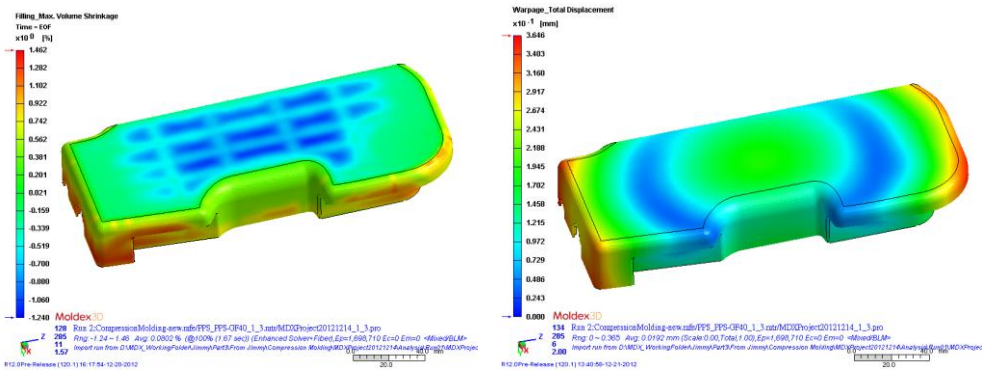




The fiber orientation effect can be taken into consideration in compression molding simulation.



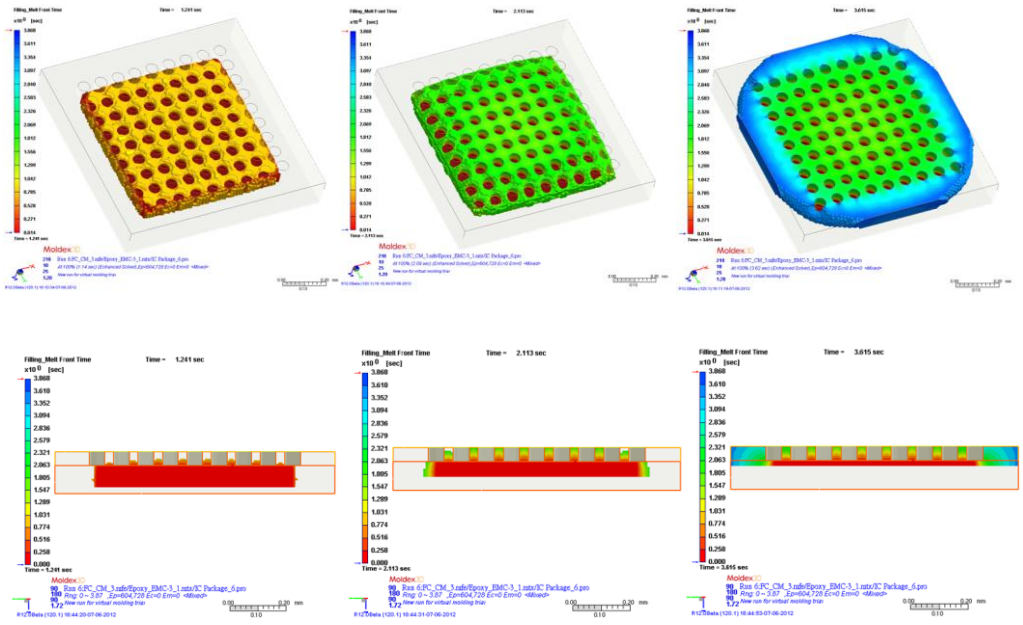
Visualize the part volume shrinkage distribution, residual stress and final geometry deformation.



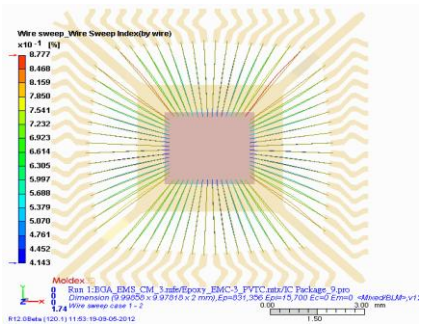
Besides, users can also simulate the viscoelastic behavior in the molding process and then run an **Optics** analysis for an optical model.

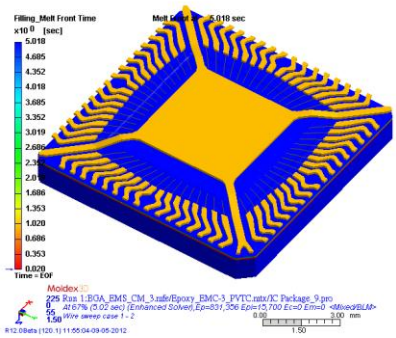
2. Compression Molding in Encapsulation

Moldex3D R12.0 Encapsulation provides wafer level compression packing simulation on flip chip.

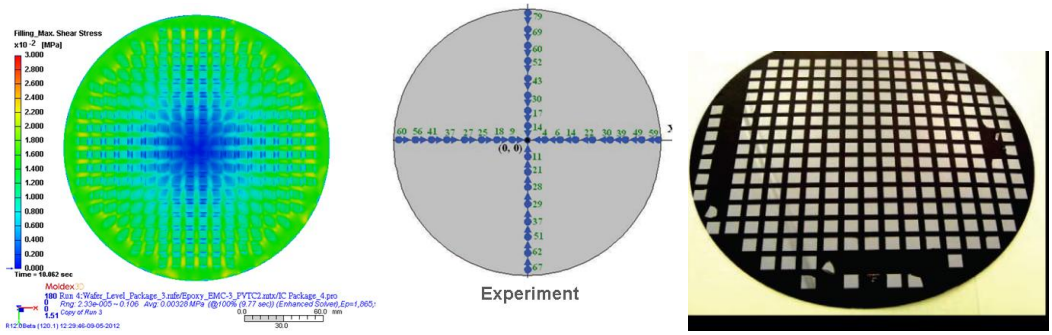


The wire sweep and paddle shift analyses are also available for this molding process.



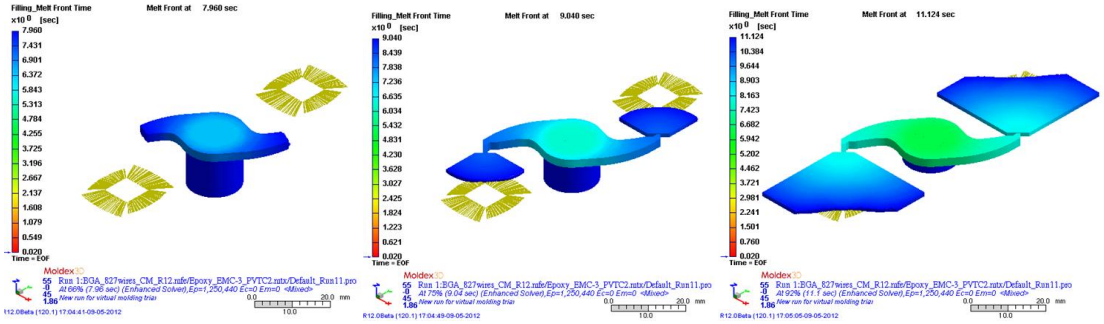


The die sweep phenomena in wafer level packing can be visualized by maximum shear stress distribution in the filling stage.



Aditya Kumar, Xia Dingwei, "Wafer Level Embedding Technology for 3D Wafer Level Embedded Package", *2009 Electronic Components and Technology Conference*

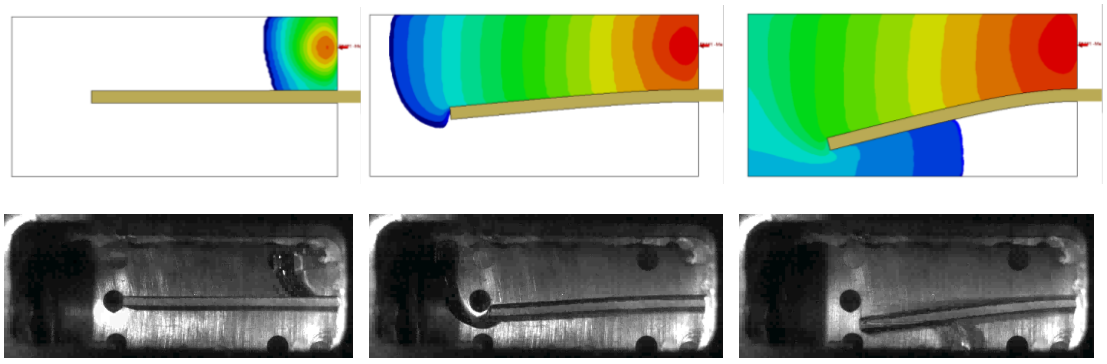
Besides, **Moldex3D R12.0** provides compression molding simulation for traditional transfer molding process.



3. Core Shift with Two-Way (FSI) Analysis

Core Shift with Two-Way (FSI) analysis is the newly expanded feature within MCM module to provide more accurate core shift simulation. Program has the ability to simulate core deflection, which is caused by non-uniform pressure distribution within the cavity during the filling stage. The Core Shift with Two-Way (FSI) analysis simulates entire dynamic flow interactions between core deflection and mesh deformation.

Simulation result corresponds with actual experiment in core deflection. **Moldex3D R12.0** accurately predicts interior core deformation which occurs during the filling process.



Reference: Y.C. Cheng and Y. J. Liao, "Core Deflection in Plastics Injection Molding: Direct Measurement, Flow Visualization and 3D Simulation", Polymer-Plastics Technology and Engineering, 50: 863 – 872, 2011.

This new feature could be a reference for part insert/mold insert design, and help to optimize gate locations and injection pressure for minimizing the movement of mold cores and gain control of core shift.

4. Powder Injection Molding (PIM)

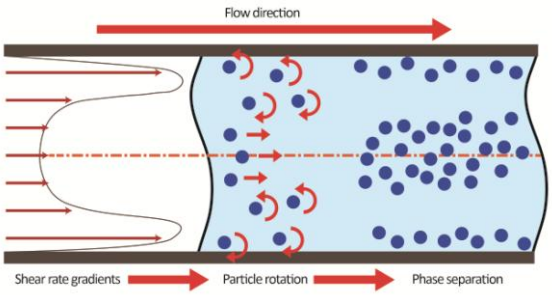
Powder metallurgy is the process of blending fine powdered materials, pressing them into a desired shape or form (compacting), and then heating the compressed material in a controlled atmosphere to bond the material (sintering). In industry, the production of some gear is an extensive use via powder metallurgy.

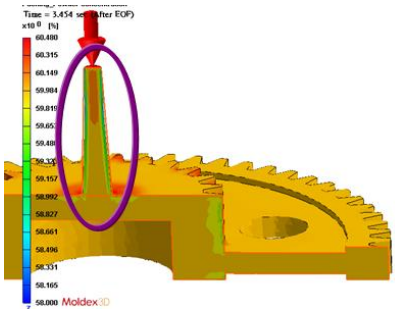
Moldex3D R12.0 PIM simulates only the injection molding stage in the entire powder metallurgy production workflow. It is available in both Solid and eDesign project, and covering filling, packing, cooling and warpage analyses. Both metal powder and ceramic powder are supported. Some special points are described in the

following.

- Phase separation

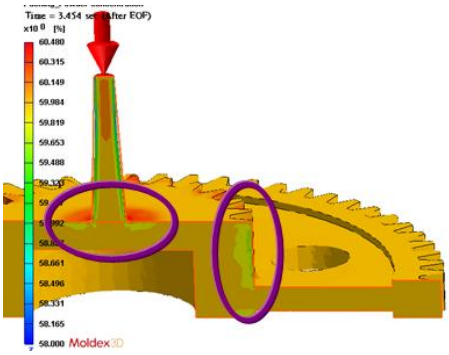
Phase separation between binder and powder (also called the shear-induced particle migration) is a special phenomenon in Powder Metallurgy process. In general, it shows higher shear rate around cavity wall, then resulting in lower powder concentration. In Moldex3D R12.0 PIM, users can visualize it accurately from the analysis result of Powder concentration.

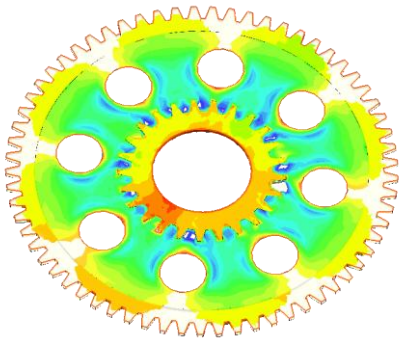




- Surface Defect

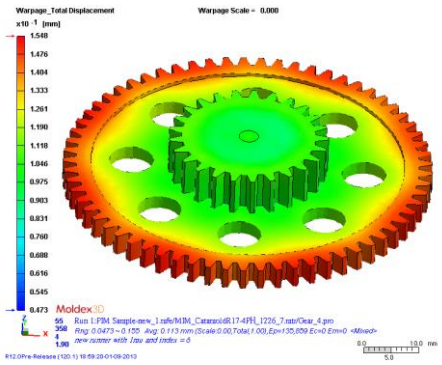
Black line, one of Powder Metallurgy defects, occurs potentially in areas with high powder concentration on part surface. Users can view predicted black lines by Powder Concentration result item.





- Influence on Warpage

Power concentration distribution effect is considered in warpage analysis for volumetric shrinkage and molding warpage deformation.

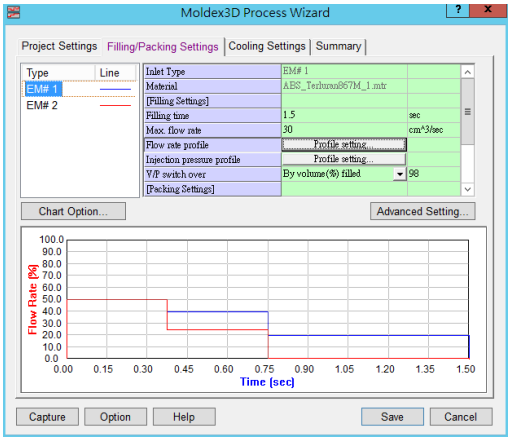


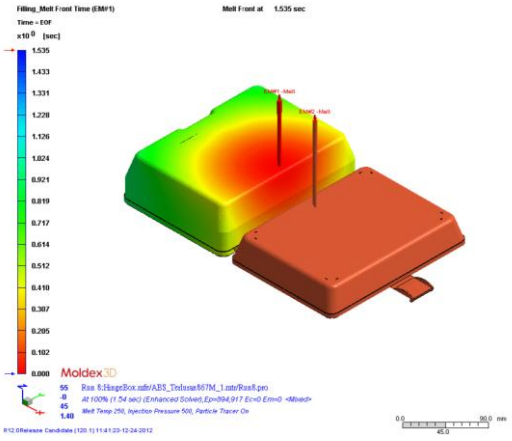
5. Bi-Injection Molding

It's a molding process that two colors of the same plastic material are injected via two independent gates and meet in the same cavity.

The simulation of **Bi-Injection Molding** process is available in Solid project only. The filling, packing, cooling and warpage simulation tools are all supported in bi-injection.

Users can specify two different types of material when running, and customize filling and packing settings for each material. Process Wizard will show all flow rate profiles in the same chart to display the flow rate change. Users can examine filling pattern of each gate from melt front time animation and particle trace analysis.





6. Annealing Analysis

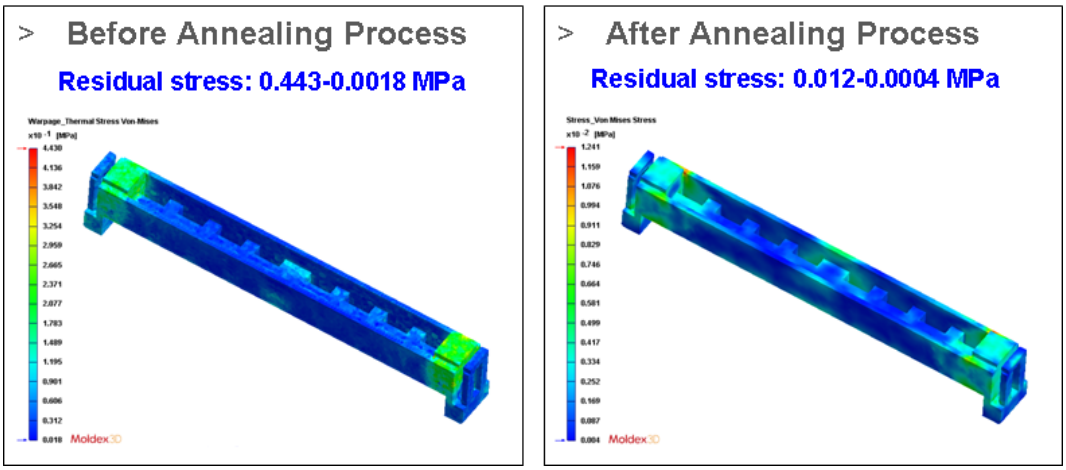
After molding process, the product will deform due to thermal stress caused by non-uniform temperature distribution. In the end, there will be thermal residual stress stored in the product and resulted in poor performance in an application. Annealing is used to reduce inherent stresses that may be introduced during the molding and cooling processes.

Annealing analysis is used to simulate the part deformation under the hot oven annealing process, and this function is available in Solid and eDesign projects. The fiber anisotropic property and gravitational effect both are considered in annealing analysis.

Both linear elasticity theory and viscoelasticity theory are supported

- Linear elasticity theory: Poly-curve describe the Young's modulus variation with respect to temperature
- Viscoelasticity theory: Generalized Maxwell viscoelasticity model. Polymer time-temperature superposition property is described by WLF equation.

Two warpage results, displacement and stress, are taken as initial conditions in annealing analysis. From analysis results, it shows that residual stress becomes much smaller after annealing process.



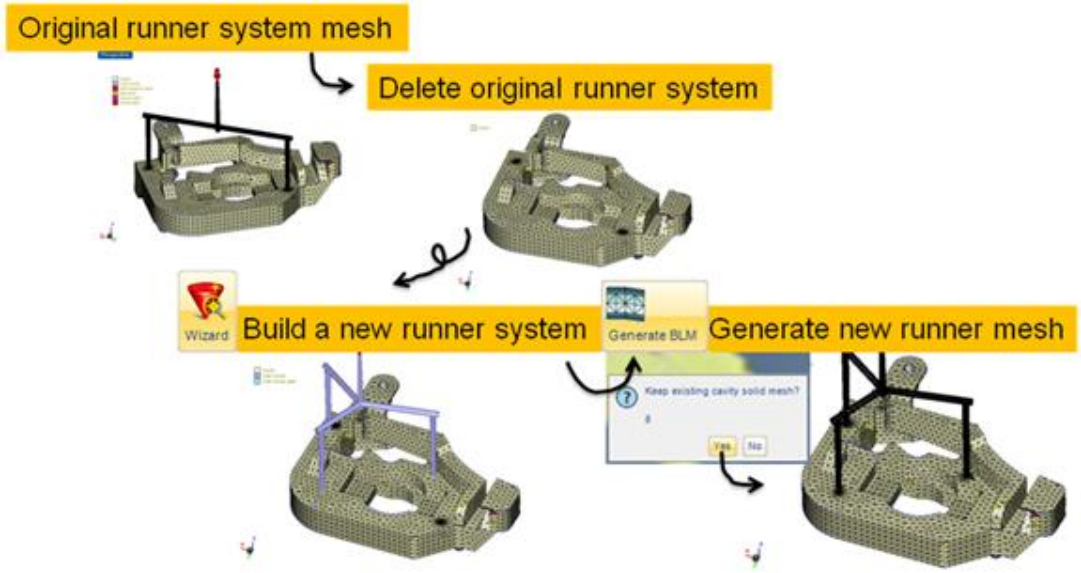
7. BLM Generation in Designer

- **Generate BLM with intuitive workflow as in eDesign Mode**

The BLM mode in Moldex3D Designer provides the function to generate boundary layer solid mesh. User can build high resolution mesh with easy-to-navigate user interface. The workflow is similar to eDesign mode. For eDesign users, they can switch to BLM mode seamlessly; for solid users, they can generate mesh from integrated workspace. Since the BLM mode is embedded in Designer, the Runner Wizard and Cooling Wizard can be applied deservedly.

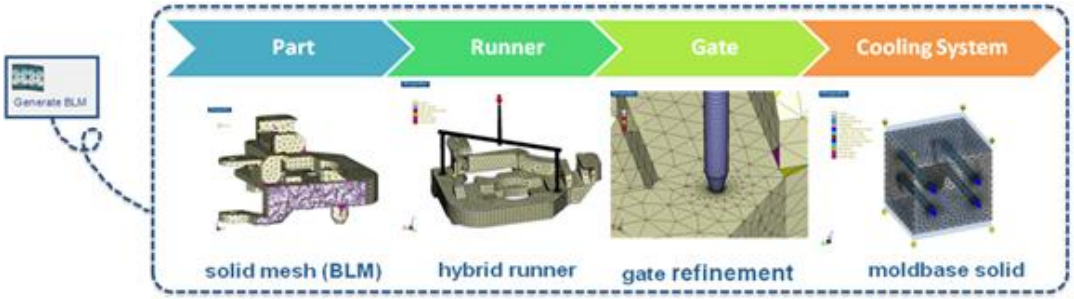
- **Easy to make design changes**

In BLM mode, design change is easy and quick. While the cavity solid mesh has been generated, all users has to do is to delete the original runner lines and mesh, then build the new runner system, and press the Generate BLM button. User can keep the cavity solid mesh and only regenerate new runner solid mesh. The workflow is very quick and efficient.



- **One button to generate solid mesh**

The Generate BLM button integrated the whole meshing process, including surface mesh and solid mesh for cavity, runner and cooling system. Users only have to press one single button to create the mesh for the geometry model.

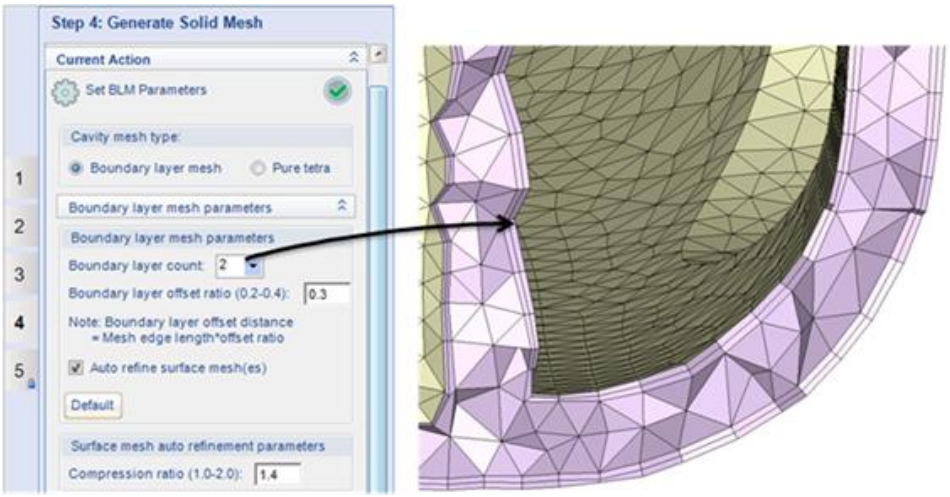


- **Global and local mesh density specification**

The global and local node seeding can be specified on user interface. Specify global mesh size by inputting initial mesh size. Specify local mesh size by selecting edge and modifying seeding parameters. BLM mode also provides biasing seeding for advanced users to adjust the mesh quality.

- **Mesh parameters setting**

User can specify the boundary layer count and offset ratio for boundary solid mesh. The offset ratio determines the boundary thickness. For model with large thickness variations, we recommend turning on the Auto Refine process in parameter page.



- **Surface mesh fixing tools**

BLM mode provides several surface mesh fixing tools. Should mesh issue exists, the program will switch to fix surface mesh mode and list the issues in the mesh information table. User can use the fixing tools to fill mesh holes, fix free edges, delete overlapping elements, or rebuild bad quality elements.

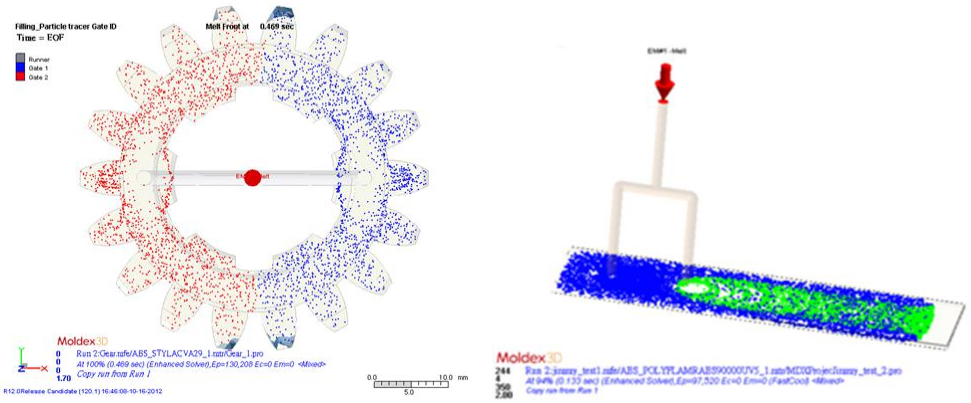
8. Flow/Pack Solver

- **Air temperature and pressure distribution for venting analysis**

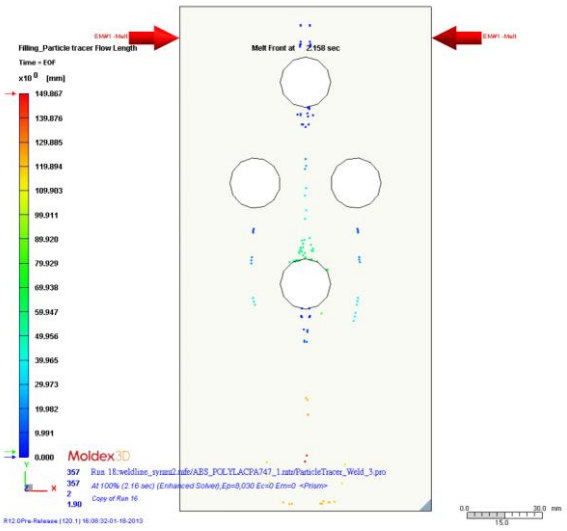
It can predict and display temperature and pressure distribution in air zone. Trapped air caused by the rising temperature may induce burn mark on part. In addition, trapped air pressure will affect melt filling pattern.

- **Particle tracking technology enhancement**

Provide option to define particle released from “gate” or “melt entrance”, and support visualizing and animating particle movement from each gate. This feature is adopted to visualize the gate contribution of the model with valve gate sequential opening settings.



The option to release particles at weld line region is provided.



New enhancement reduces particle tracking result file size and also speeds up the computation efficiency by 4 to 5 times.

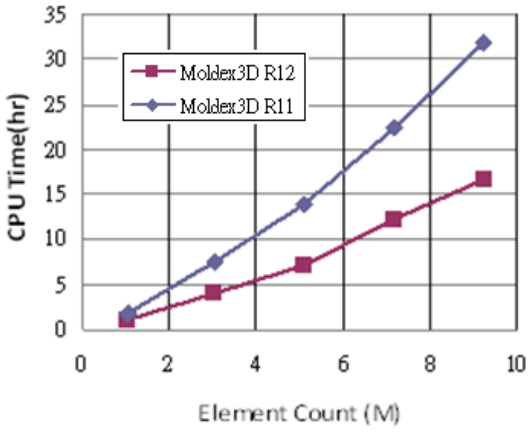
Case	Model Information		Efficiency			File Size		
	Element Count	Release Freq.	R12	R11	Speedup Ratio	R12	R11	Comp. Ratio
1	130k	100	93''	473''	5.1	32MB	236MB	14%
2	273k	100	177''	714''	4.0	13MB	54MB	24%
3	620k	10	81''	192''	2.4	6.4MB	19.6MB	33%
4	760k	10	40'	171'	4.3	441MB	1,350MB	33%
5	1,300k	10	83''	369''	4.5	5.2MB	21MB	25%
6	1,531k	100	1,167''	2,415''	2.1	62MB	137MB	45%
Average					4.48			29%

- **Weld line welding temperature and weld line welding angle**

Display welding temperature and welding angle for each weld lines. The result helps to identify whether weld line causes appearance defects.

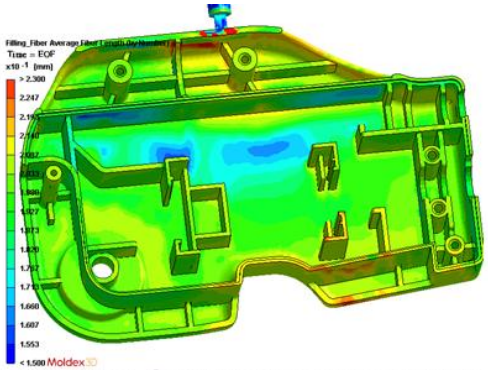
- **Flow solver efficiency enhancement**

Enhanced Solid-Flow solver improved computing efficiency in solver acceleration 1-4. In this test, around 1.86 times speedup is performed comparing to Moldex3D R11.0 (under solver acceleration 1).

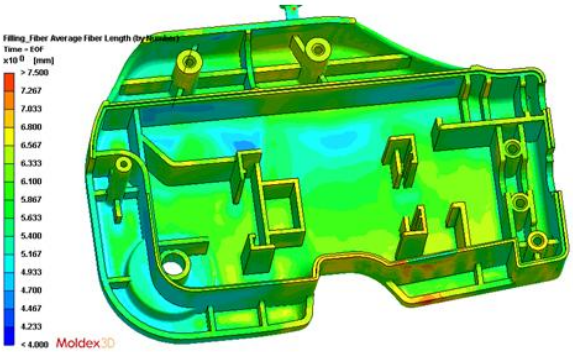


- **Fiber length distribution prediction**

It calculates and considers fiber breakage phenomena in filling stage if the fiber length distribution prediction option is active. Fiber length distribution does not affect part mechanical properties in this version. This function is supported in eDesign and Solid projects.



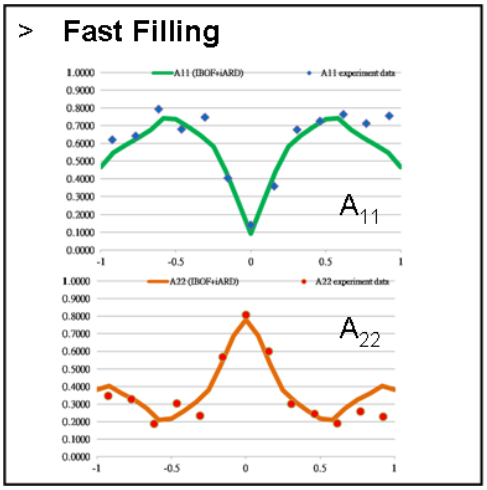
Short fiber, Initial fiber length: $3.5x10^{-1}$mm

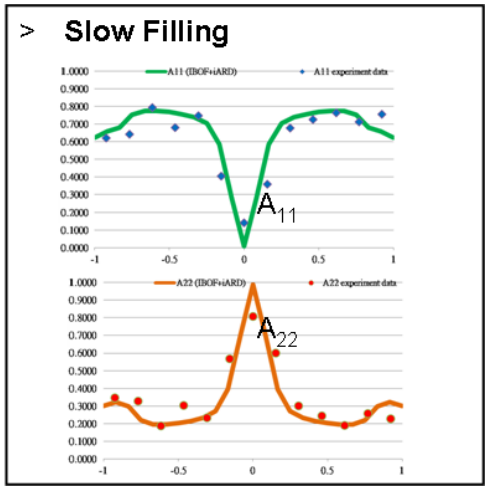


Long fiber, Initial fiber length: 8.5mm

- **Fiber orientation prediction capability enhancement**

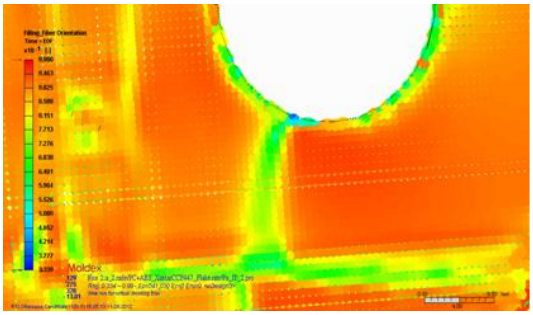
Moldex3D R12.0 enhances fiber orientation prediction in Shell project for both short and long fiber filled materials.





- **Flake simulation**

Among fiber-reinforced thermoplastics, some are reinforced with flake filler. Moldex3D R12.0 extends the capability to predict the effect of flake orientation on mechanical properties, and take such influence into Warp solver.



- **Restart flow solver calculation**

This feature is supported in filling analysis of injection molding type only. Flow solver can automatically capture information from the last break point and resume the calculation. This helps to save computing resource if the calculation stops before finishing.

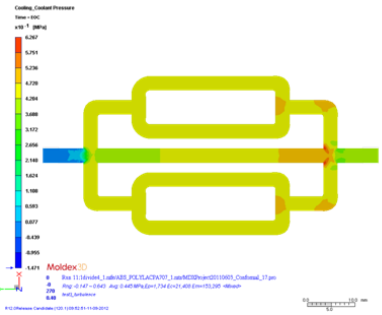
- **Output flow rate data in log**

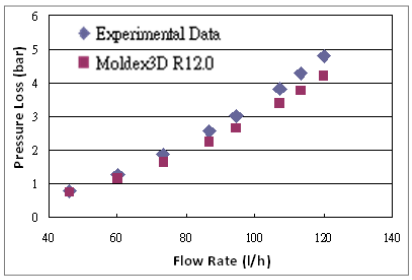
Flow solver output flow rate information in filling log, and this is supported in Shell, eDesign and Solid flow solver. It helps real-time monitor the filling simulation status by flow rate data.

9. Cool Solver

- **More 3D cooling channel simulation controls**

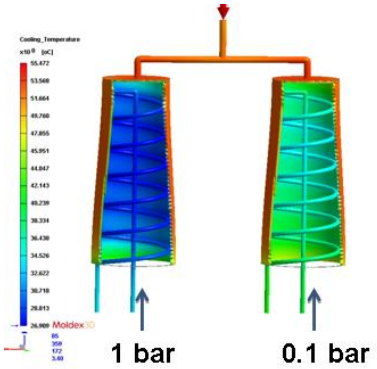
The Cool solver now supports turbulence formulation in 3D cooling channel CFD calculation and increases the accuracy of pressure loss simulation in cooling system.

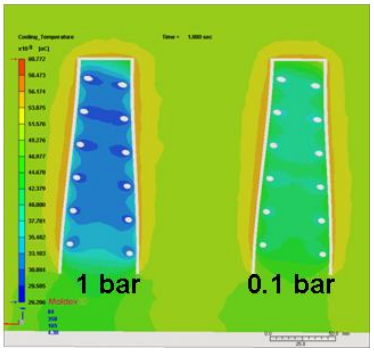




Specifying flow rate variation control with time is supported; Mold base temperature distribution will be influenced by coolant flow rate variation. This function expands wider range of transient cooling design.

Pressure drop setting in molding process is supported; Solver will output required coolant flow rate and pressure record in log. It can be used to evaluate required pump size of cooling system design.



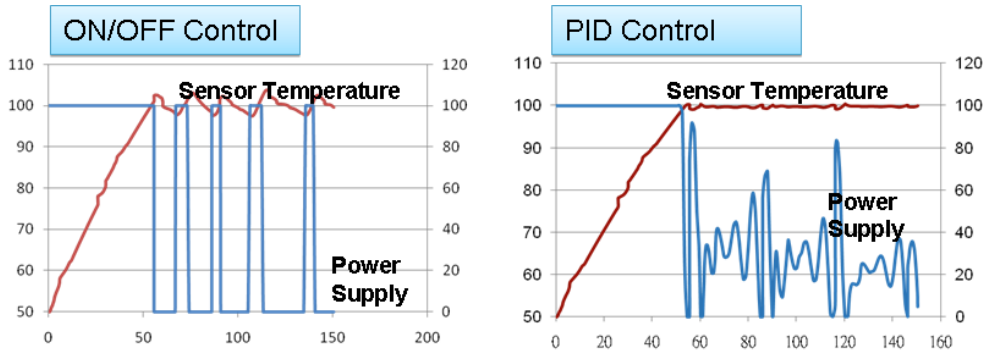


Parallel computing of 3D cooling channel simulation is supported.

Post-processor provides animation making for 3D cooling channel simulation. The animation makes coolant flow behavior in cooling system understood more easily.

- **Heating power history output**

Cool solver outputs heating power history of each heating rod, and helps to synchronize display history curve of sensor temperature and power supply.



10. Warp Solver

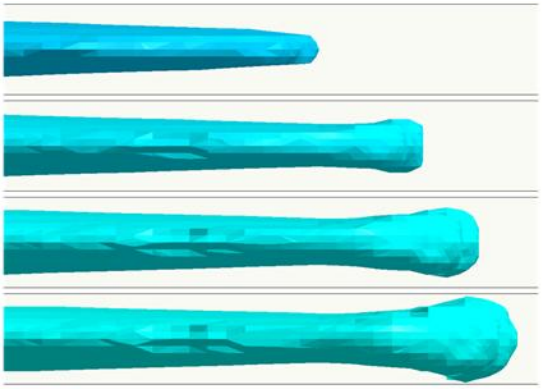
- **Support viscoelastic theory**

In **Moldex3D R12.0**, Warp solver takes the theory of linear viscoelasticity into account for warpage calculation. Generalized Maxwell viscoelasticity model is adopted, and the polymer time-temperature superposition property is described by WLF equation. This function is supported in Solid and eDesign projects.

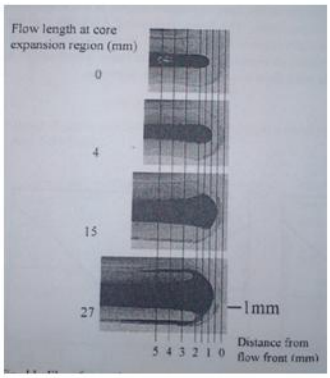
11. Co-Injection Module

- **Blow through prediction and display**

In **Moldex3D R12.0**, Co-Injection solver predicts blow through location and simulates core expansion phenomena near the breakthrough area. It helps realize the skin and core advancement before and after breakthrough happens, that could be a useful guide for geometry thickness in product design.



The side view shows that the core expanded in thickness direction as the melt front advances right before breakthrough.

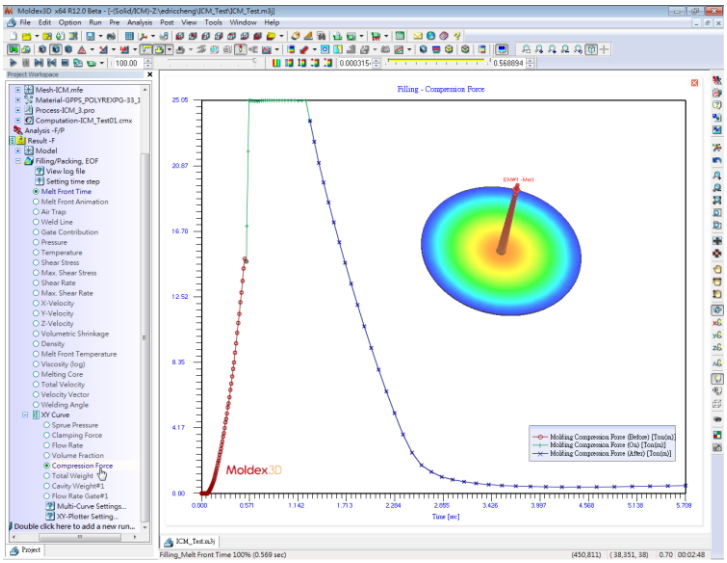


Ref: D. Watanabe, U. S. Ishiaku, T. Nagaoku, K. Tomari, H. Hamada, *International Polymer Processing*, **18**, 405 (2003)

12. ICM Module

- **Compression force history output**

Compression force history is recorded during the entire molding process, helping determine the capability of clamping unit.



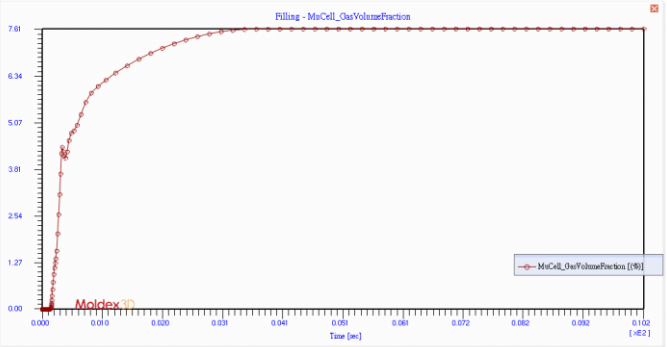
13. MuCell Module

- **Improved molding condition setting user interface**

Process Wizard supports the shut off control setting by ram position in Machine mode. In addition, Process Wizard user interface is improved by making the molding condition settings procedures more real and easier to control.

- **Gas volume fraction history output**

Solver outputs gas volume fraction data in log file; moreover, users can visualize the volume fraction variation history by XY plot.



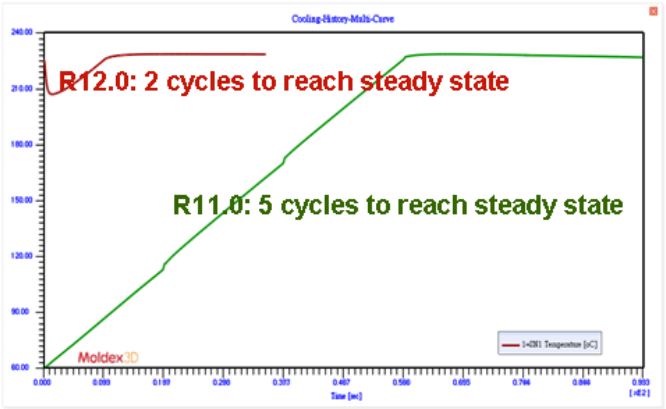
14. Advance Hot Runner Module

- **Residence time prediction**

Process Wizard supports estimating melt residence time in hot runner system from process molding conditions. It can be a reference for molding process setting.

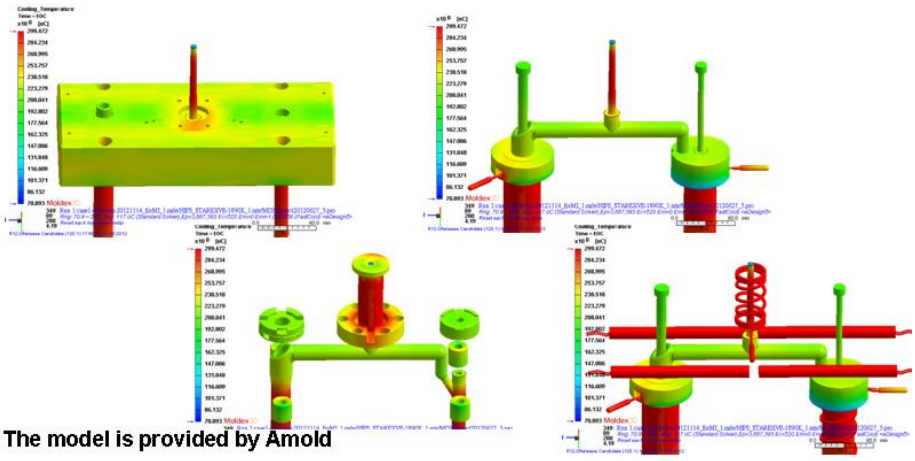
- **Enhanced calculation efficiency**

The initial temperature of hot runner components can be set as melt temperature, by which the calculation cycles will be reduced and shorten the CPU calculation time.



- **Hot Runner Component Temperature Display**

It now supports showing temperature distribution of each hot runner metal and heating rod components. This feature provides an easier tool to visualize the temperature distribution of hot runner component.



The model is provided by Amold

- **Button for showing/hiding hot runner components**
- **Button for showing/hiding heating rod components**

15. FEA Interface

- **More efficient integration with ABAQUS**

New kernel in **Moldex3D R12.0** can take the complete model anisotropic property into account for ABAQUS stress analysis and also save a lot of CPU time and memory usage when running stress analysis in ABAQUS. This feature makes the full model analysis in ABAQUS feasible.

	Output CPU Time	Output File Size	ABAQUS Analysis CPU Time
Moldex3D R12.0	467 sec.	786MB	Solve 30mins (2G memory is enough)
Moldex3D R11.0 (Medium-Level reduction)	51,599 sec.	393MB	Solve 1 day ↑ (Huge memory needed)
Moldex3D R11.0 (No Material reduction)	458 sec.	405MB	Solve 1 day ↑ (Huge memory needed)

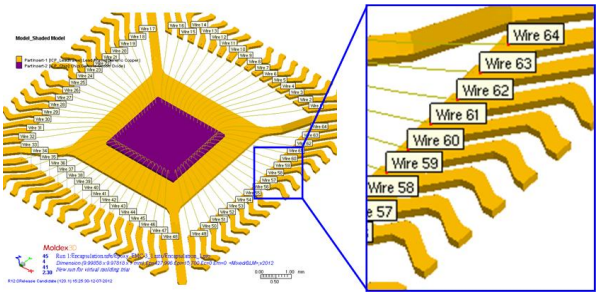
- **Moldex3D-Workbench Integration**

Moldex3D extension toolbar and Moldex3D button have now become a part of ANSYS Mechanical user interface. Specifically, Moldex3D users can set the analysis properties directly from ANSYS-Workbench drop-down menu. This feature helps user to run structure analysis in ANSYS-Workbench straighter forward.

16. Encapsulation Module

- **Wire ID display**

Wire ID can now be shown in the Display window.



- **Nonlinear material model for wires**

Moldex3D R12.0 supports nonlinear material model calculation for wires. Users can define non-linear (multi-linear) elastic material property of wire in Material Wizard. The stress-strain behavior for non-linear elasticity represents the stress-strain behavior of this option. This feature provides more accurate wire sweep analysis.

- **User defined wire crossover tolerance**

Specifying wire crossover tolerance value is supported for wire crossover calculation.

- **Wire Location Data Copy to Excel**

Provide a tool to copy wire location data to excel.

17. Designer Module

- **Supports Parasolid file import**

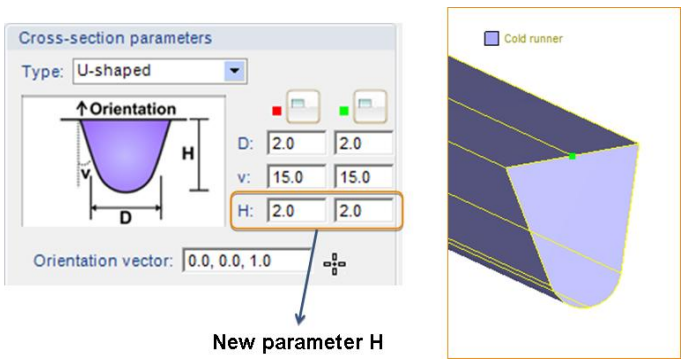
Designer now supports Parasolid (.x_t / .x_b) file import.

- **New features in Runner wizard**

  - Annular hot runner drop

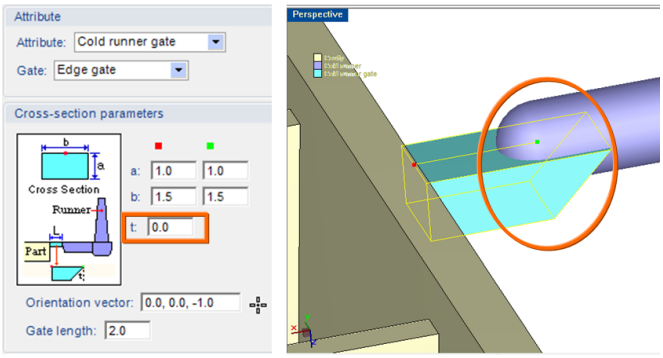
    Supports specifying inner and outer diameters for each valve gate controlling hot runner drop.

  - Specifying height for U-shaped cross-section



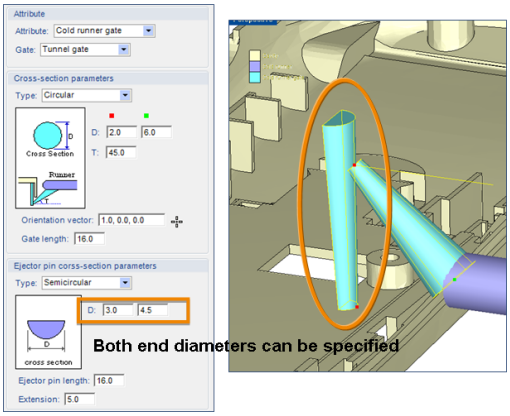
  - Edge gate to cavity bottom side contact

- Edge gate with taper angle define

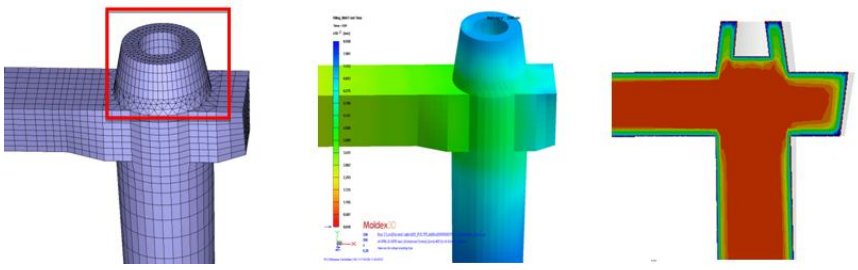


- Cashew gate of arc geometry

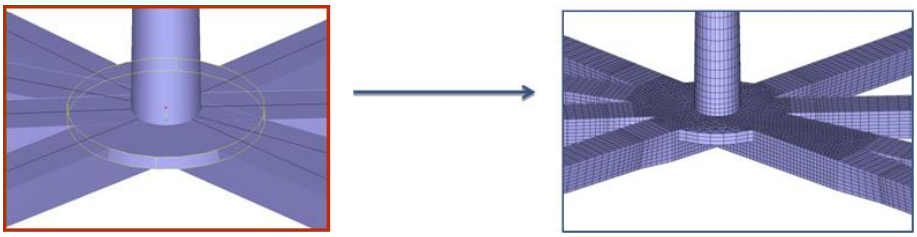
- Tapered flow channel for tunnel gate



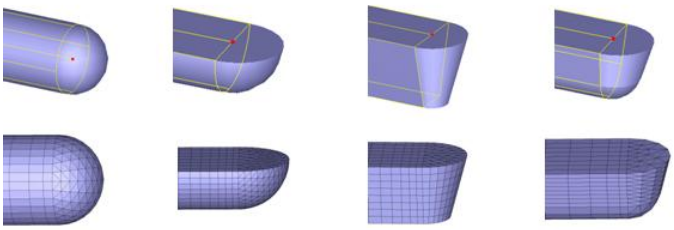
- Supports lock pin design option



- Supports junction disk design at sprue



- Supports rounded/spherical runner end design option



- **Specifying cooling channel property group**

Specifying cooling channel property group on coolant entrance for eDesign users is now supported.

- **Support object mirror transformation**

Mirror objects by specifying a mirror plane is now supported.

18. Mesh Module

- **Easier workflow for gate location change of BLM model**

The system will automatically remesh runner solid mesh after gate location changes whereas in R11.0 users need to manually remesh.

- **Extrude solid mesh functionality enhancement**

Selecting multiple surface mesh objects to extrude to solid mesh is now supported.

- **Supports surface mesh objects attribute as “Cooling Channel” or “Heating Rod”**

Surface mesh objects are supported for being attributed as “Cooling Channel” or “Heating Rod” for users to easily simulate the mold design with complex cooling system.

- **Auto solid runner meshing functionality enhancement and stability improvement**

19. Material Wizard

- **Herschel-Bulkely Cross Model**

Material Wizard now supports a new viscosity model, “Herschel Bulkely Cross Model”, which enables describing the yield stress behavior especially in low shear rate. It is especially applicable for the materials in “Powder Injection Molding”.

- **Material database upgraded**

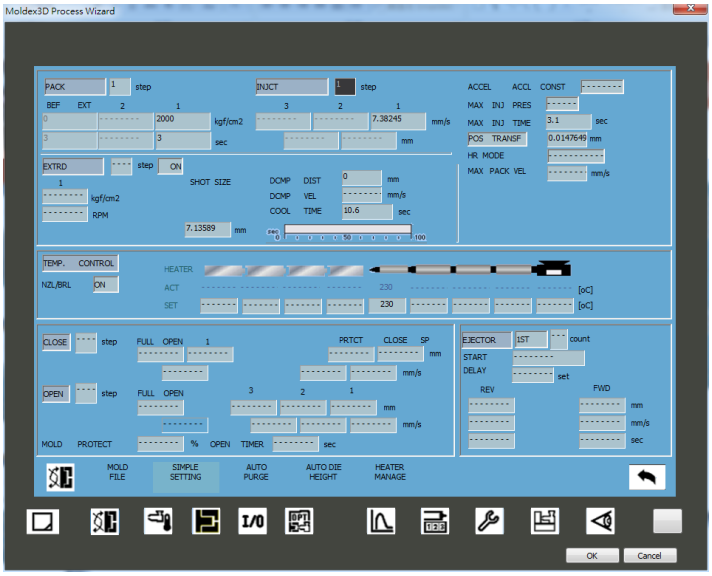
175 materials are newly added to Moldex3D Material Bank.
Other than the newly added materials, existing 155 materials are updated in viscosity, PVT, mechanical property and freeze temperature.

20. Process Wizard

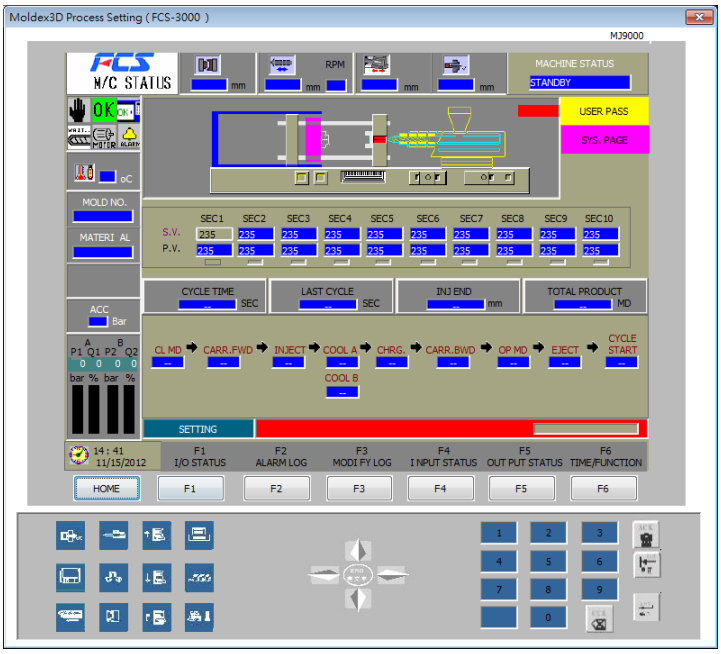
- **More injection molding machine User Interface**

Intuitive UI mimicking the real control panel on injection molding machine from selected vendors is equipped. It helps setting the molding process in a rather realistic environment. The newly added injection molding machine user interface includes:

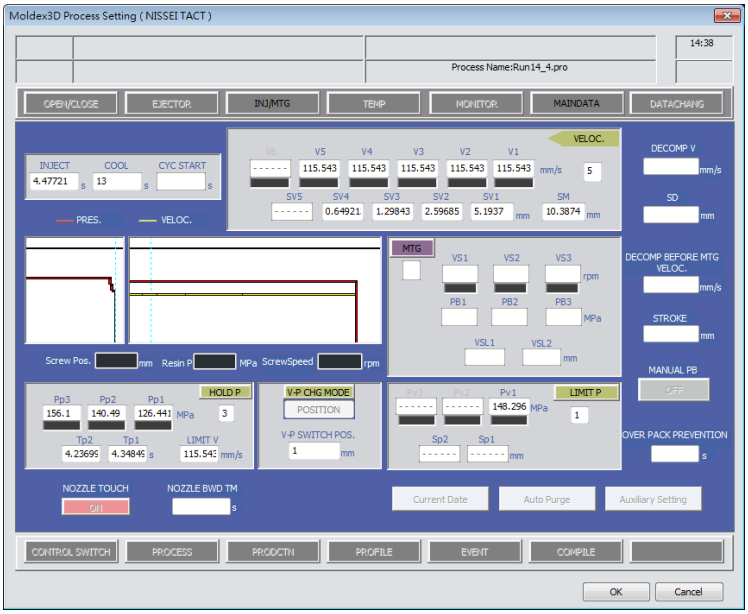
■ Fanuc


Moldex3D Process Wizard
PACK
INJCT
ACCEL
ACCL
CONST
MAX INJ PRES
MAX INJ TIME
POS TRANSF
HR MODE
MAX PACK VEL
EXTRD
SHOT SIZE
DCMP DIST
DCMP VEL
COOL TIME
TEMP. CONTROL
HEATER
NZL/BRL
ACT
SET
CLOSE
OPEN
FULL OPEN
PRTCT
CLOSE SP
EJECTOR
START
DELAY
REV
FWD
MOLD PROTECT
OPEN TIMER
MOLD FILE
SIMPLE SETTING
AUTO PURGE
AUTO DIE HEIGHT
HEATER MANAGE
OK
Cancel

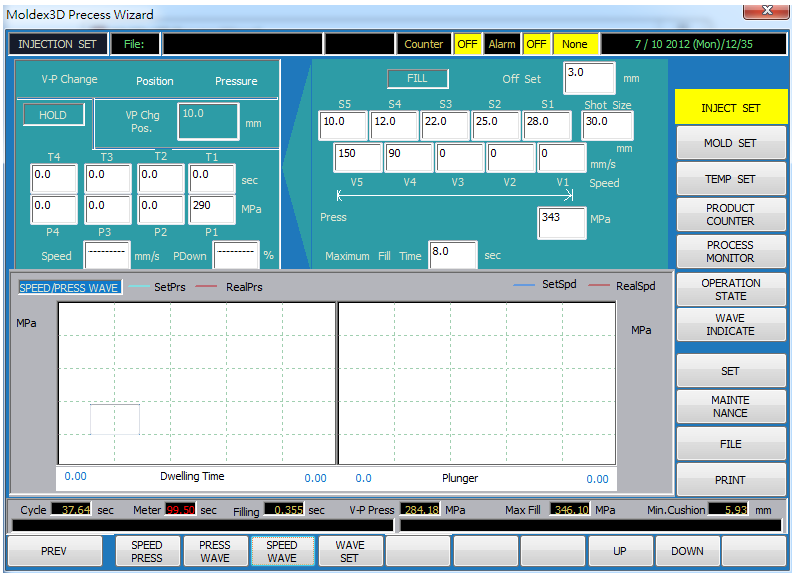
■ FCS


Moldex3D Process Setting (FCS-3000)
MJ9000
FCS
M/C STATUS
RPM
MACHINE STATUS
STANDBY
USER PASS
SYS. PAGE
MOLD NO.
MATERI AL
S.V.
P.V.
SEC1
SEC2
SEC3
SEC4
SEC5
SEC6
SEC7
SEC8
SEC9
SEC10
CYCLE TIME
LAST CYCLE
INJ END
TOTAL PRODUCT
ACC
CL MD
CARR.FWD
INJECT
COOL A
CHRG.
CARR.BWD
OP MD
EJECT
CYCLE START
COOL B
SETTING
14 : 41
11/15/2012
F1 I/O STATUS
F2 ALARM LOG
F3 MODI FY LOG
F4 I NPUT STATUS
F5 OUT PUT STATUS
F6 TIME/FUNCTION
HOME

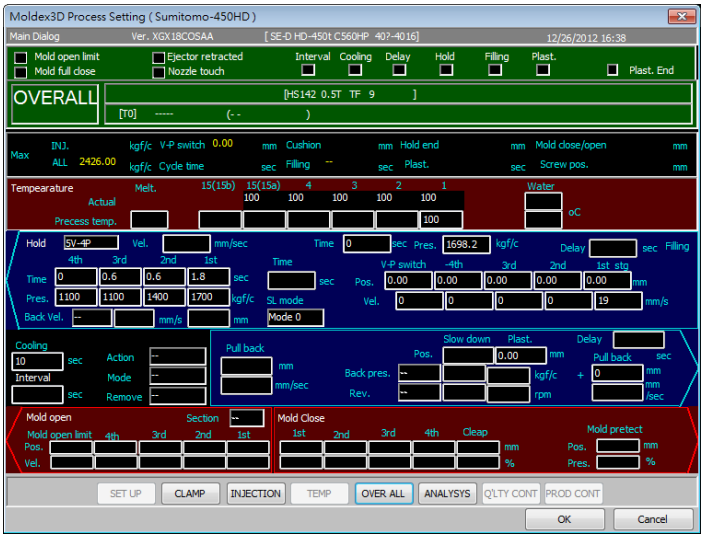
■ NISSEI



■ Sodick



■ **Sumitomo**



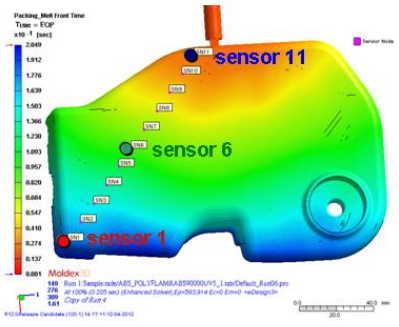
- **More intelligent default setting**

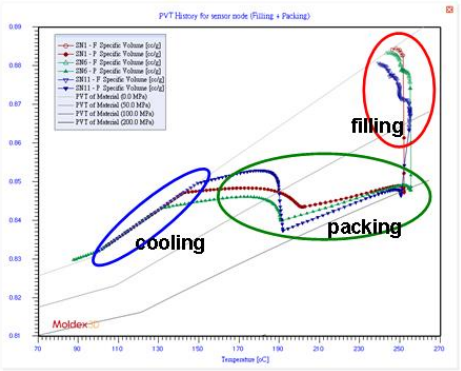
Based on part geometry and material property, auto-set default flow rate profile and packing pressure profile are provided.

21. Project

- **PVT variation history output**

This feature is used to visualize the melt PVT variation during filling and packing stages in the molding process.





- **Model deformation data output for NX**

Moldex3D R12.0 Project now provides the option to output deformed model to NX for global deformation purpose. The global geometry deformation data can provide feedback for model revision in NX.

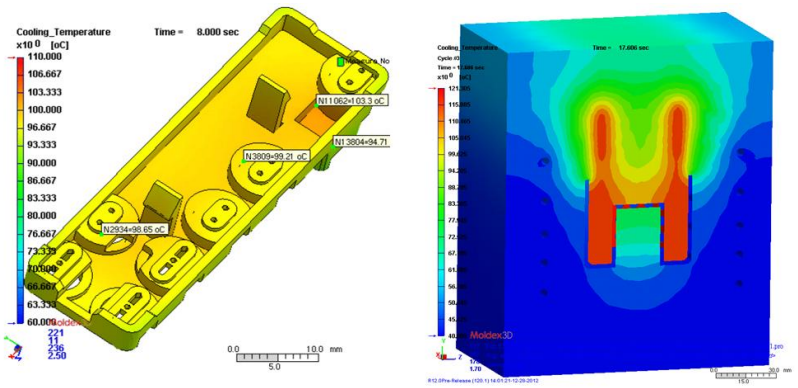
- **Expands injection molding application**

The Create a New Project workflow of thermoplastics and thermoset materials are improved in Moldex3D R12.0 by supporting both in Injection molding application.

This feature enables users to flexibly set materials for parts and inserts; especially for MCM model with mixed-material setting. Now users can set the material of one part as thermoplastics and the other as thermoset.

- **Supports history animation**

Moldex3D R12.0 Project now supports producing history animation of each result from multiple time steps. Moreover, program supports making the history animation of each molding cycle under transient cooling analysis. This feature is supported in eDesign, Shell and Solid projects.



- **Interactive help**

Increase the functionality of Moldex3D Help by:

  - **Clicking F1 on particular result item to show its interpretation**

  Take advantage of this feature to understand the meaning of each result.

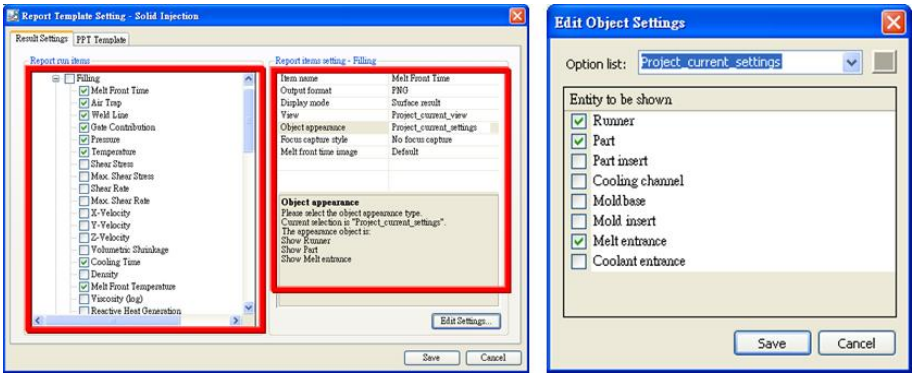
- Providing setting guidelines in Process and Computation parameter setting.
- Supporting exclusive material property descriptions in Material Wizard.
- **Customizable default settings in Computation parameter**

Moldex3D R12.0 allows users to customize default setting of each tab in Computation parameter setting tab. It saves Moldex3D default and user defined default of each tab for users to switch between them. This feature provides an efficient tool for Computation parameter setting of each analysis, and it is also a flexible approach in a mixture of Moldex3D and user-defined default setting.

- **User experience enhancement**
  - Removes several dialog windows that appear during the process of importing MFE mesh file.
  - Reminds users to replace mesh file after they have done editing mesh in Designer and going back to **Moldex3D Project**.
  - Supports opening Material Wizard in **Moldex3D Project** directly.
  - Adds an option to launch **Moldex3D Viewer** after .rsv file output.
  - Allows users to rearrange the order of jobs in Job monitor.
  - Supports specifying which project type to compress in Compact Wizard.

- **User defined report template**

It provides a user interface to define report generator template. The template includes output items, result display mode, viewing angle and image size. In addition, this function allows users to toggle the visibility of each molding component.



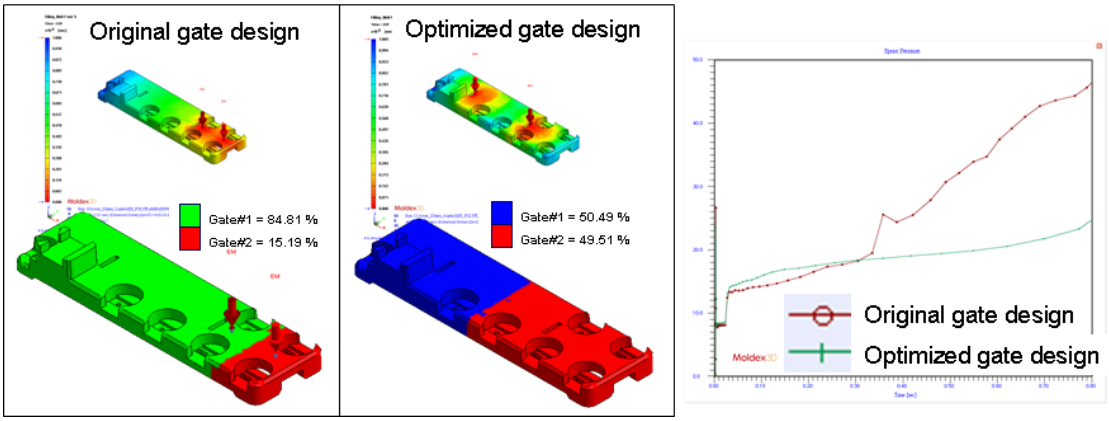
- **3D PDF report**

Moldex3D Project now provides 3D PDF report output. The 3D model in the 3D PDF report can be rotated, zoomed and moved. This helps users to visualize the analysis result from different viewing angle. In addition, the report can be split by analysis modules to reduce file size. With this convenient 3D-PDF-outputing feature, it is easy to redistribute for sharing the analysis result with third party.

22. Expert

- **Gate location optimization**

AutoGate provides the features to balance gate location automatically through a series of filling analyses and find the shortest flow path for each gate. It is used to help designers find out the optimal gate location efficiently. Besides, it supports single and multiple gates for gate location optimization. This function is supported in Shell and eDesign projects.



- **Simplified UI for optimization analysis**

Moldex3D R12.0 Expert module provides a simplified user interface for commonly used optimization analysis tool. The features include:

- Flow rate profile optimization for uniform melt front velocity
- Packing pressure profile optimization for minimum volumetric shrinkage in warpage
- Molding temperature optimization for minimum volumetric shrinkage or deformation
- Molding time optimization for minimum volumetric shrinkage or deformation

This function is supported in eDesign and Solid projects, and it makes setting optimization analysis a lot easier.

- **DOE supports multiple quality factors**

It supports weighting of multiple quality factors for DOE analysis. This helps users to obtain optimal process conditions based on different weighting values of each quality factor.

23. Remote Computing

- **Change of Application Name**

The function in **Remote Computing Admin** in Moldex3D R11.0 is now replaced by **Job Scheduler** and **RC Account Manager** in Moldex3D R12.0.

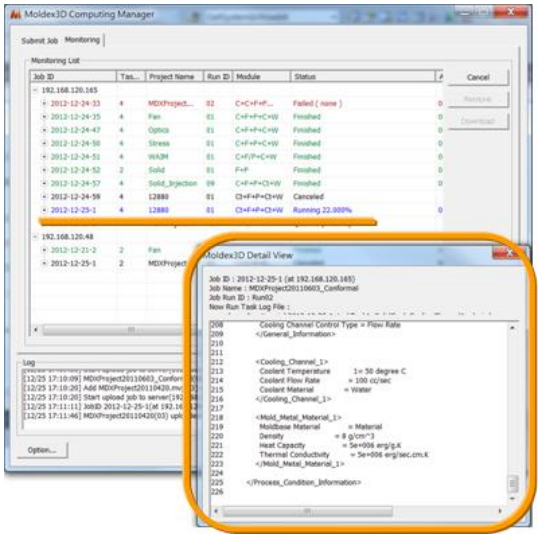
Job Scheduler is used to schedule analysis jobs and allocate available computing resources.

RC Account Manager is used to set account ID and password of clients for logging in to remote computing server.

- **Enhanced Robustness**

The application robustness enhanced a lot in client side (**Computing Manager**) and server side (**Job Scheduler**). Many potential instability issues are fixed.

- **New features in Computing Manger**
  - Submits jobs to different servers and monitor job computation status and progress on different servers from client machine.
  - Provides log file with computation progress in real-time.



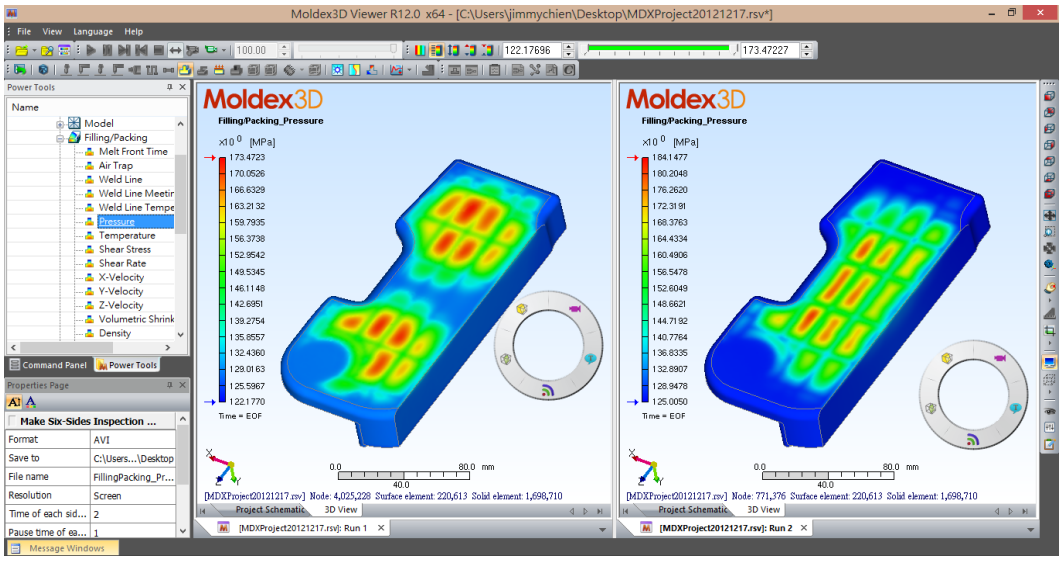
  - Provides the option to download compact analysis result only.

- **New features in Job Scheduler**
  - Supports dynamically add/delete computing node.
  - Enables specifying which computing nodes are activated for computation process by setting those nodes “Online”.
  - Maximizes resource utility by new computing configuration of assigning the min. computing unit as logic processor.

24. Viewer

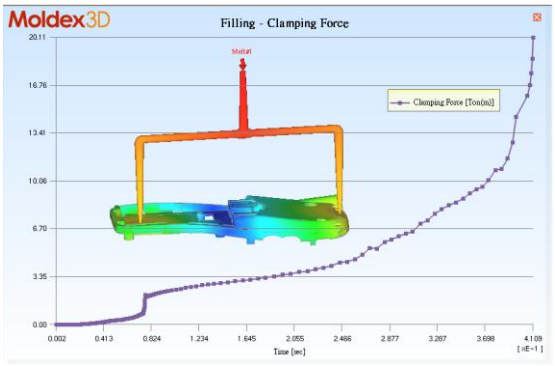
- **Run result comparison tool**

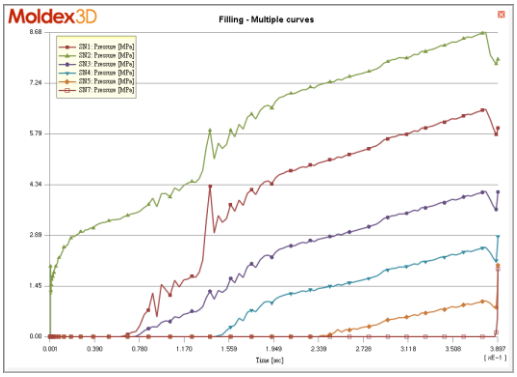
Moldex3D Viewer provides the function to compare the analysis result between two runs. Users can active the viewing angle synchronization when comparing result. Results, including distribution, animation and XY-Curve are all supported by this function.



- **Supports XY Curve result display**

Moldex3D Viewer now supports molding property history curve display and sensor node history curve display.





- **Adds bounce animation option**

With the bounce option on, the animation will be played forward, then backwards through the sequence of frames.

- **Supports multiple time step output data and multiple run data in .csv file**.

- **Supports transient cool analysis result display**

Moldex3D Viewer now supports transient cool analysis result display. Users can select each molding cycle number and each time step output for result visualization.

- **Supports range bar control**

Moldex3D Viewer now supports specifying minimum and maximum value of display range from Range Toolbar.

- **Supports banded distribution display**

- **Supports display unit change**

Supported units includes **Metric units (mm, kg, s), SI Metric units (m, kg, s)** and **US English units (in, lb mass, s)**

- **Supports project schematic**