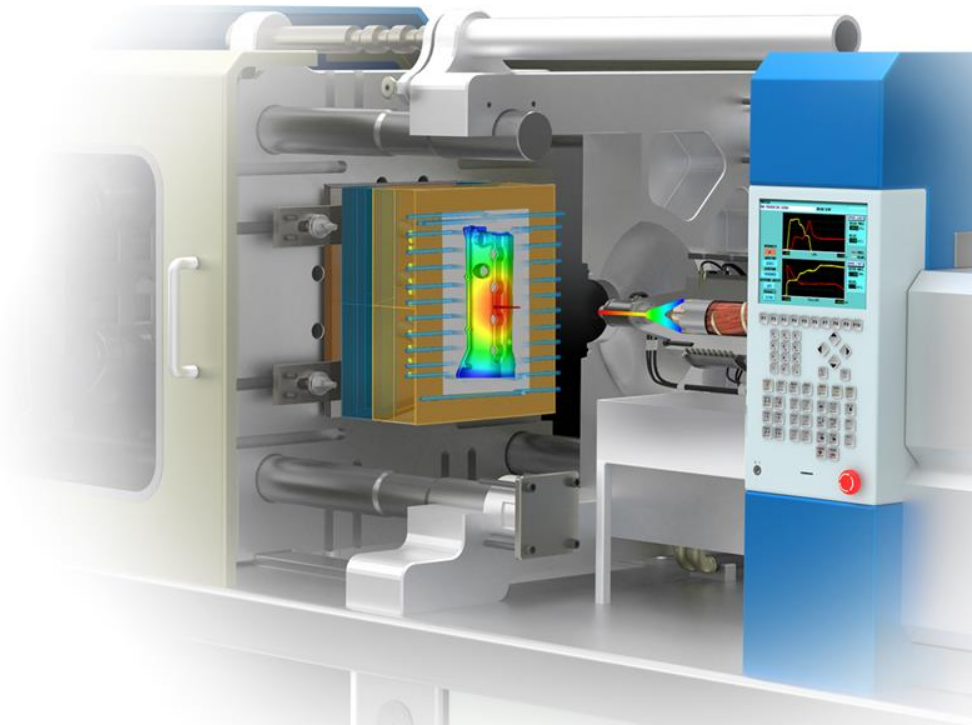
Moldex3D
MOLDING INNOVATION

What's New in Moldex3D R17

Version: R17 OR



Outline

1. Studio
   - Enhanced Usability
   - New Capability
   - Performance

2. Solver Capability
   - Solver Enhancement
   - Advanced Analysis
   - Machine Response & Characterization
   - Fiber Analysis

3. Molding Innovation
   - RTM Solver Capability
   - Foaming Molding Solution
   - Other Molding Types

Outline

4. Pre/Post-processing Tools
   - CAD & Mesh Tool
   - Meshing Kernel
   - Modeling Wizard

5. Usability & Database
   - Speeding Up Calculation
   - Interface & Integration
   - Database Update

Supported Platforms

- Moldex3D supports Windows 64-bit platform for all purposes such as pre-processing, solving and post-processing, and Linux platform is supported as calculation resource
- Moldex3D Mesh R17 for Rhino5 64-bit platform only

Platform	OS	Remark
Windows / x86-64	Windows 10 series Windows 8 series Windows 7 series Windows Server 2012 R2 Windows Server 2016	Moldex3D R17 is certified for Windows 10
Linux / x86-64	CentOS 6 series CentOS 7 series RHEL 6 series RHEL 7 series SUSE Linux Enterprise Server 12	Linux platform is used for calculation resource only. Moldex3D LM, Pre-processor and post-processor do not support Linux platform

New Module and Terminology

> Moldex3D Studio is now the standard Moldex3D platform

> New Terminology: Barrel Compression, Machine Response
> New License: EnhancedFiber, MachineResponse

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Studio – New Standard Platform

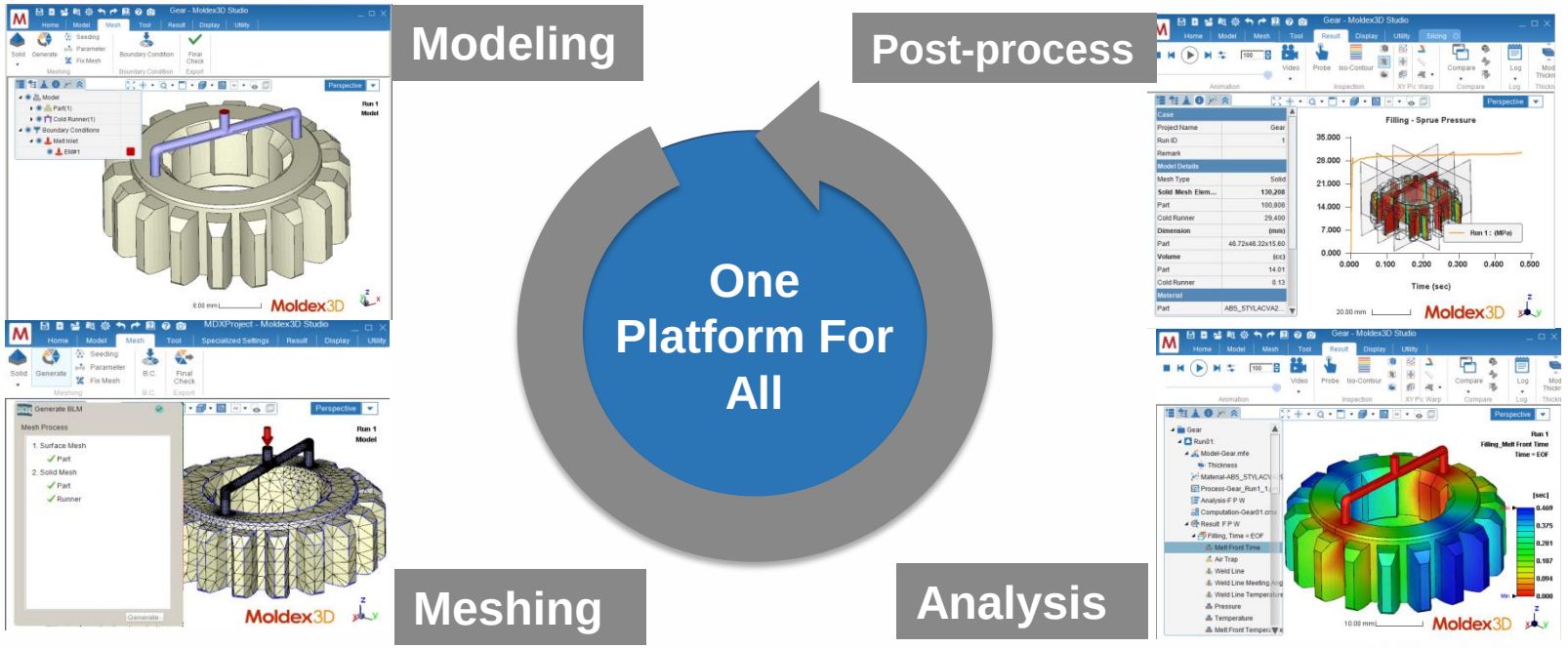
Enhanced Usability

New Capability

Performance

Enhanced Usability: All Tasks in One Platform

- Allow going back anytime to pre-processing stage
  - Consistent model and project information through out
  - Provide option to copy or replace current project and model
- **Benefit**
  - Fully integration through modeling tools, analysis setup and post-processing tools for user to switch anytime when needed



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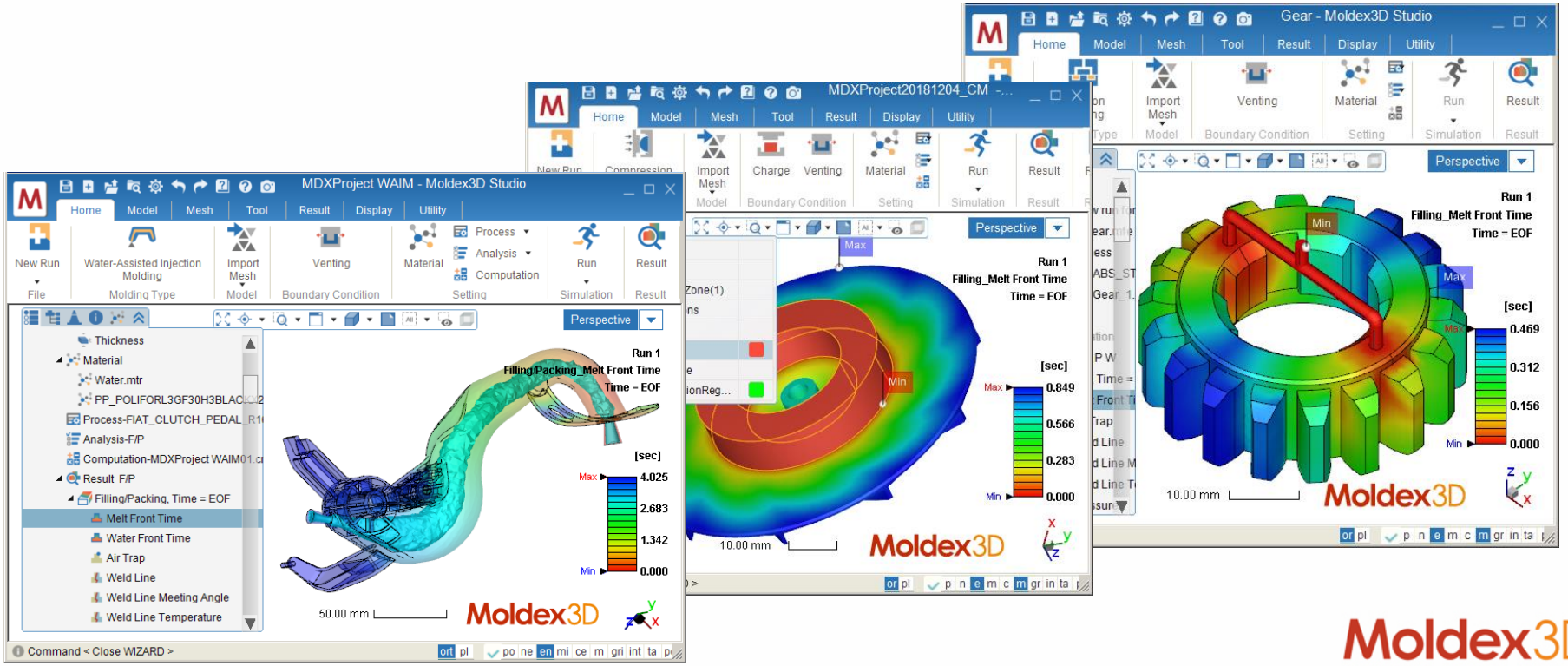
Enhanced Usability: Variety of Molding Simulation

> Support a variety of molding project and simulation

- Co-injection Molding (CoIM), Bi-injection Molding (BiIM)、Gas/Water Assisted Injection Molding (GAIM/WAIM),
- Powder Injection Molding (PIM), Foam Injection Molding (FIM), Chemical Foaming Molding (CFM),
- Compression Molding (CM), Injection Compression Molding (ICM)



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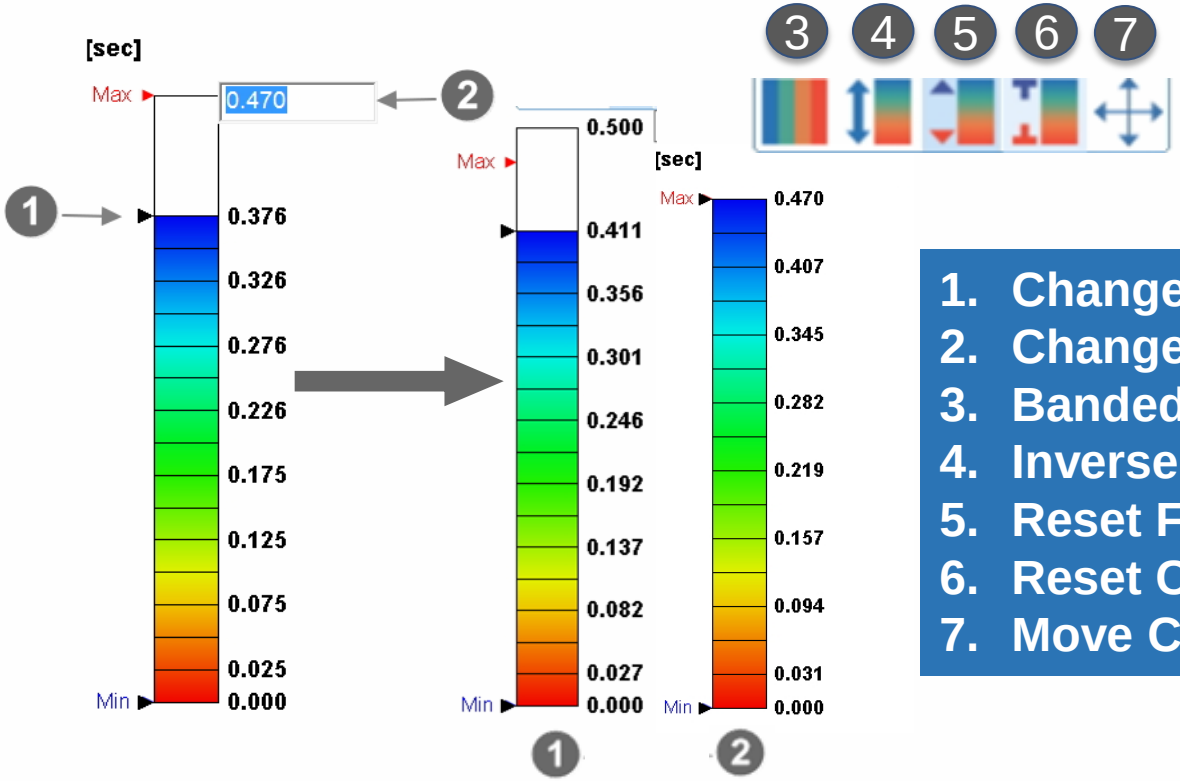
Preference Setting : Color Legend

> Directly and Intuitively make modification on color bar:
  - Provide color bar option when moving cursor on it
  - Allow pulling color bar to change it location (left/right)
  - Allow pulling Max/Min mark to change color fill range
  - Click and enter value to modify bar Max/Min value



1. Change Fill Range
2. Change Color Bar Range
3. Banded Distribution
4. Inverse Color Legend
5. Reset Fill Range
6. Reset Color Bar Range
7. Move Color Bar (Left/Right)

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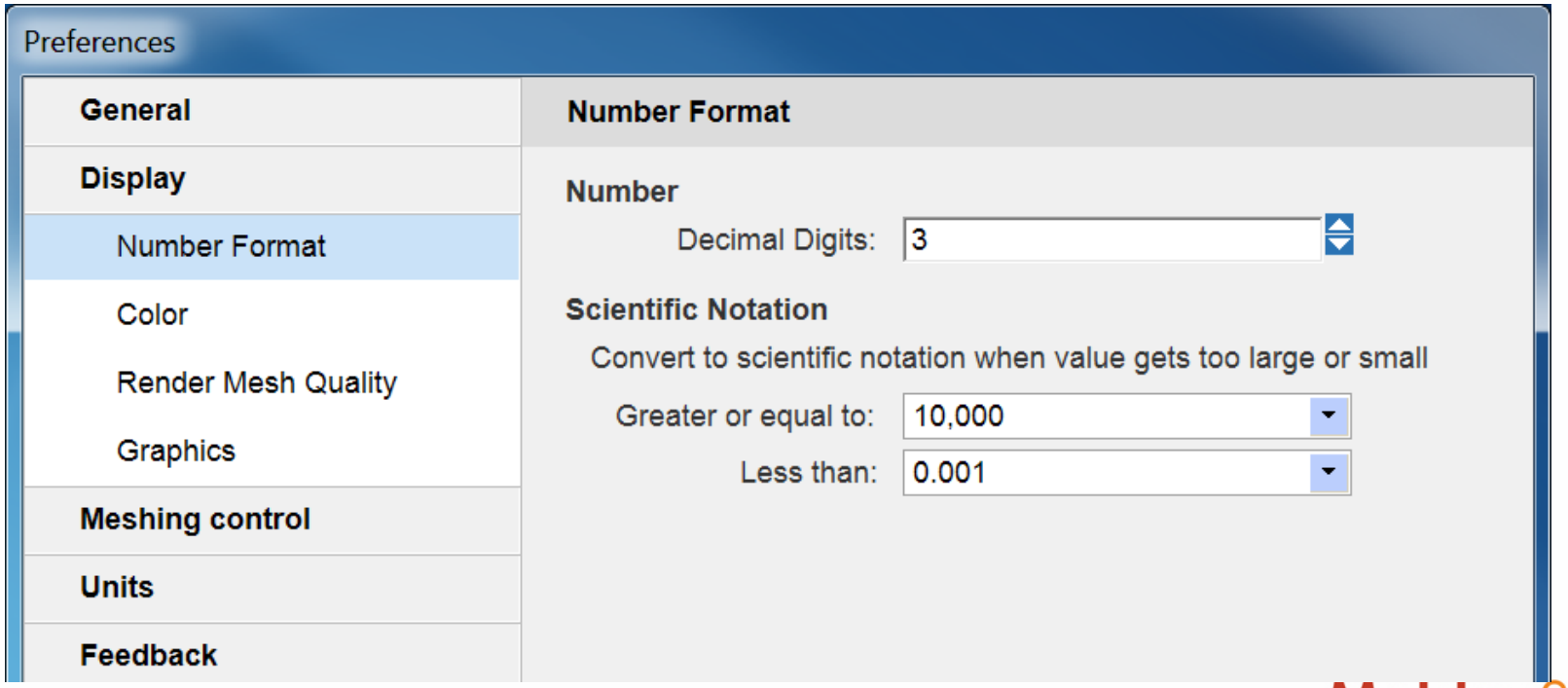
Preference Setting : Global Parameter

Preference of Number Format

- Modify Scientific Notation/ Decimal Digits display in Preferences
- Default Decimal Digits = 3
- Default to show Scientific Notation for value between 10^{+4} to 10^{-3}
- **Benefit**: Customized number format to conform user's preference



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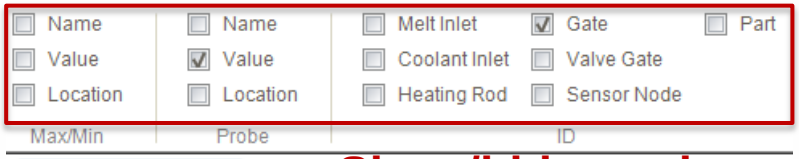
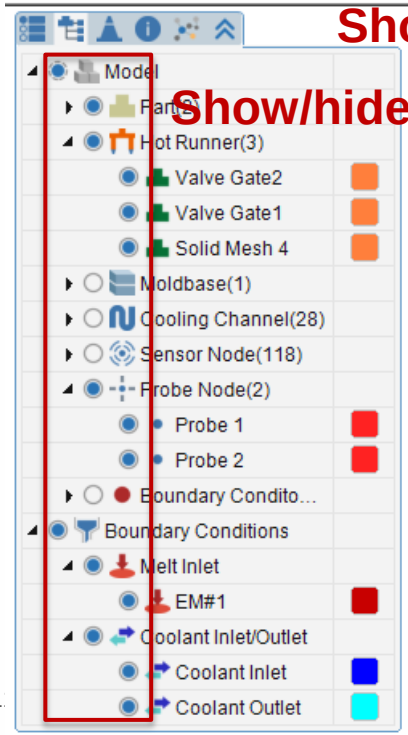
Other Usability Enhancements in Studio

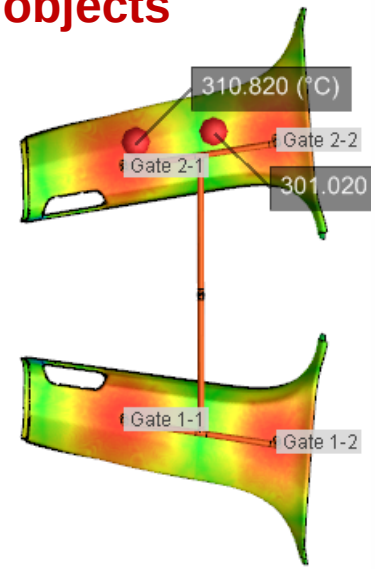
- > Allow Show/hide control in Display Window such for Melt Inlet/Coolant Inlet/Gate/Valve gate/Sensor Node/Part IDs
- > Allow saving and editing preference view option
- > Allow Language Pack download for Multi-Language interface

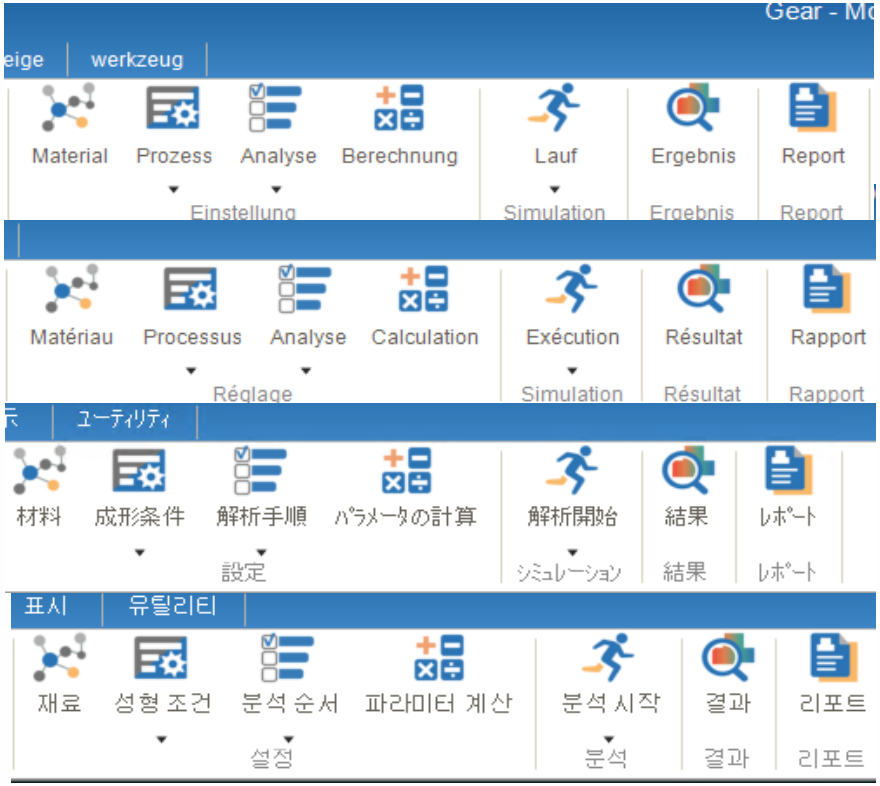


Show/hide marks

Show/hide objects







Language Packs will be provided with Service Pack

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Studio – New Standard Platform

Higher Usability

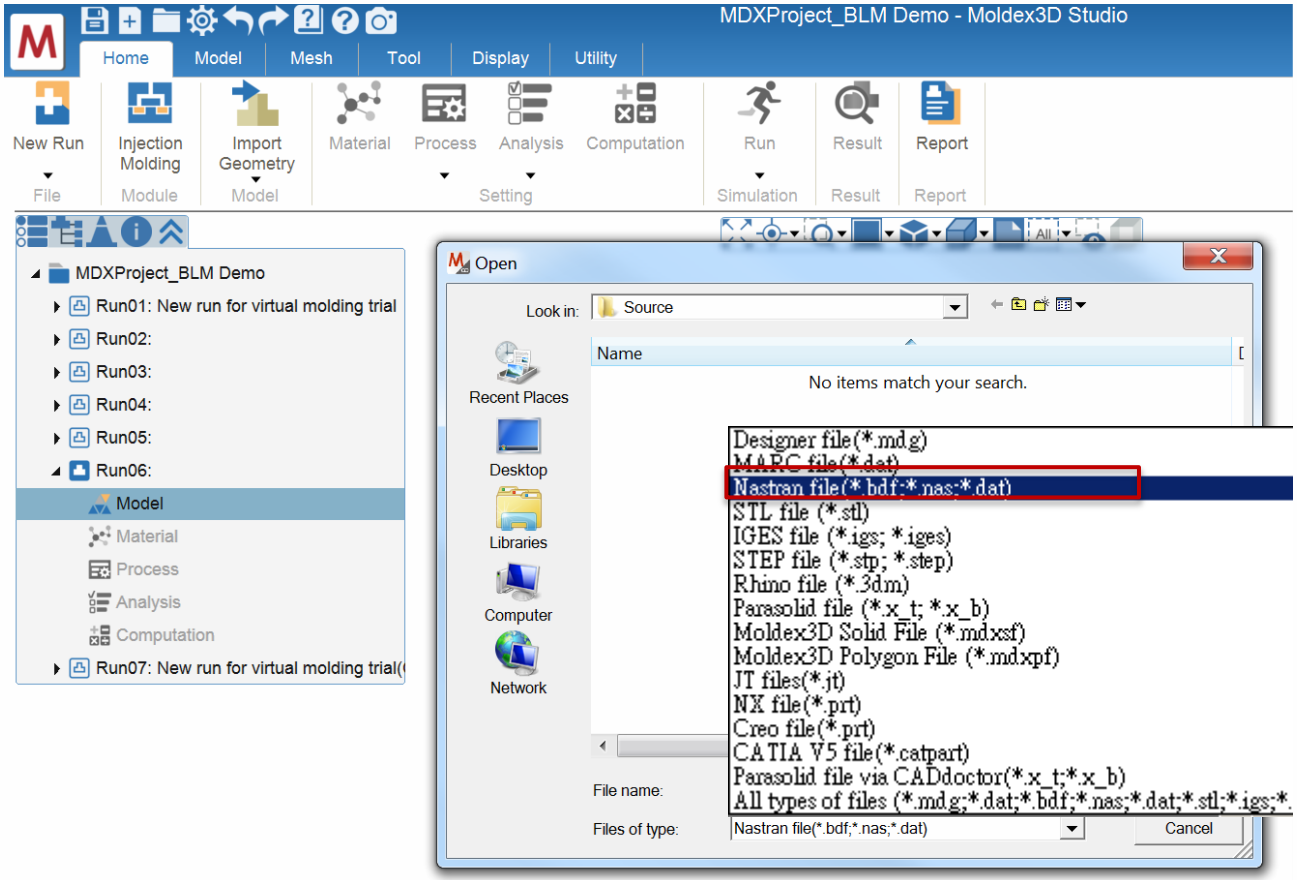
New Capability

Performance

CAD Tool: Import of Nastran BDF file

Support BDF format surface mesh file

- **Import Nastran BDF for surface mesh and then continue with solid mesh generation in Moldex3D**
- **Benefit: Convenient workflow for Nastran users**



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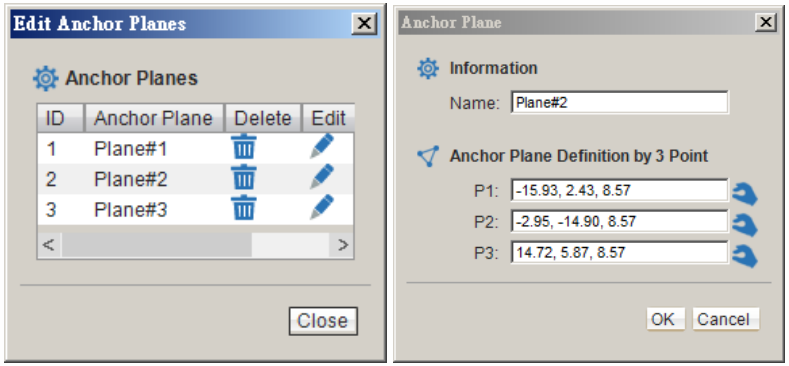
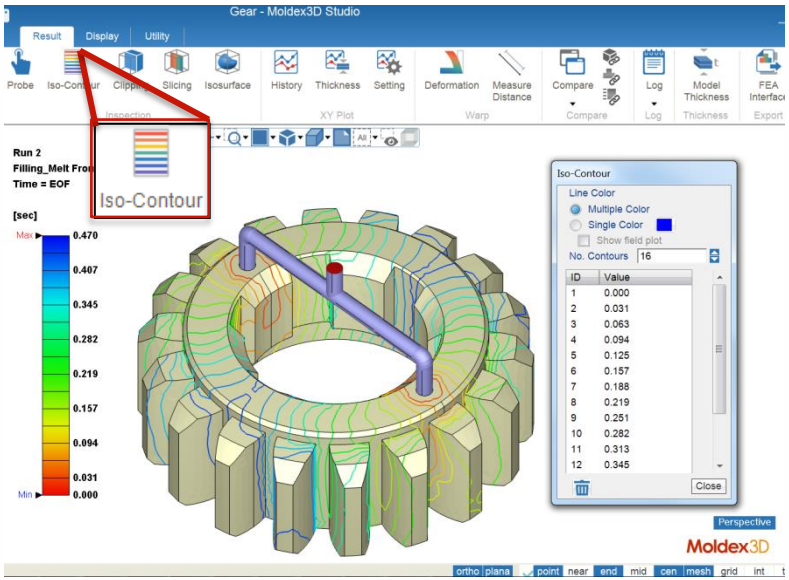
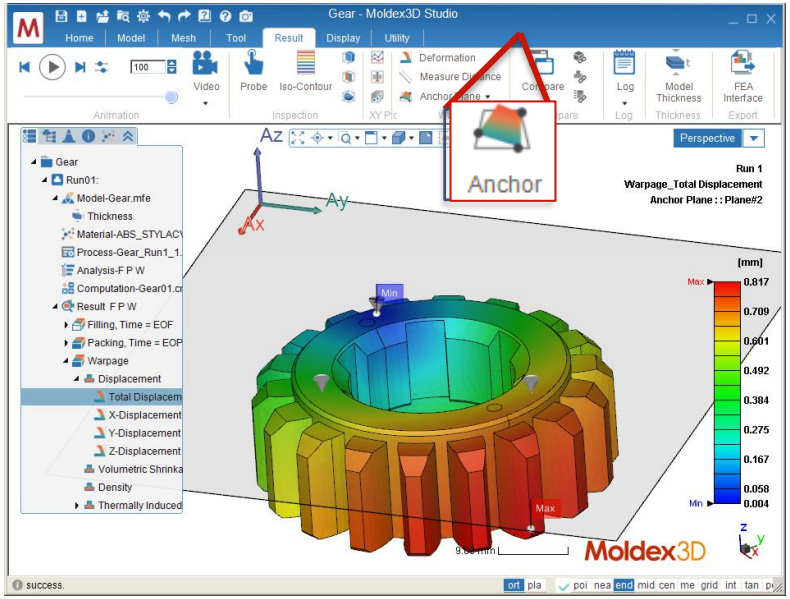
Inspection: Variety of Post-processing Tools

- Support Anchor Plane setting for deformation scale of Warpage
  - Update result value based on the anchor plane applied
  - Allow multiple anchor plane
- Enable Iso-contour result display
  - Allow single color, legend color line or on top of field plotting







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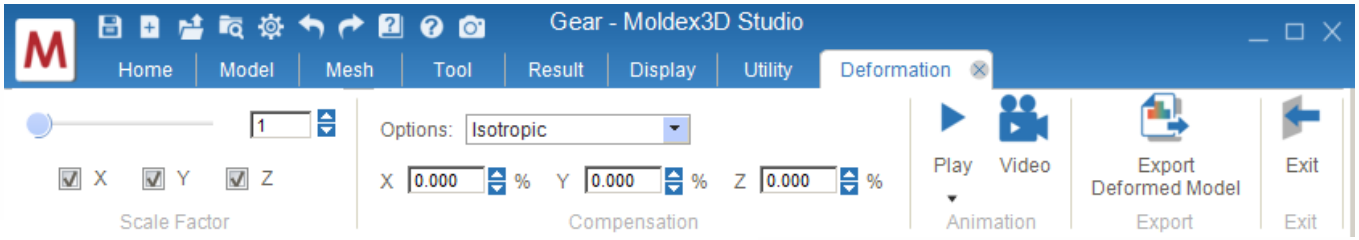
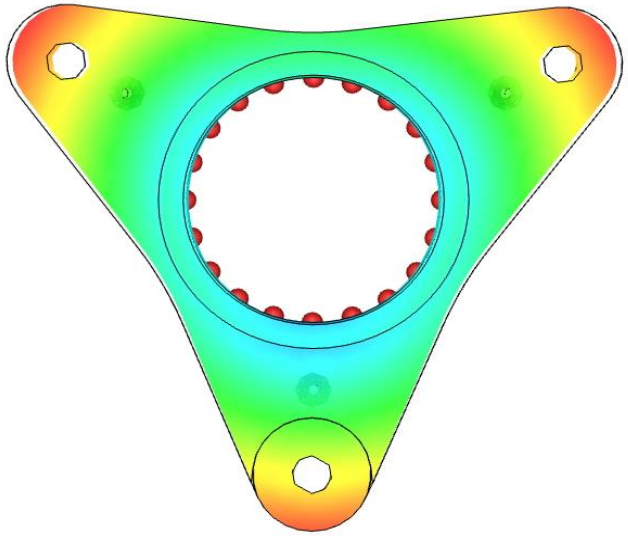
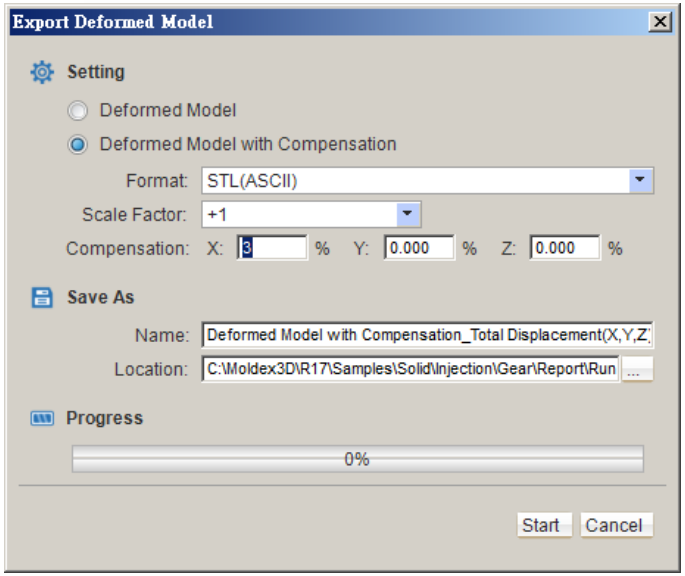
Inspection: Warpage Result and Export

- Deformation result display with scaling or mold compensation
  - Control scaling and compensation individually in each direction
  - The value of Measure function will updated for scaled result
  - Model export and anime for deformation or mold compensation model







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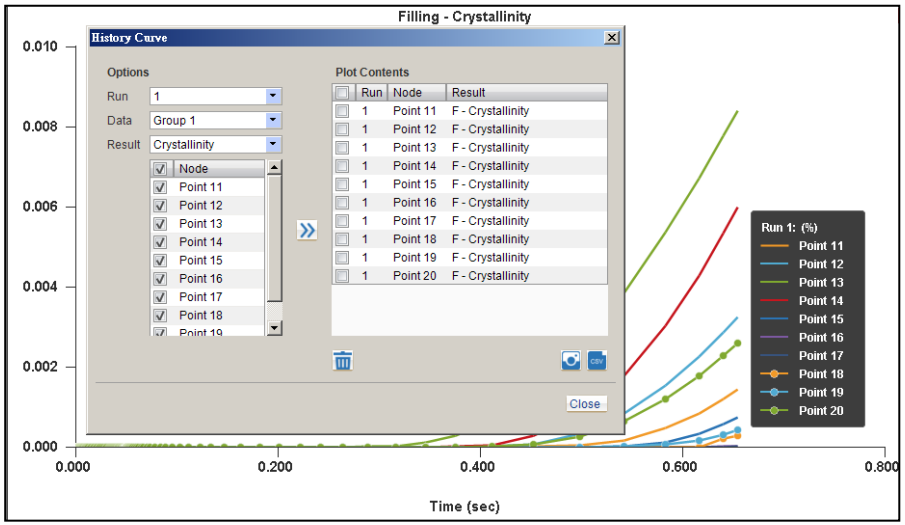
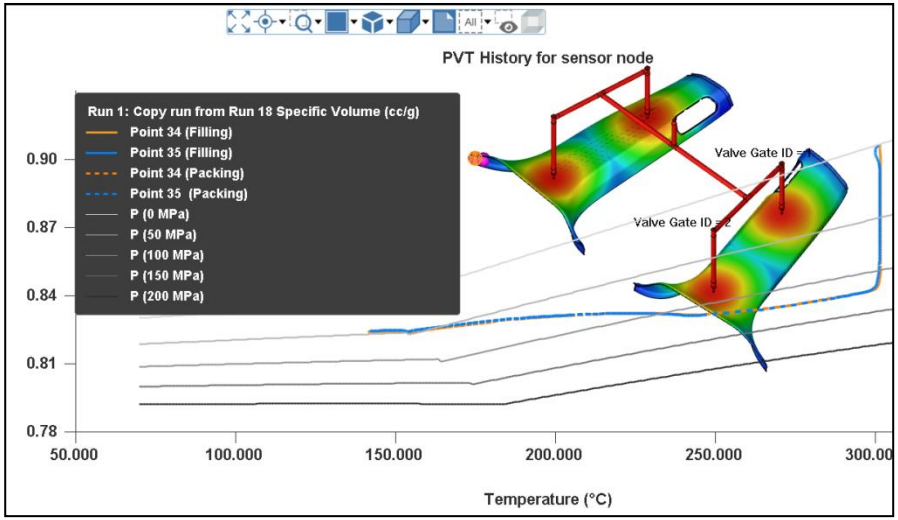
XY Plot : History Curve Plotting

- Plotting result change with time
  - Support local history on Probe and Sensor nodes
  - Support global history of molding properties
  - Display specific volume history with reference line of PvT behavior
  - Enable crystalline history
- XY plot customization
  - Allow combination of different node and data
  - Allow data export as CSV and JPG files





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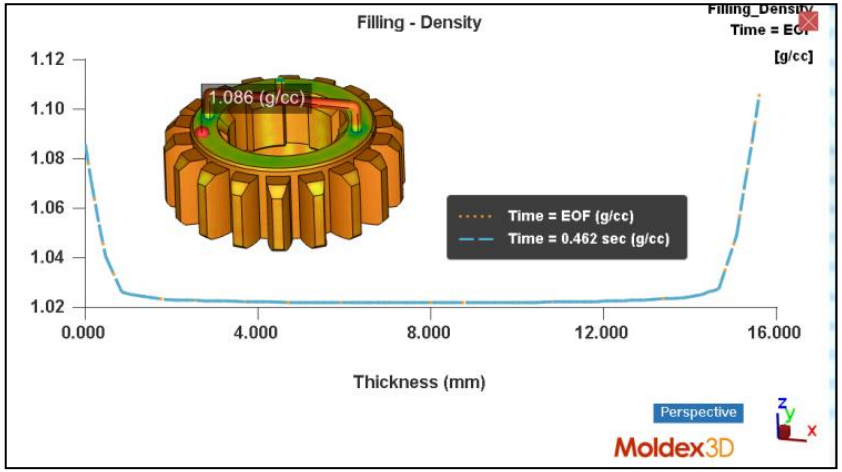
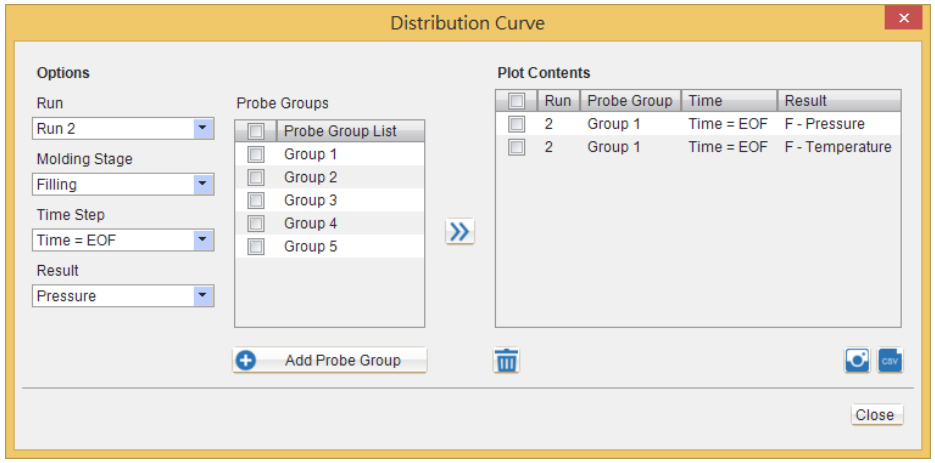
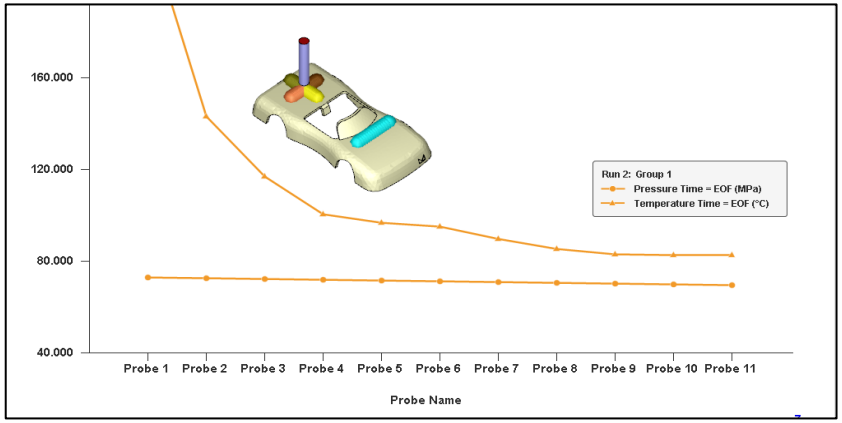
XY Plot: Distribution Curve Plotting

- Plotting thickness direction variation curve
  - Inspect the variation inside
- Plotting result distribution
  - Add curve by Probe group
  - Add multiple time steps data
- Support Probe selection and data export (JPG & CSV)







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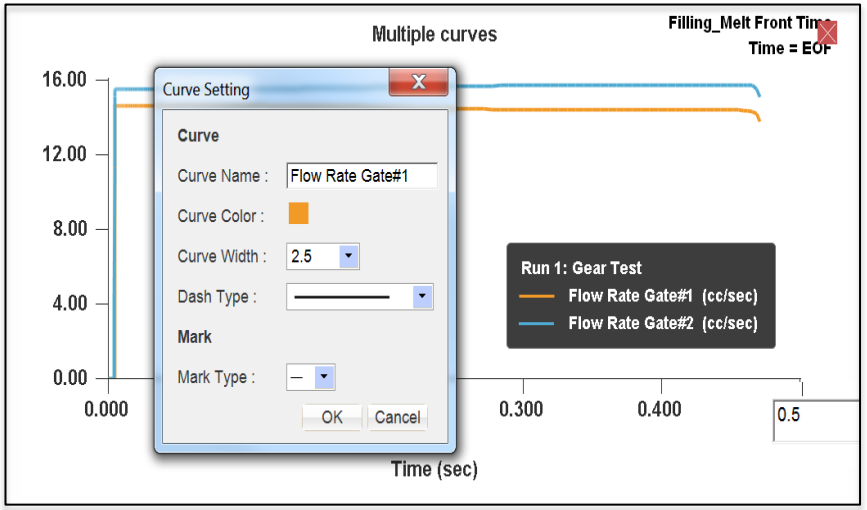
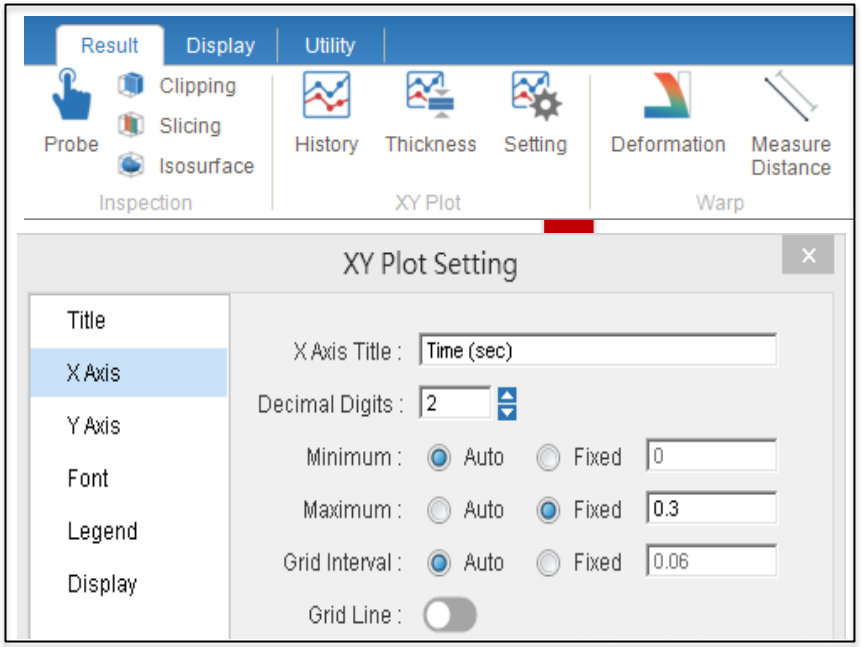
XY Plot : Preference Setting

- Provide quick edit function directly on XY Plot
  - Double click on different place to modify plot setting
- Provide Plot setting wizard:
  - Directly launch on XY plot
  - X and Y axes format & title
  - Style change on legend / font size / curve sort
  - Option to display model and tracer on XY Plot
- **Benefit**: Customized style for performance in different company format presentations





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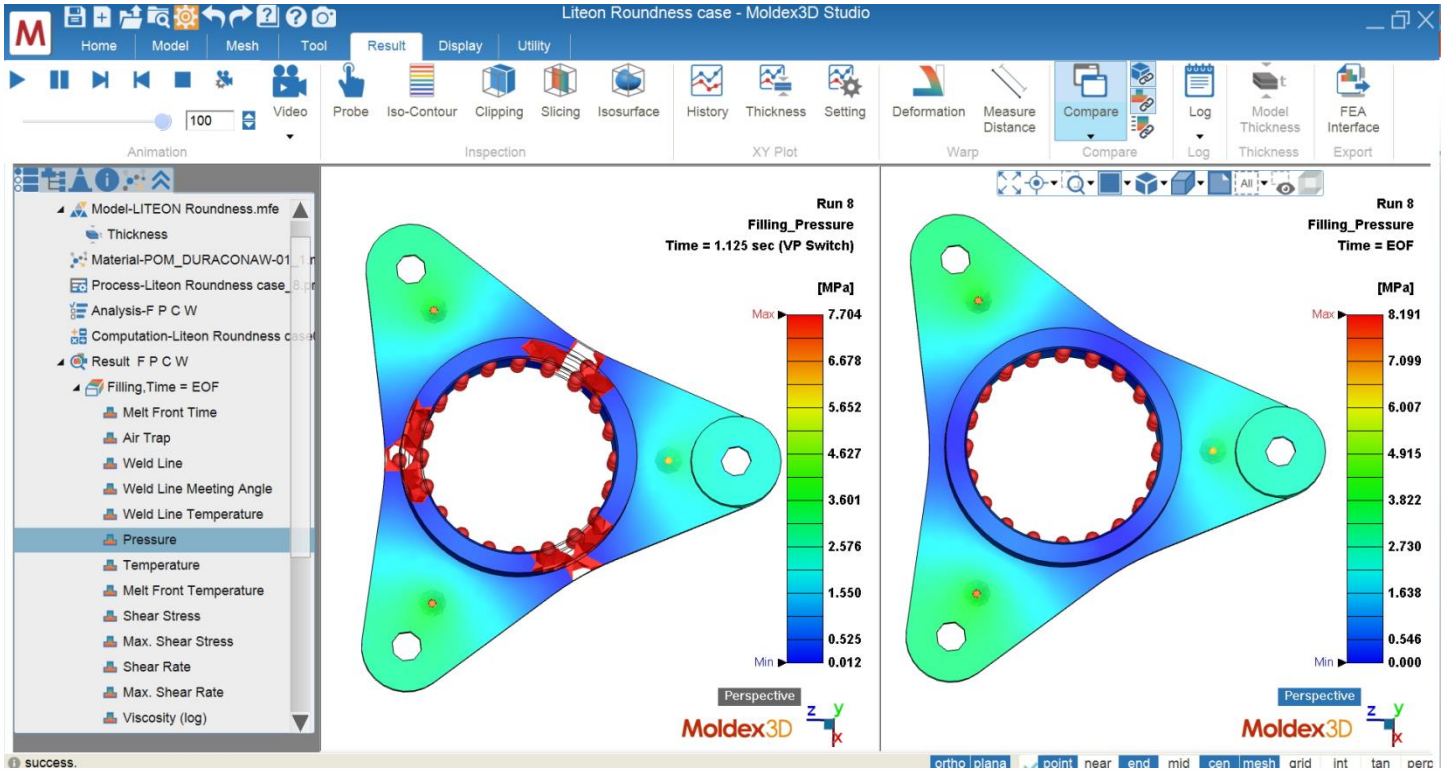
Compare: Multi-window Result Comparison

- Cross-group/time/result comparison
  - Compare results from different time, runs and result items
  - Provide flexible Sync setting for different purpose
  - **Benefit:** Compare result difference with controlled factor



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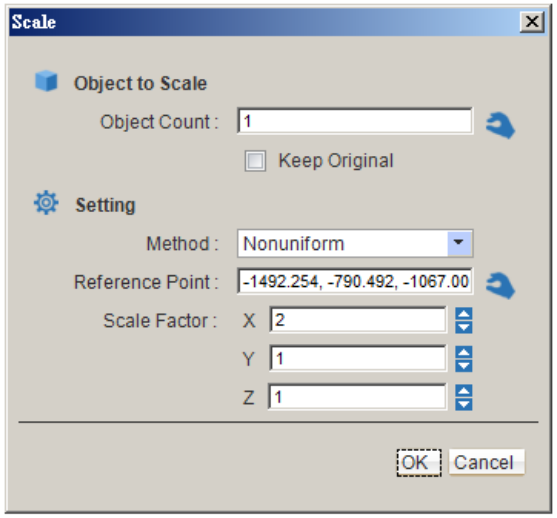
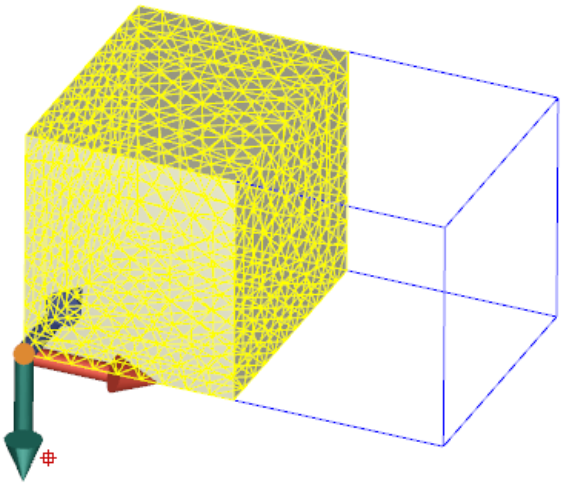
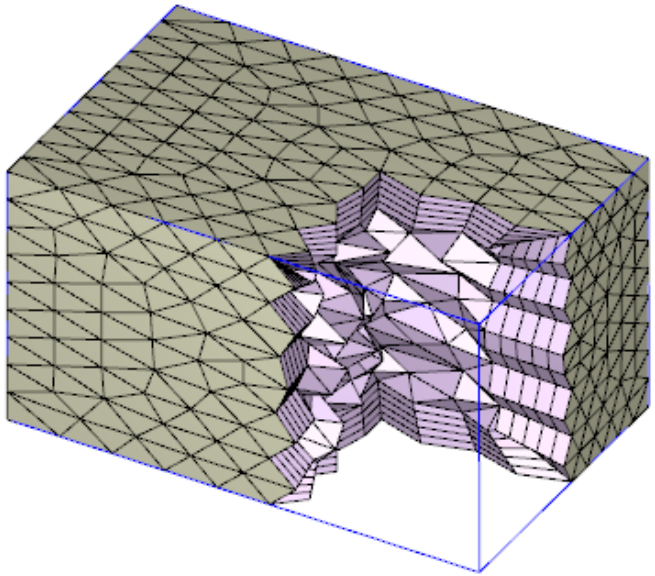
Other New Capabilities in Studio

- Support former Designer function in
  - Add Rotation function based on C plane in CAD tools
  - Add Extraction function in improve surface mesh tools
- Enable Compuplast MTC mesh file export
- Add model scaling function in CAD tools







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Studio – New Standard Platform

Higher Usability

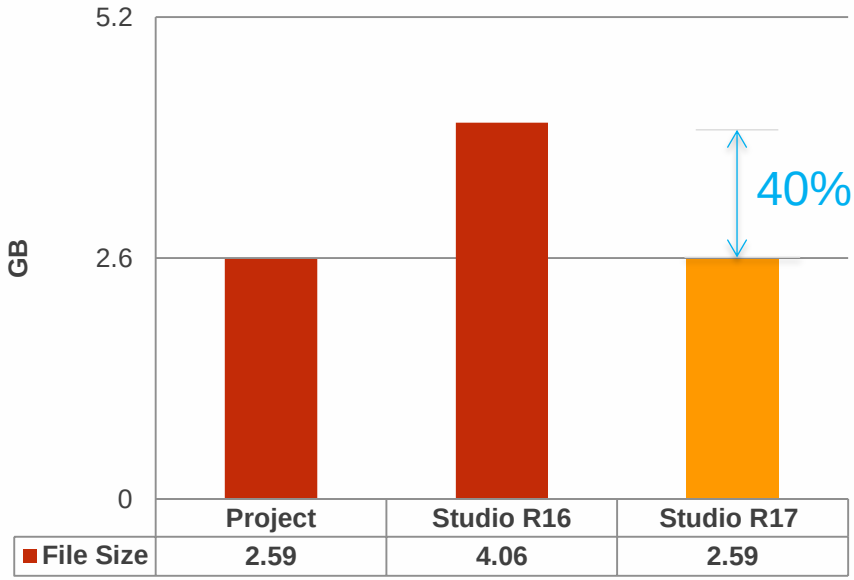
New Capability

Performance

Render: More Efficient Project Management

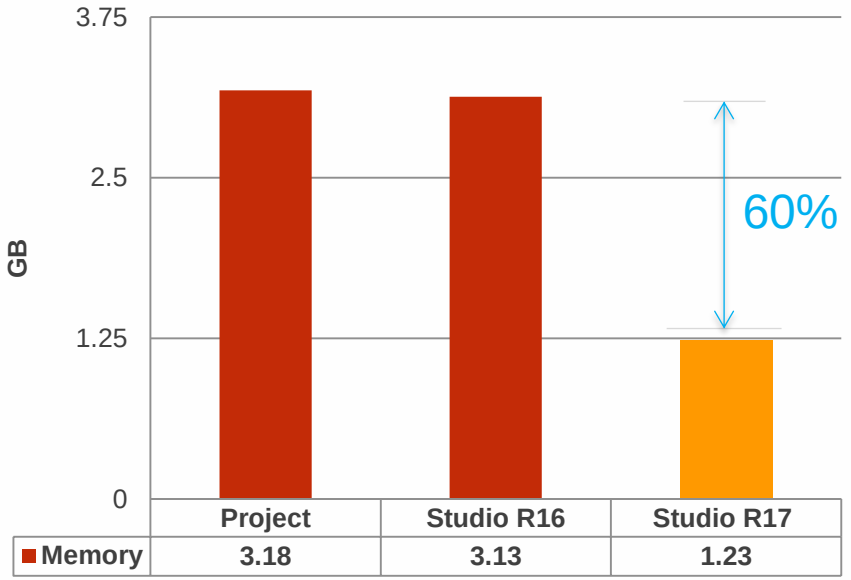
- File size 40% reduced
- Memory usage 60% reduced
- Up to **50X smooth** rendering performance

Reduced File Size



	Project	Studio R16	Studio R17
File Size	2.59	4.06	2.59

Reduced Memory Use



	Project	Studio R16	Studio R17
Memory	3.18	3.13	1.23

*** Test mode Information:**

Cell Count: 4.7 Million

Results Data: Filling (5 time-step) + Packing (5 time-step) +C+W

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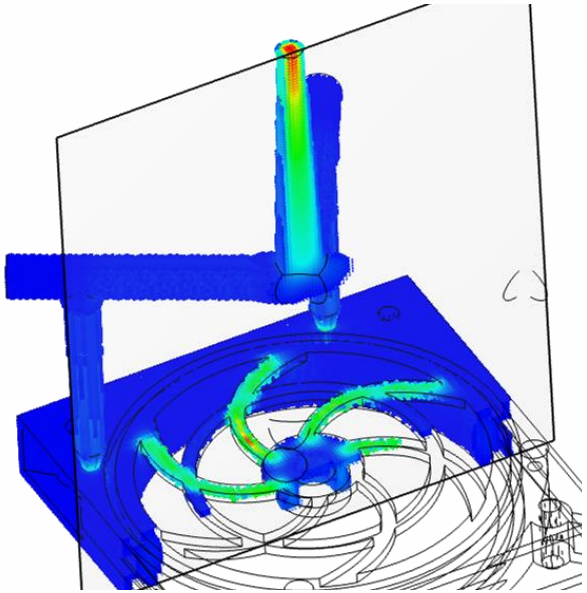
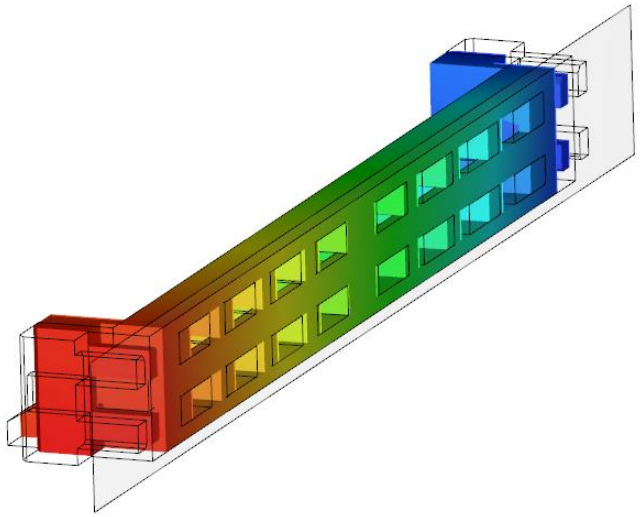
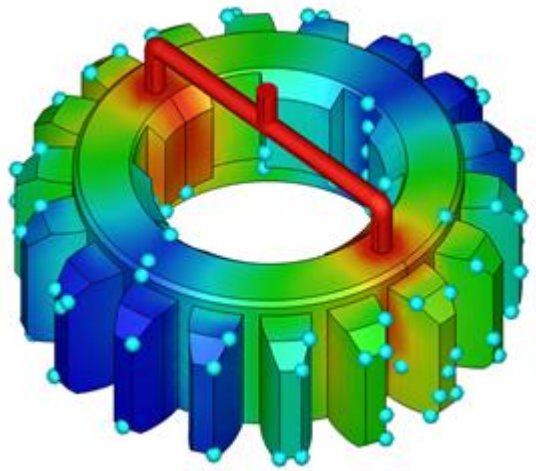
Render : Enhanced Display Kernel

- New display kernel: Speed up project open and result reading
  - Save the time in data transfer and avoid RSV file issues
- Enhanced Clipping display with Velocity vector and Warpage Deformation results
- Render Enhancement: Improved Air Trap display accuracy
  - Allow superimposed with other type results display
  - Save data transfer time, file size and memory usage

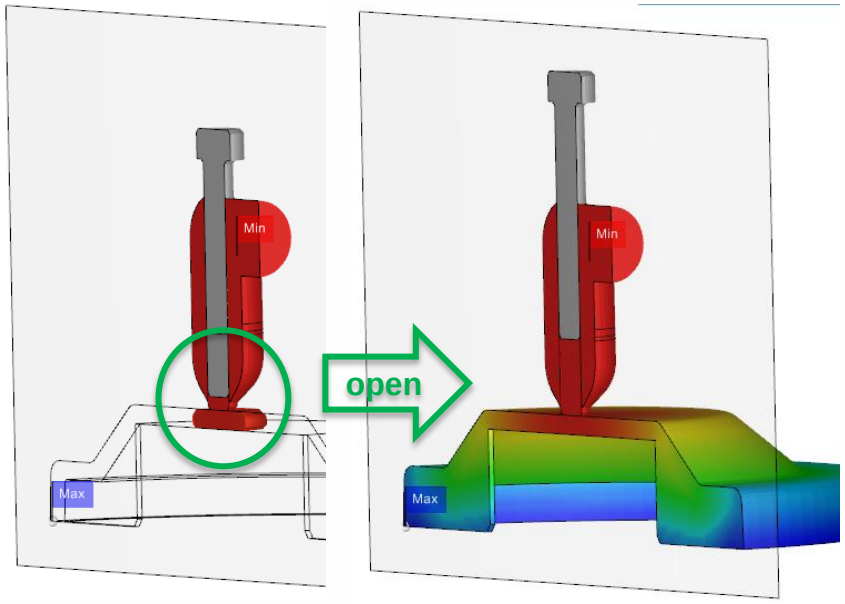


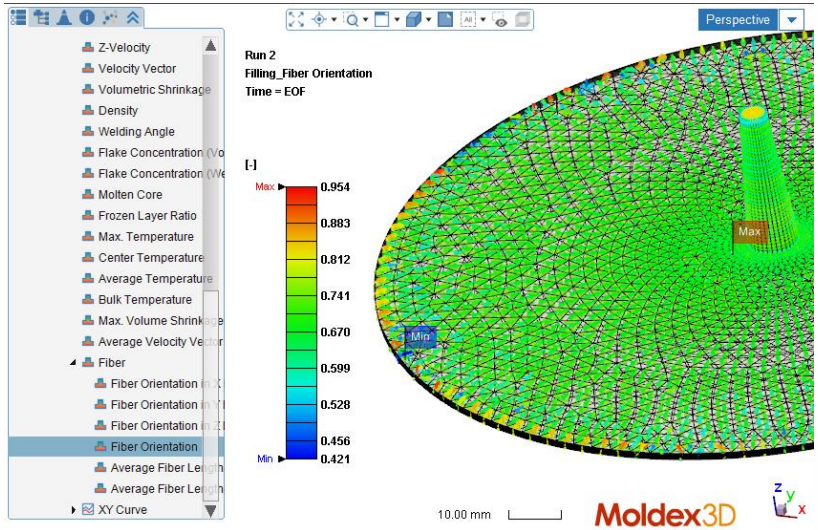


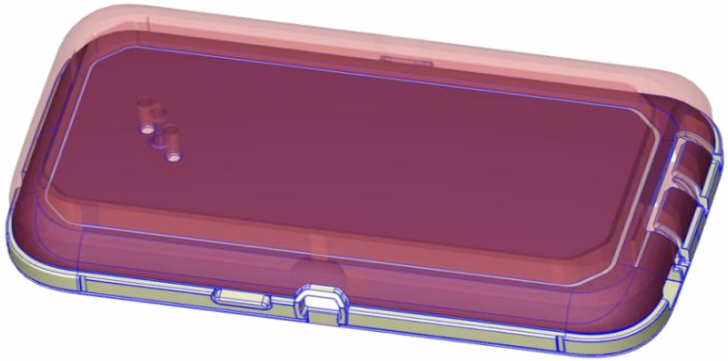


Render: Advanced Analysis and Display

- Venting Analysis
  - Assign BC and venting pressure profile
- Pin Movement Simulation
  - Pin Movement modeling and result display
- Fiber Orientation Prediction
  - Fiber Orientation and Alignment Display
- Compression Zone & Charge
  - Assign BC and Property







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Solver Capability

Solver Enhancement

Advanced Analysis

Machine Response & Characterization

Fiber Analysis

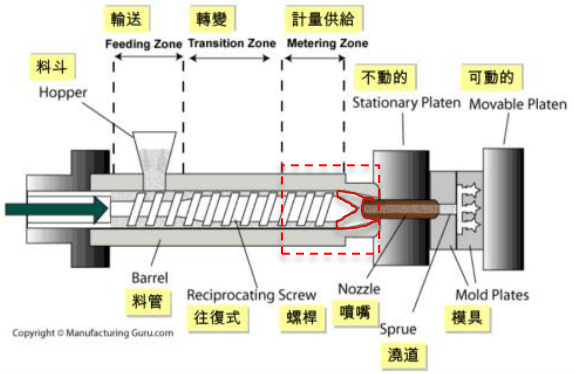
Important Factors for Injection Molding Simulation

Process Modeling
- Modeling domain and procedures
- Governing equations of molding process

Barrel, Screw, Nozzle

Filling, Packing, Cooling

Response and control



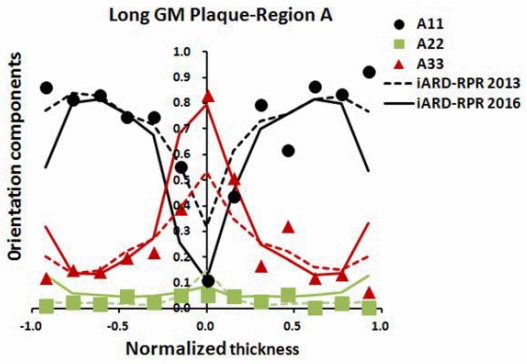
Material Modeling
- Constitute equations of material
- Material phase transition function

Fiber orientation modeling

Crystallization modeling

Viscoelastic modeling

Micromechanics modeling



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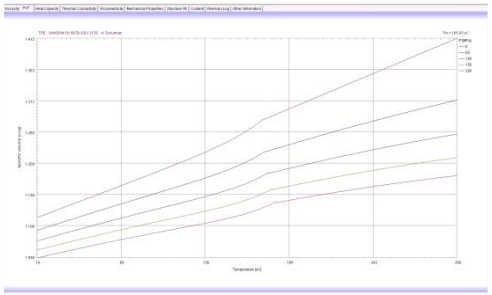
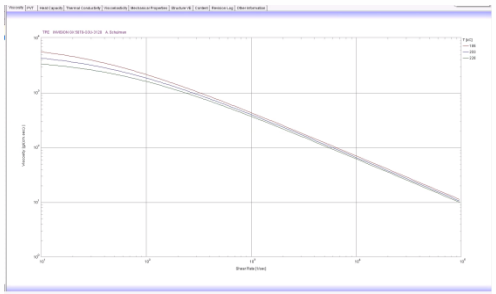
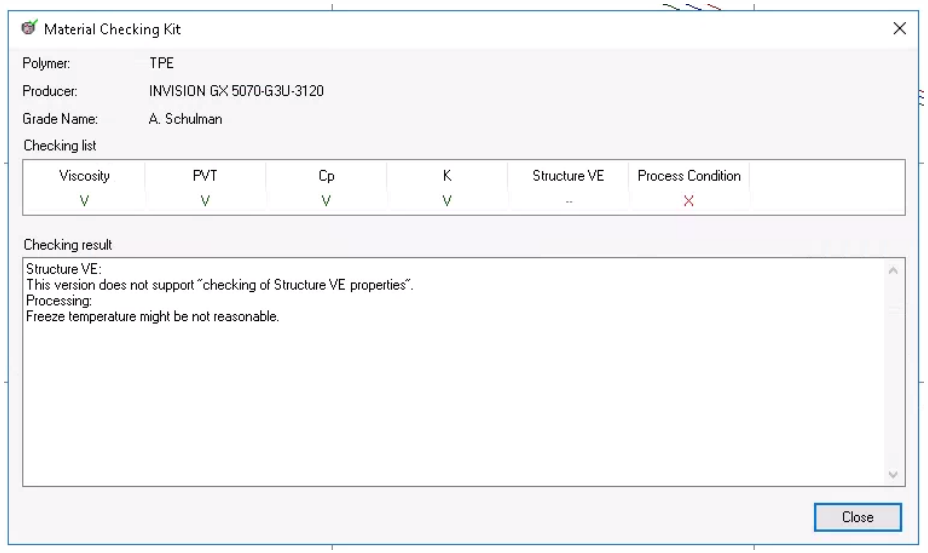
Material: Enhanced Material Checking Kit

- Cross check different material properties to ensure consistent material behavior for accuracy
  - Solver will launch checking and put result in analysis log
  - Checking criteria is according to basic material behavior (transition point and etc..) consistency
  - Improper items will be listed for their possible reasons
  - Support for thermo-plastic material



Viscosity, PVT, Cp, K…





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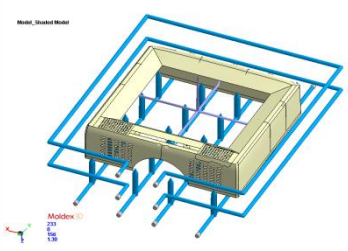
Cool : Mold Temperature Controller Advisor

- Predict flow rate and pressure drop of cooling channel, and heat dissipation of mold
  - Initially elevate mold up to operating temperature, maintain the temperature during operation and compensate for heat losses
- Adopt the pump performance curve (user input parameters)
  - For evaluating the mold temperature controller whether its performance is sufficient or not



Simulate

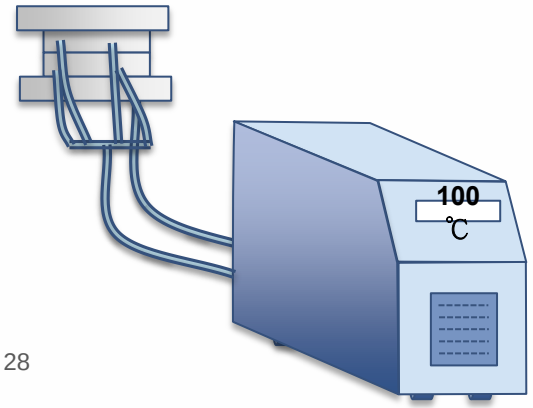
_MoldTempReqired.csv

	A	B	C	D	E
1	InletID	PressureDrop(bar)	Inlet FlowRate(cm3/sec)	Inlet FlowRate(L/min)	Heat Remove(kW)
2	1	3	495.27	29.72	3.05
3	2	3	948.25	56.89	3.92
4	3	3	581.91	34.91	6.006
5	4	3	717.48	43.05	3.342
6	5	3	495.27	29.72	2.853
7	6	3	484.69	29.08	4.282
8	7	3	948.25	56.9	3.814
9					
10					
11		Pressure Required(bar)	Total FlowRate Required(L/min)	Cooling Capacity Required(kW)	
12		3	280.27	27.268	

Max. pressure requirement

Total flow rate requirement

Cooling capacity requirement



Select

Evaluate

Evaluate with Controller's Specification

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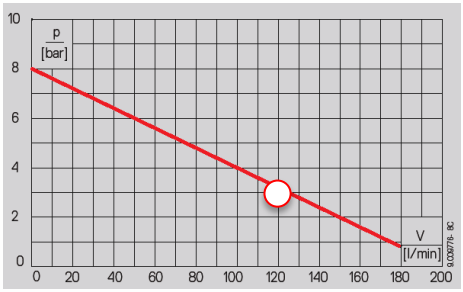
Cool: Mold Temperature Controller Evaluation

> Example: Regloplas P161XL specification

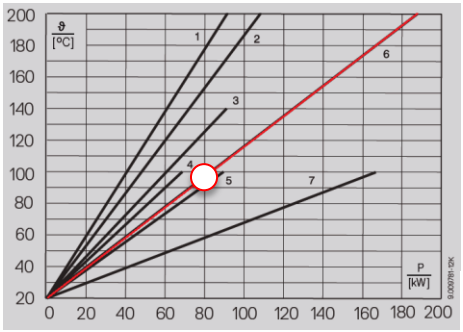
	Analysis requirements	Evaluation
Step1	Max. pressure requirement 3bar	Refer to pump performance curve.P161XL need flow rate 120 (l/min)underpressure 3 bar.
Step2	Total flow rate requirement 280 l/min	280(l/min)/120(l/min) ≈at least need 3 temperature controller
Step3	Cooling capacity requirement 27kW	Refer to cooling capacity curve. · P161XL provide 80kW cooling capacity. That's enough.

REGLOPLAS

Technical data		P161XL*
Outlet temperature max.	°C	160
Heat transfer fluid Filling quantity Expansion volume	 l l	Water 10,0 5,0
Heating capacity at 400 V	kW	20/40/60
Cooling capacity at outlet temperature Cooler (K) Diagram (Fig.)	kW °C	135 150 SK 6
Pump capacity/ Type Flow rate Pressure Power consumption Diagram (Fig.)	 l/min. bar kW	SM85 200 8,0 4,0 4
Control Measuring mode (Standard)		RT100 Pt100
Connections Outlet/inlet Cooling water mains		 G1½"IG G¾"
Dimensions W/H/D	mm	436/1356/1554
Weight approx.	kg	ca. 255-265



Pump performance curve



1	P140S SK, P160S SK, P160M(D) SK
2	P140S 2SK, P160S 2SK, P160M(D) 2SK
3	P140smart 1K
4	P100S 1K, P100M 1K
5	P100S 2K, P100M 2K
6	P141XL SK, P161XL SK,
7	P100S DK, P100M DK

Cooling capacity curve

https://kuwatec.nl/wp-content/uploads/2018/03/Kuwatec-Wilmod-Brochure-Regloplas-2017-ENG.pdf

Moldex3D

Moldex3D

Solver Capability

Solver Enhancement

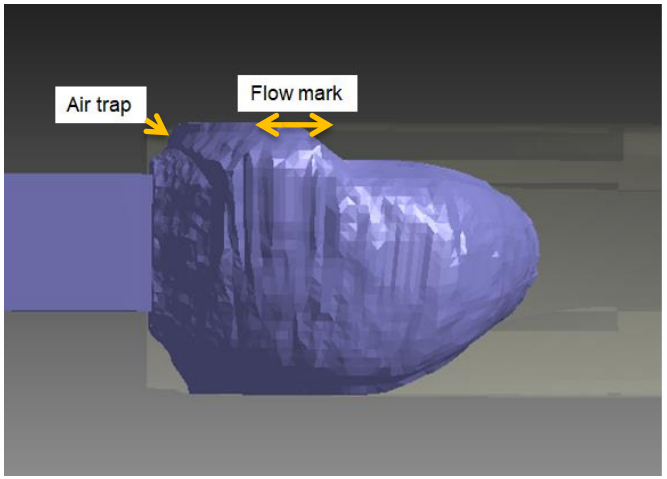
Advanced Analysis

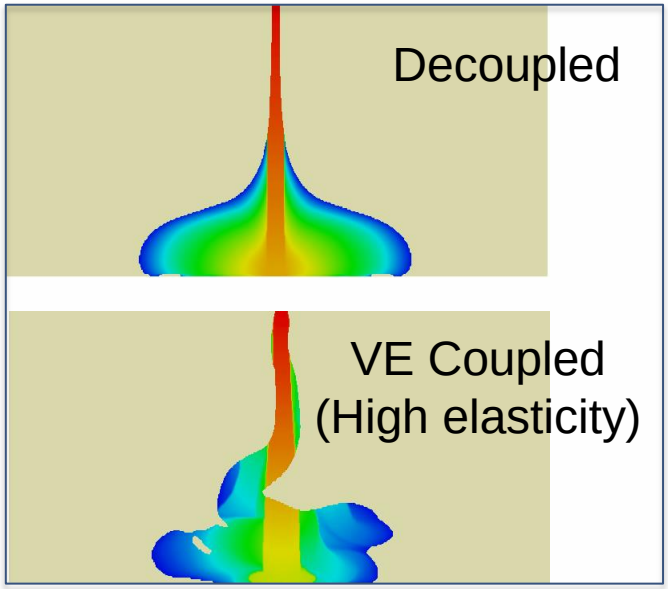
Machine Response & Characterization

Fiber Analysis

VE: Common Application of Flow-VE Coupling Analysis

- Jetting Prediction
  - Common slight jetting behavior in the thick part
  - May cause some defect likes flow mark, air trap….
- Simulation Trend Correction
  - Optical behavior
  - Cavity pressure
  - Warpage
- Advanced Molding Behavior
  - Die swell
  - Buckling

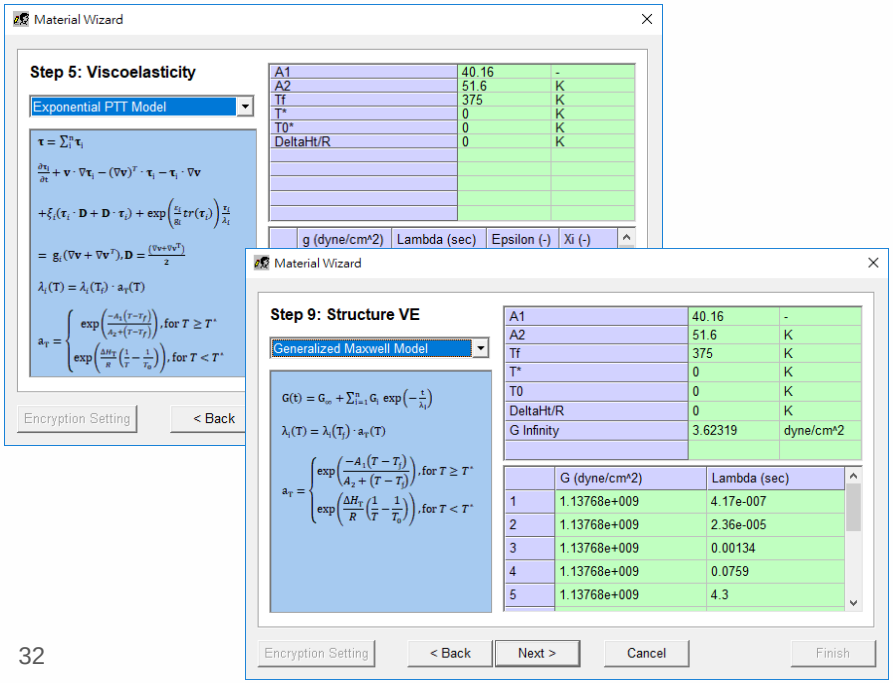


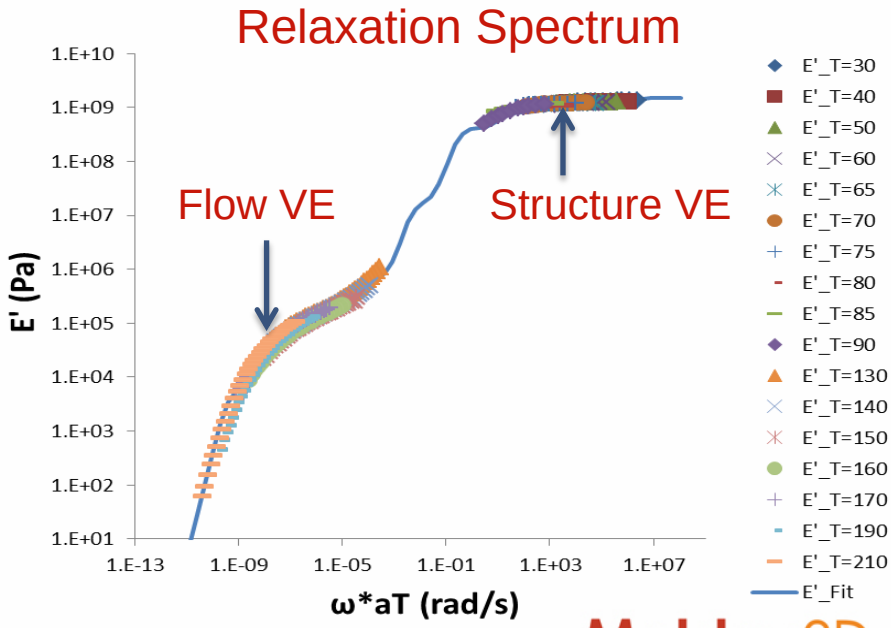


Moldex3D

VE : Enhanced Capability for Flow-VE Coupling

- Higher speed and stability calculation
  - Up to 2 times faster
- Improved material modeling for Flow and Structure VE
  - Consistency on model display and setting workflow
- More accuracy on Flow-VE coupling Simulation
  - Better prediction on vortex flow, warpage and optical behavior



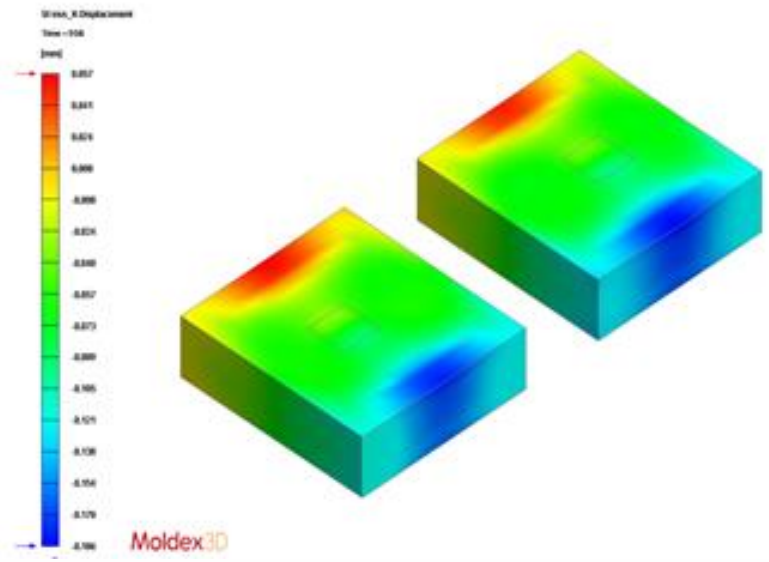


Moldex3D

Stress : Annealing Analysis with Fiber Orientation

- Consider the fiber orientation effect in annealing simulation
  - Annealing analysis automatically read fiber orientation data output from Flow-Fiber analysis
  - Use Mori-Tanaka model to consider fiber orientation effect on mechanical property
  - Perfect validation with leading FEA product

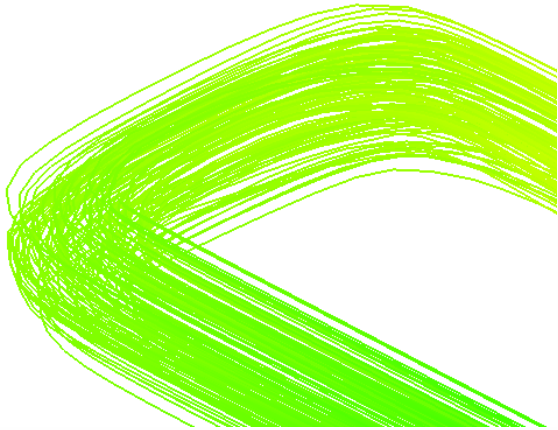
```
>>>  Analysis start time: Thu Jul 26 10:59:11 2018


<Computation parameter setting>
    Consider fiber orientation effect      = on
    Link with the Previous Shot            = off
    Consider Weld Line effect              = off
    Consider Gravity effect                = off
    Micro-Mechanics Model                  = Mori-Tanaka model
    Consider Flow-induced residual stress  = off
    Max. no. iteration                     = 5000
    Convergence tolerance                  = 5.000000e-005
    Solver acceleration                    = on
</Computation parameter setting>
```

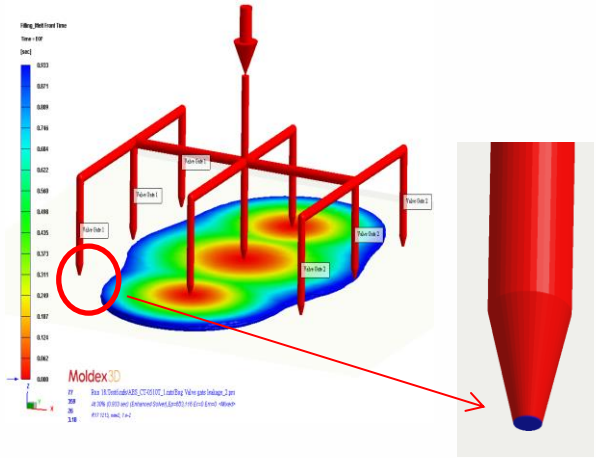


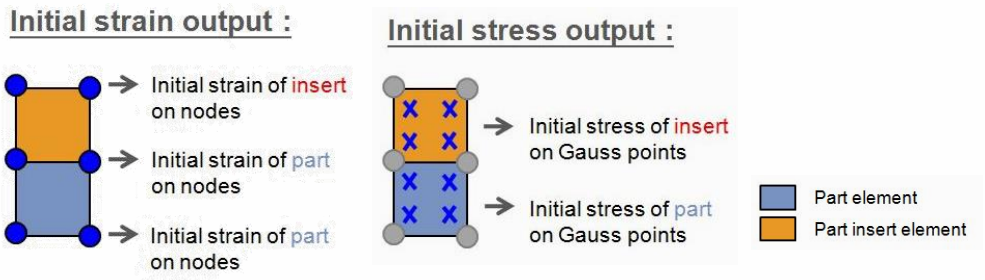
Moldex3D

Other Solver Enhancement

- [3D CFD] Enhance stream line calculation
- [Hot Runner] Enhance valve gate control simulation accuracy
- [Fiber/PIM] Enhance fiber/powder/filler concentration prediction
- [FEA-I] Initial stress can be output via FEA Interface.
  - **The initial stress output is equivalent to the initial strain output in application.**
  - **Benefit: Avoid interfacial co-node effect between part and part insert on numerical discrepancy for initial strain output.**







Moldex3D

Moldex3D

Solver Capability

Solver Enhancement

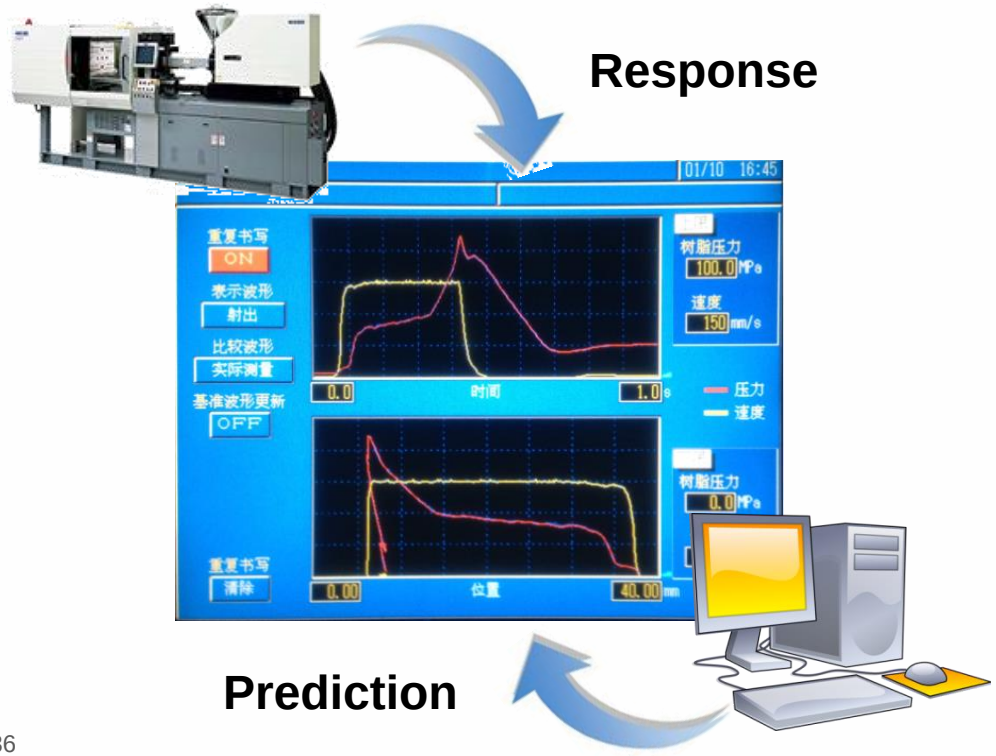
Advanced Analysis

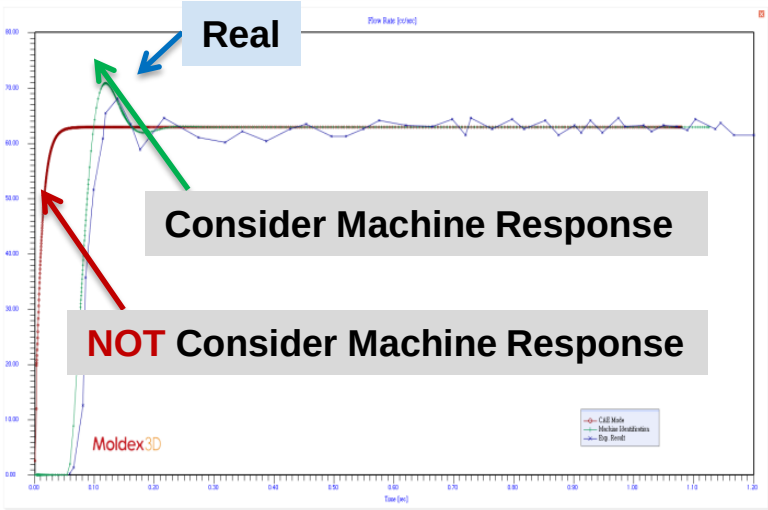
Machine Response & Characterization

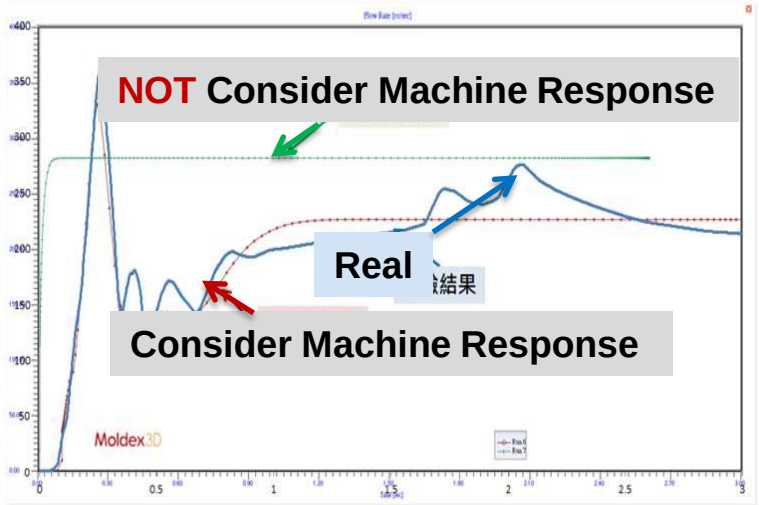
Fiber Analysis

Machine Response : Machine Response Simulation

- Consider the difference between operator process setting and actual injection behavior
  - Machine response can be highly diversified for different type machines and controllers







Moldex3D

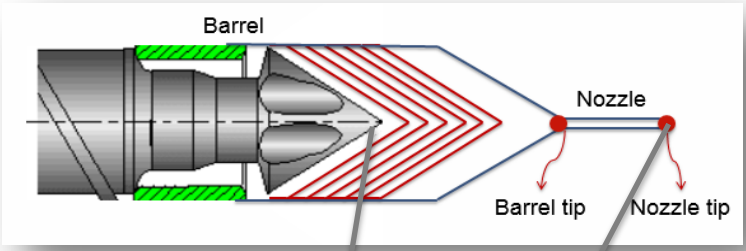
Machine Response : Melt Compressibility Effect inside the Barrel

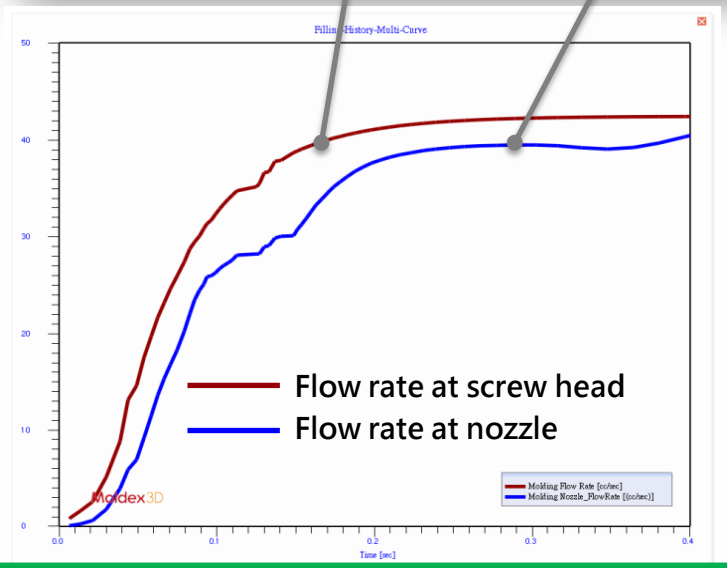
- Can collaborate with barrel compression consideration
  - Solver calculation option with Machine mode
  - Virtual nozzle and barrel will be considered automatically

Machine Response (Drive unit)

New in R17

+





Nozzle

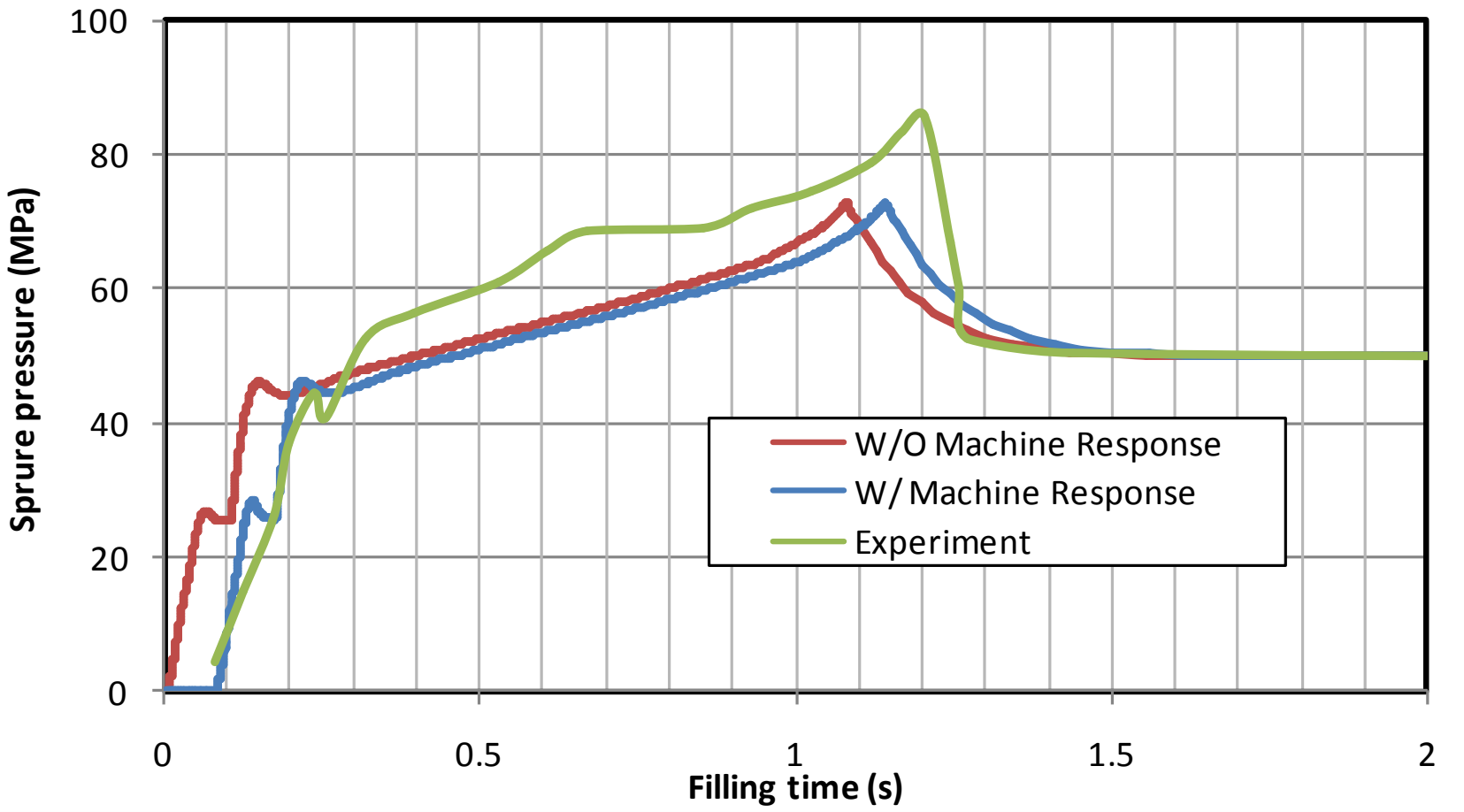
Screw (Barrel)

Before R17

Moldex3D

Machine Response : The effect of Machine Response

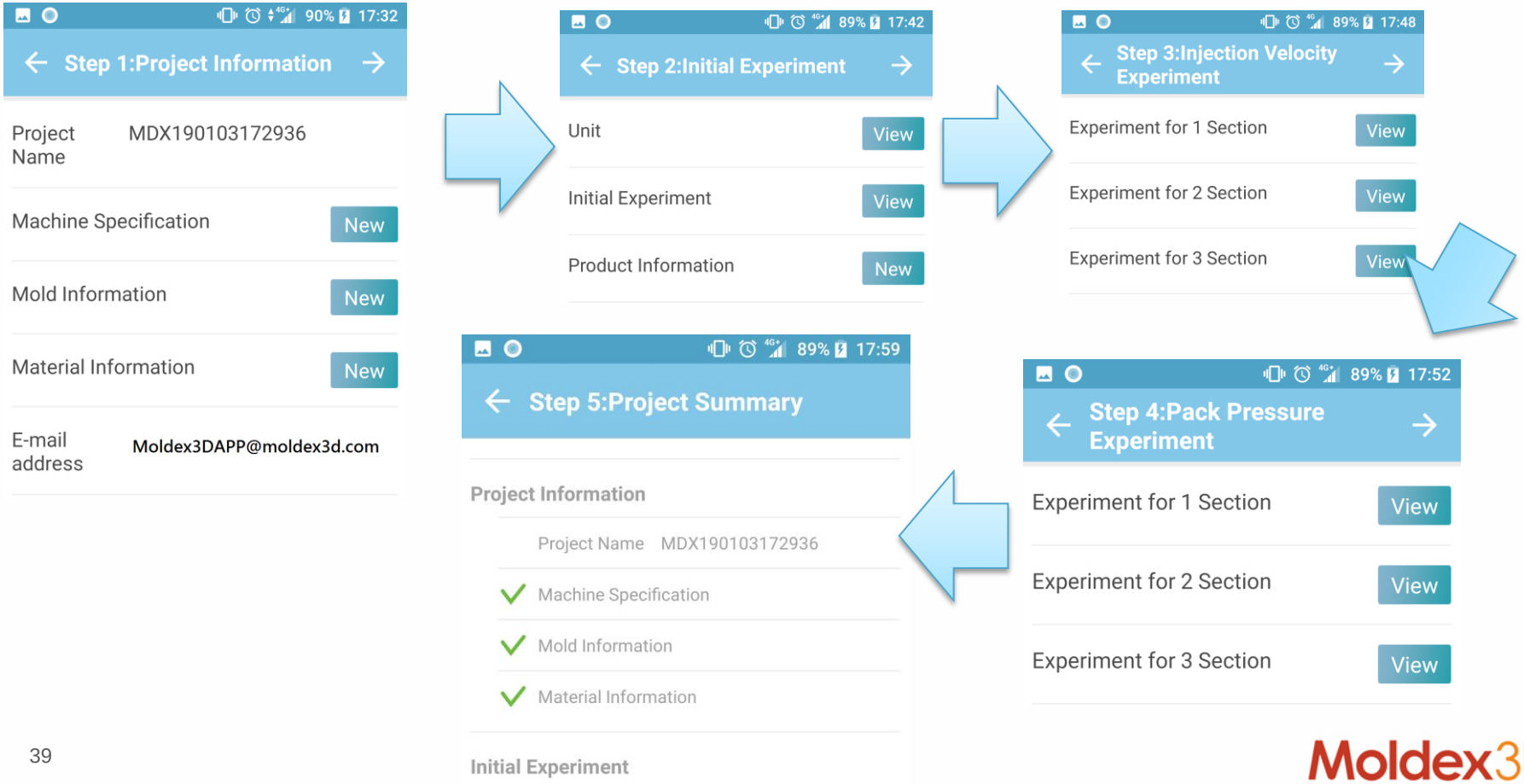
> Machine response with compressibility behavior inside barrel



Moldex3D

Machine Response : Machine Characterization APP

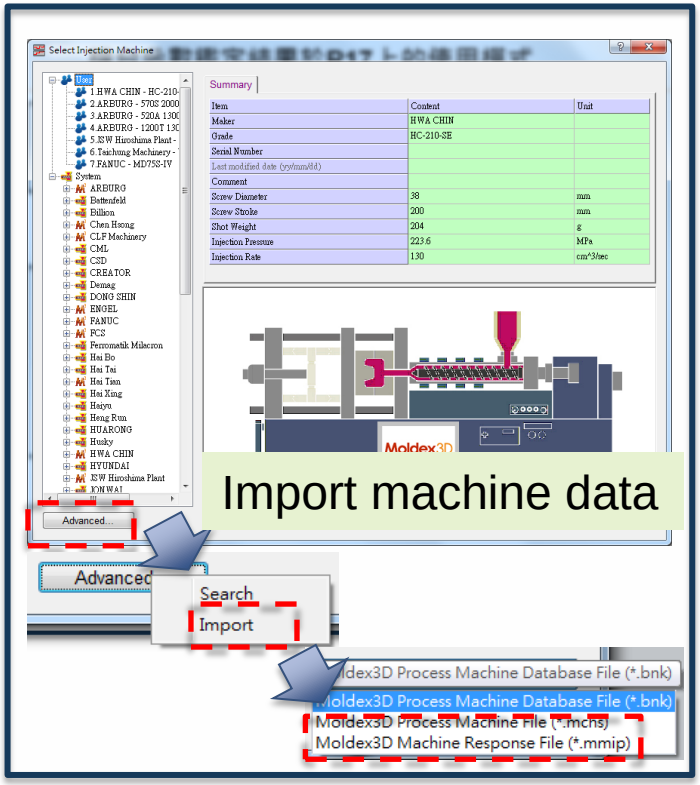
- 5 Steps to Complete Machine Characterization
  - Submit data to Moldex3D for receiving machine response file
  - Import machine response file (MMIP) in Machine Bank

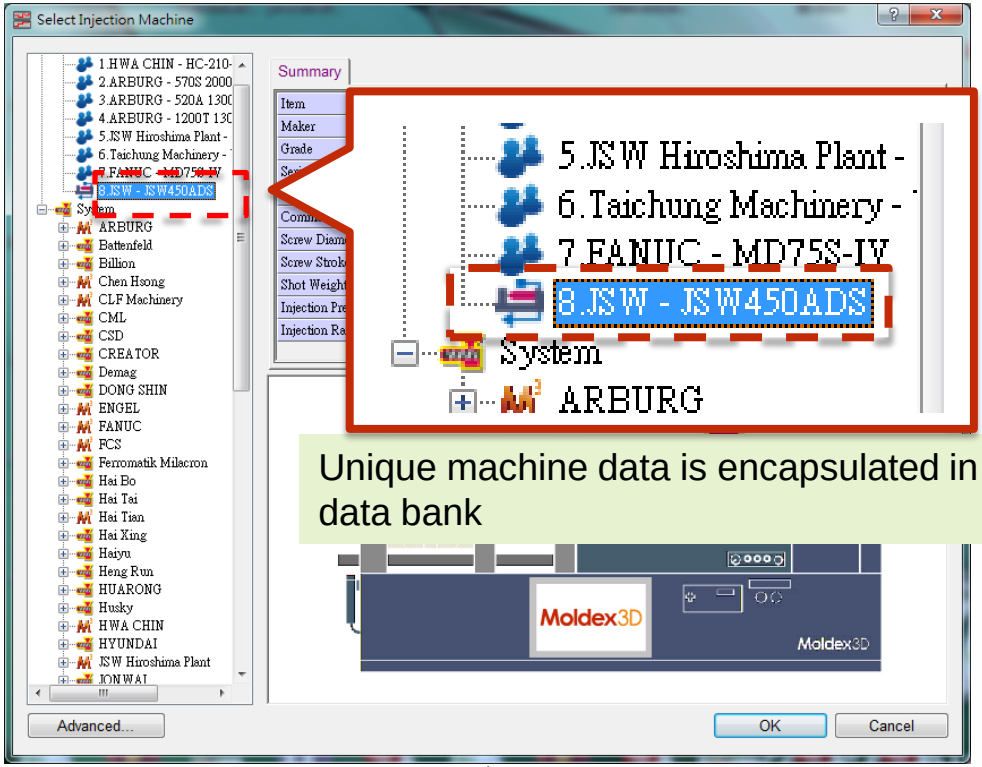


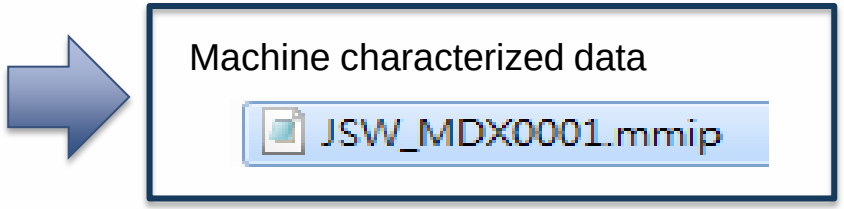
Moldex3D

Machine Response: Characterization for Specified Machine

> dditional license required
  - “MachineResponse”







Moldex3D

Moldex3D

Solver Capability

Solver Enhancement

Advanced Analysis

Barrel Compressibility & Machine Response

Fiber Analysis

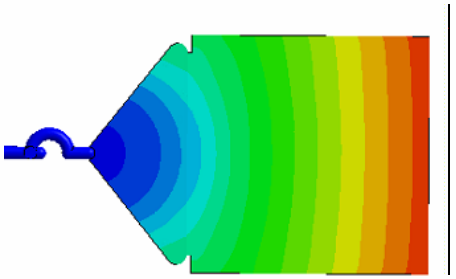
Fiber: Flow-Fiber Coupling – Analysis Theory

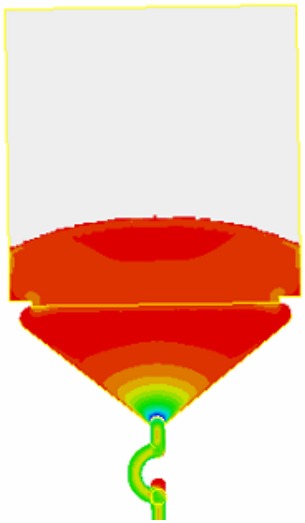
$$\frac{\partial \rho}{\partial t} + \nabla \cdot \rho \mathbf{u} = 0$$

$$\frac{\partial}{\partial t}(\rho \mathbf{u}) + \nabla \cdot (\rho \mathbf{u}\mathbf{u} - \boldsymbol{\sigma}) = \nabla \cdot \boldsymbol{\sigma} + \rho \mathbf{g}$$

$$\boldsymbol{\sigma} = -p\mathbf{I} + \boldsymbol{\tau}$$

$$\boldsymbol{\tau} = 2\eta \mathbf{D}$$





Flow

Stress

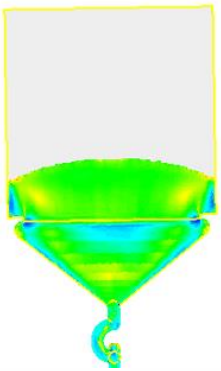
Orientation

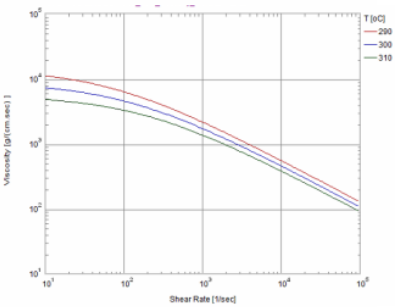
Viscosity

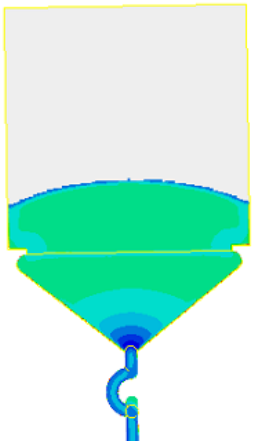
Fiber Orientation to Flow Viscosity

PASS

$$\dot{\mathbf{A}} = \dot{\mathbf{A}}^{\mathrm{HD}} + \dot{\mathbf{A}}^{\mathrm{iARD}}(C_I, C_M) + \dot{\mathbf{A}}^{\mathrm{RPR}}(\alpha)$$







Decoupling

Coupling

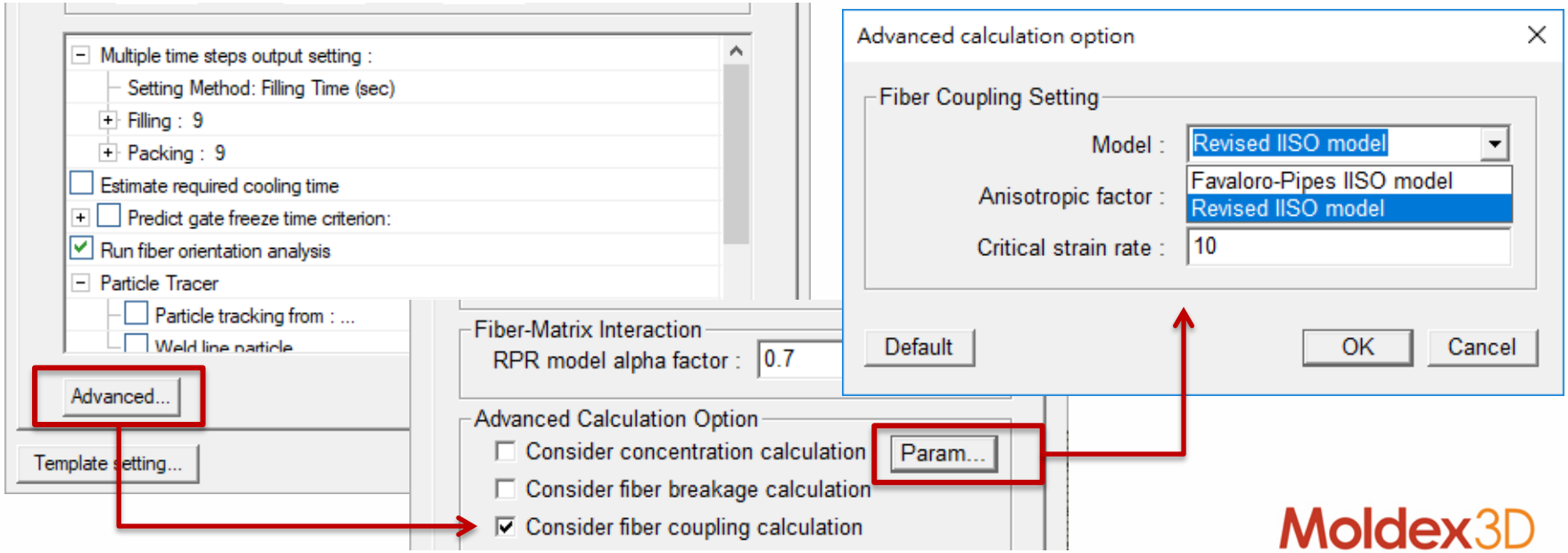
$$\eta(\dot{\gamma}, T, P) = \frac{\eta_0(T, P)}{1 + \left(\frac{\eta_0 \dot{\gamma}}{\tau^*}\right)^{1-n}}$$

$$\eta = \eta(\dot{\gamma}, T, P, \mathbf{A})$$

Moldex3D

Fiber: Flow-Fiber Coupling – Computation Parameters

- Apply two anisotropic viscosity models from collaborated research by Moldex3D (Ivor) and Purdue University (Pipes)
  - Favaloro-Pipes IISO model: Better for Compression Molding (CM)
  - Revised IISO model: Default, better for Injection Molding(IM)
  - Require additional license: EnhancedFiber
  - **Benefit**: advanced simulation of anisotropic flow behavior induced by fiber orientation of FRP material

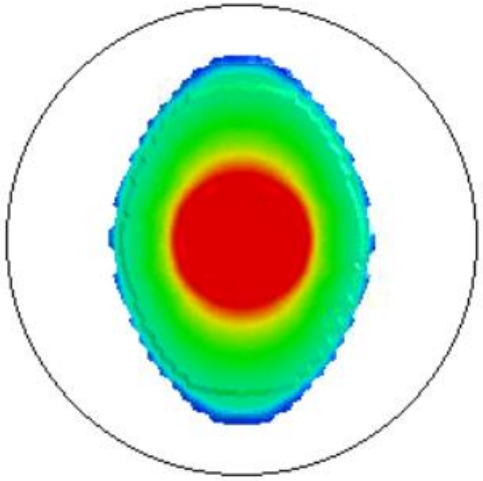


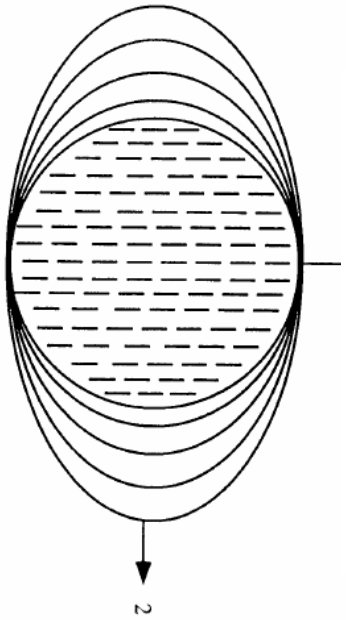
Moldex3D

Fiber: Flow-Fiber Coupling for Compression Molding

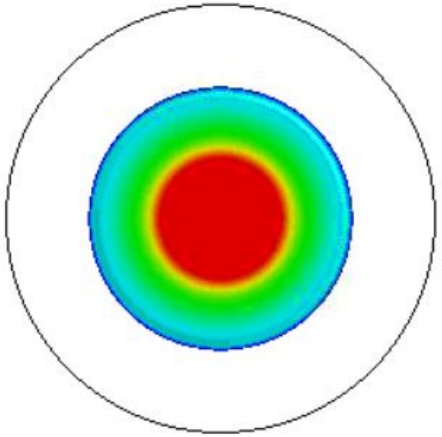
- Full coupled fiber-flow analysis to simulation anisotropic flow
  - Compression molding: GMT. SMC
    - with high fiber concentration: >> 20 vol%
  - Effect of high fiber orientation on flow behavior

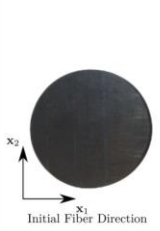
Fully Coupled





Decoupled





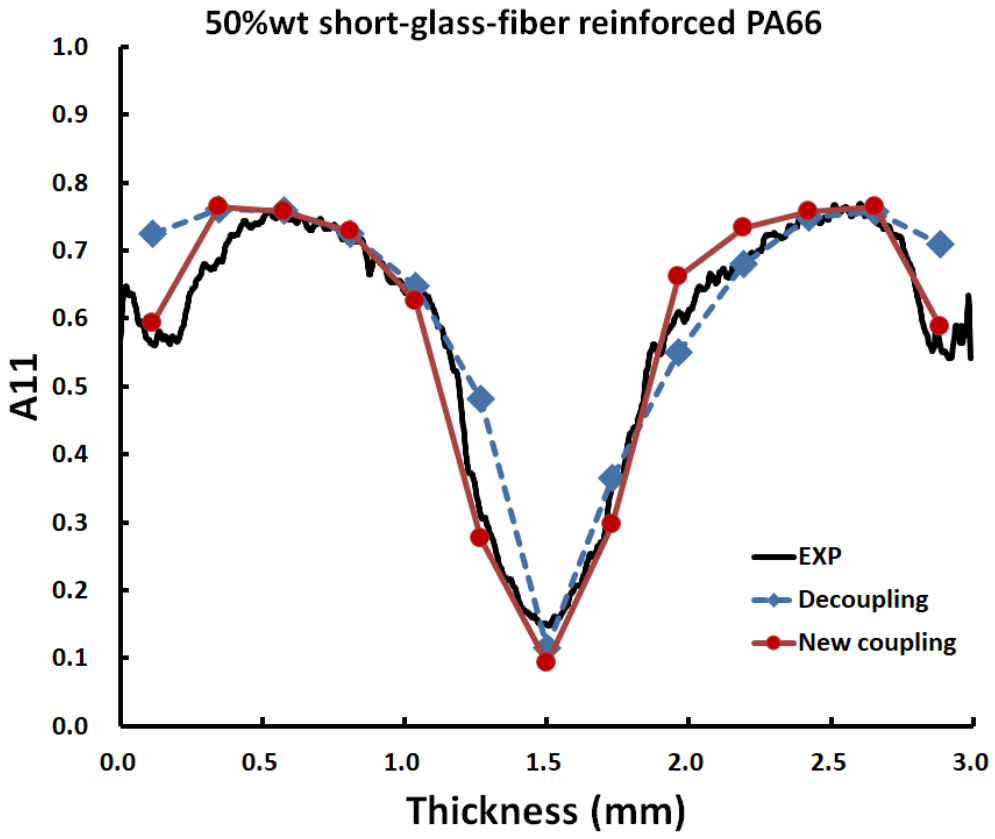
(b)

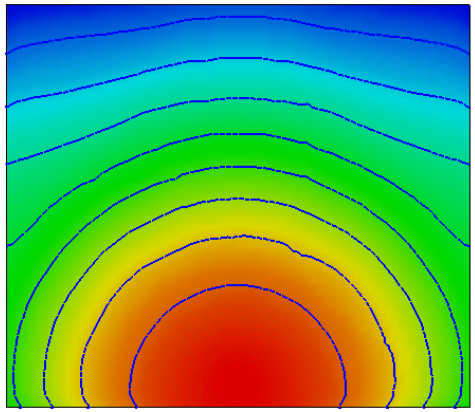
(c)

Moldex3D

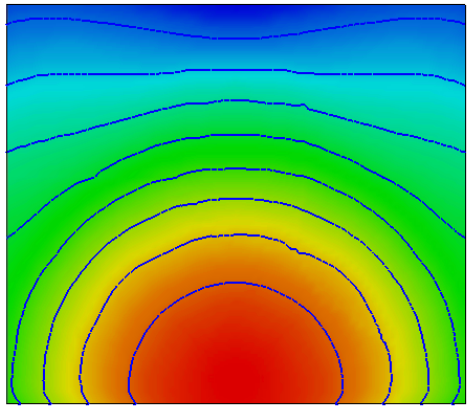
Fiber: Flow-Fiber Coupling for Injection Molding

- Full coupled flow and fiber orientation simulation for anisotropic viscosity and flow in Injection Molding
  - flow advances faster near the edge than in the center





Decoupled



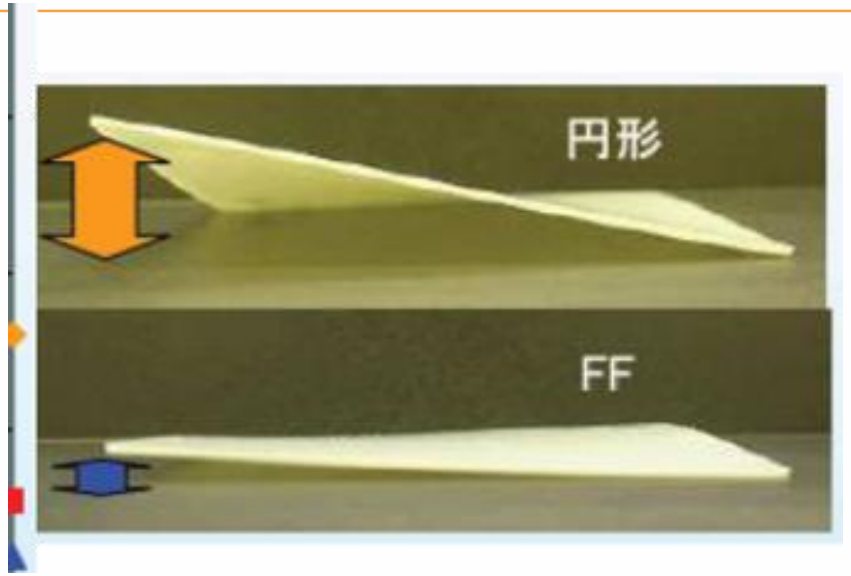
Fully Coupled

moldex3D

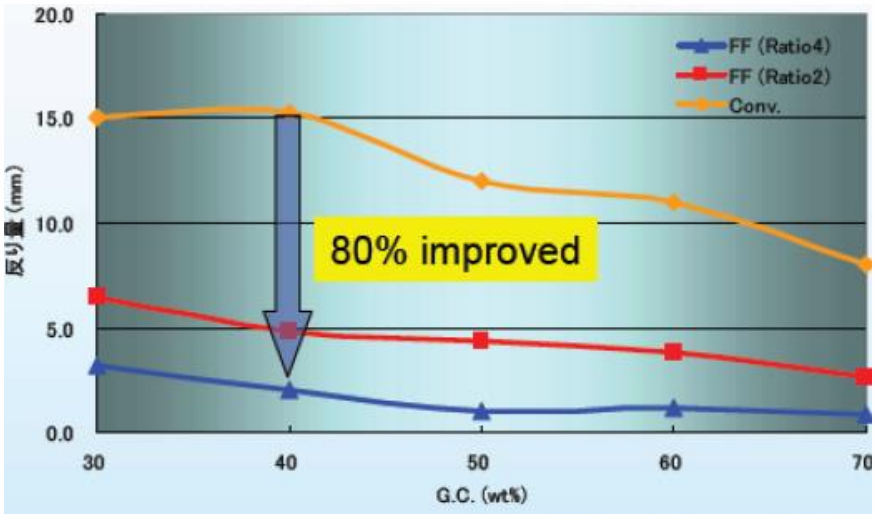
Fiber: Flat Fiber – New Type Filler in Simulation

- Flat fiber has different cross section shape to regular fiber
- Significant effect on improving warpage result in experiment

Oval cross-sectional shape



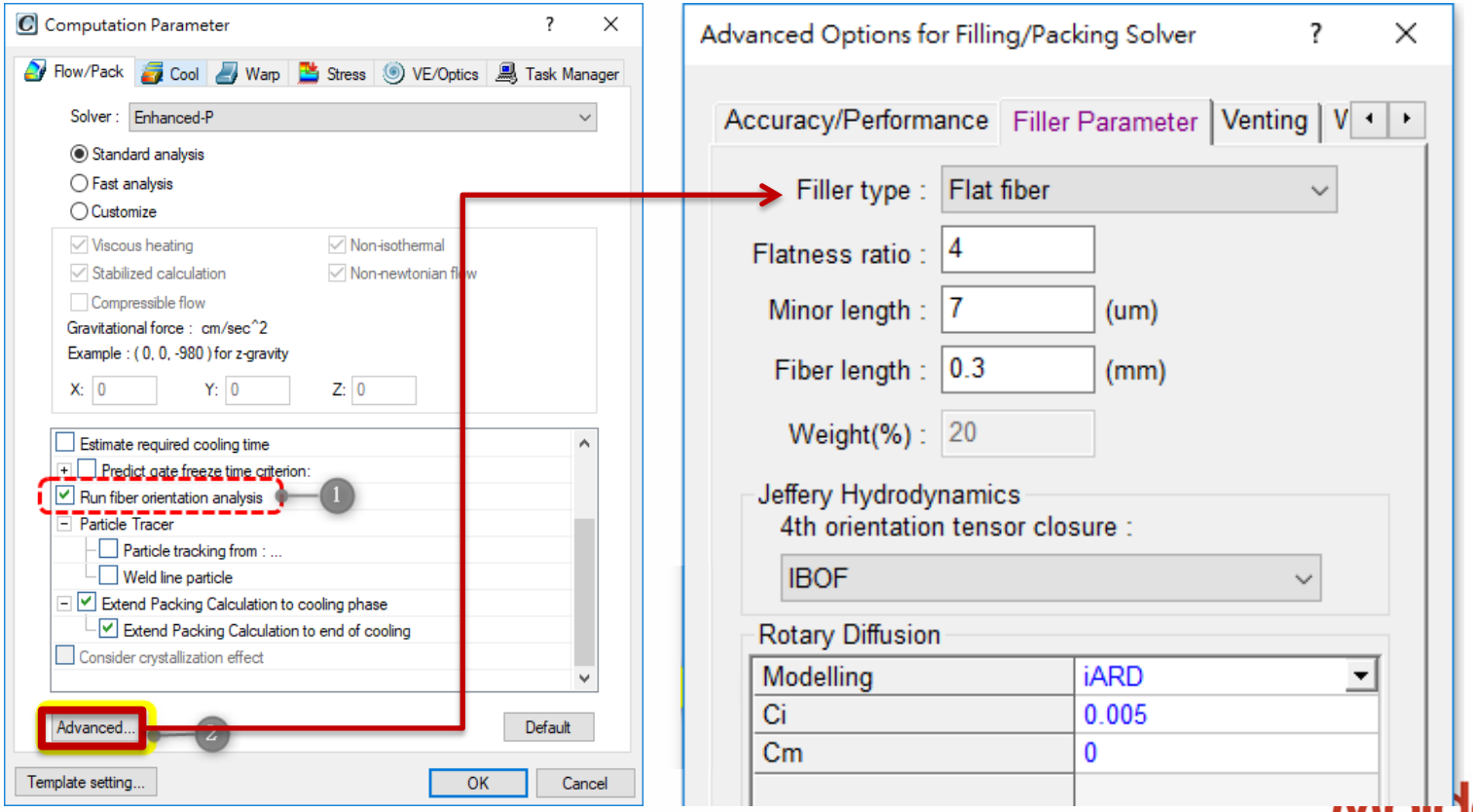
http://www.nittobo.co.jp/business/glassfiber/frtp/hisff.htm



Moldex3D

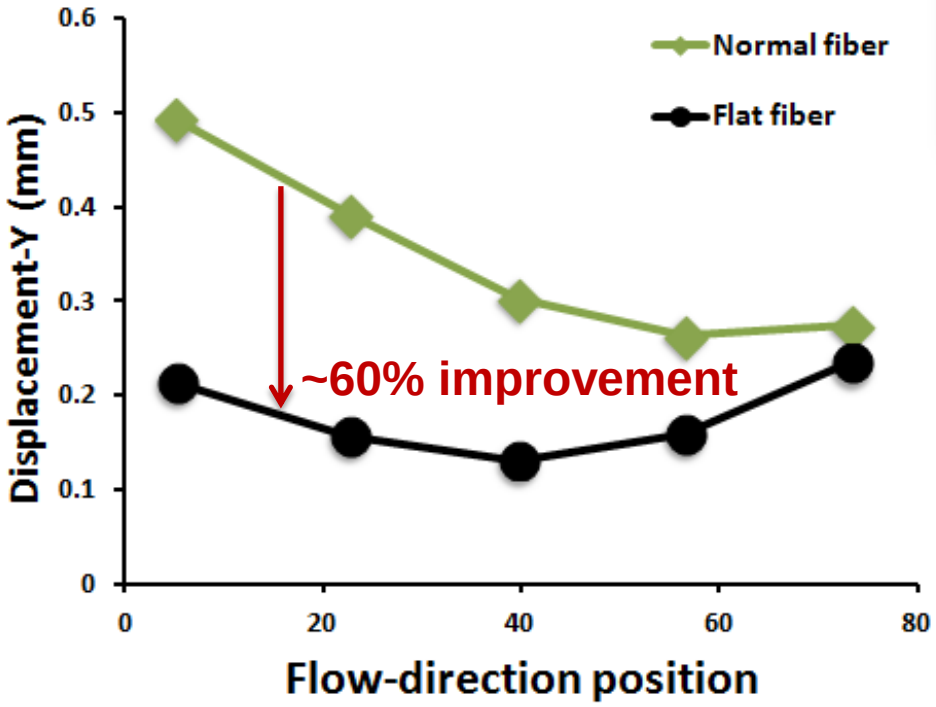
Fiber : Flat Fiber Simulation & Computation Parameters

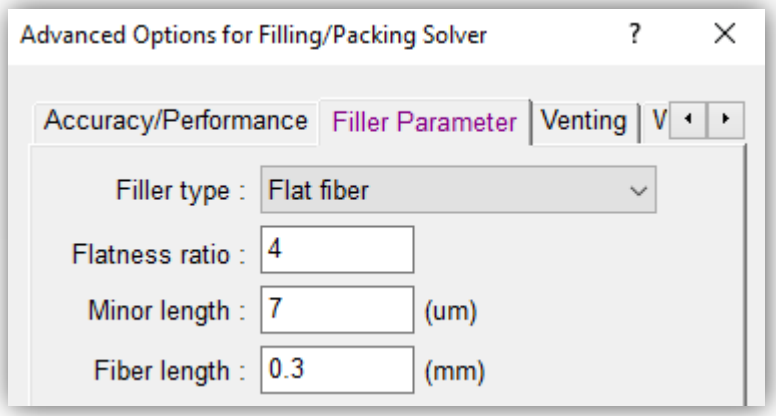
> [Fiber] Support Fiber analysis with flat fiber
  - Require additional license: EnhancedFiber
  - Additional filler option in Computation Parameter
  - **Benefit:** Expand Fiber analysis capability for new reinforced filler

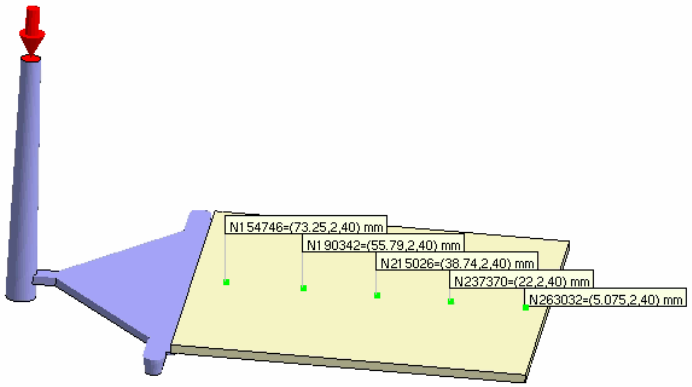


Fiber: Flat Fiber – Warpage Improvement Validation

> By having this oval shape of glass fiber, various properties as a base material for injection molding are shown improved :
  - Fluidity
  - Dimensional stability
  - Tensile strength







Moldex3D

Moldex3D

Moldex3D

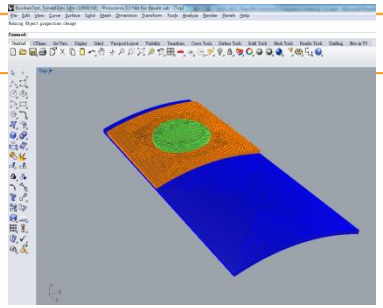
Molding Innovation

RTM Solver Capability

Foaming Molding Solution

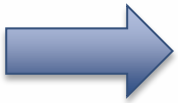
Other Molding Types

RTM : Easier Mesh Preparation for RTM

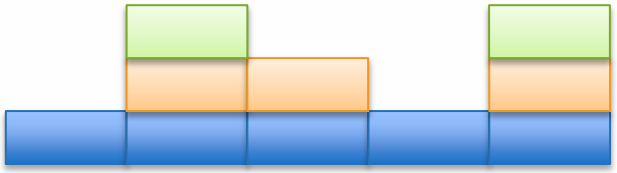


> 1. Auto Hybrid tool:
  - Extrude solid mesh from surface

User setting the ply information

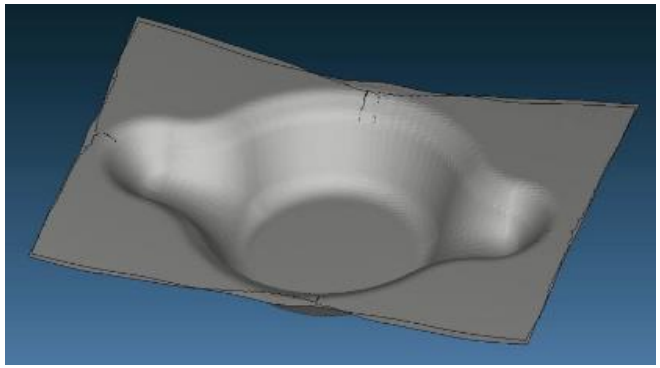


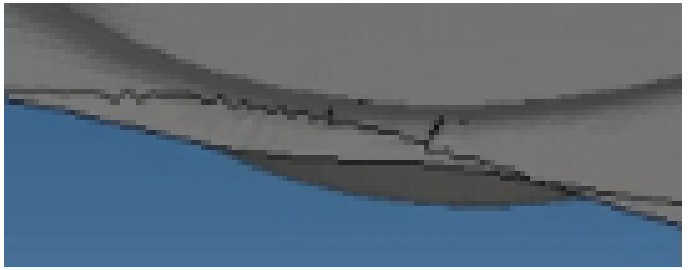
Auto hybrid tool



Solid mesh

> 2. Multiple layers from LS-Dyna draping result





Support user to import multiple layers draping result.

RTM：Melt Overflow Data Output and Curing Mold Temperature Profile Setting

> Output overflow amount through vent to LOG after analysis

> Set mold temperature profile in Curing stage

– **Manufacturer raises the mold temperature to reduce curing time.**

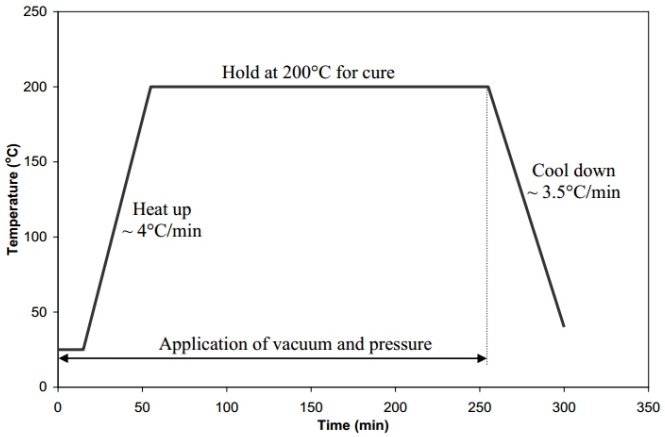
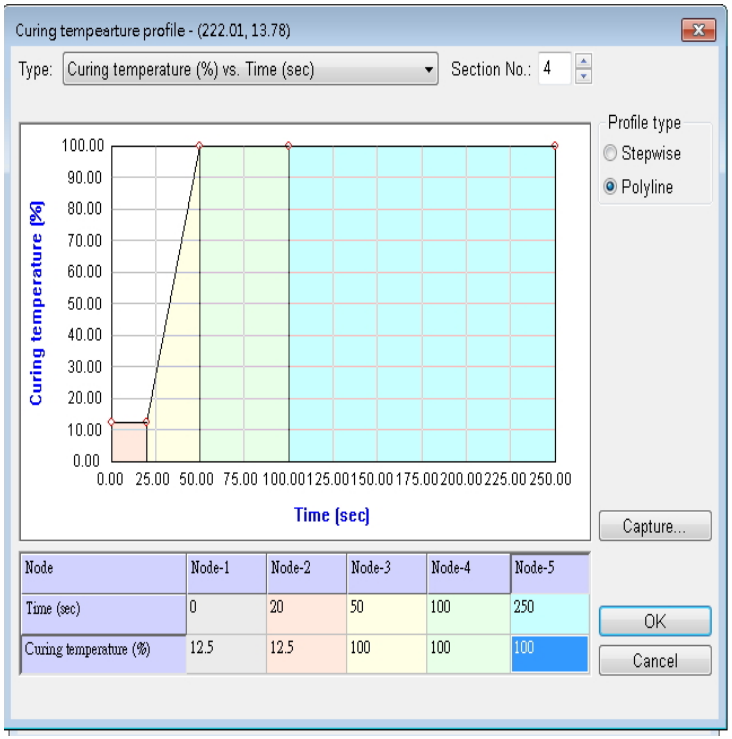


Figure 1.7: Temperature profile utilized during autoclave curing of 24 plies of AS4/3501-6 graphite/epoxy prepregs.

Ref：Effect of post-fill pressure and nanoclay on void morphology in resin transfer molded composites.



Moldex3D

Moldex3D

Molding Innovation

RTM Solver Capability

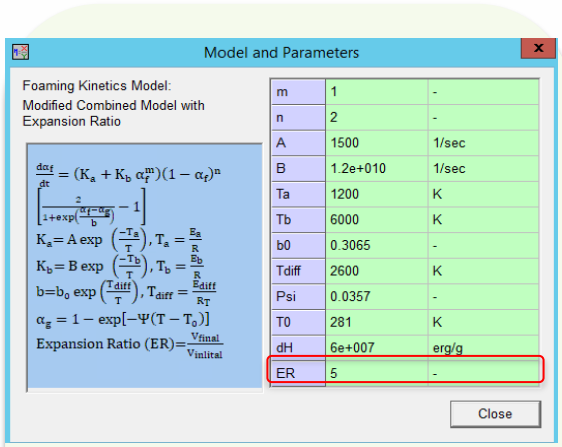
Foaming Molding Solution

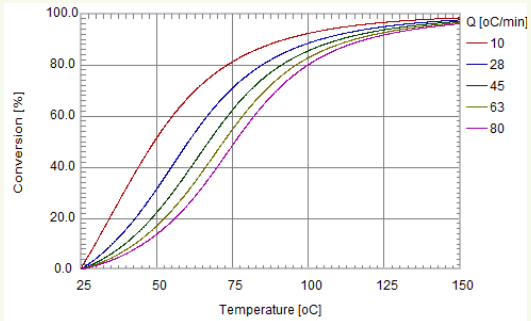
Other Molding Types

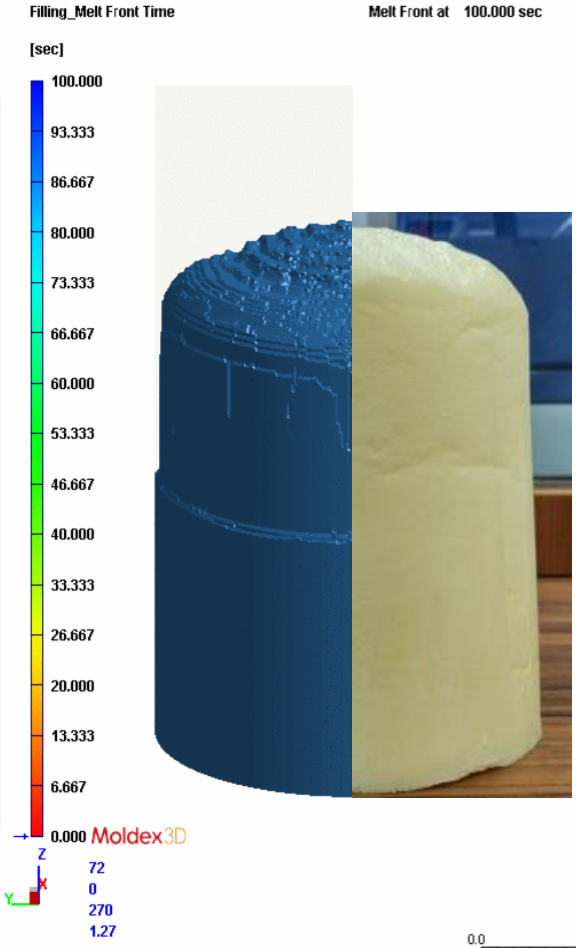
CFM: Enhanced Foaming Kinetics Model

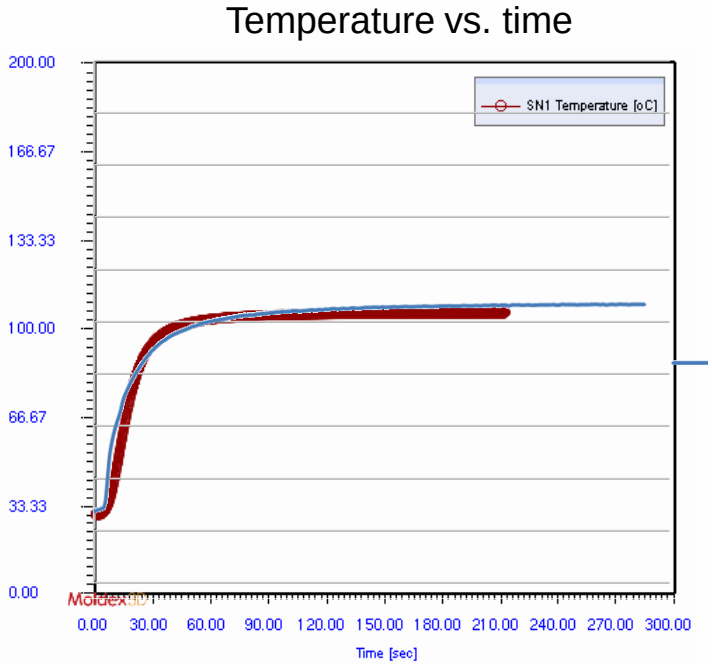
> Foaming Analysis with Specified Expansion Ratio

– Improved simulation accuracy validated with FOAMAT experiment for fine material data and process conditions









Moldex3D

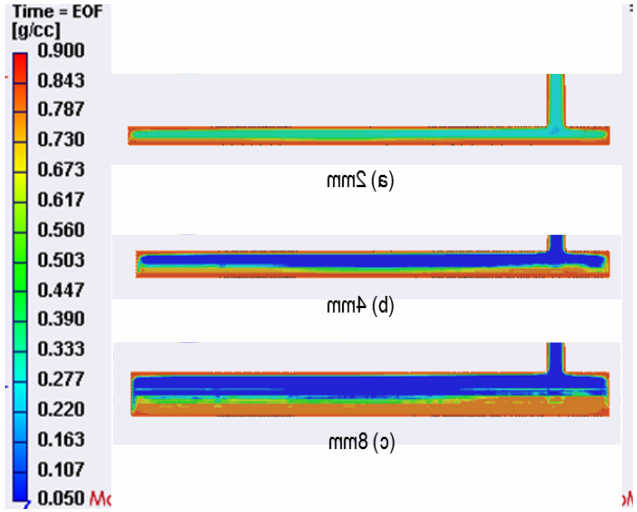
FIM: Improved Coreback Simulation

> Consider bubble convection during FIM (Foam Injection Molding) Coreback process
  - To better observe bubble transportation during cavity expansion
  - Better stability and accuracy on bubble distribution prediction
  - Good result for moderate Coreback distance

Coreback distance 2mm

Coreback distance 4mm

Coreback distance 8mm



Moldex3D

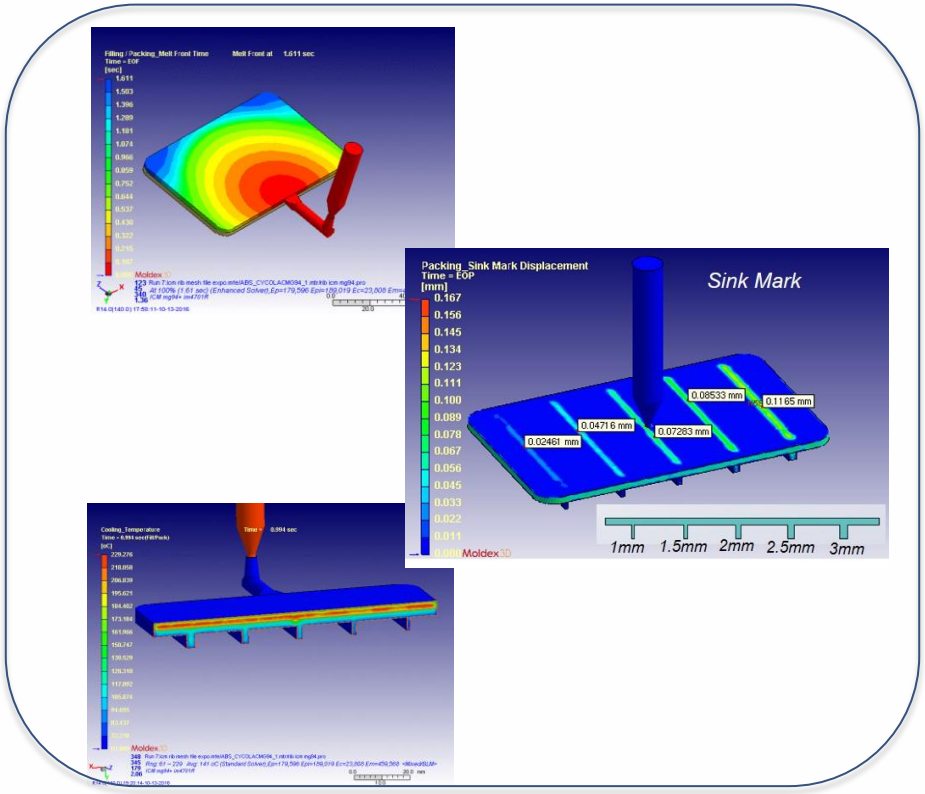
Moldex3D

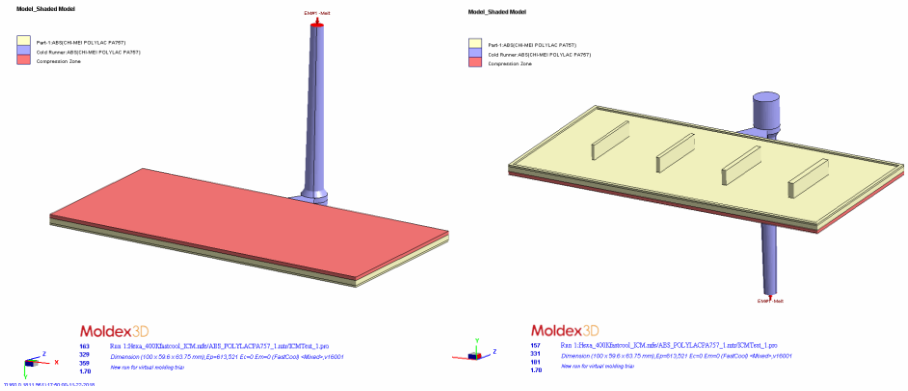
Molding Innovation

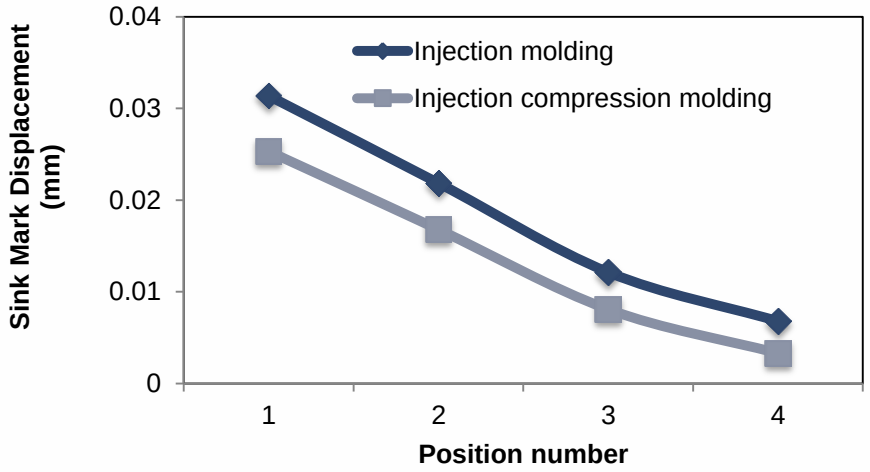
RTM Solver Capability
Foaming Molding Solution
Other Molding Types

ICM: Sink Mark Output for ICM Simulation

- Fully support Sink mark prediction for ICM process.
  - Compression part is modeled by compression zone





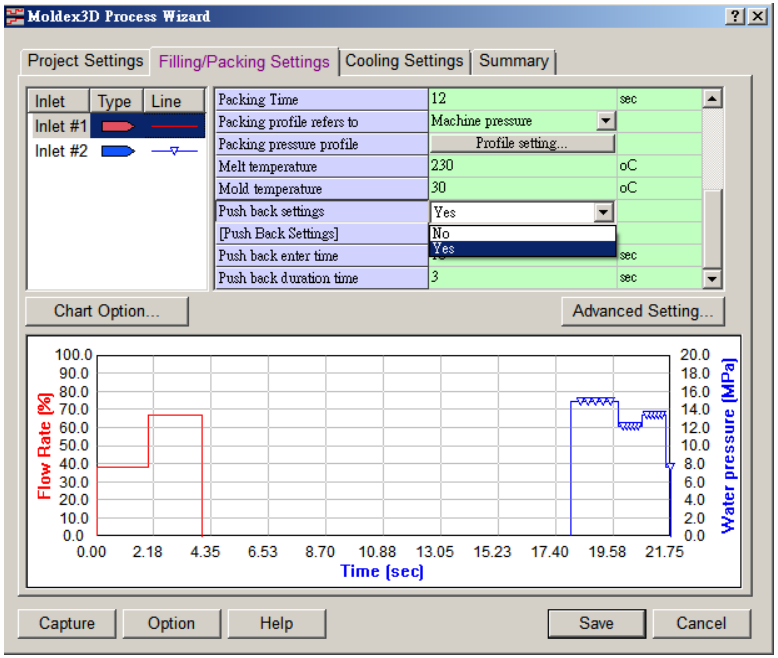


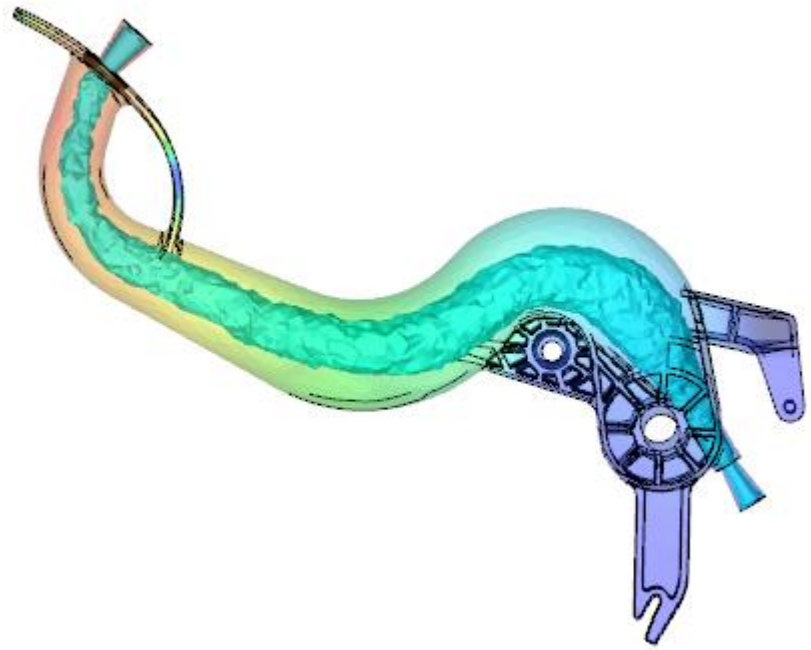
2K-ICM Simulation Framework to Enable Design Optimization for Surface Aesthetics
http://www.moldex3d.com/en/2018-gita-winners-company-n10/

Moldex3D

GAIM : Support Push-back Process

- The process set gate and fluid inlet on different side of cavity
  - GAIM use gas with lower thermal transport ability, and thus will cause more core-out volume in part especially near inlet
  - **Benefit**: reduce flow mark by short-shot process and recycle the material push back to barrel to avoid overflow waste

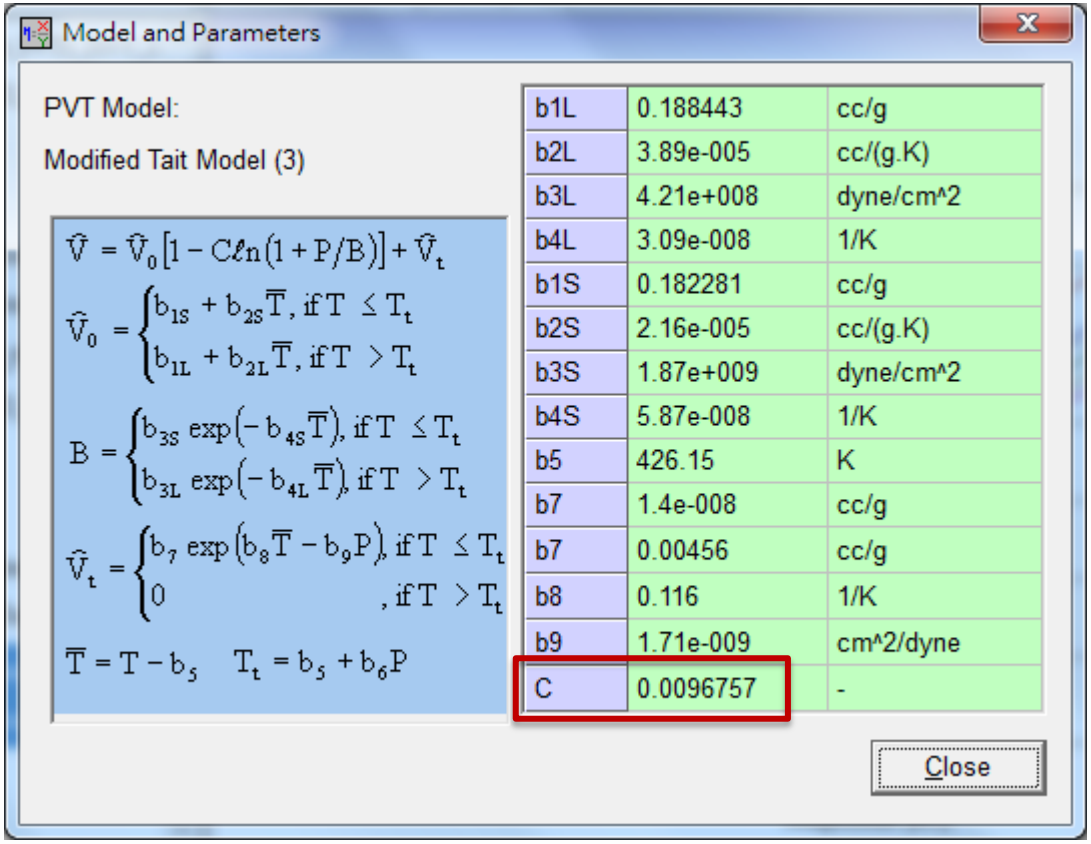




Moldex3D

PIM: New PVT Model

- New PVT model: Modified Tait Model (3)
  - To more accurately present compressibility change of PIM (Powder Injection Molding) material under different pressure
  - Coefficient C becomes fitting instead of fixed parameter



Moldex3D

Moldex3D

Pre/Post-processing Tools

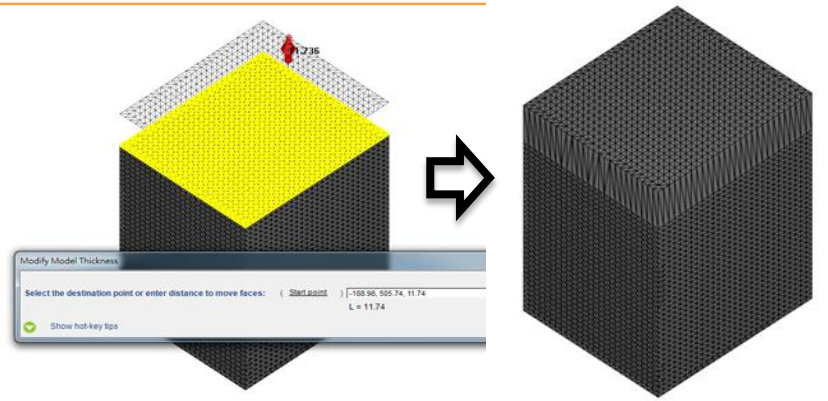
CAD & Mesh Tool

Meshing Kernel

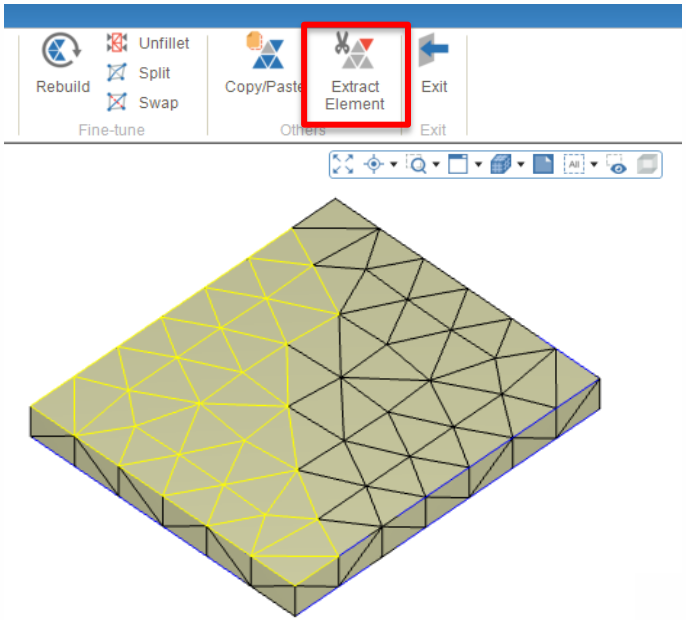
Modeling Wizard

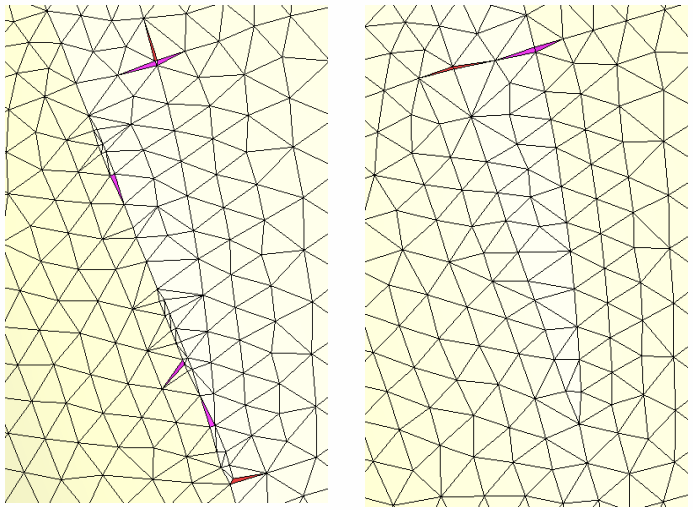
BLM : Improve Surface Mesh

- Allow locally modify thickness by scaling surface mesh



- Support to extract element
  - Consider feature line during surface mesh generation
- Enhance Unfillet Wizard
  - Better Performance and Speed



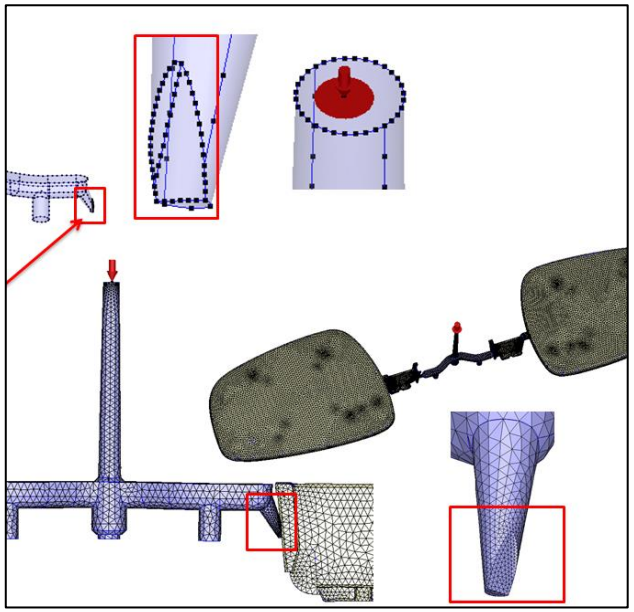


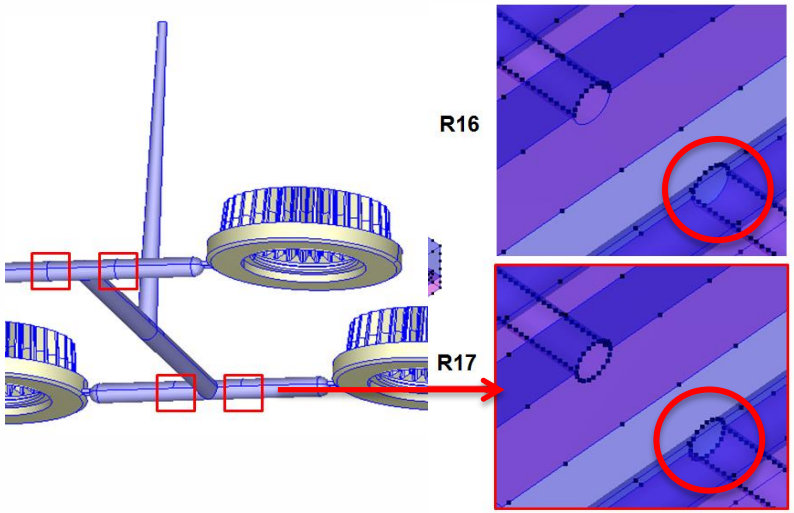
Original Result New Result

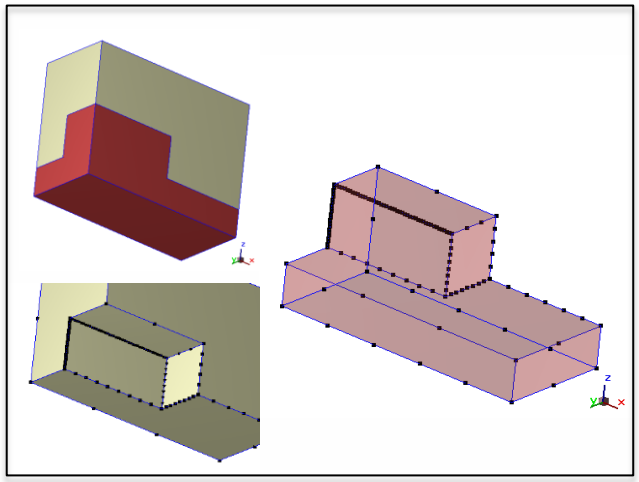
Moldex3D

BLM: Node Seeding Auto-refined Enhancement

- Node seeding auto-refine for geometry runner system
  - Mesh refine around inlet/outlet of geometry runner and cooling system
  - Adjust mesh parameter for runner and cooling system
- Full mold quick seeding function
  - Support Edge to Face seeding mapping
  - Support seeding mapping from Part/Part insert to other components







Moldex3D

Moldex3D

Pre/Post-processing Tools

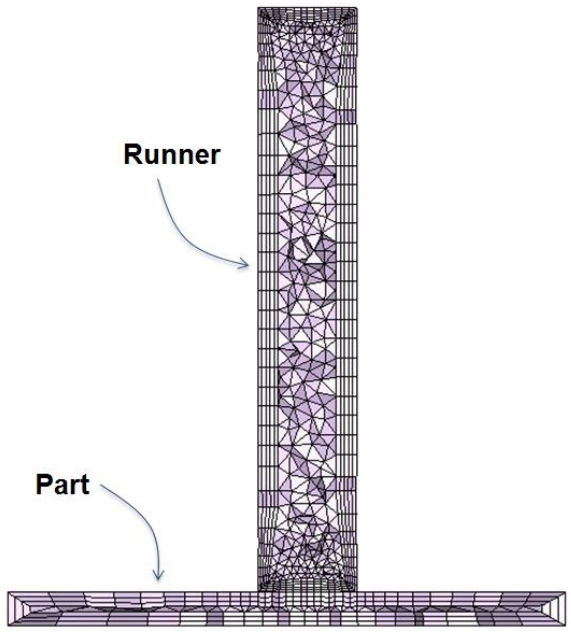
CAD & Mesh Tool

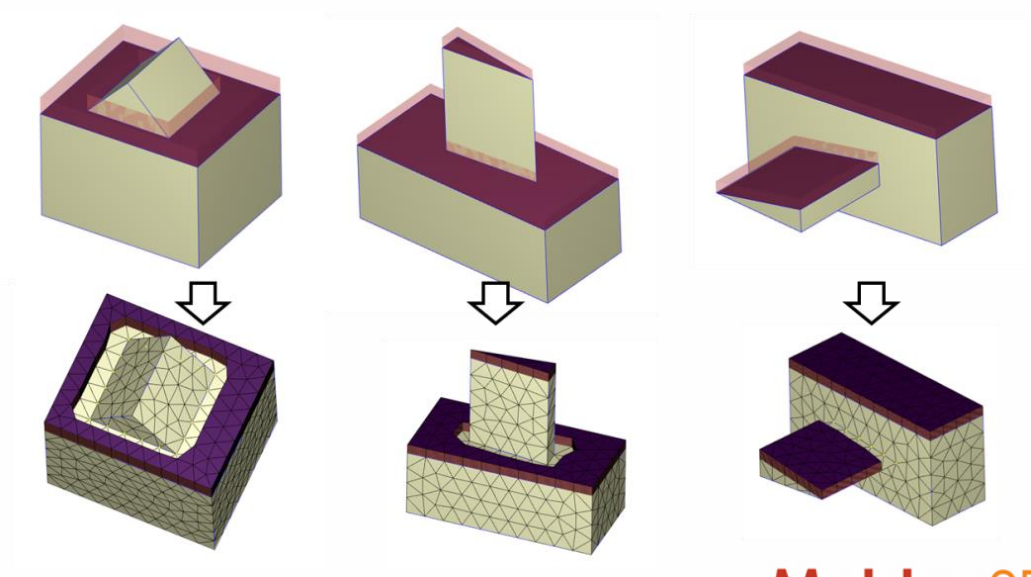
Meshing Kernel

Modeling Wizard

BLM: Mesh Generation Performance Enhancement

- Add option for auto BLM offset ratio adjustment
  - Separated BLM parameters for part and other components
- Support Prism mesh element for Compression Zone
  - Add option to switch mesh type between BLM and Prism in wizard with corresponding parameters to modify
  - Skip unsupported feature to avoid interference during mesh generation (too large angle / nearly vertical / concave corners)





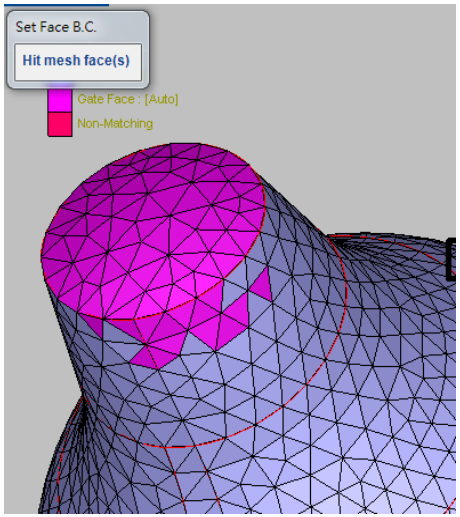
Moldex3D

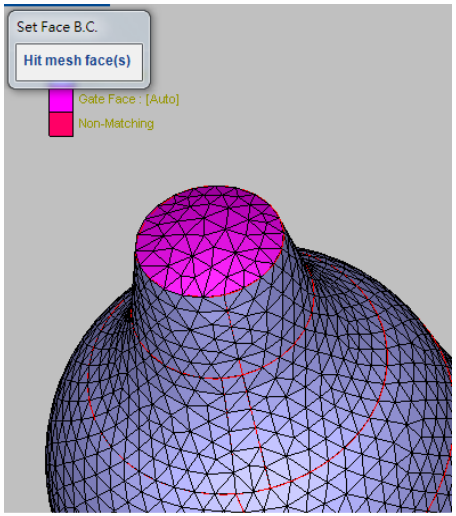
BLM : Gate Rebuild Capability Enhancement

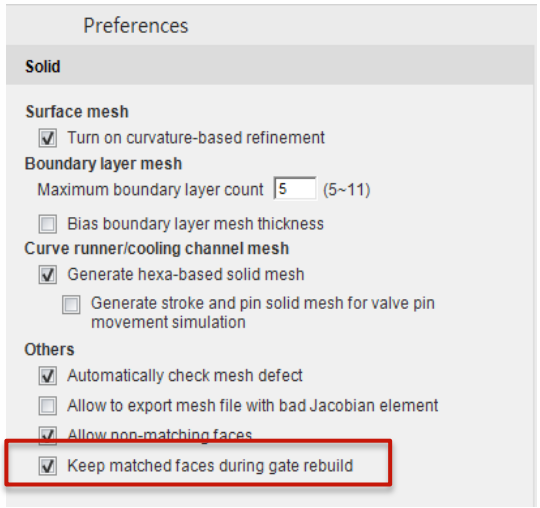
> Gate rebuild can keep surface mesh after matching faces

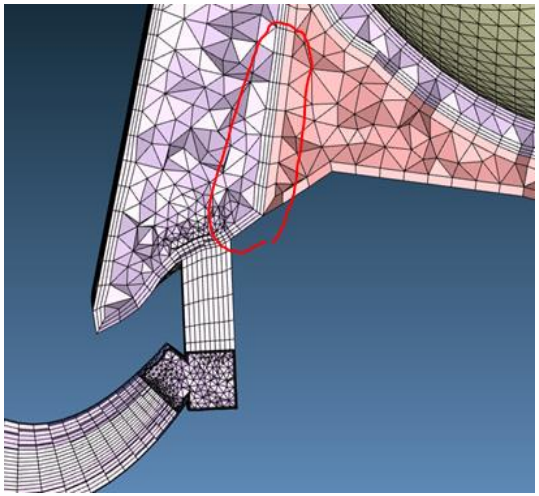
> Allow editing and fixing gate face BC

  – **Show Gate Face BC when contact issue found during mesh generation for users to manually fix it (Add/Remove BC)**









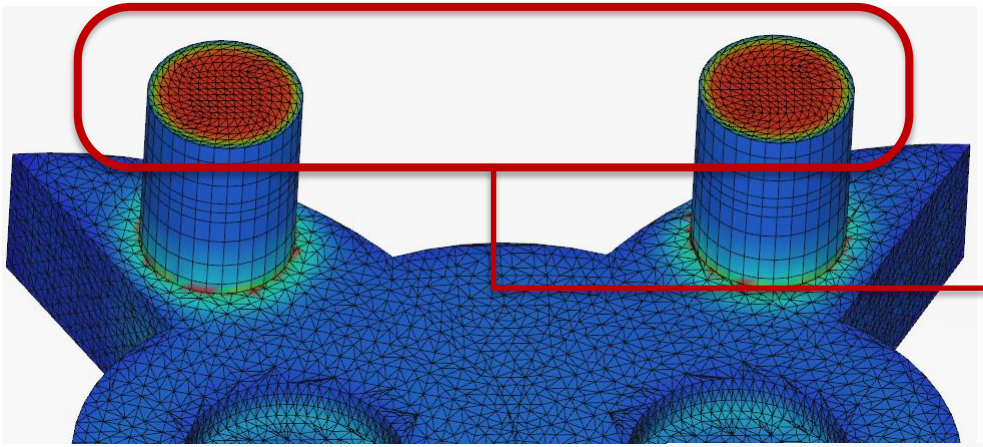
Moldex3D

BLM : Non-matching Mesh Enhancement

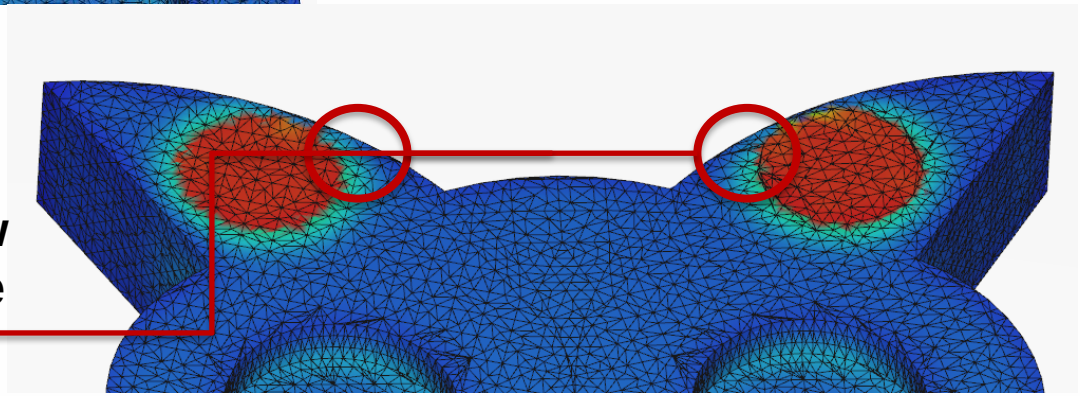
- Non-matching Moldbase / Mold Plate Meshing Enhancement
- Improved Node Seeding
  - Auto density control: Part、Runner、Gate、Cooling Channel、Moldbase、Mold insert、 Mold Plate
- Check Model interference between Components
- Check Mesh Defect and Issue
  - Highlight Trouble point and Bad orthogonality
  - Find and fix mesh interference

eDesign: Enable Hexa-based Runner Mesh

- Hexa-based mesh kernel is available in eDesign Mode
  - Better to observe flow and thermal behavior especially near the junction of part and runner



Hexa-based Structural Runner Mesh



Better Prediction of Flow Pattern and Temperature Distribution

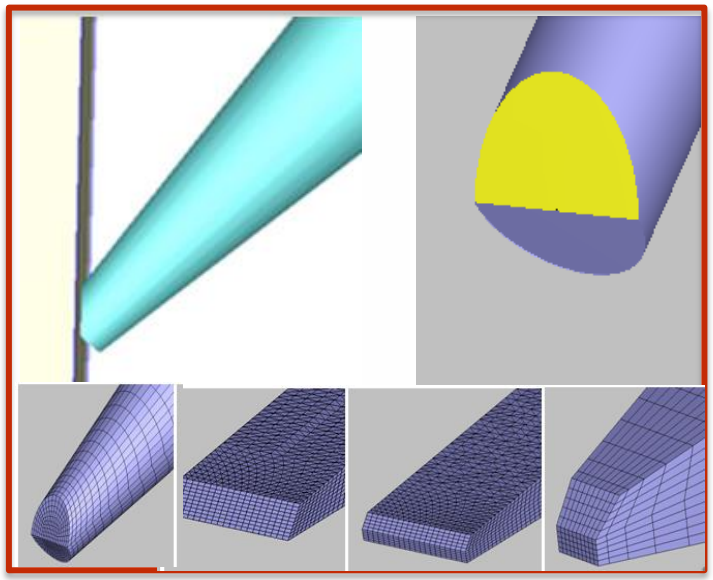
Moldex3D

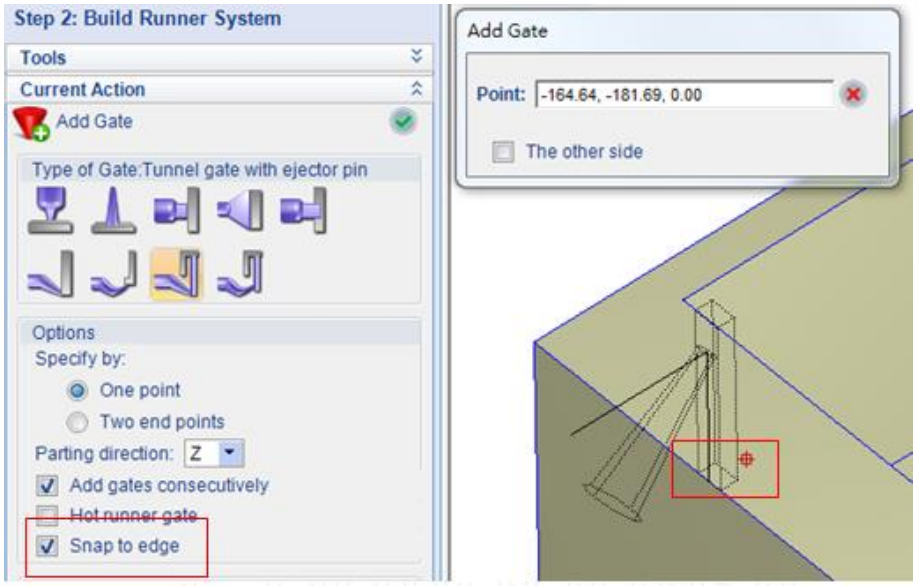
Pre/Post-processing Tools

CAD & Mesh Tool
Meshing Kernel
Modeling Wizard

Designer: Gate/Runner Wizard Enhancement

- Set Hexa based runner mesh as default
- Allow Tunnel Gate gating shape adjustment for D-shape gating
- Allow attribute setting for multiple joints in the same time
- Allow snap to edge for Tunnel/Cashew gate with ejector pin

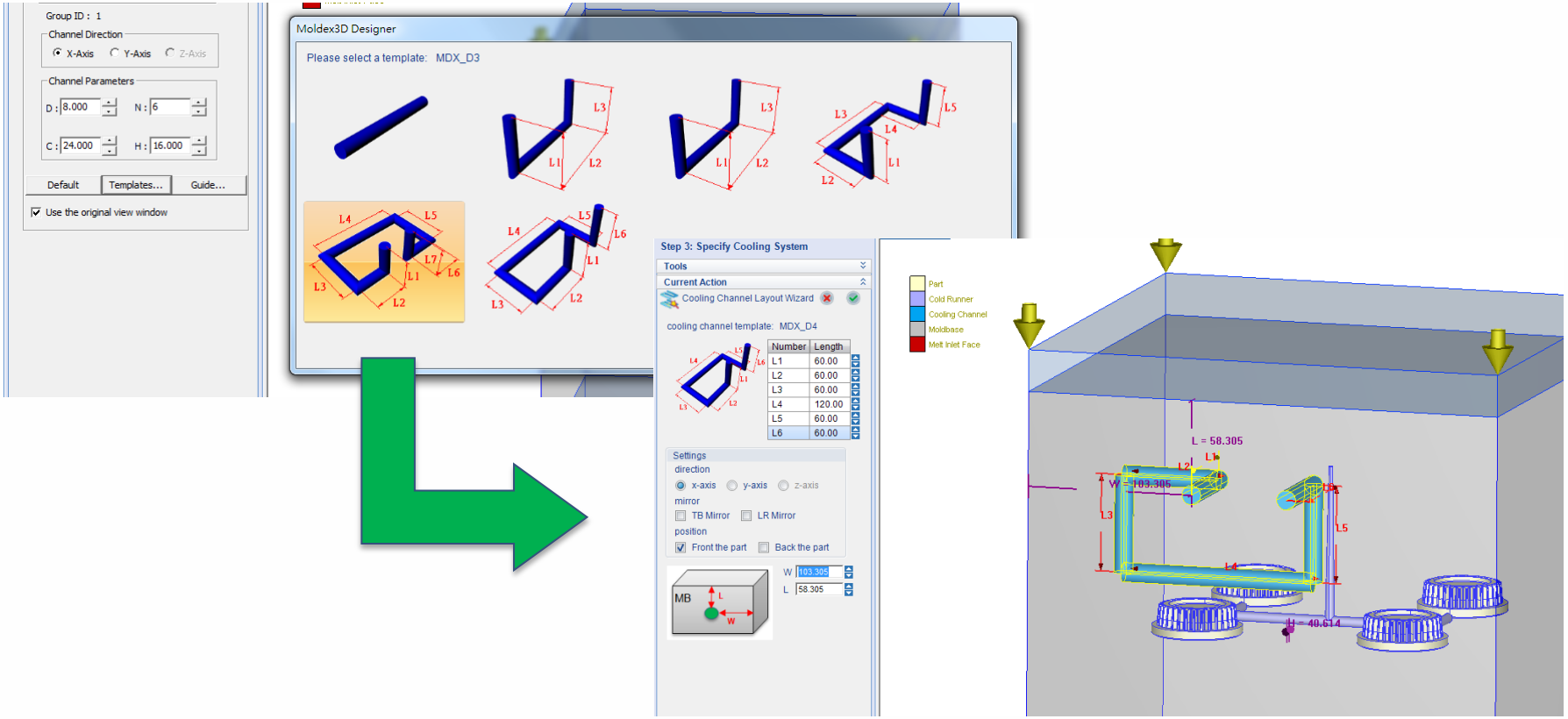




Moldex3D

Designer: Cooling Channel Wizard Enhancement

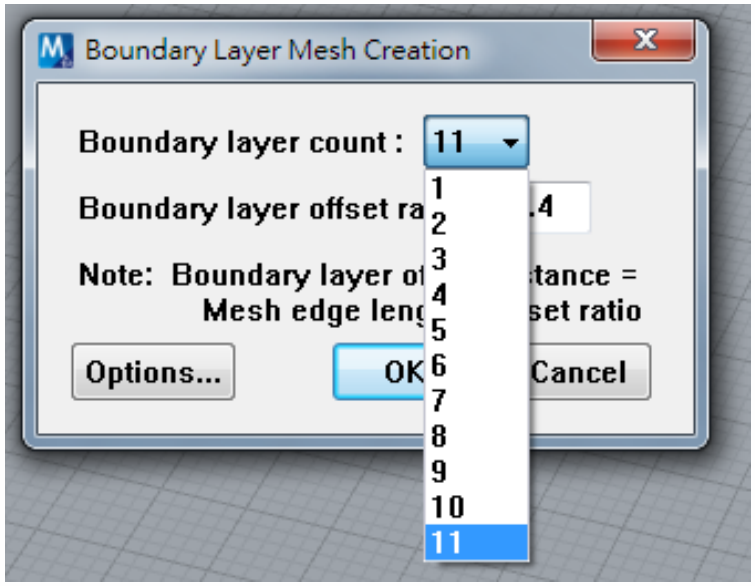
> Enhance cooling channel template workflow
  - Improved user interface and template arrangement
  - Provide setting parameters according to selected template

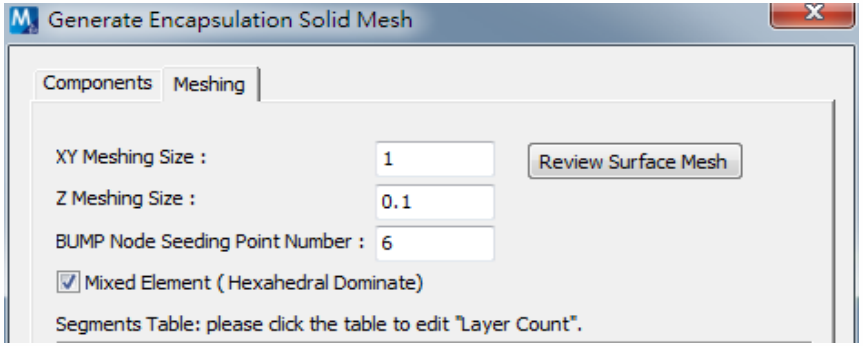


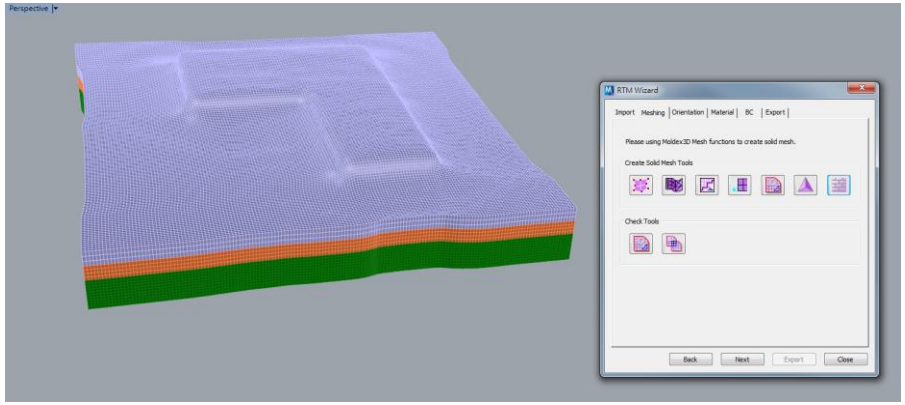
Moldex3D

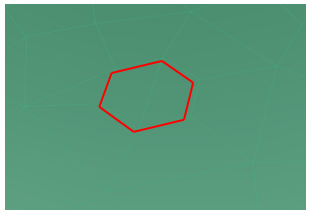
Mesh: Moldex3D Mesh (on Rhino) Enhancement

- Enable BLM max layer count adjustment
- Enhance RTM Wizard
  - Extrusion Solid Meshes from Multi LS-DYNA Files
- Reduce element count for Auto IC Solid mesh generation
  - Support quad surface element and solid mesh hexa cells
  - Allow BUMP node seeding adjustment









Moldex3D

Moldex3D

Usability & Database

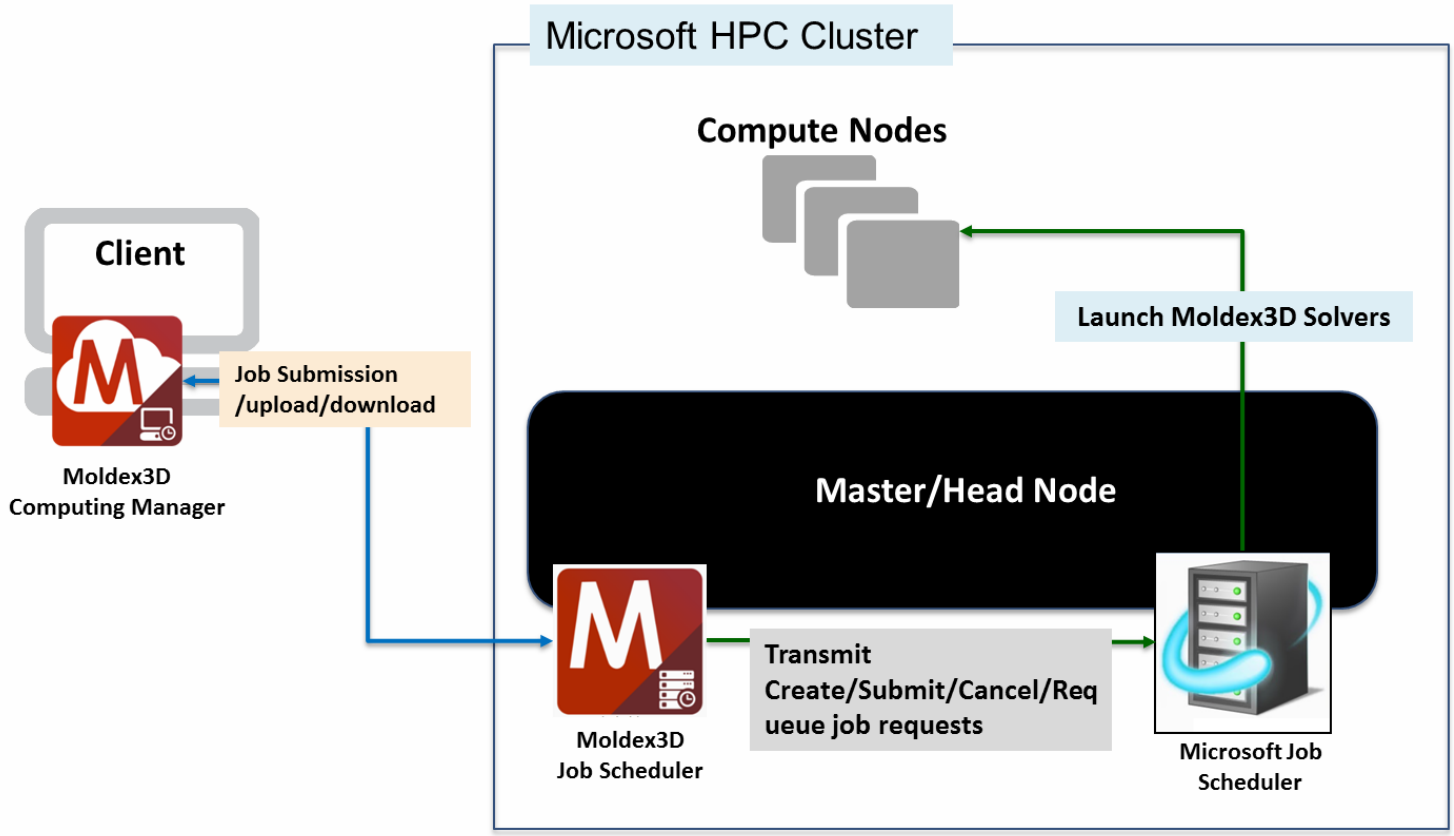
Speeding Up Calculation

Interface & Integration

Database Update

RC : Remote Computing Capability Enhancement

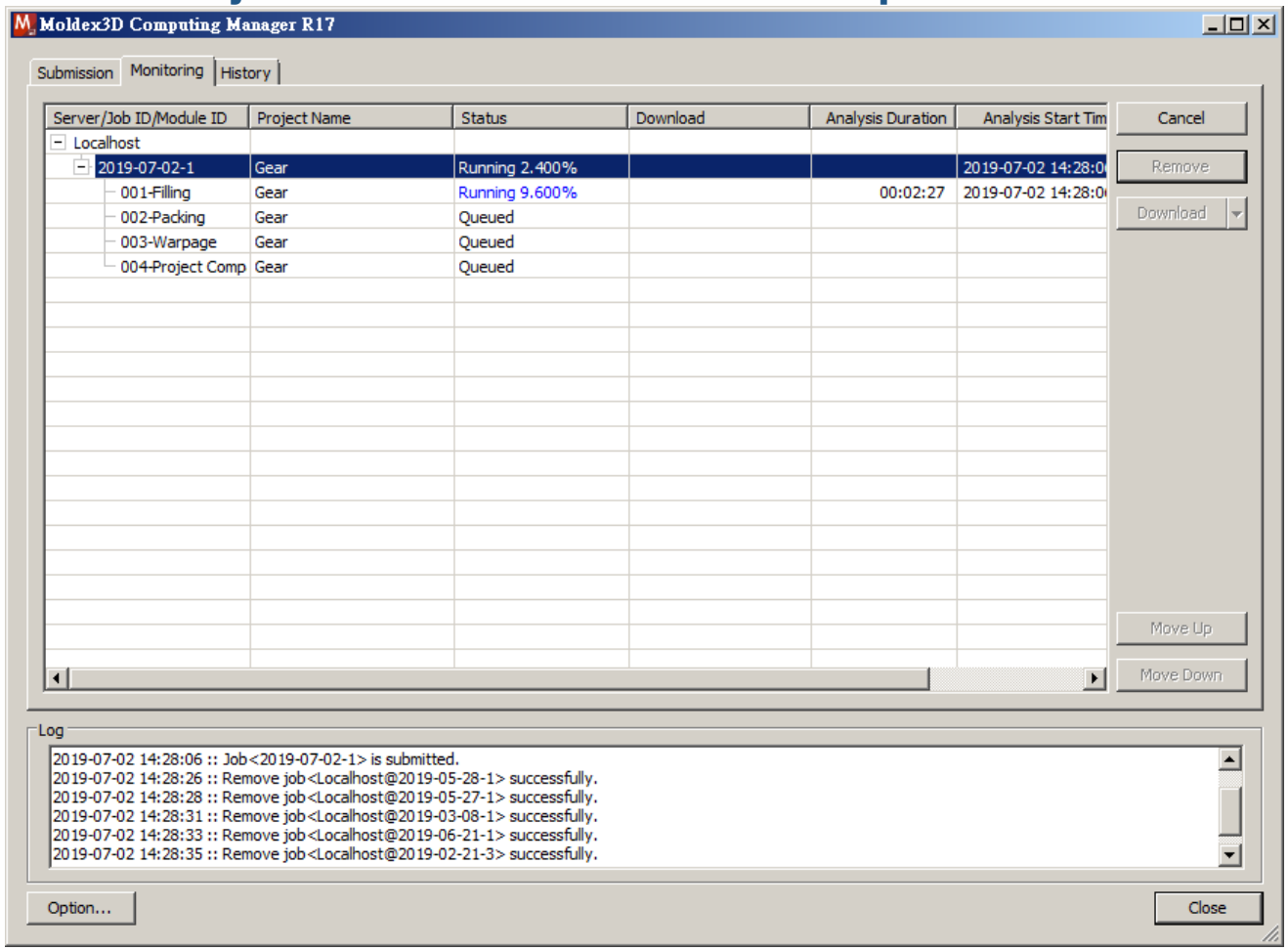
- Support Remote Computing with Microsoft MPI
- Enhance Remote Computing to minimalize access request to IT system and network



Moldex3D

RC : Remote Computing Usability Enhancement

- Add overall progress ratio display for each analysis job
- Allow window size adjustment for Computing Manager
  - The adjusted window size will be kept when closed



Moldex3D

Moldex3D

Usability & Database

Speeding Up Calculation

Interface & Integration

Database Update

SYNC : New Installation Package

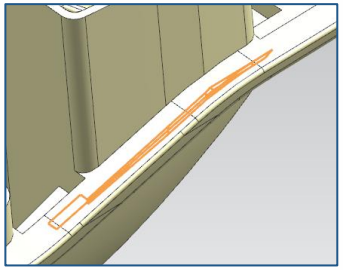
- Individual Installation Package
  - Specific light product package for Moldex3D entry users
  - Require only SYNC installation, no more Moldex3D installation
  - Avoid potential issue of different version solver and mesh kernel

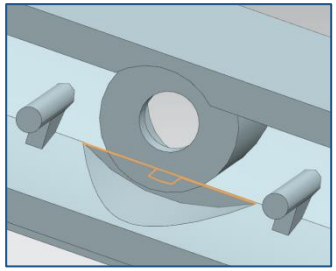
- New SYNC Installer interface
  - Check issue before start installing
  - New style (Silent Mode & Parallel setting included)

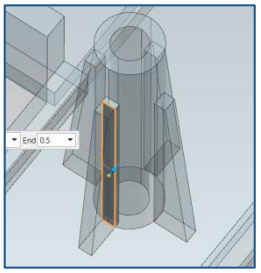
	SYNC R16		SYNC R17	
	SYNC	Moldex3D	SYNC	Moldex3D
Pre (Meshing)	O		O	
Solver		O	O	
Post-processor	O		O	

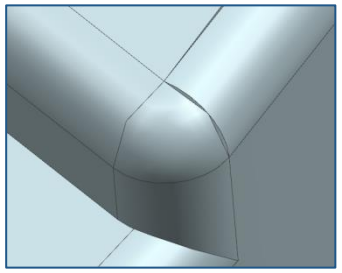
SYNC: Pre/Post Tools Enhancement

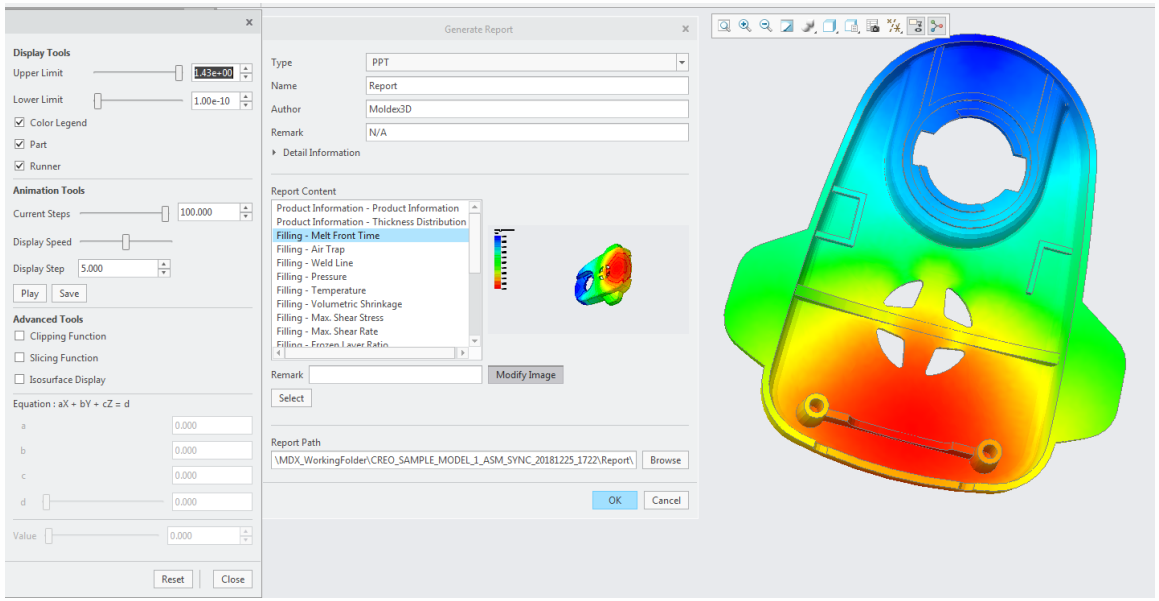
- Geometry fixing workflow for mesh generation
  - Will remove bad faces during mesh generation
- Support Machine Interface and Machine Response
- Enhanced Report Wizard
  - A variety of customized options







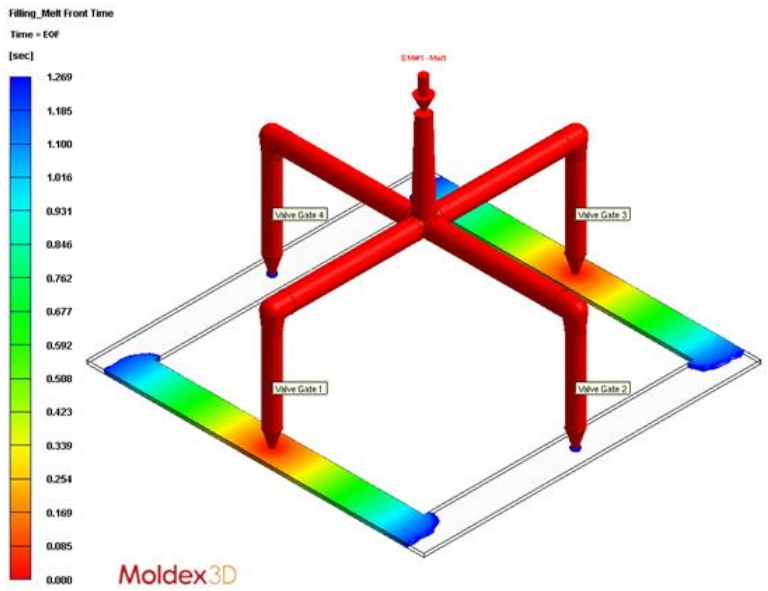




Moldex3D

API: More Capability through API Control

- Support Valve gate Control
  - Establish analysis tasks with customized interface
  - Support the combinations of different gate switch control



Customer Defined IT System

Moldex3D API

Moldex3D

Moldex3D

Moldex3D

Usability & Database

Speeding Up Calculation
Interface & Integration
Database Update

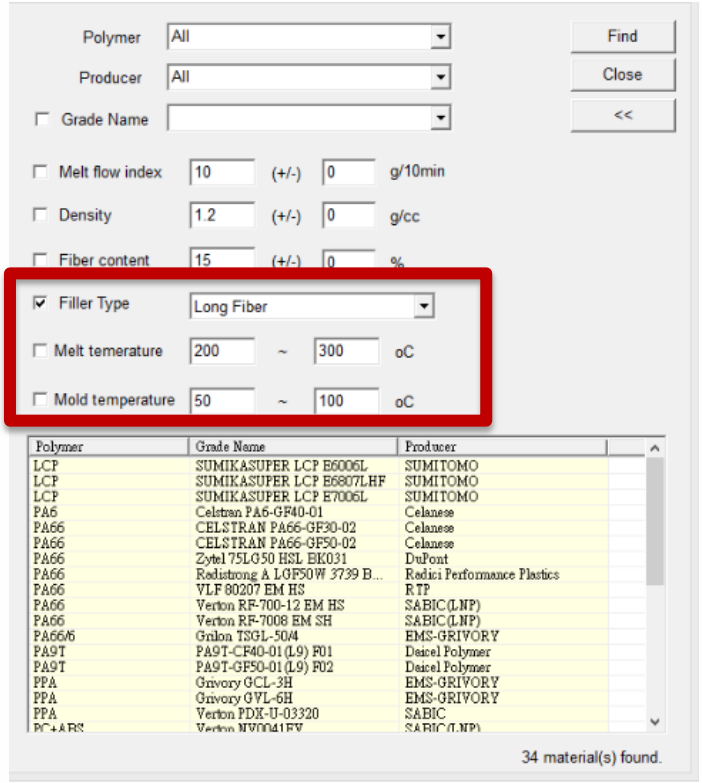
Material: Database Update

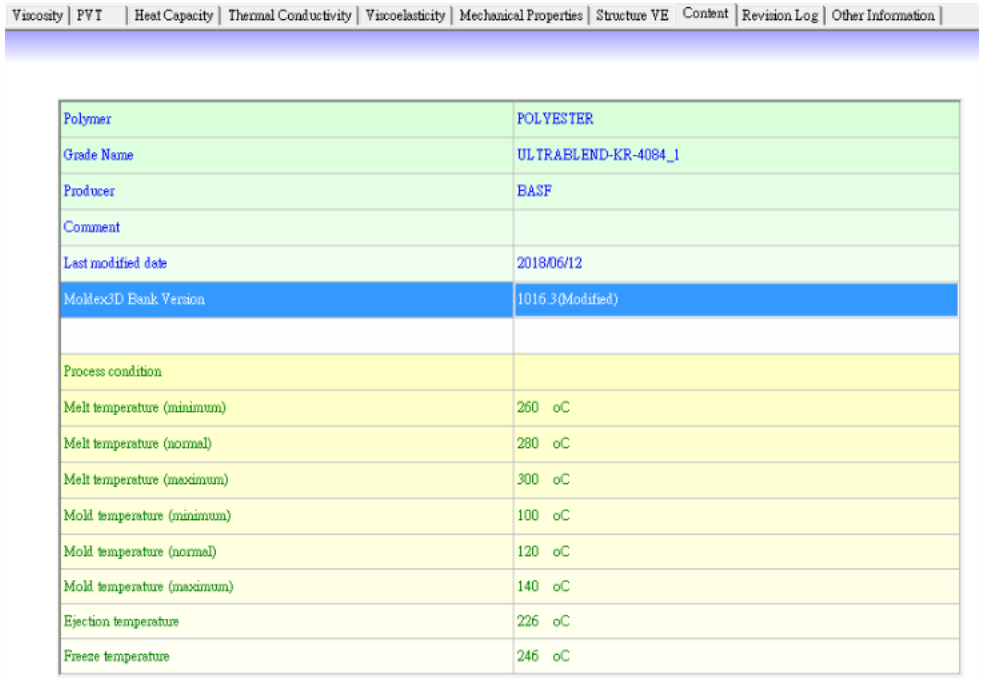
> [Material] Update material database

- 39 thermoplastic materials are newly added
  - PA(26), PFA(3), TPE(5), TPV(5)
- 0 thermoset is newly added
- 6 material information is updated for properties including viscosity, PVT, specific heat and thermal conductivity
  - PA(4), TPE(3), TPV(2)

Material: Material Wizard Usability Enhancement

- Improved material search options:
  - Long Fiber / Mold Temperature / Melt Temperature / Structure VE
- Show Material Bank version in Content page
  - Ensure the latest material file for simulation accuracy
- No longer support ASC format as exterior source

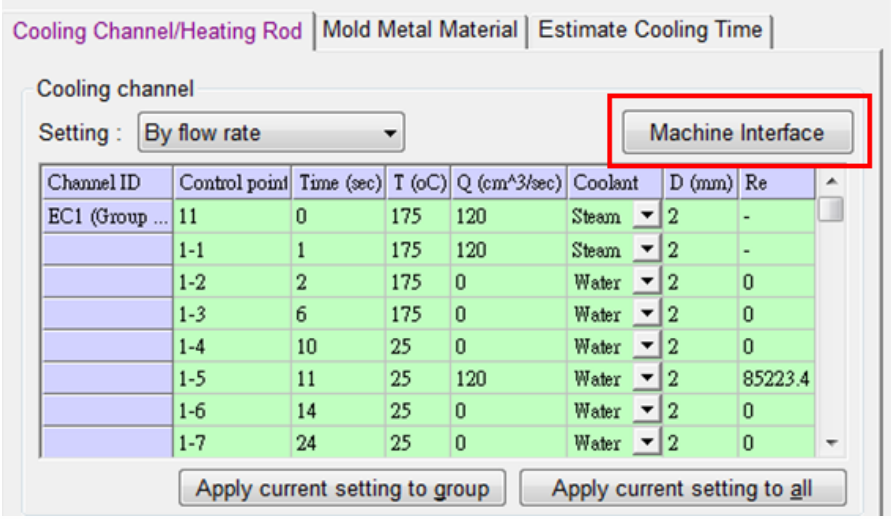




Moldex3D

Machine: New Added Machine Interface

- Add Machine Interface of BAIFENG mold temperature controller
  - Expand Machine Interface to mold temperature controller
  - Provide straightforward information for machine operator
- New injection machine and new Machine Interface
  - Add YIZUMI 444 injection machine to Machine Bank
  - Add Machine Interface: SUMITOMO/ Hwa Chin / Taichung Machinery /JSW/Hai Tian and the corresponding machine controllers



Moldex3D

Report: Customized Report Format and Content

- Support report format and content customization to show material/process information or key data (Max/Min/Avg/SD)
  - Use standard TAG items to modify report content
  - Support Max/Min/Avg/SD value, curve peak and scaled result
  - Support control through API

Template

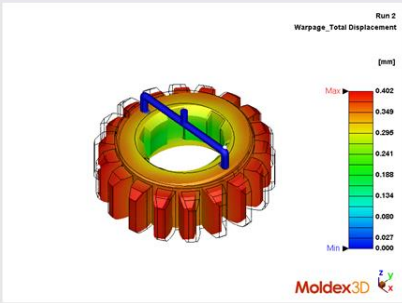
#Text_Result_Warp_TotalDisplacement_Deformation

#Text_Result
#Image_Result_Warp_TotalDisplacement_Deformation(!CHECK)

#Text_Result_Warp_TotalDisplacement_DeformationFactor	#Text_Result_Warp_TotalDisplacement_DeformationMaxDisp	Unit
#Value_Result_Warp_TotalDisplacement_DeformationFactor	#Max_Result_Warp_TotalDisplacement	#Unit_Length

Derived PPT

Warpage - Total Displacement Deformation

Result


Deformation Factor	Max Total Displacement	Unit
5	0.402	mm

115

Moldex3D

	Text	Image	Video	Statistics	Description	Max	Min	Avg	SD	Rng	Value
Result_Warp_XDisplacement_DeformationFactor	v	v	x	x	x	x	x	x	x	x	v
Result_Warp_YDisplacement_DeformationFactor	v	v	x	x	x	x	x	x	x	x	v
Result_Warp_ZDisplacement_DeformationFactor	v	v	x	x	x	x	x	x	x	x	v
Result_Warp_TotalDisplacement_DeformationFactor	v	v	x	x	x	x	x	x	x	x	v

Command Pool

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MOLDING INNOVATION