# Moldflow R&D Update

April 2026

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Moldflow Solver and Meshing Team Leader

# Agenda

Moldflow 2026 Update 1

Moldflow 2027

AI Coding with Solver API

Current Developments

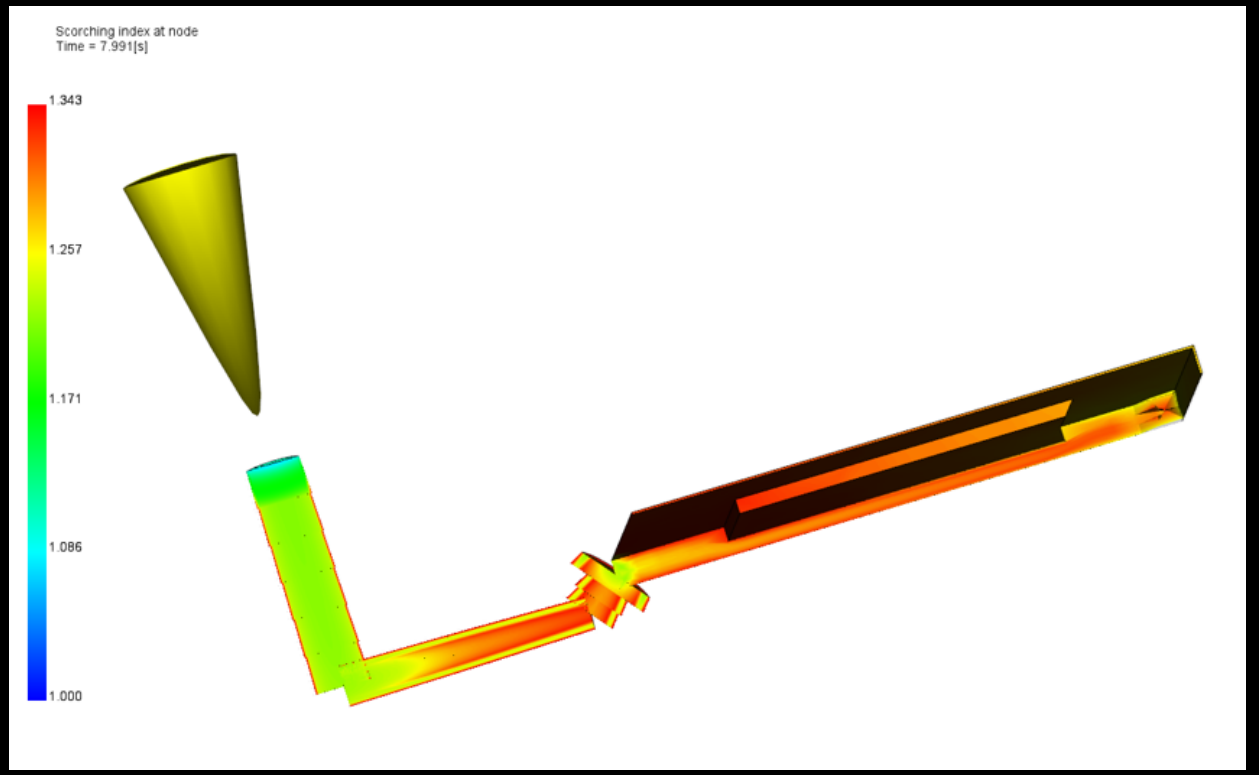
# Moldflow 2026 Update 1

# Moldflow 2026 Update 1 | Scorch Index Result

**For 3D Flow Reactive Molding Analyses**

Scorch index is the fraction of reaching the induction time

- Scorch index below 1.0 indicates that the main curing reaction is not yet started
- Scorch index above 1 indicates that curing is advanced and may affect the quality of the molding, causing defects known as scorch marks.




- Venting analysis now possible for Chemical Foam (PU) Molding

# Moldflow 2027

# Moldflow 2027 | Improved Residual Stress for Midplane & Dual Domain

Improvement in residual stress calculation of Midplane and Dual Domain.

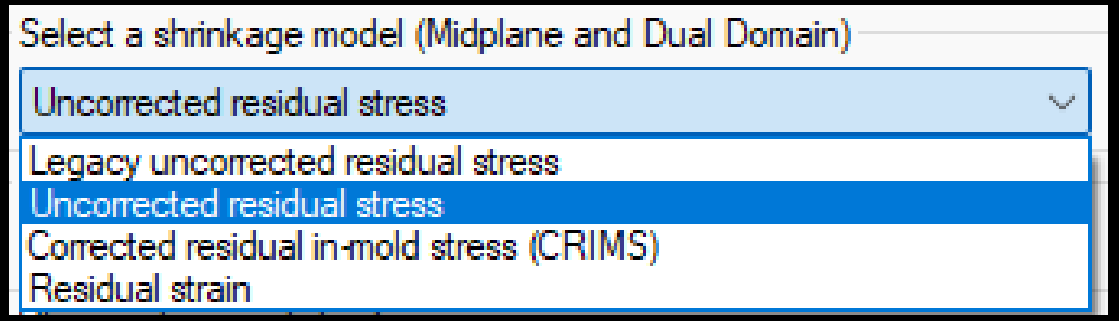
More accurate & Better agreement with 3D

MF 2026

New method is Default called “Uncorrected Residual Stress”

Old method is still available. Renamed as ‘Legacy Uncorrected residual stress’

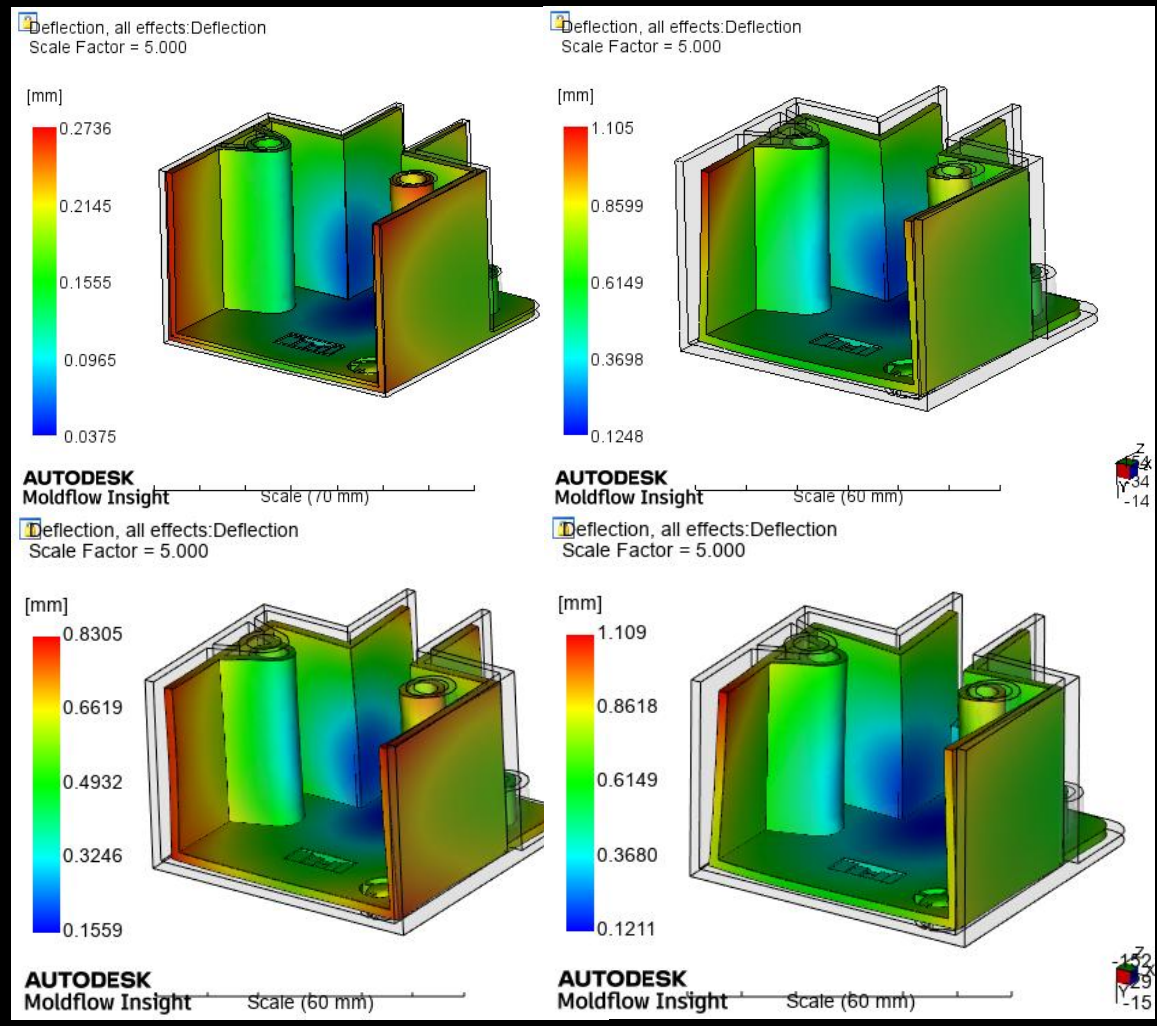
Similar in theory to the 3D Generic Shrinkage model




MF 2027

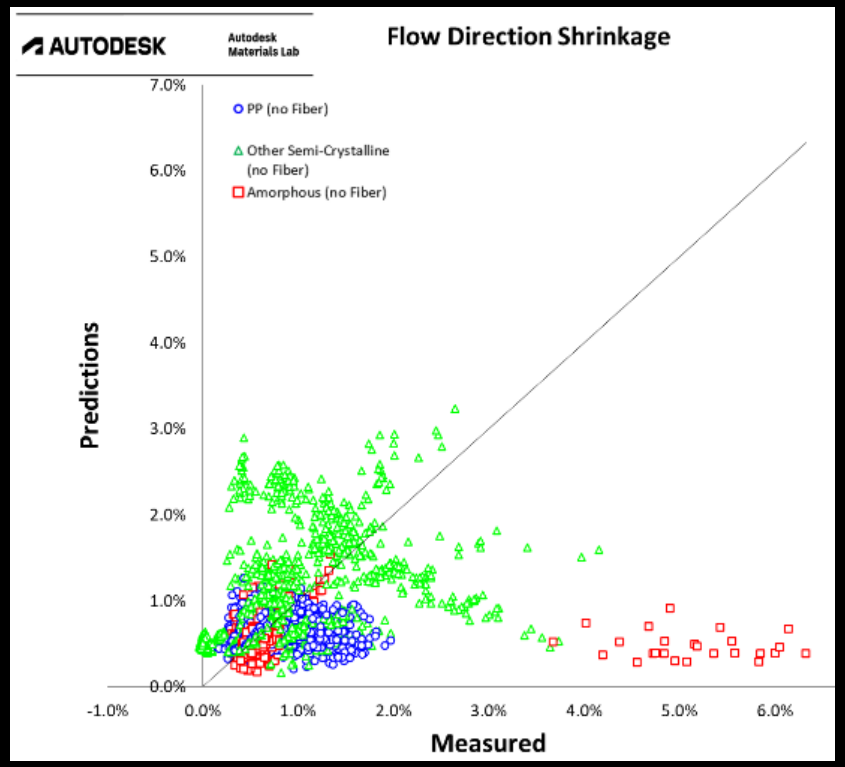
DD Uncorr. Res. Stress

3D Uncorr. Res Stress

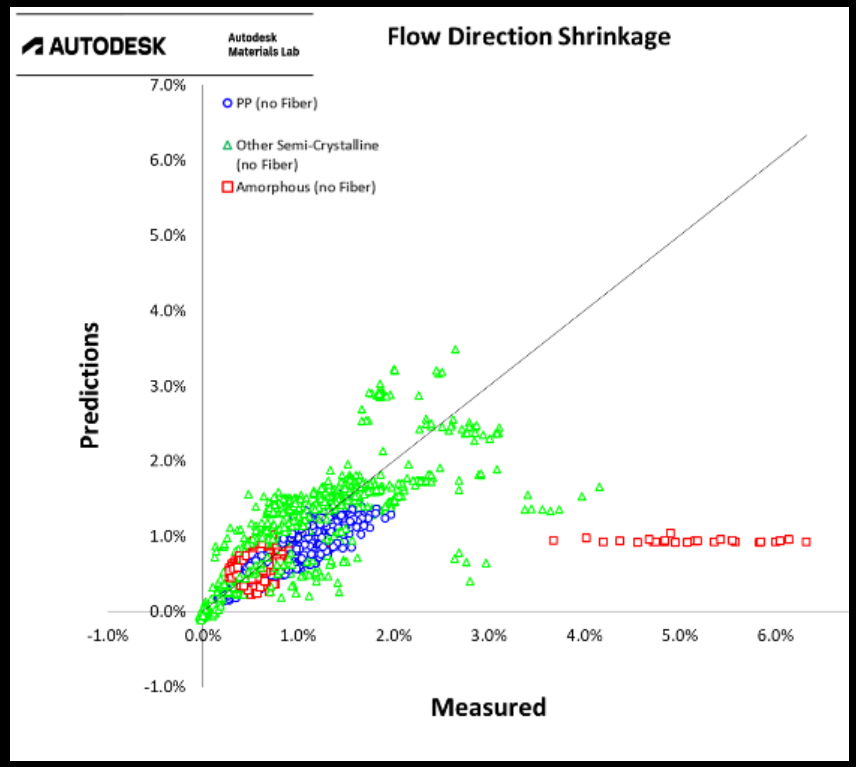


# Moldflow 2027 | Improved Residual Stress for Midplane & Dual Domain

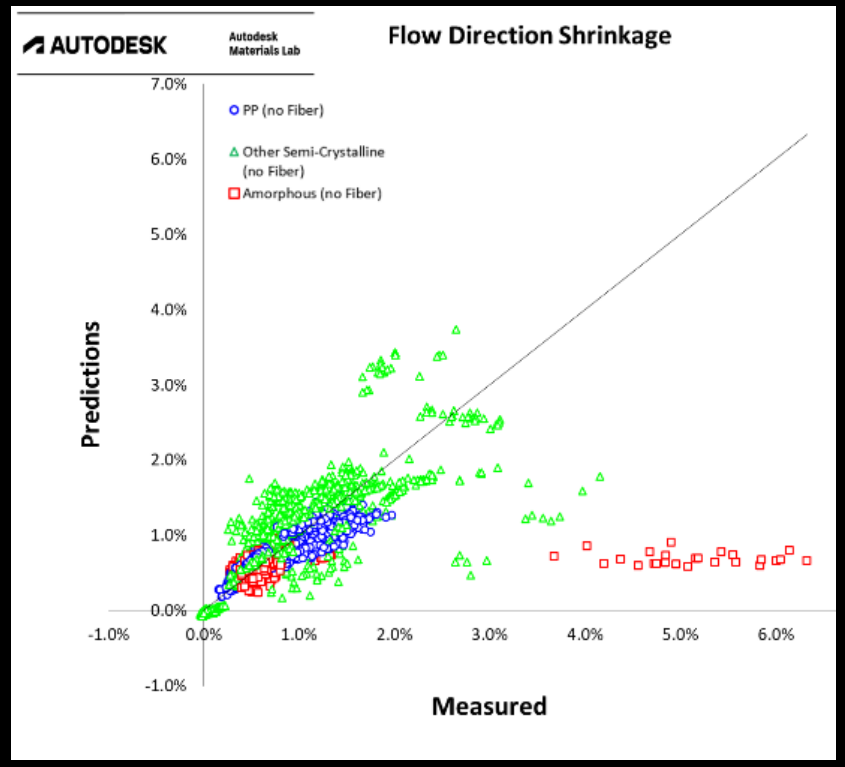
Compare shrinkage prediction with shrinkage molding data for 164 non-fiber materials (25 moldings for each material)




Midplane MF 2026




3D MF 2026




Midplane MF 2027

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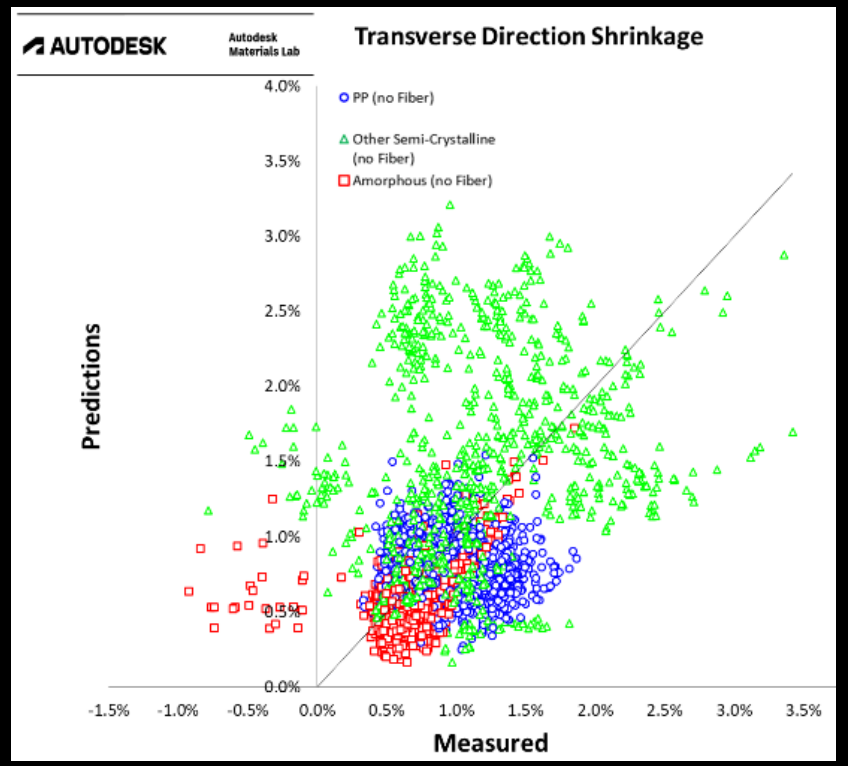
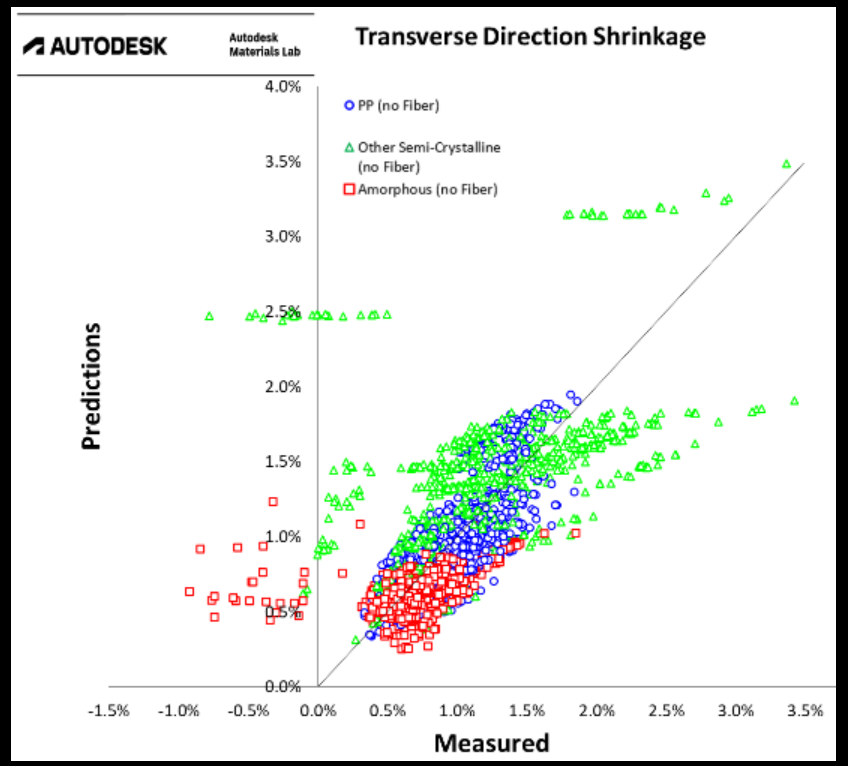
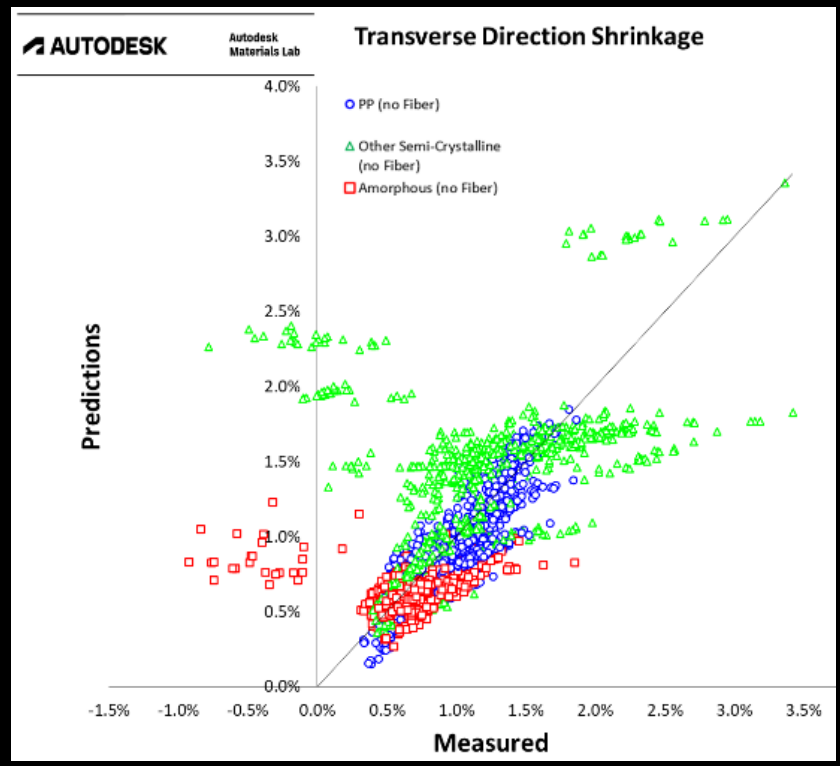



Midplane MF 2026



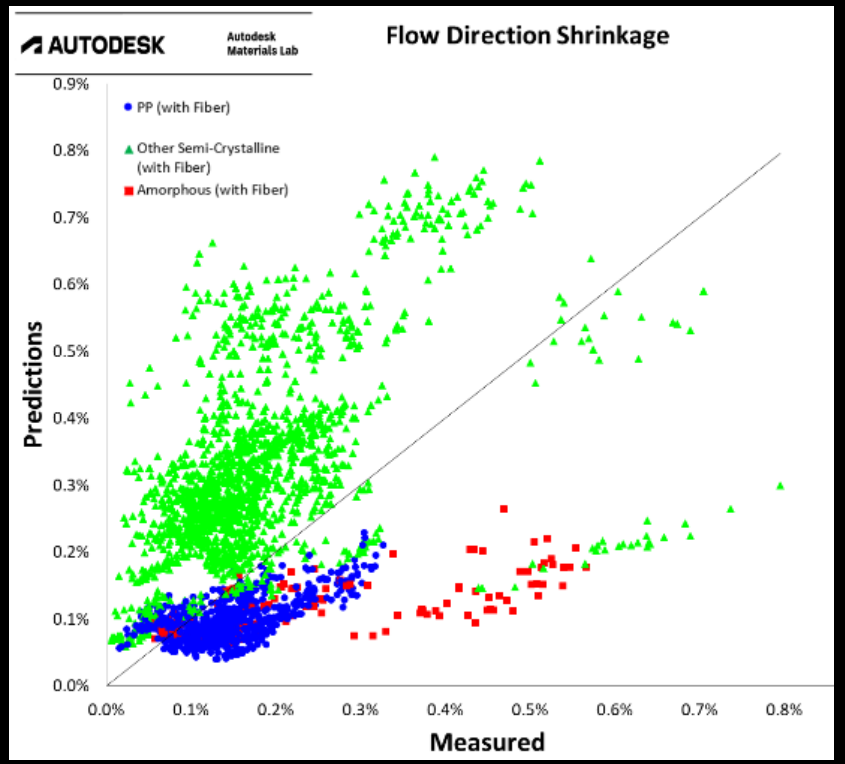

3D MF 2026



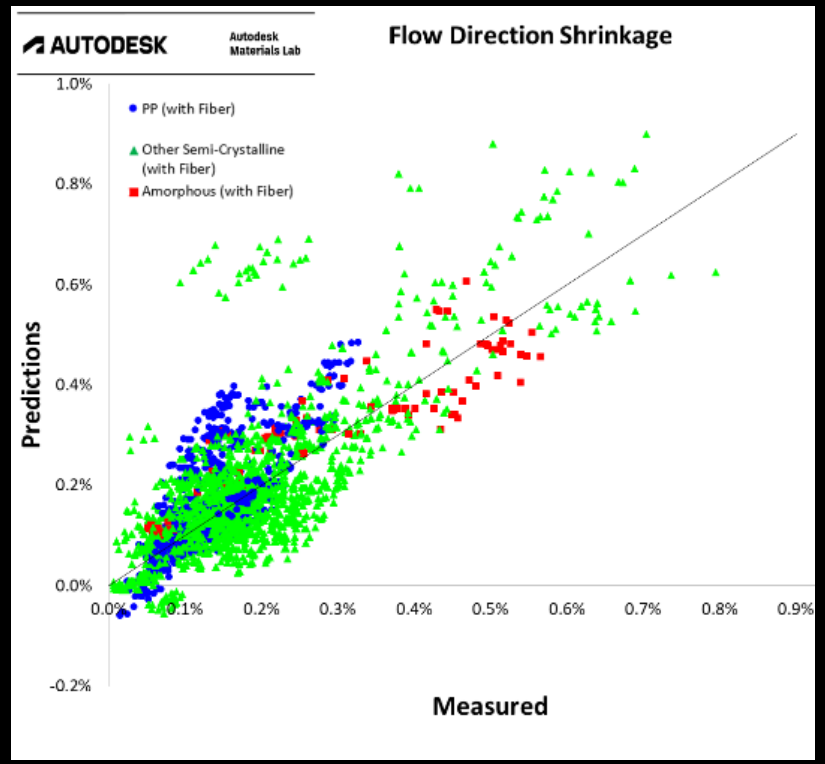

Midplane MF 2027

# Moldflow 2027 | Improved Residual Stress for Midplane & Dual Domain

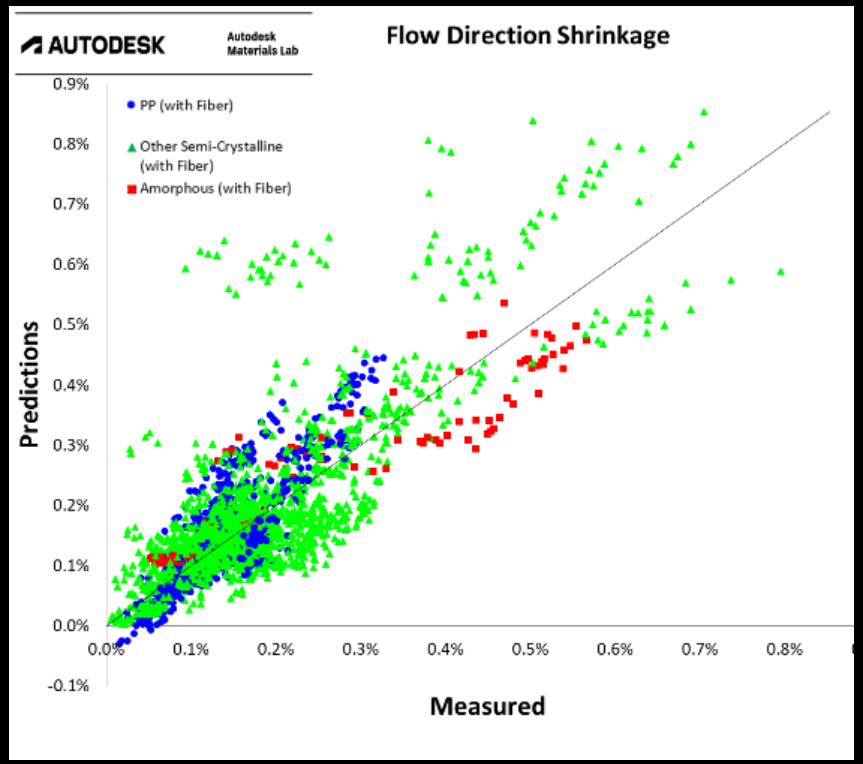
Compare shrinkage prediction with shrinkage molding data for 101 fiber-filled materials (25 moldings for each material)




Midplane MF 2026



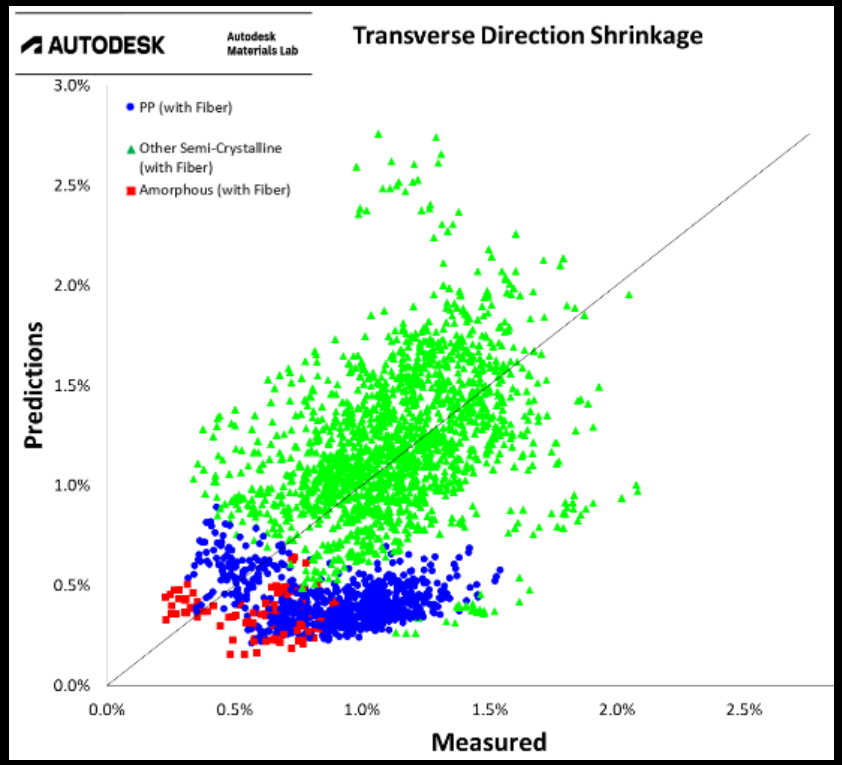

3D MF 2026



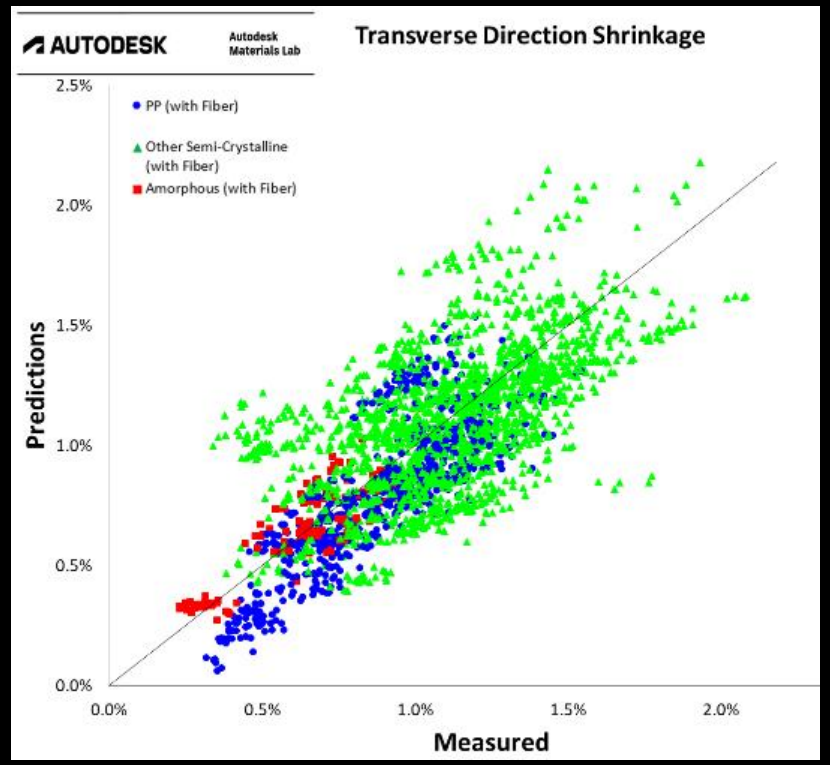

Midplane MF 2027

# Moldflow 2027 | Improved Residual Stress for Midplane & Dual Domain

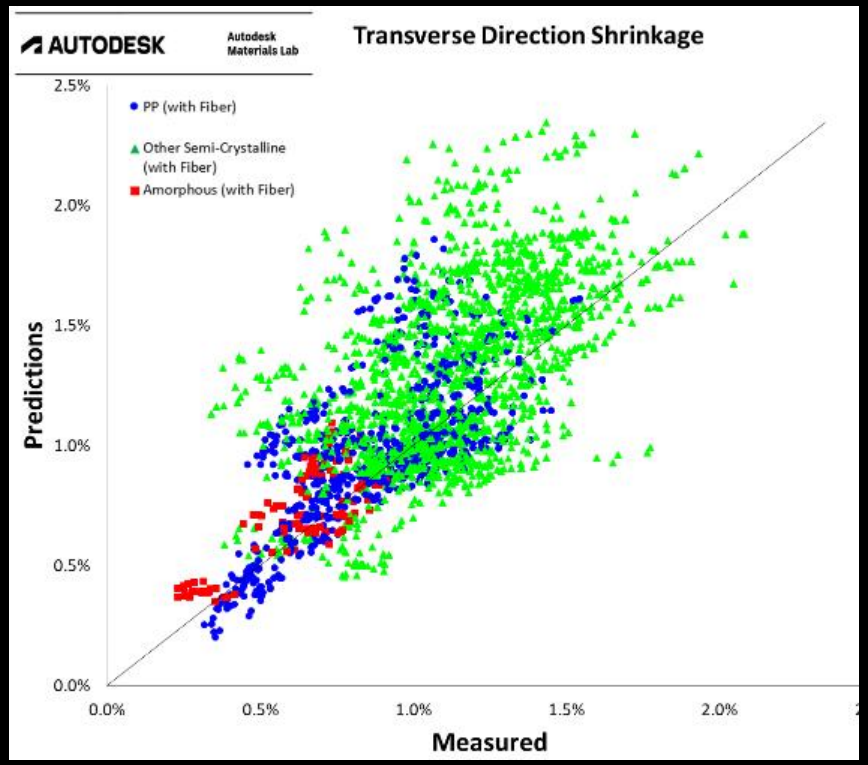
Compare shrinkage prediction with shrinkage molding data for 101 fiber-filled materials (25 moldings for each material)




Midplane MF 2026




3D MF 2026




Midplane MF 2027

# Moldflow 2027 | Improved Residual Stress for Midplane & Dual Domain

Compare Warp Predictions between Dual Domain and 3D

Database of Warp Validation Cases

*Consistency between 3D and MP/DD*

| | Better | Similar | Worse |
|---|---|---|---|
| In-plane deflection | 6 | 2 | 1 |
| Out-of-plane deflection | 7 | 2 | 0 |
| Overall | 13 | 1 | 3 |

Selected Warp Customer Cases

*Consistency between 3D and MP/DD*

| | Better | Similar | Worse |
|---|---|---|---|
| In-plane deflection | 17 | 0 | 0 |
| Out-of-plane deflection | 13 | 3 | 1 |
| Overall | 15 | 2 | 0 |

# Moldflow 2027 | Improved Residual Stress for Midplane & Dual Domain

CRIMS (Shrinkage Correction for Midplane and Dual Domain)

CRIMS is correlated on top of the Uncorrected Residual Stress method

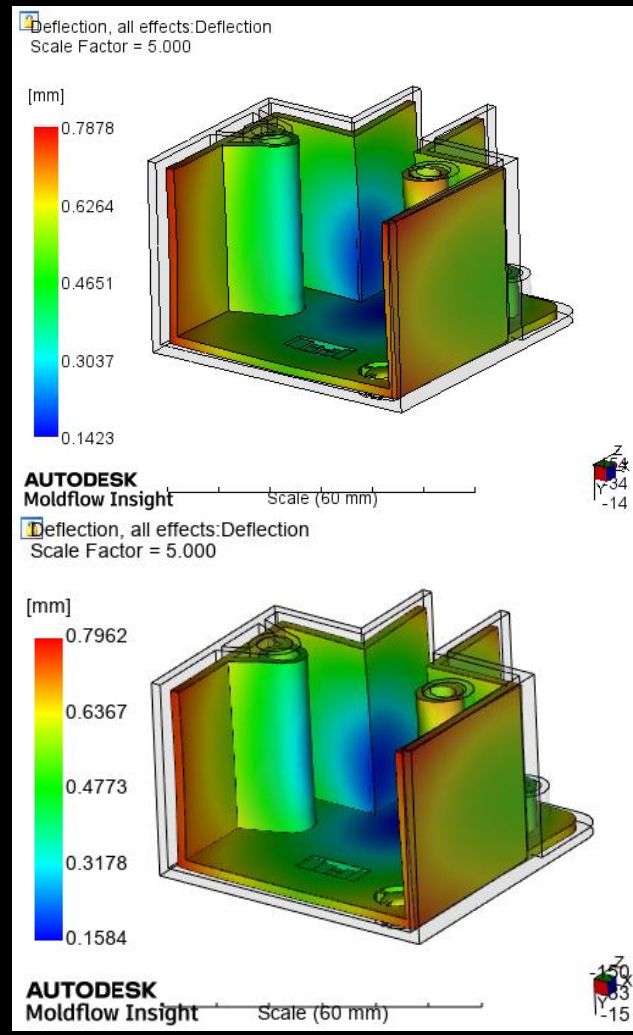
MF 2026

For Moldflow 2027, CRIMS coefficients are changed significantly

- But net warp prediction with CRIMS is often not changed

MF 2027

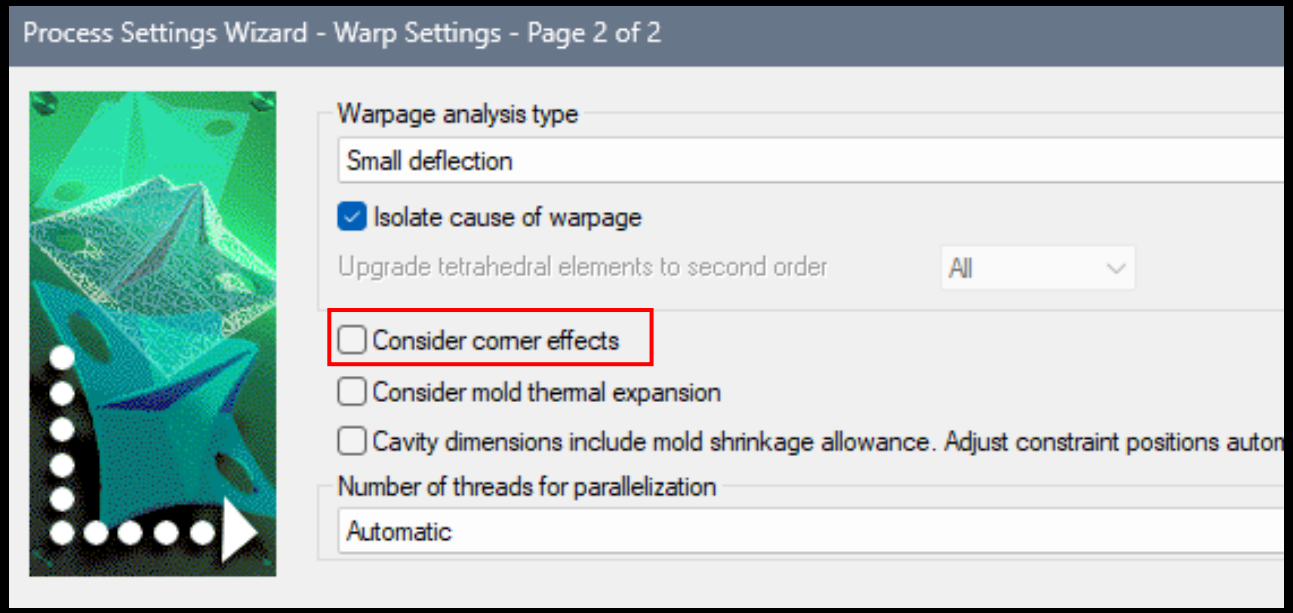
DD CRIMS

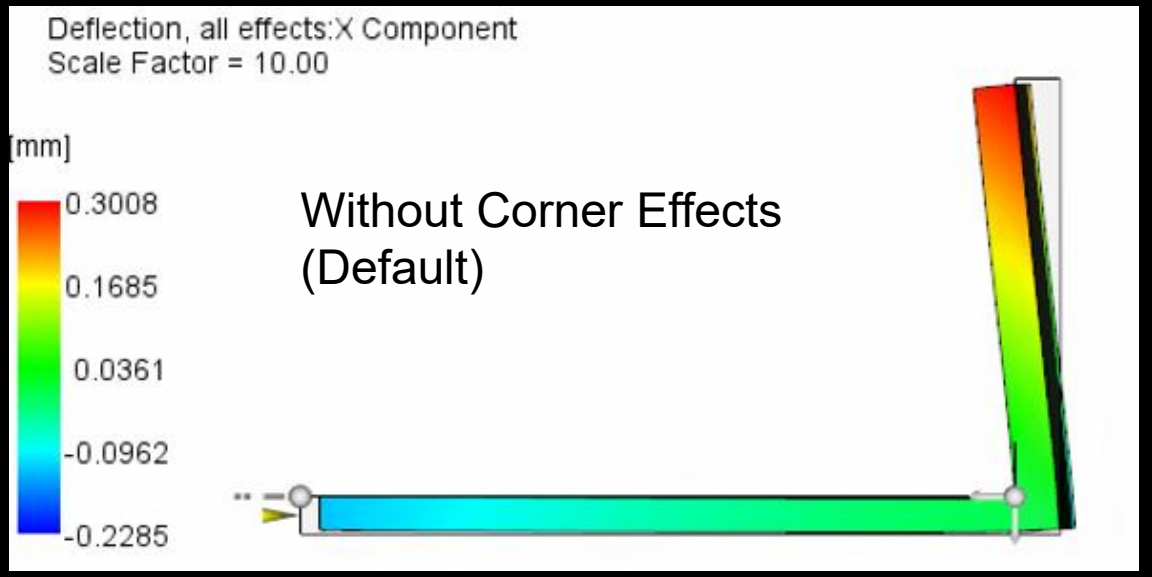


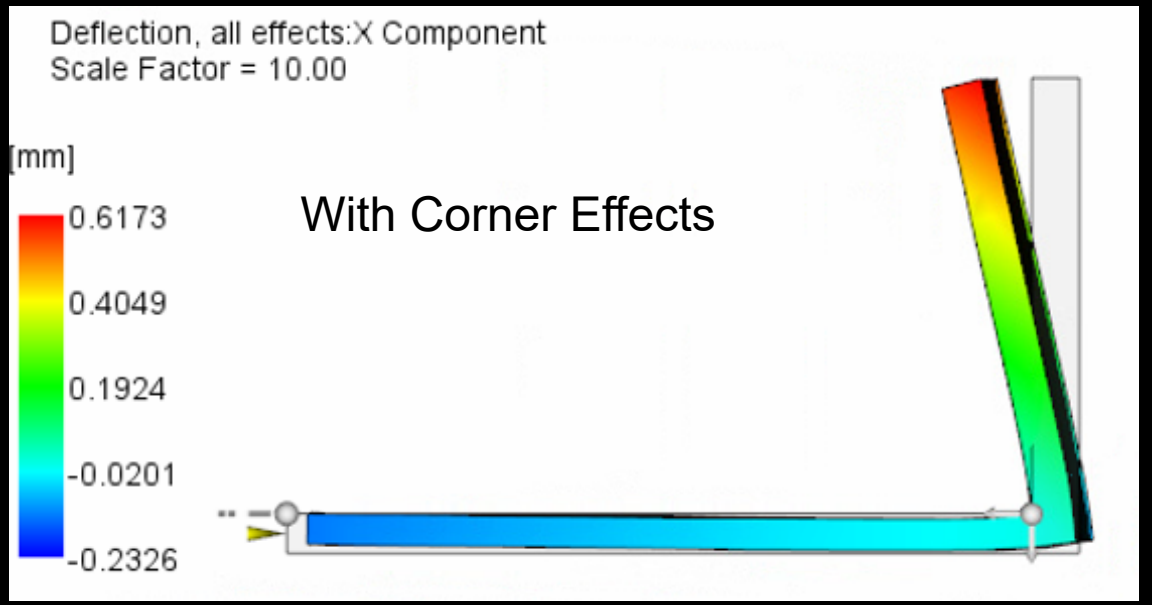
# Moldflow 2027 | 3D Corner Effects

- Corner effect option is added to 3D Warp.
- This is off by default.

NOTE: Corner effects are not broken out separately in isolate cause of warpage

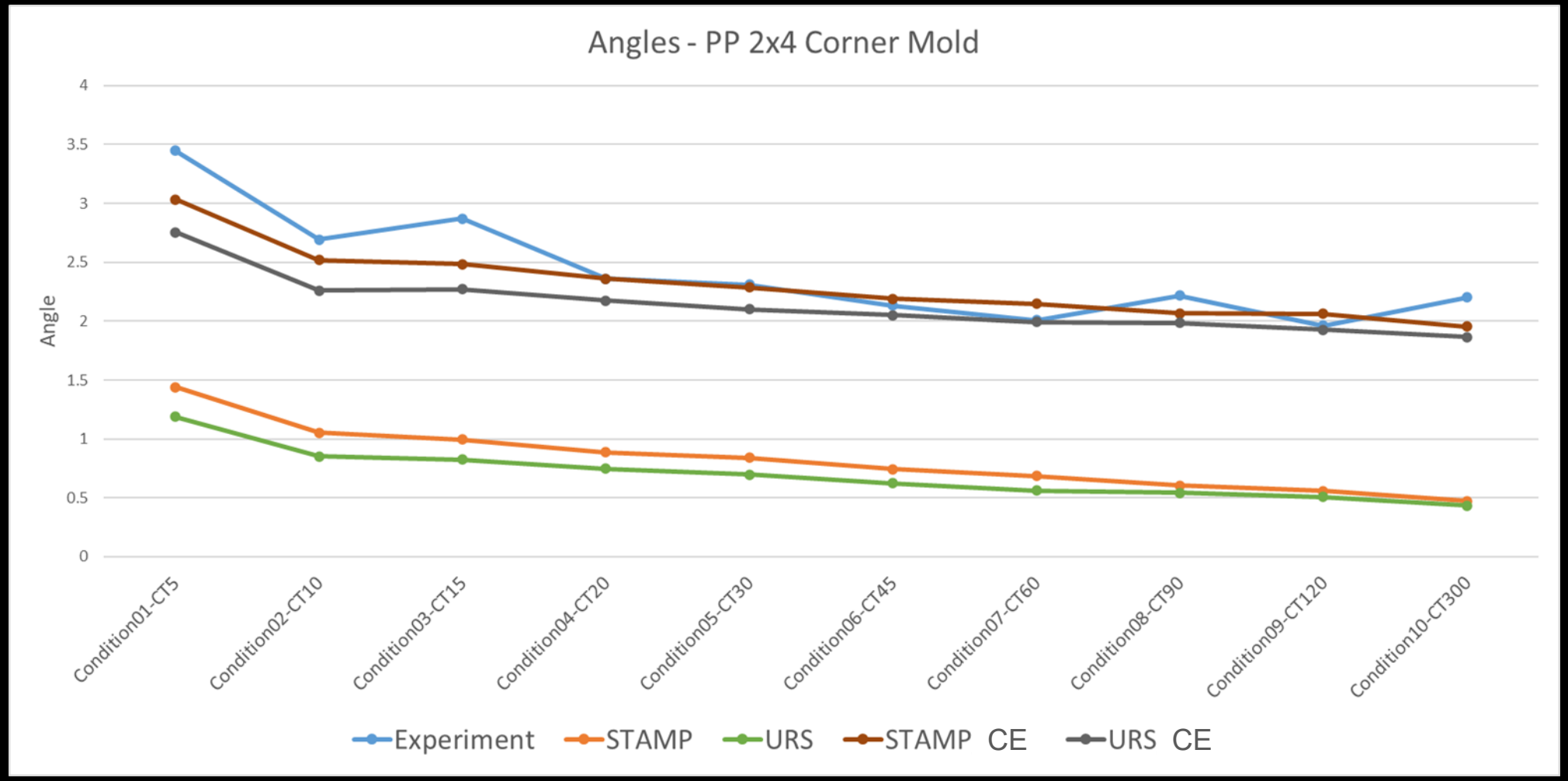


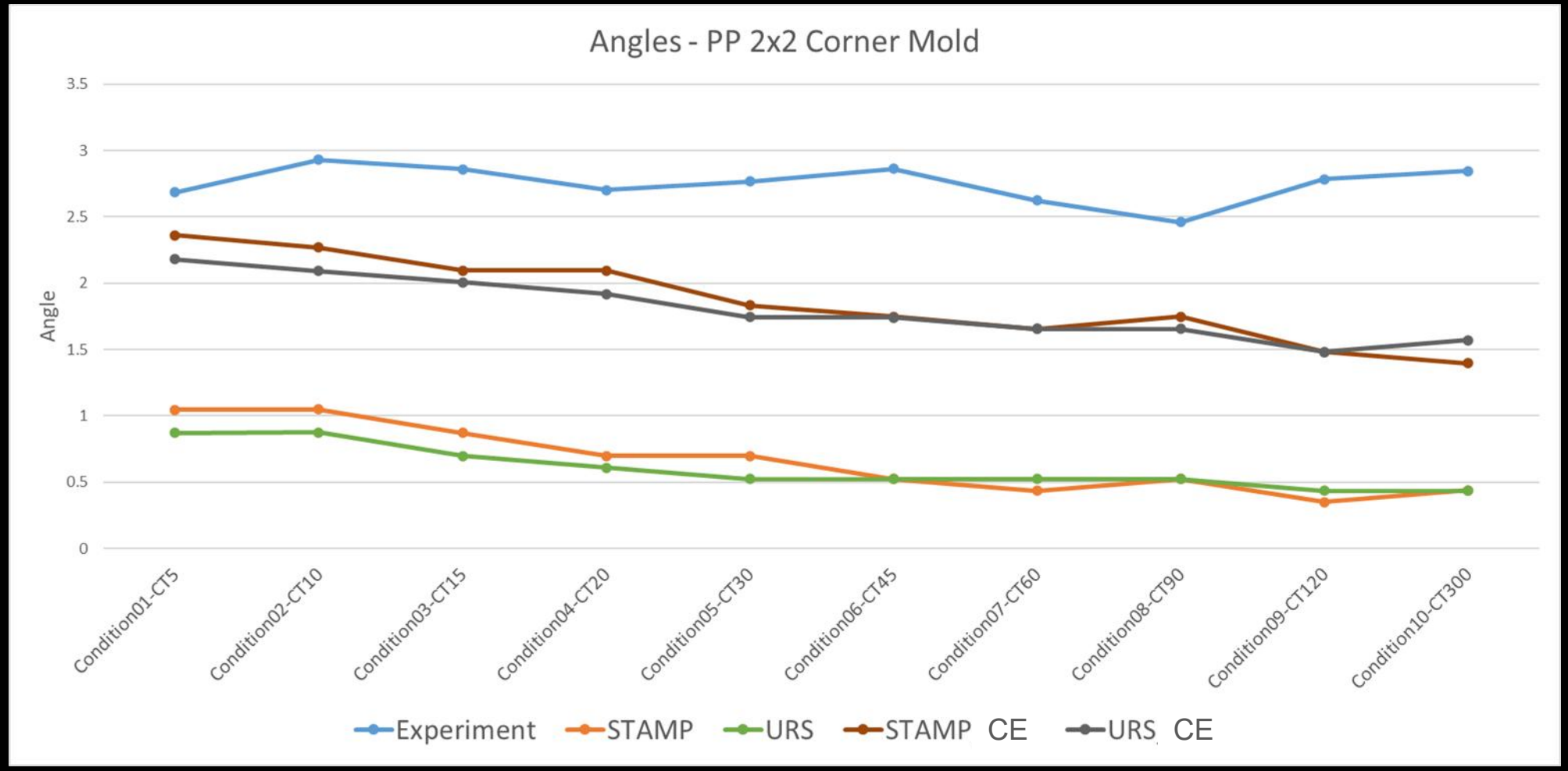
# Moldflow 2027 | 3D Corner Effects - Validation

- Validation of angle change – PP Material. Range of Cooling times



# Moldflow 2027 | 3D Corner Effects - Validation

- Validation of angle change – PP Material. Range of Cooling times – Different mold geometry



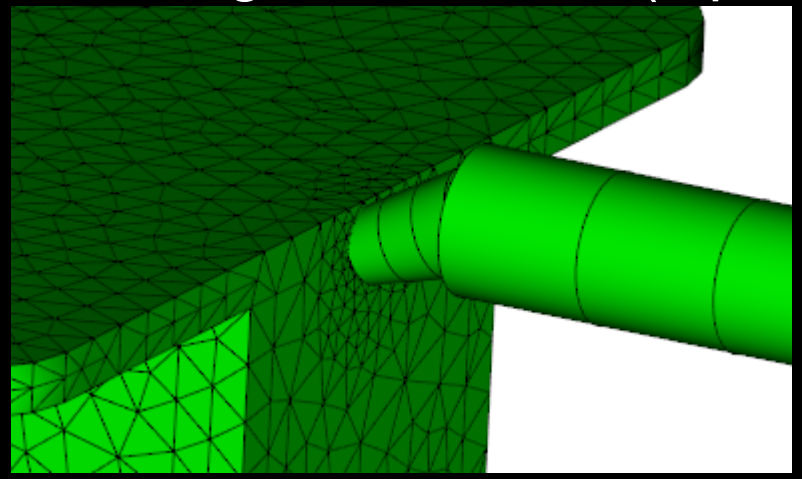
# Moldflow 2027 | 3D mesh refinement around the gate

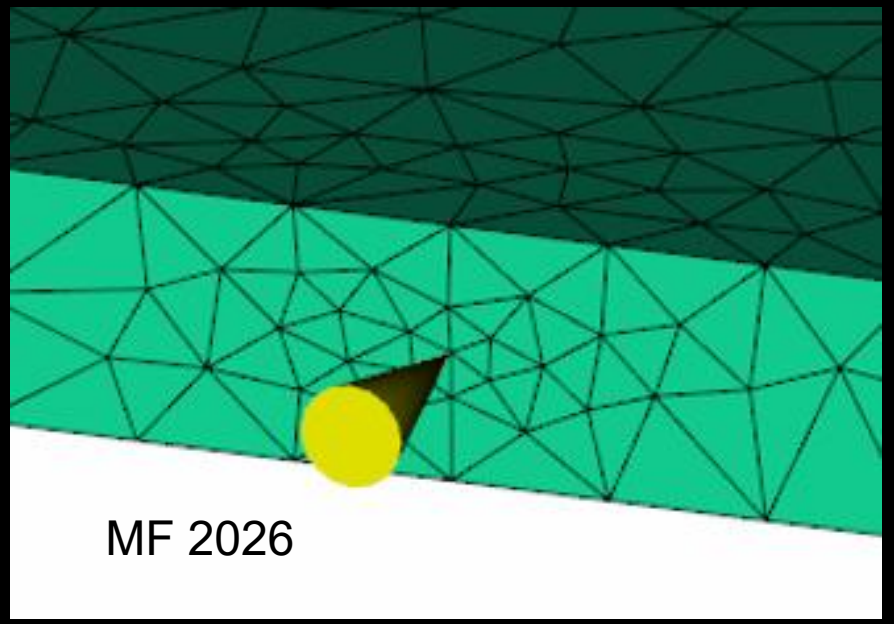
Improved option to automatically refine the mesh around the gate during 3D meshing

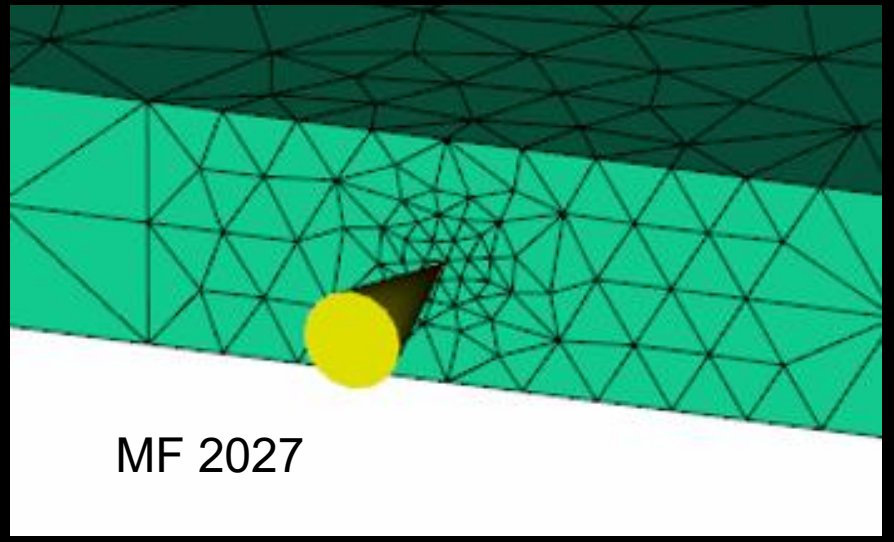
Better mesh at the gate will improve predictions in the flow solver.

- Better Symmetry

Based on gate diameter (if present)

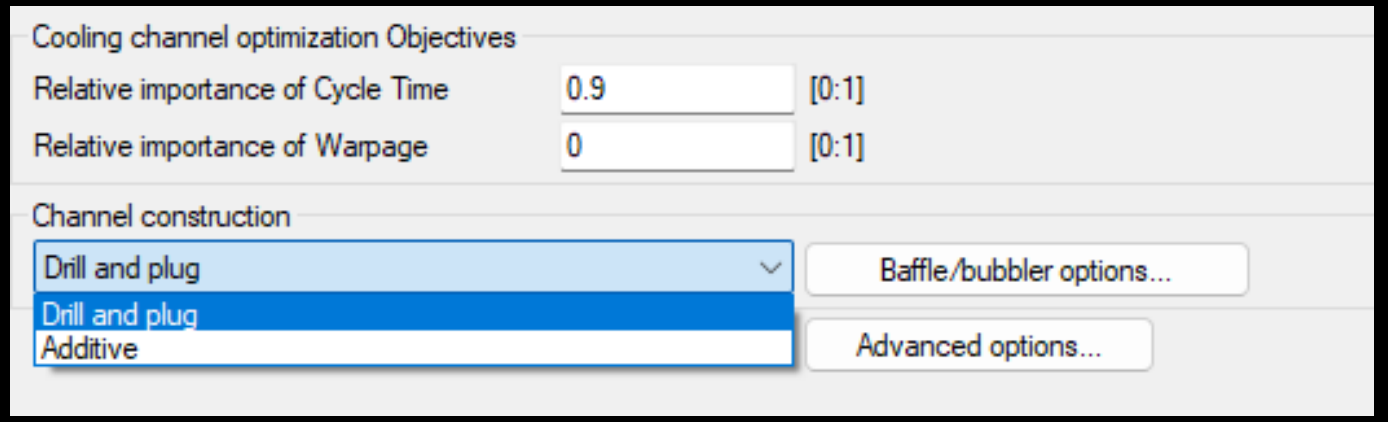


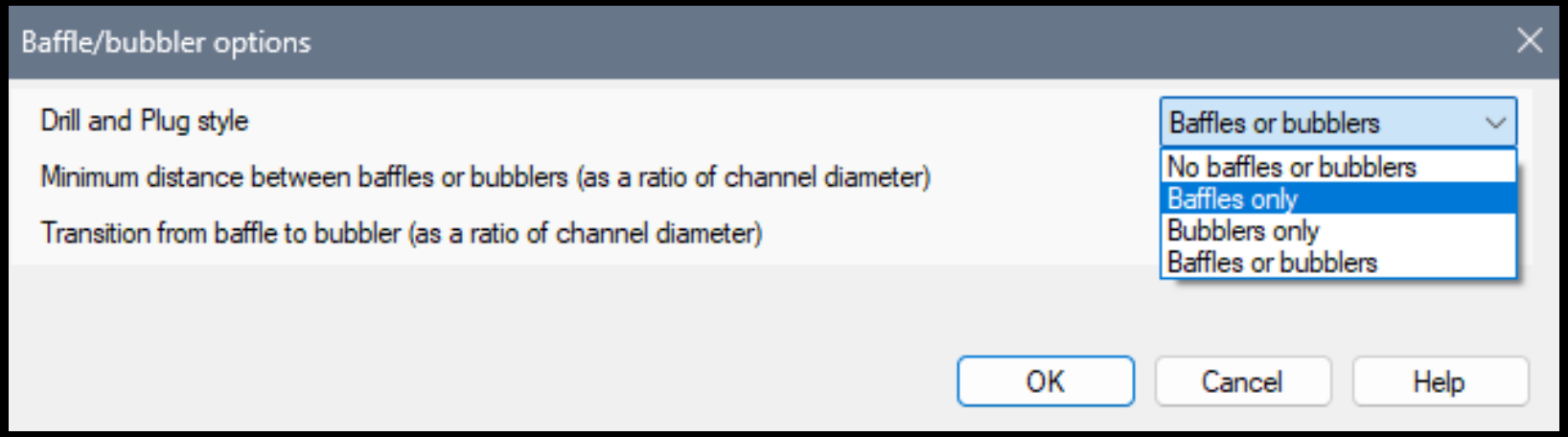


# Moldflow 2027 | Cooling Optimization for Drilled molds

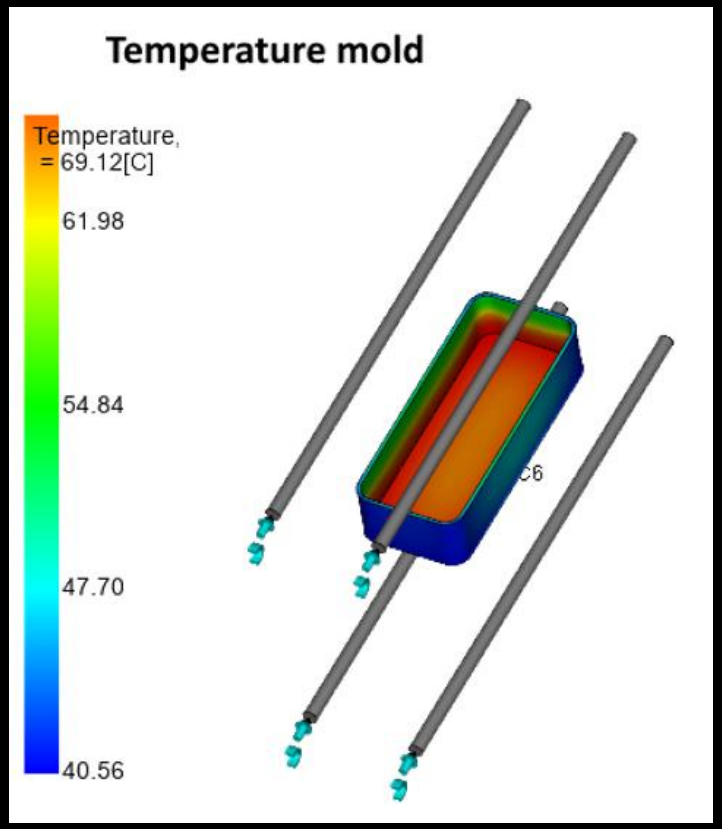
- Option to optimize channel layout either for:
  - Additively Manufactured mold (inserts)
  - Straight drilled cooling channels



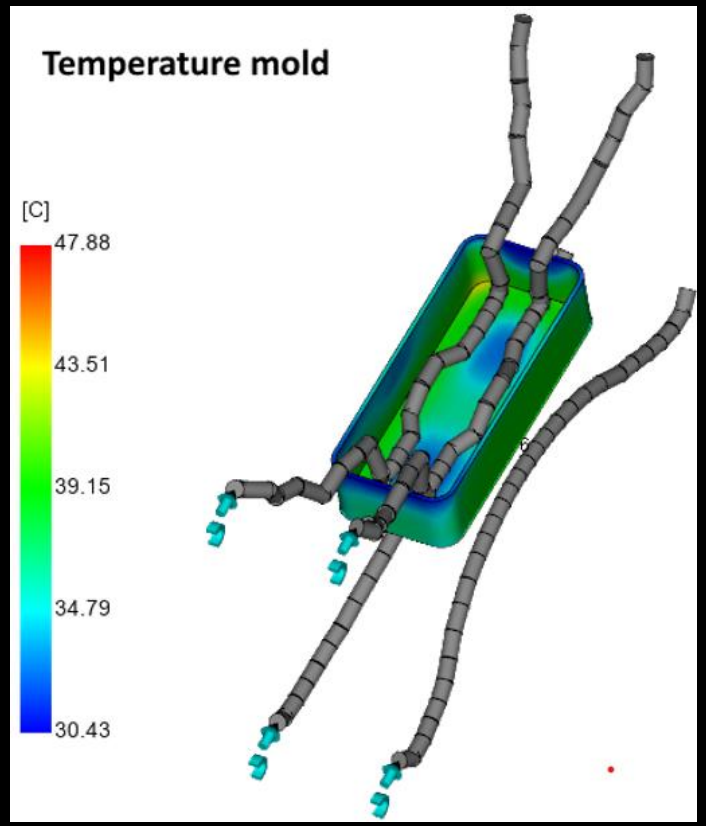



# Moldflow 2027 | Cooling Optimization for Drilled molds

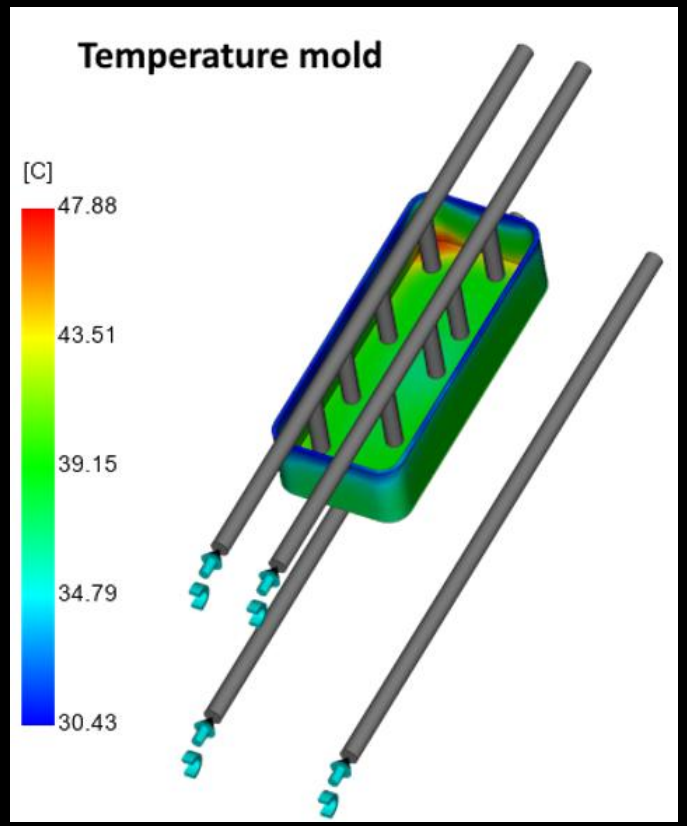
Starting Point



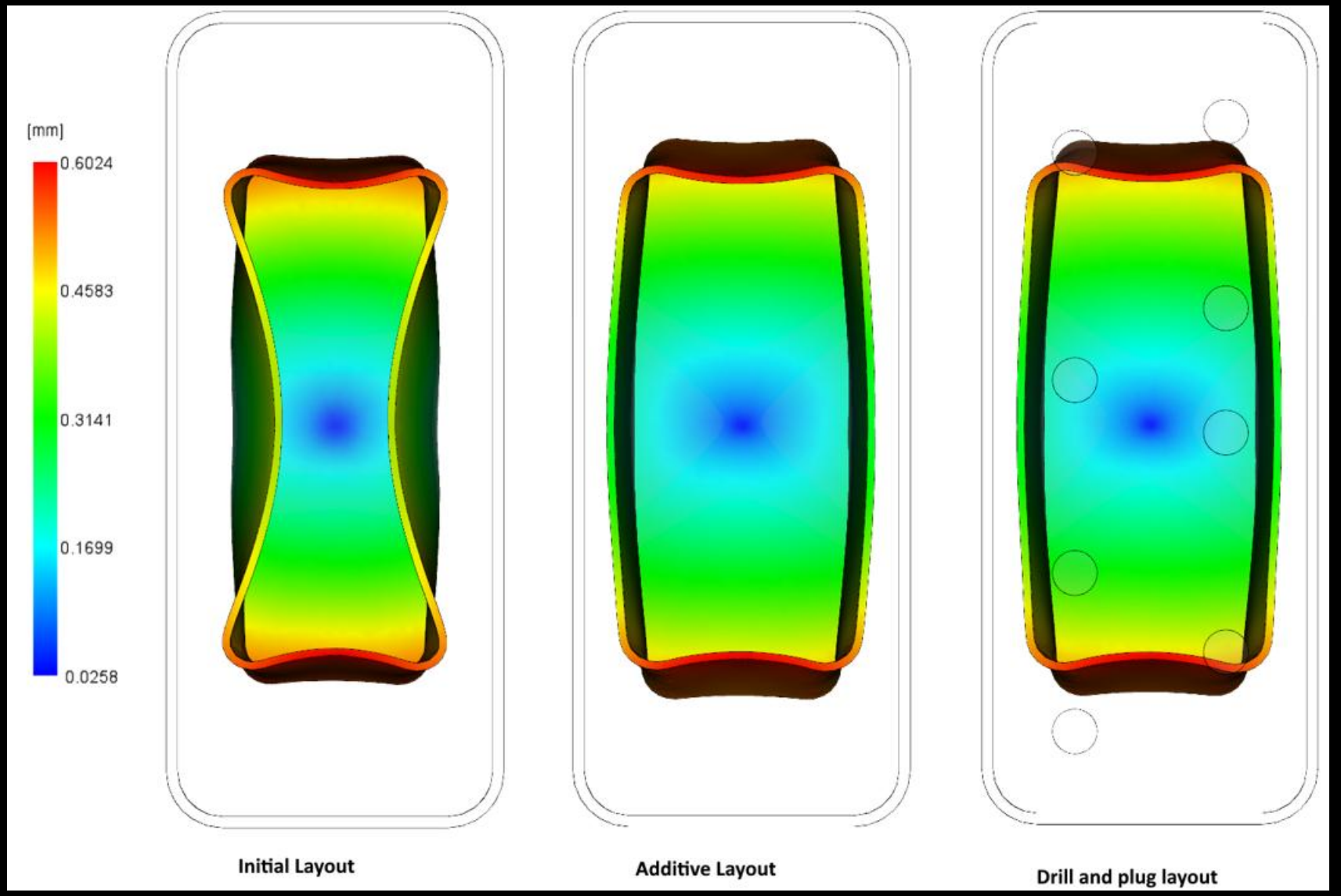

Cool Optimization for 3D printed Cores (MF 2025)




Cool Optimization for Drill & Plug molds (MF 2027)

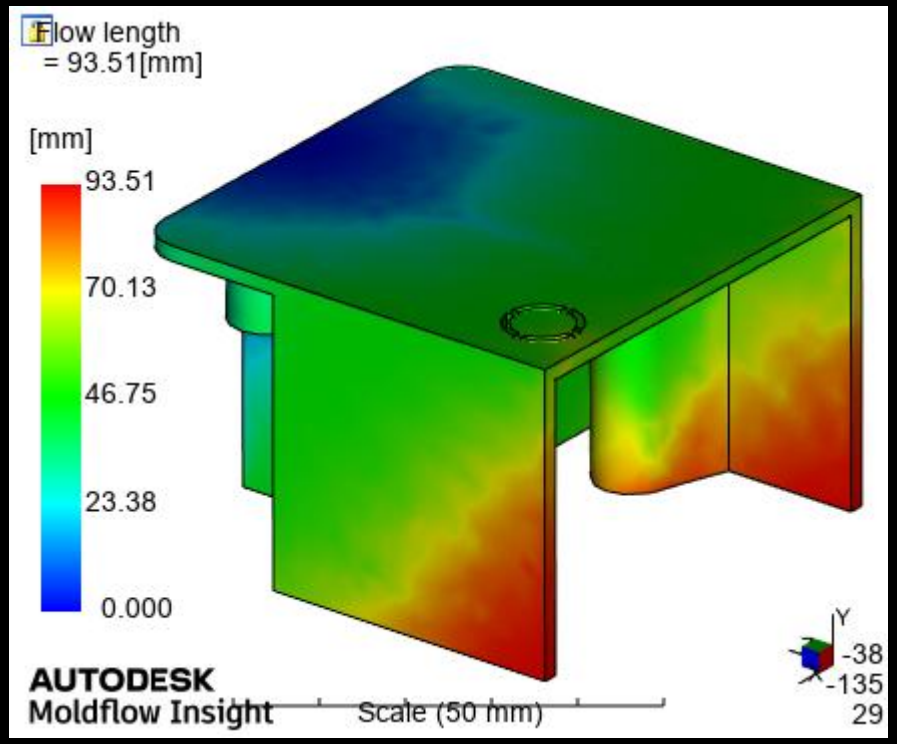


# Moldflow 2027 | Cooling Optimization: Effect on Warp



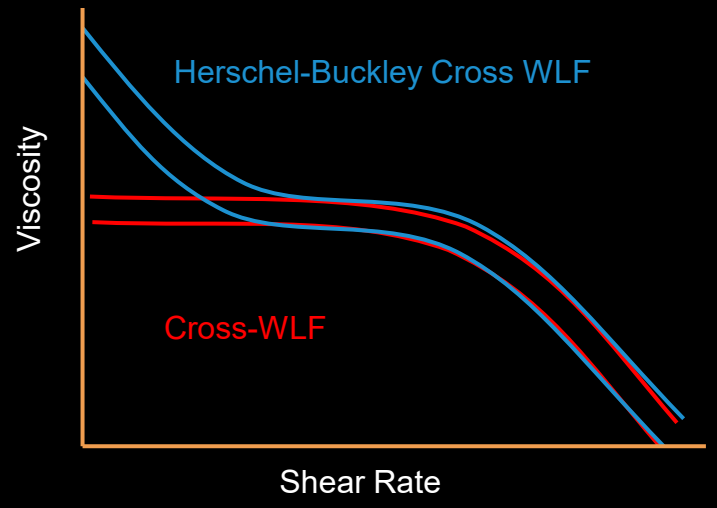
# Moldflow 2027 | New Flow length result for 3D

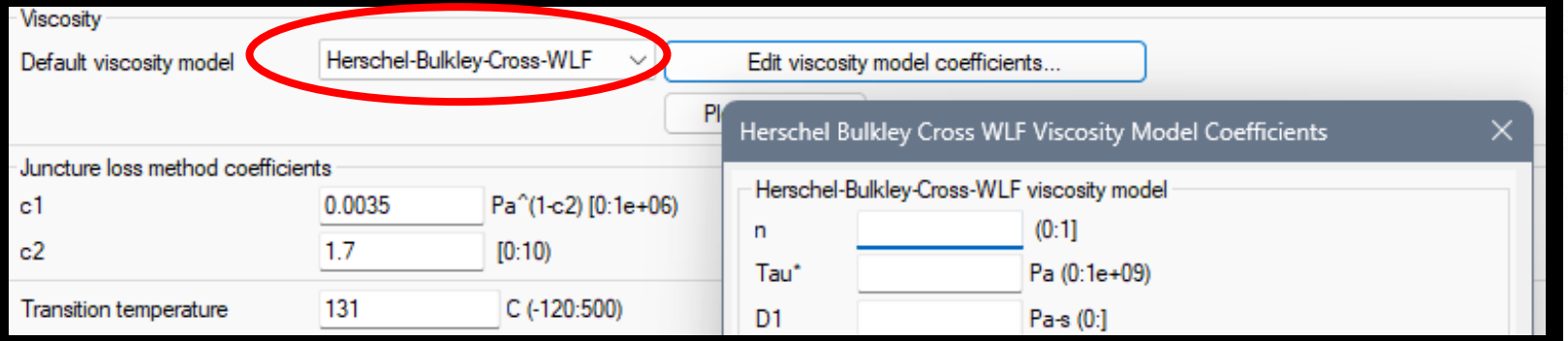
- New result for all 3D flow analyses
- Length of the flow path from the gate when a node fills
- Useful for understanding the filling pressure requirements of a gating design



# Moldflow 2027 | Herschel-Buckley cross WLF viscosity model for thermoplastic (MP/DD/3D)

- Support for new Hershell-Buckly cross WLF viscosity model for thermoplastics.
  - Supported in Midplane/Dual Domain and 3D
  - For materials that show increase in viscosity at low shear rates (e.g. highly filled polymer compounds )
  - Can help with simulation of ‘plug flow’. This influences fiber orientation in the core
  - No materials in the database yet or data fitting support

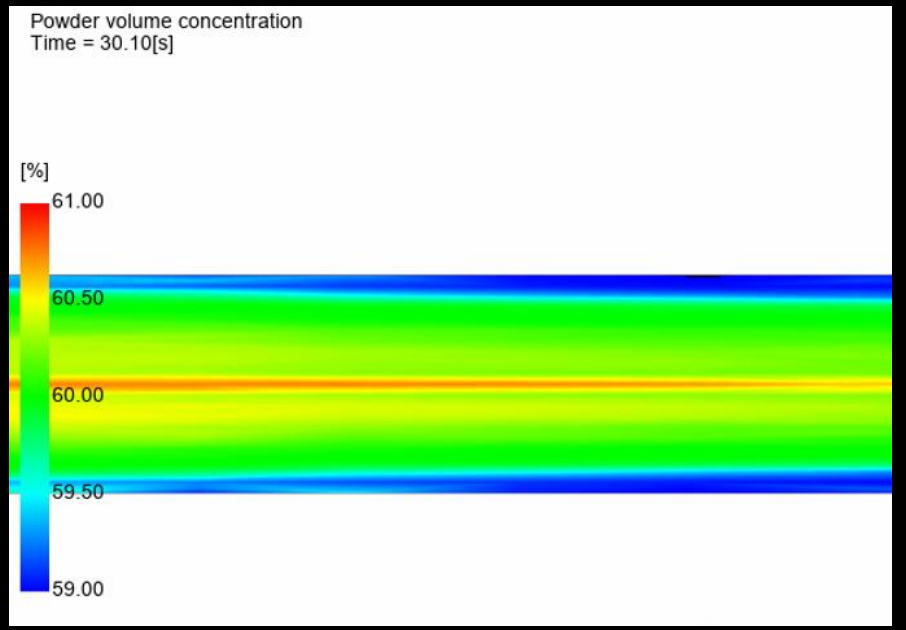



# Moldflow 2027 | Other solver improvements:

- Improved automatic constraints algorithm for warpage (all mesh types)
  - Automatically detects and retries ill-converged results
- Powder Volume Concentration is now available for all thermoplastic processes:
  - Powder Properties can be added to thermoplastic material

| | | |
|---|---|---|
| Powder radius | 0.01 | mm [0.001:10] |
| Initial powder volume concentration | 60 | % [0:100] |
| Maximum powder volume concentration | 68 | % [0:100] |
| Particle stress coefficients | | |
| Kn | 3 | [0:100] |
| Lambda 1 | 1 | [0:1] |
| Lambda 2 | 0.8 | [0:1] |
| Lambda 3 | 0.5 | [0:1] |



# Moldflow 2027 Scandium

Update

# Scandium Technology Preview

Free test version of Moldflow Insight that enables new capabilities in your commercial version of Moldflow Insight. This is available upon request through an application here. Existing Scandium participants get access by logging into https://feedback.autodesk.com/ and follow Project Scandium for Moldflow Insight. New applicants can apply here: https://feedback.autodesk.com/welcome/key/F43KDMRN2HP6CGND

These Moldflow Scandium specific capabilities require your feedback and input to help us get make these available in the commercial product.

# Scandium Technology Preview

Autodesk Moldflow 2027 Scandium Technology Preview features:

- Enhanced Valve Gate Controls for Midplane, Dual Domain and 3D
- Cool FAME Solver for 3D Mold Cooling
- Partial mold restraint for insert over-molded, or 2 shot over-molded components
- Anisotropic Thermo-Viscoelastic Residual Stress Model
- Tiger Stripe Prediction
- Underflow diagnostic
- Fiber concentration
- Annealing analysis with viscoelastic material properties for Midplane and Dual-Domain meshes

# Moldflow Scandium 2027 | Enhanced Valve Gate Triggers

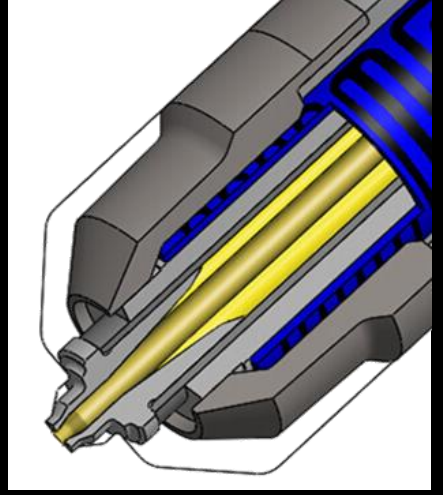
Now enabled for Midplane, Dual Domain and 3D

Open by ram-position, close by time (same controller)

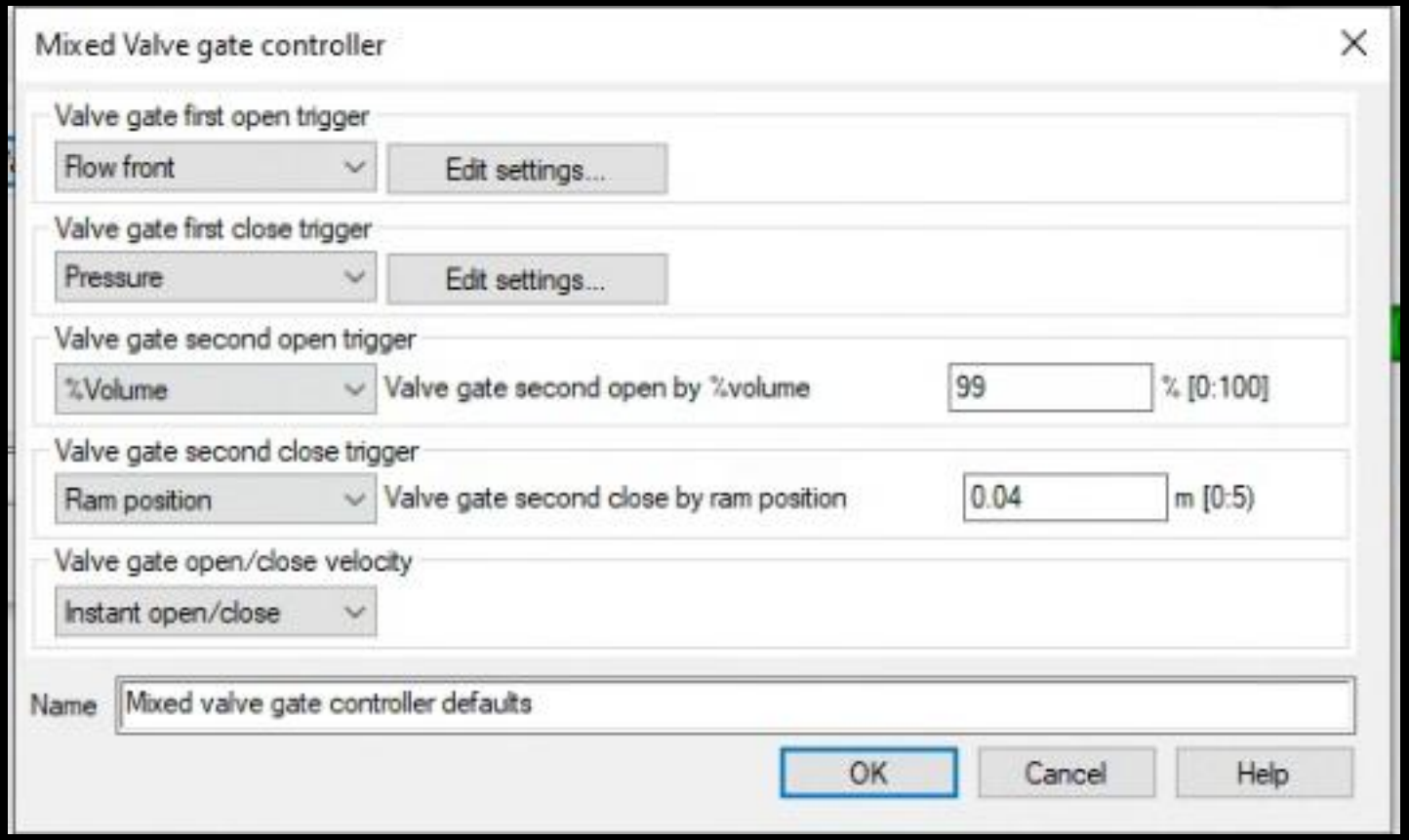
Option: Open at “end of filling”

Option: Close of “end of packing”

Option: Open-Close-Open-Close



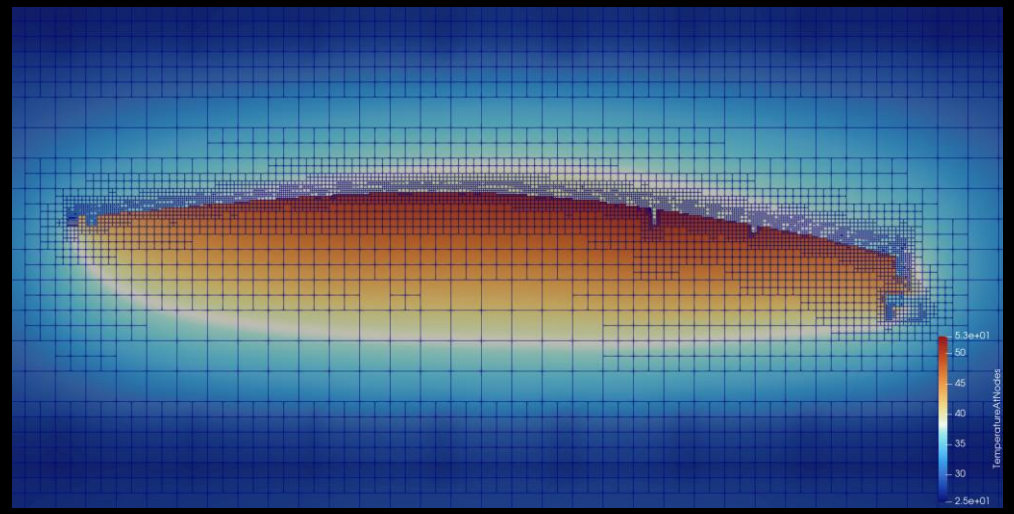
https://www.guenther-hotrunner.com/products/hot-runner-systems/valve-gate-systems/valve-gate-nozzles.html

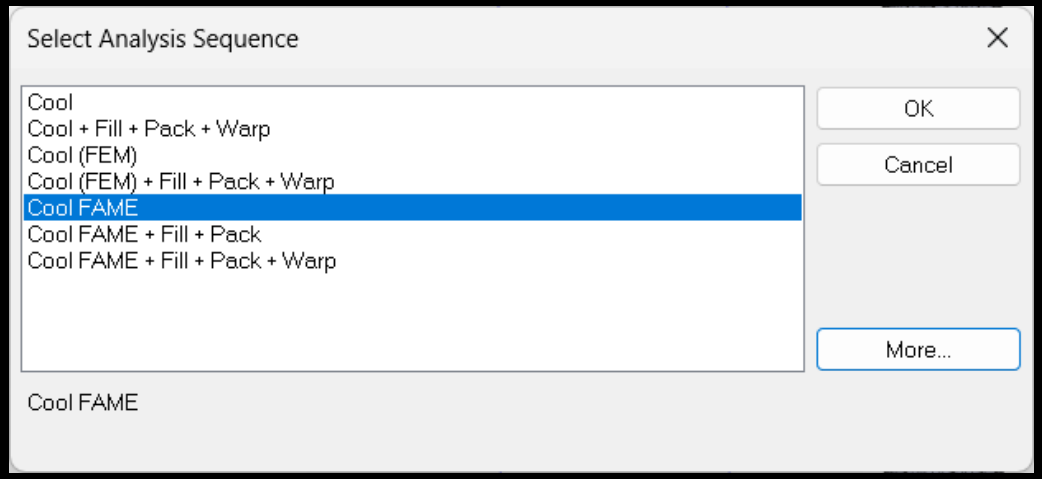


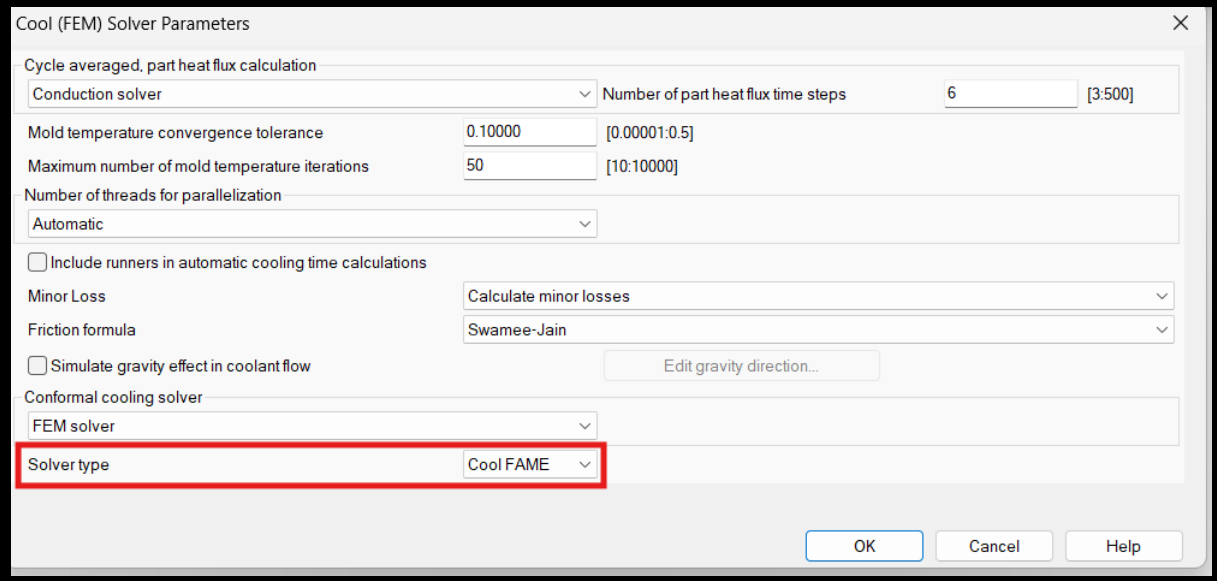
# Moldflow Scandium 2027 | Cool FAME

New Cool FAME solver:

- Mold discretization by Adaptive Voxels (hidden)
- Run from:
  - Mold surface mesh: Choose “Cool FAME” analysis sequence
  - Mold tetrahedral mesh: Choose “Cool FAME” in the Cool(FEM) solver parameters

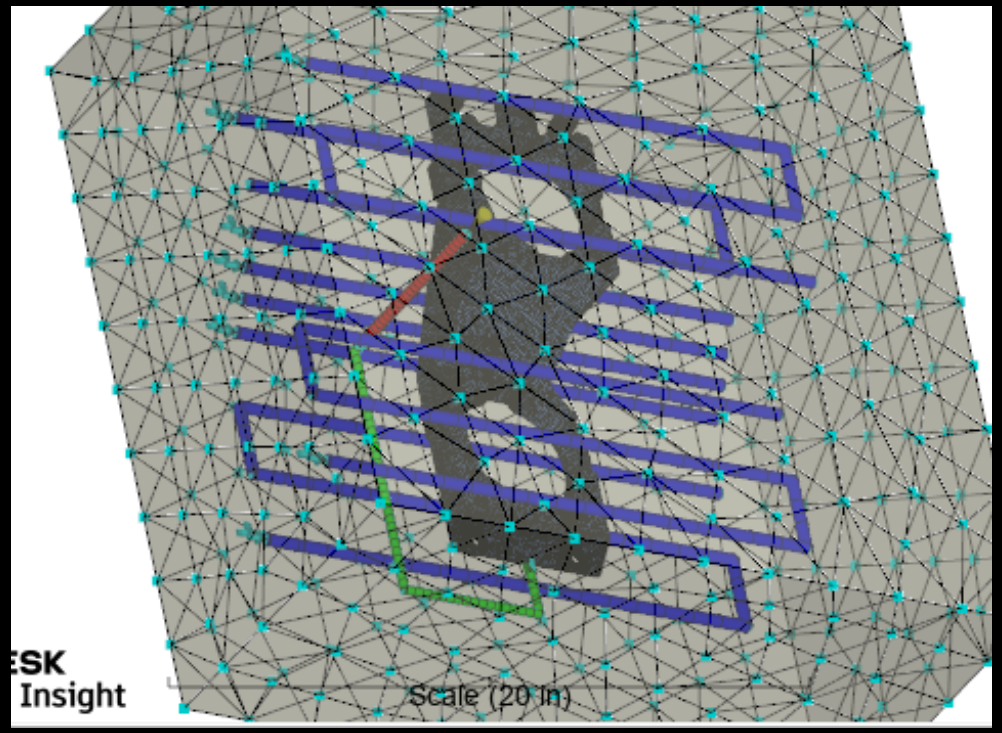


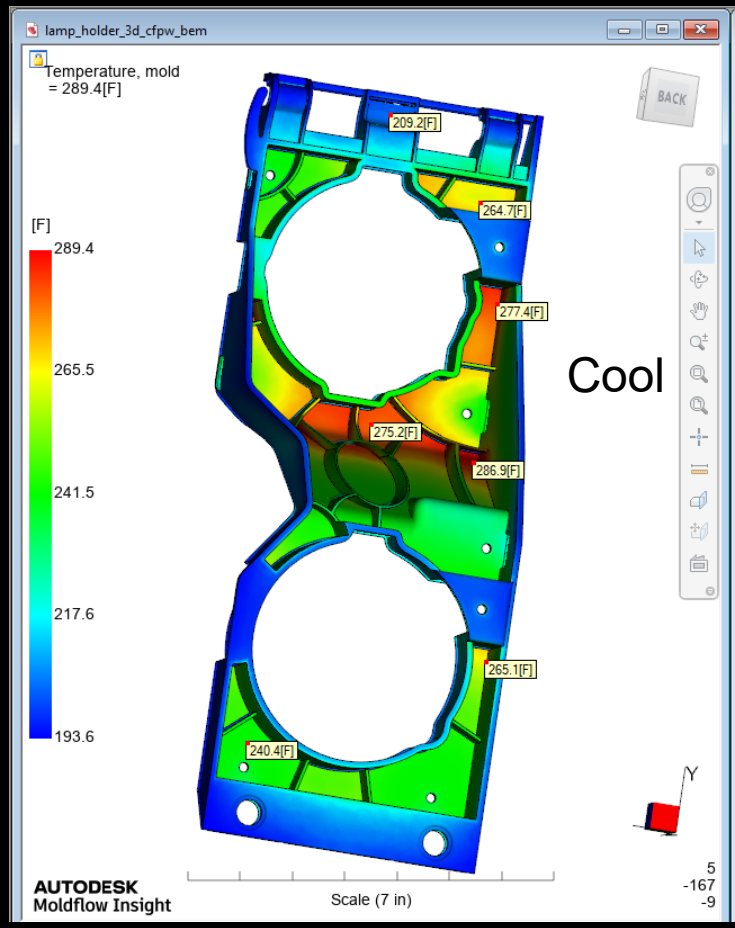


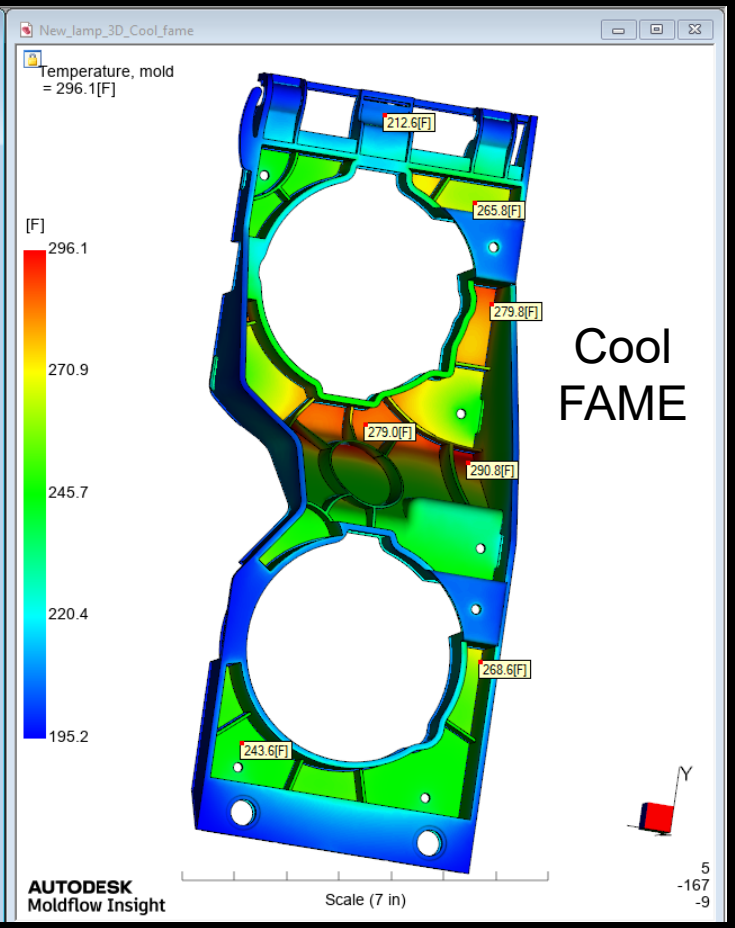



# Moldflow Scandium 2027 | Cool FAME

| | Cool | Cool (FEM) | Cool FAME |
|---|---|---|---|
| **Total time (meshing + analysis)** | 59 min | 22 min | 11 min |



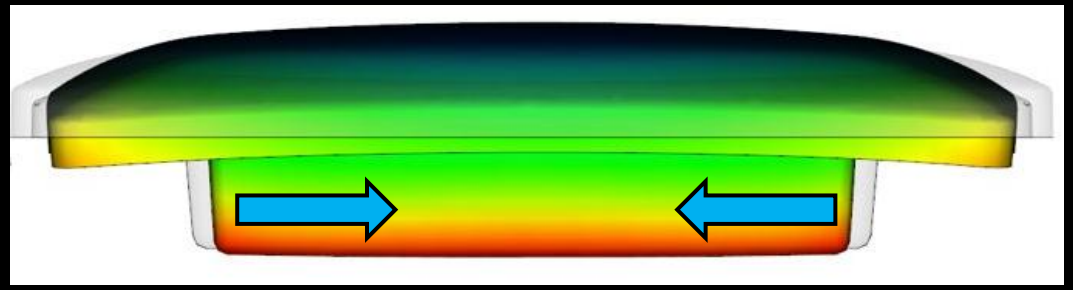



# Scandium Tech Preview | Overmolding Improvements

Improve 3D Warp with Part Inserts by considering

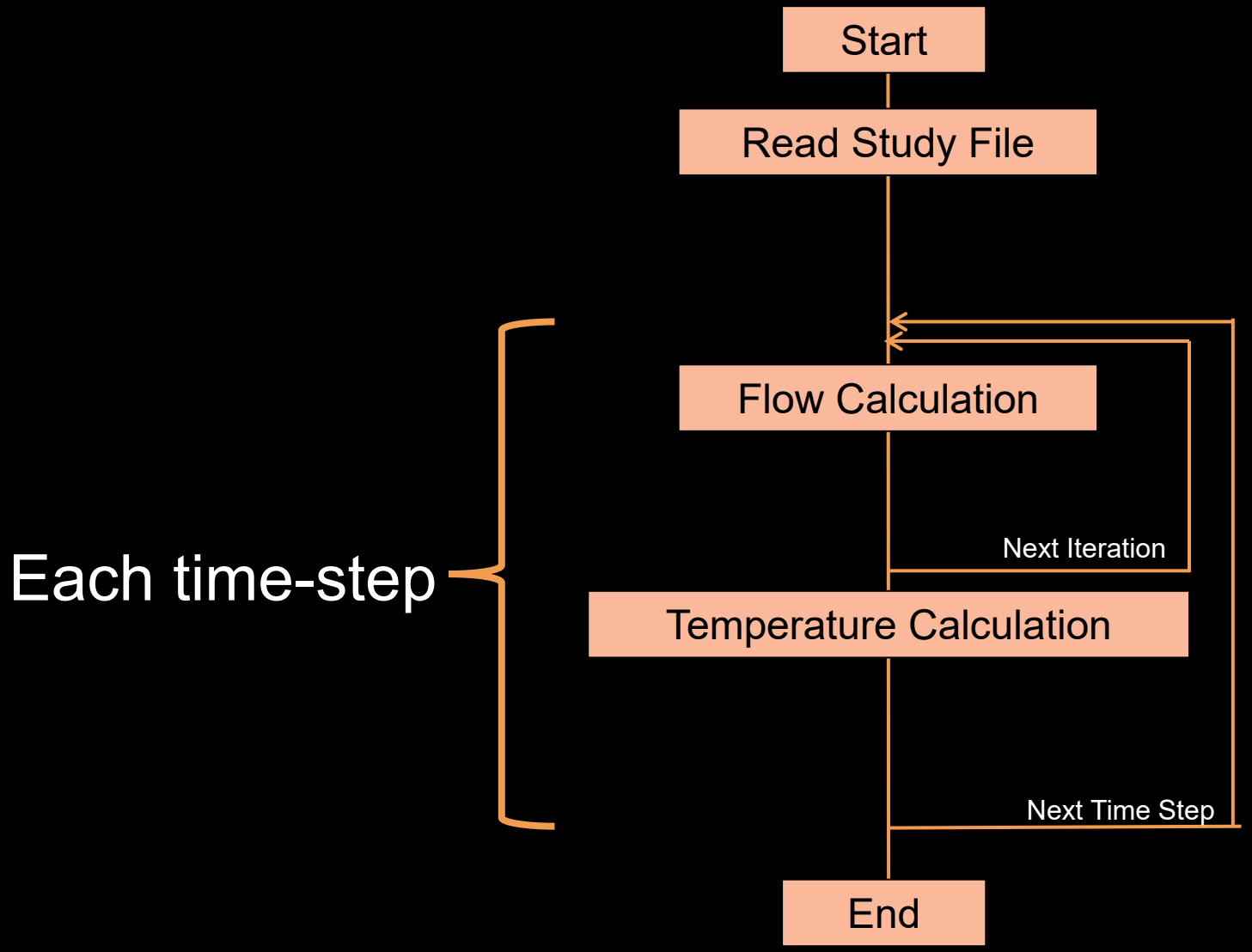
- Thermal expansion of insert before contact
- Thermal contraction after contact
- Achieve consistent application of pre-contact time which heats the insert

Improve 2-component overmolding by considering relaxation of first shot before overmolding



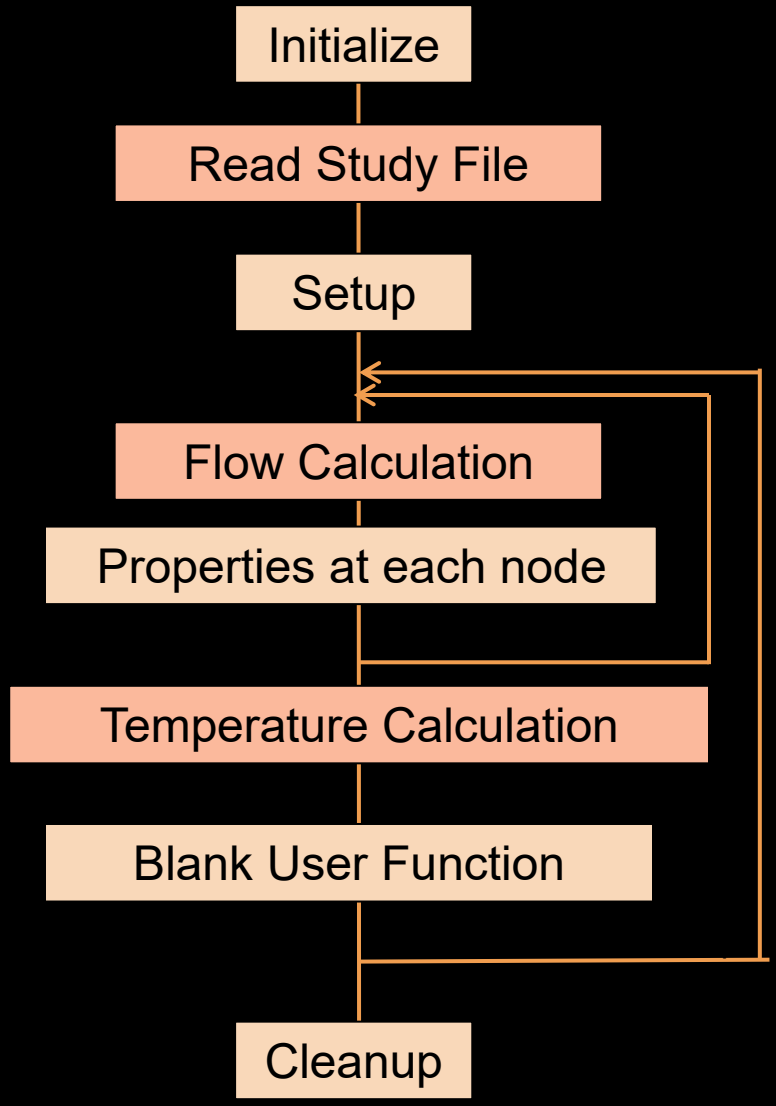
# Vibe Coding with Solver API

# 3D Flow Solver Calculation Sequence



# User Functions Called by the 3D Flow Solver

- Initialize
- Setup
  - After all mesh and process information is available
- Calculate Viscosity, PVT, and/or solidification at each node
  - Called individually for each node
- Blank Function at the end of each time step
  - Update own calculations (e.g. own fiber orientation calculation)
- Cleanup
  - At the end of analysis



# Instructing the AI Agent

- Explain context
  - DLL which interactions with the Moldflow solver
- Provide documentation
  - Location of header files
- Provide examples
  - Installed with Moldflow
- Ask specifically for what you want
- Ask again to refine – treat it like a conversation

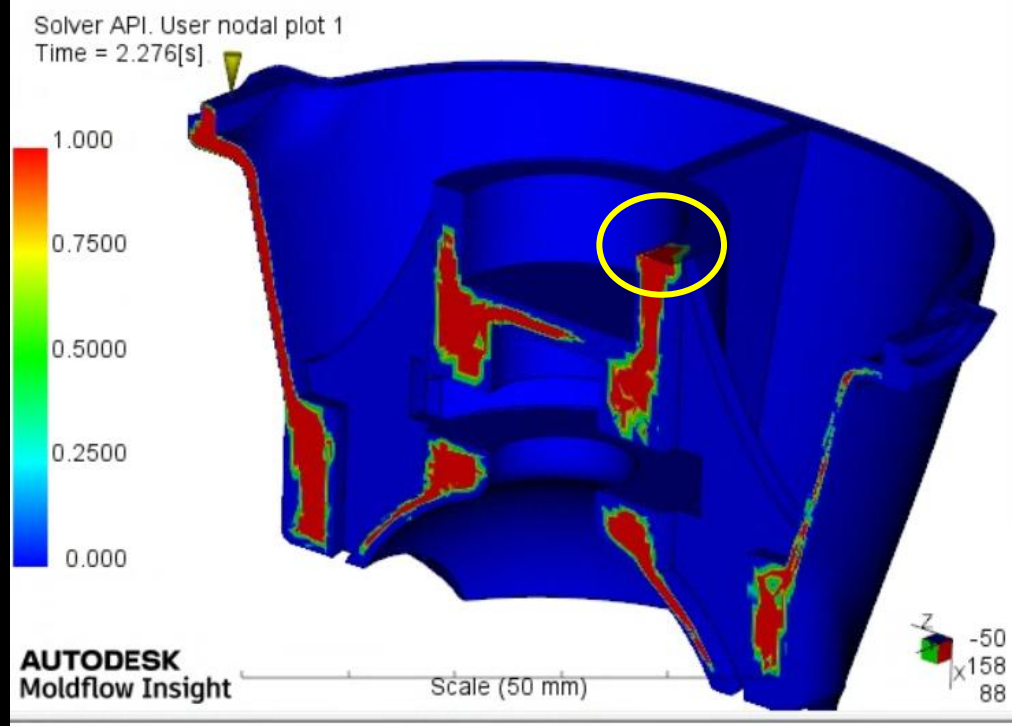
Image: ChatGPT

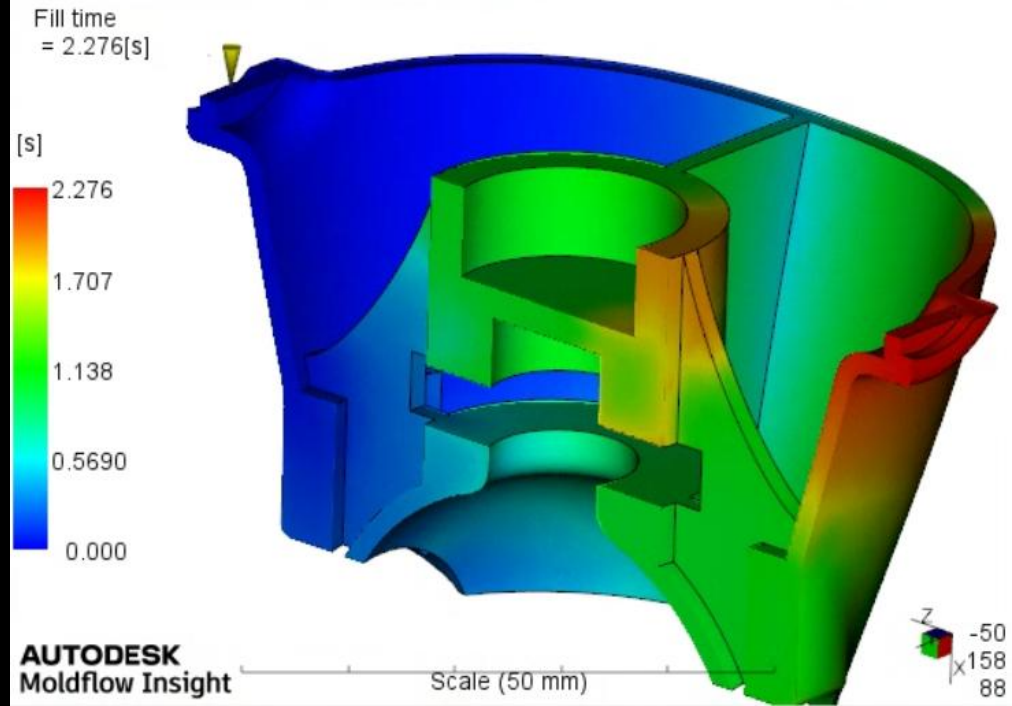
# Co-Injection example

Multi-barrel injection molding analysis with a delay time on the second barrel.

Red regions are filled with the second material (cutting plane)

Second material is breaking through at surface (yellow circle)



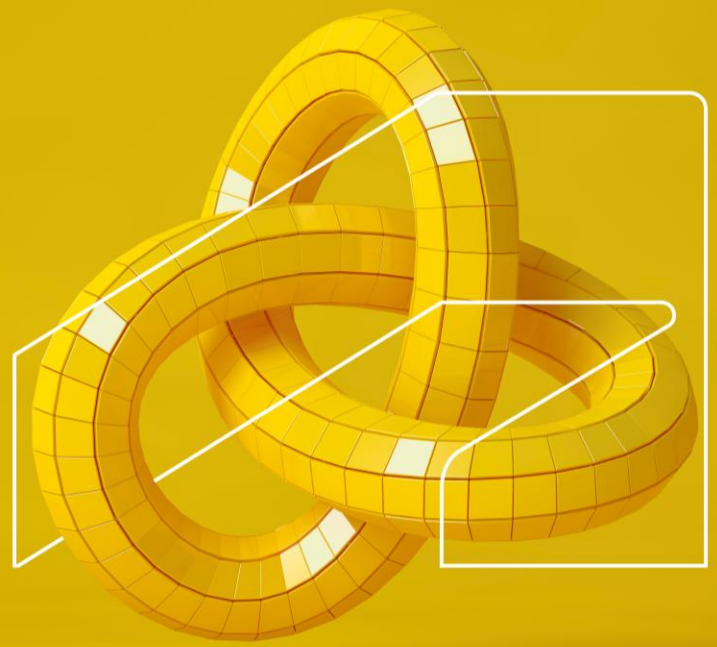



# Current Development

# Research Disclaimer

*We may make statements regarding planned or future development efforts for our existing or new products and services. These statements are not intended to be a promise or guarantee of future delivery of products, services or features but merely reflect our current plans, which may change.  Purchasing decisions should not be made based upon reliance on these statements.*

*The Company assumes no obligation to update these forward-looking statements to reflect events that occur or circumstances that exist or change after the date on which they were made.*



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# Under Development | Visual Effect of Metal Flakes

Depends on orientation of the flakes relative to the surface

Appearance changes with viewing angle and location of light source

Aim: Provide a result which shows the reflective index

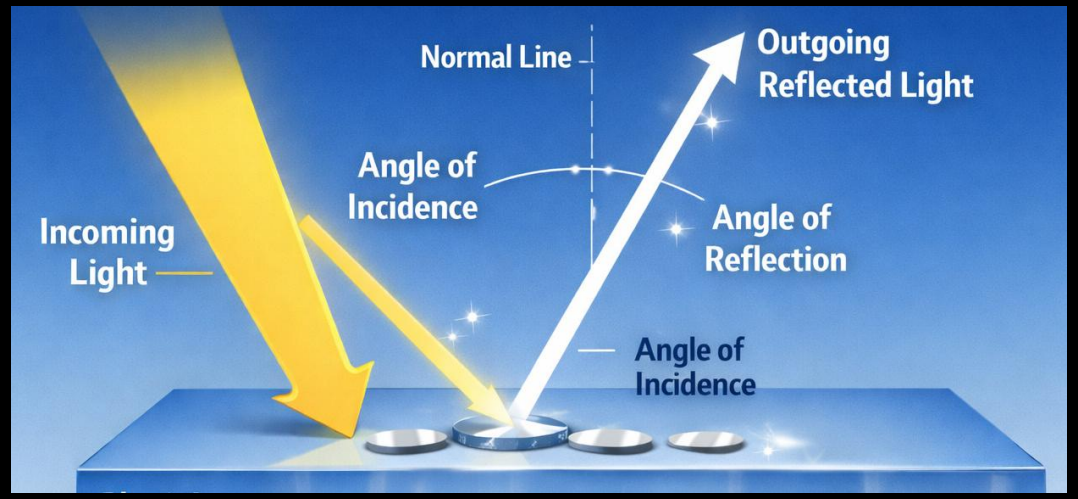
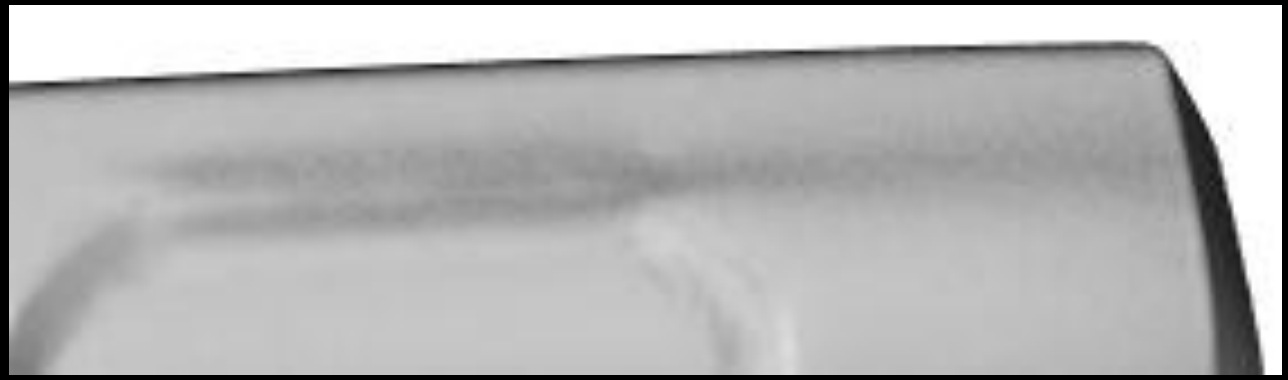



Image: ChatGPT



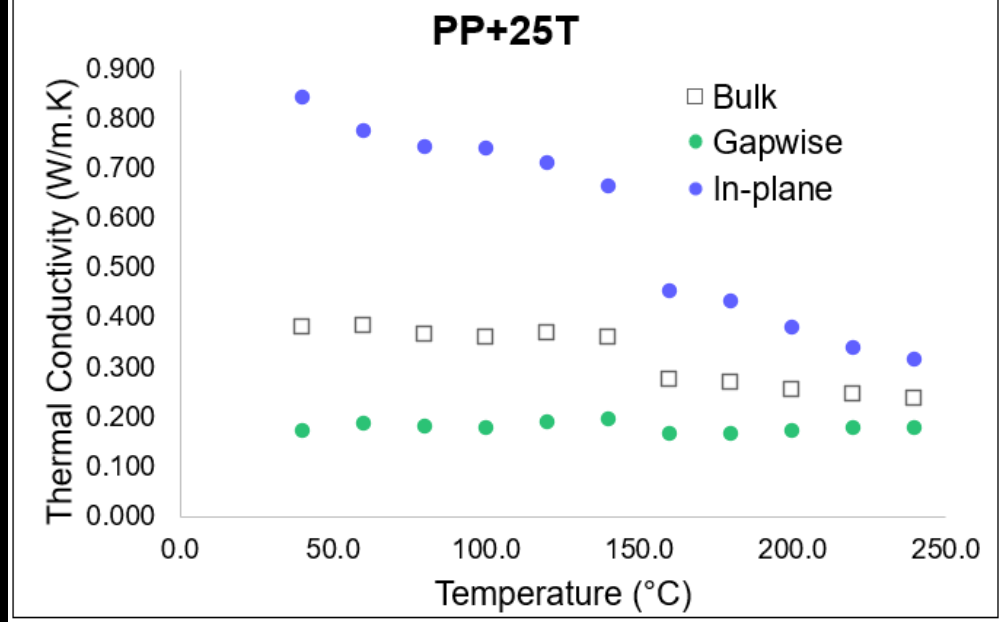
# Under Development | Visual Effect of Metal Flakes

Appearance changes with viewing angle

# Under Development | Other

- Time to Solidification result – From Ideas station
  - Based on Transition Temperature
- Extending Cool FAME to transient cool analyses, tetrahedral runners, heaters, etc.
- Collaboration Research on the effect of talc shape on properties and warp
  - Including Molding experiments at Beaumont

| | Mean Bulk (W/m.K) | Mean In-plane (W/m.K) | Mean Gapwise (W/m.K) |
|---|---|---|---|
| PP+25T | 0.318 | 0.582 | 0.184 |



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Make Anything