Beaumont: Material Characterization Lab Update

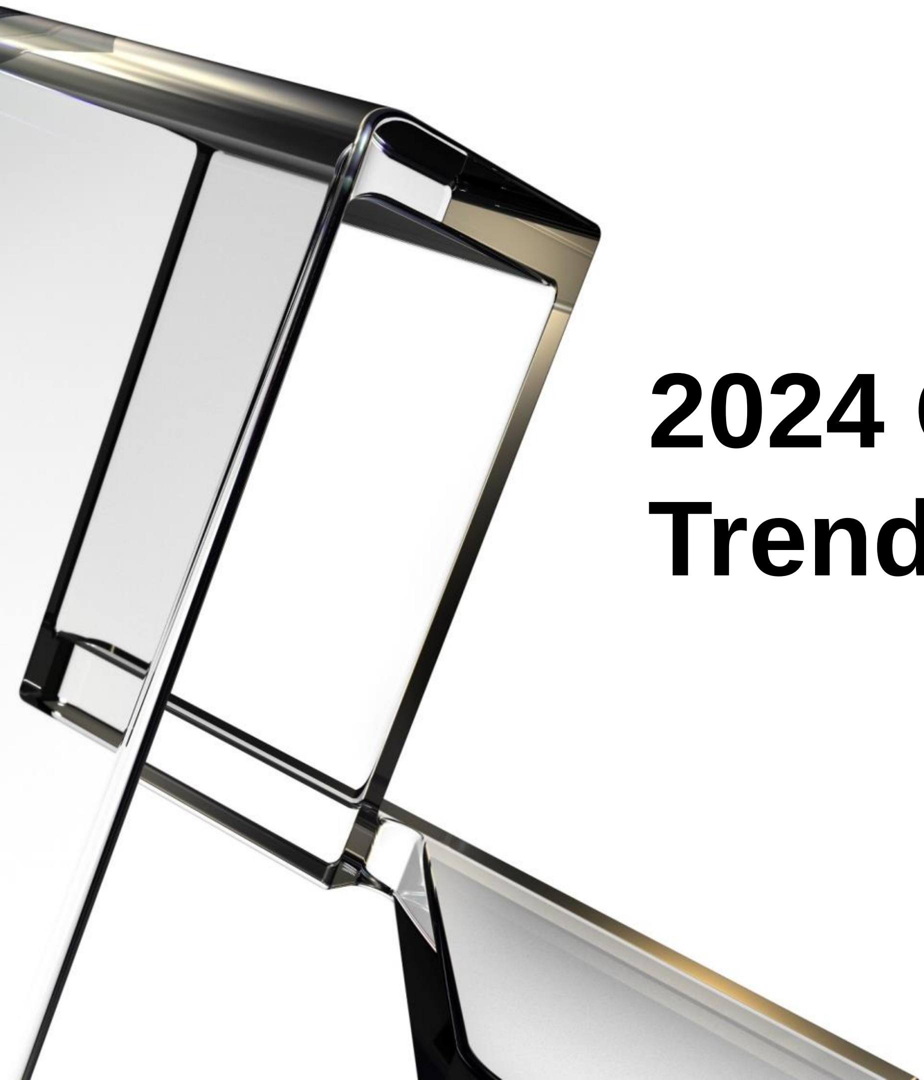
Jacob Trott
Director, Material Characterization Division | Beaumont Advanced Processing

Beaumont Advanced Processing

- With Beaumont Since 2014
  - Research and Development
  - Production Molding
  - Moldflow Material Characterization

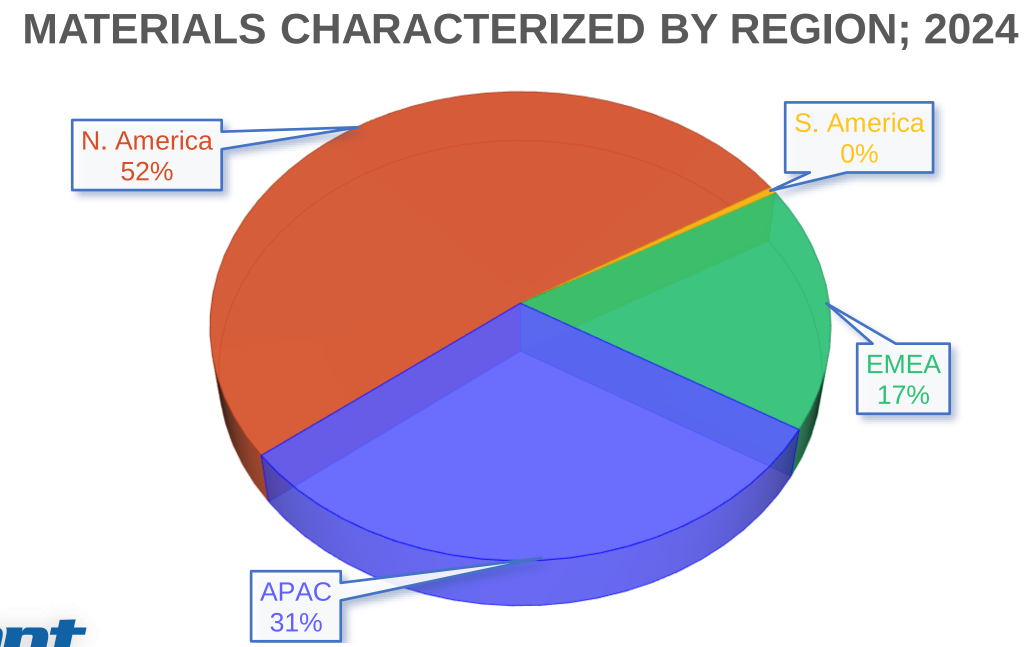
Presentation Overview

1. 2024 Characterization Trends
2. AMPL Lab Transition to BAP
3. Standard Changes in .udb Files
4. Thermal Conductivity and Orientation
5. Case Study



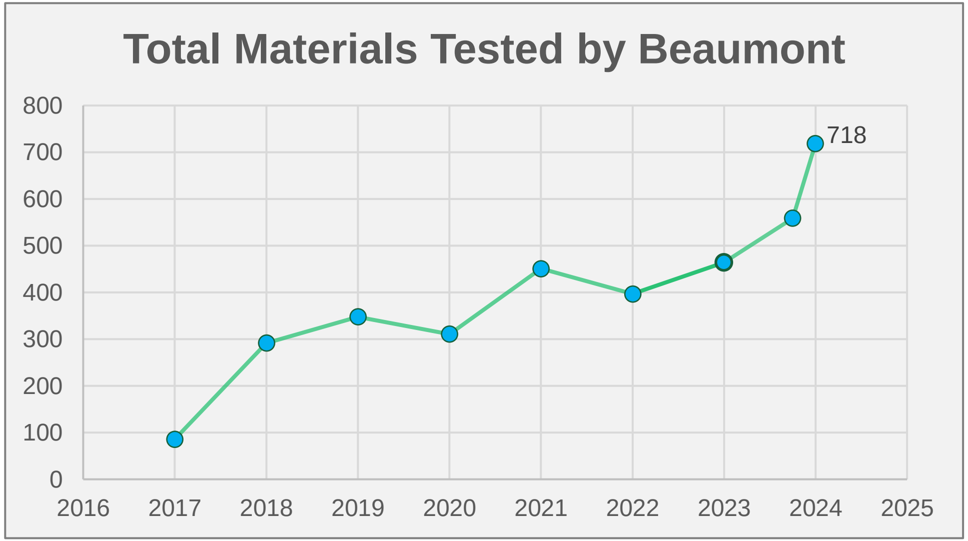
2024 Characterization Trends

Geographical Breakdown



Characterization Totals and Market Trends

- Characterized 3000+ Materials
  - Majority of these included or expected to be included in the Public Database

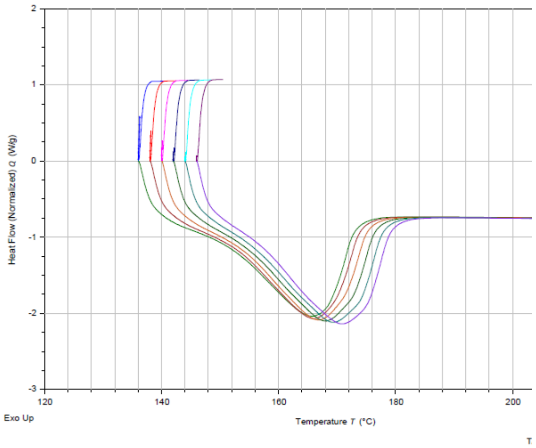


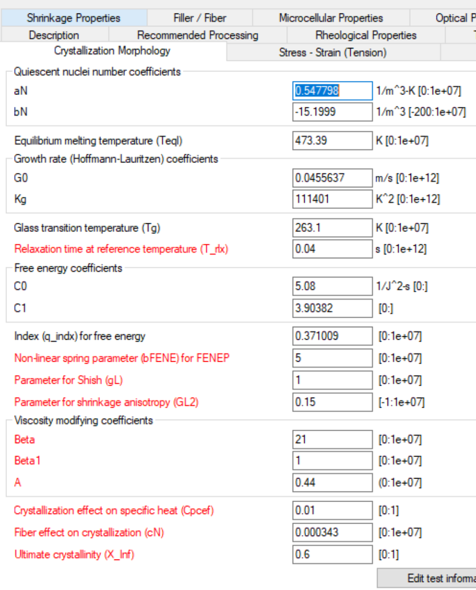
AMPL Lab Transition to BAP

Equipment Transition

Equipment/Package Updates

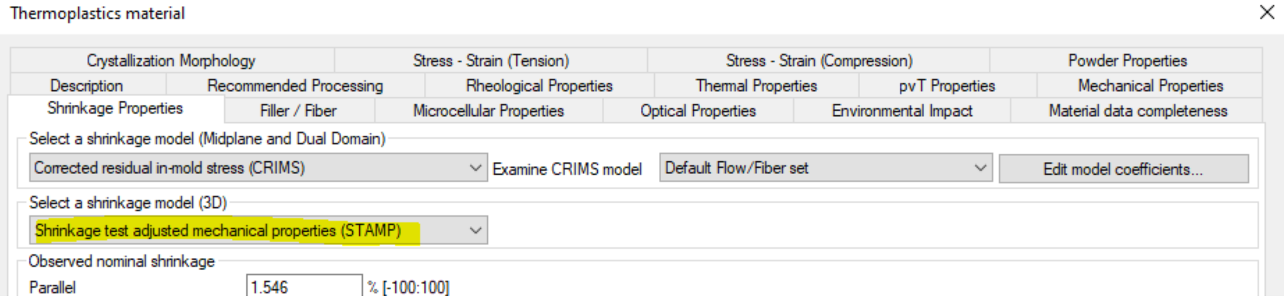
- Now Supported
  - MPL-420 Crystallization
- Upcoming
  - MPL-410 Viscoelasticity for Birefringence
  - Duplicate equipment
    - Electrical infrastructure complete
    - Equipment operational
    - Equipment calibrated and validated
    - Increased capacity – reduced lead times





Standard Changes in .udb Files

STAMP



- Will become default 3D shrinkage model when data is available

- No additional data required if shrinkage testing was completed

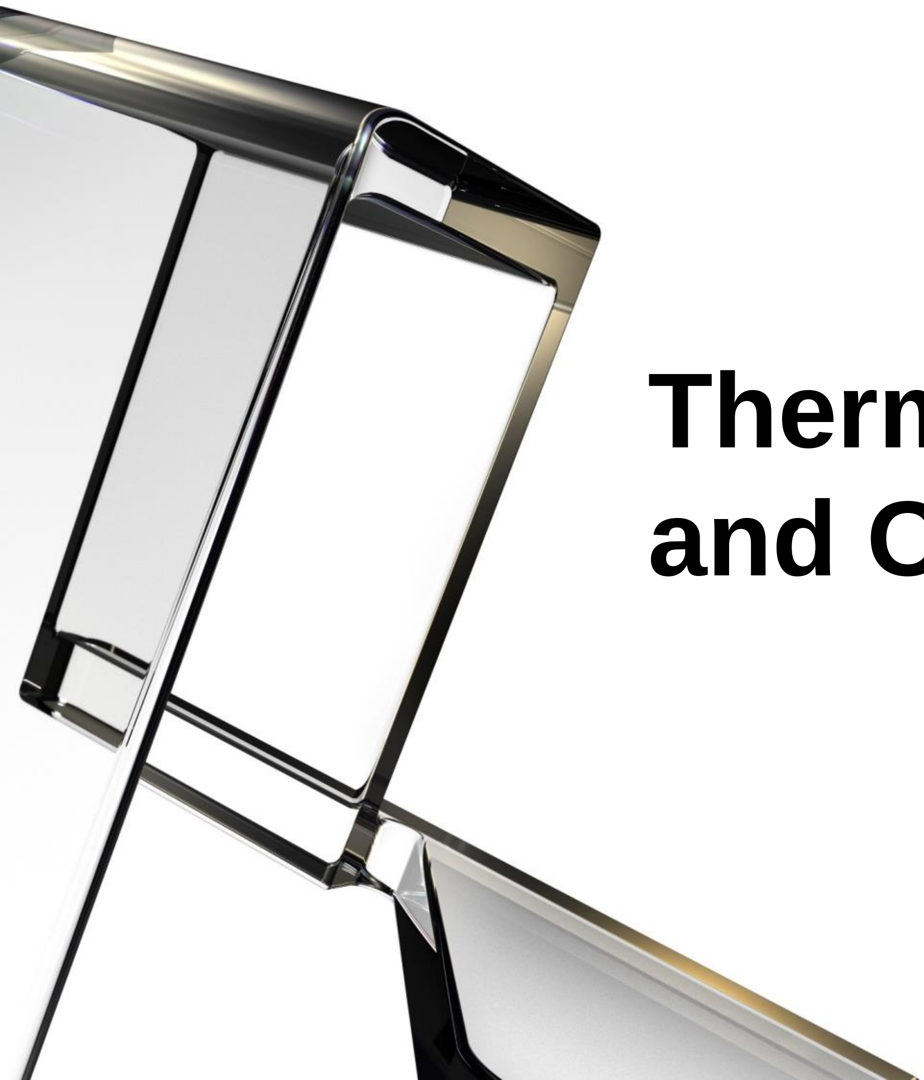
Beaumont

Environmental Impact Tab

Autodesk Moldflow Sustainability Descriptors (Optional):

The completion of this section is **optional** for customers ordering Autodesk Moldflow Material Characterization. If chosen to report this information, the data will be available with 2025 release of Autodesk Moldflow products.

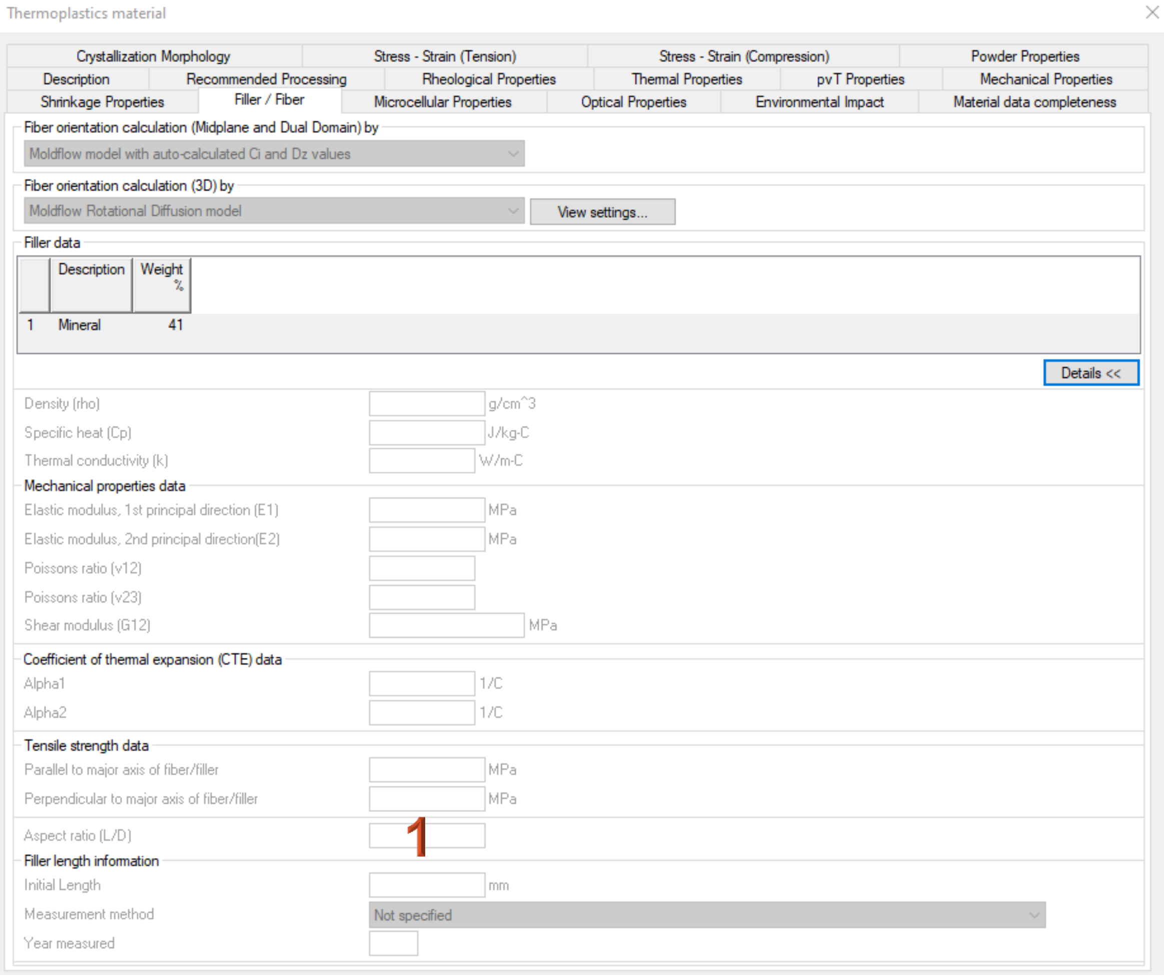
Sustainability Field	Available Values	Assigned Value
Minimum Potential Biomass Sourced Feedstock	0-100%	
Maximum Potential Biomass Sourced Feedstock	0-100%	
Biodegradable?	Yes / No	
Minimum Recycled Content	0-100%	
Maximum Recycled Content	0-100%	
Recycling Method	Unknown / Mechanical / Chemical / Other	
Recycled Source	PCR / PIR / Other	
Comments on Environmental Impact		



Thermal Conductivity and Orientation

Filler Properties

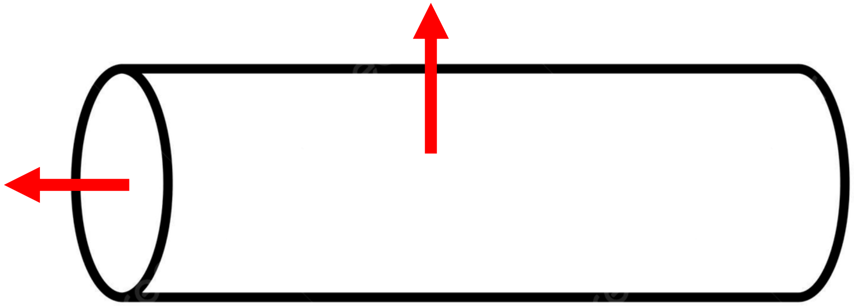
- Why filler properties are important
- Removed mineral option as it is very generic and often hides the aspect ratio we should be capturing

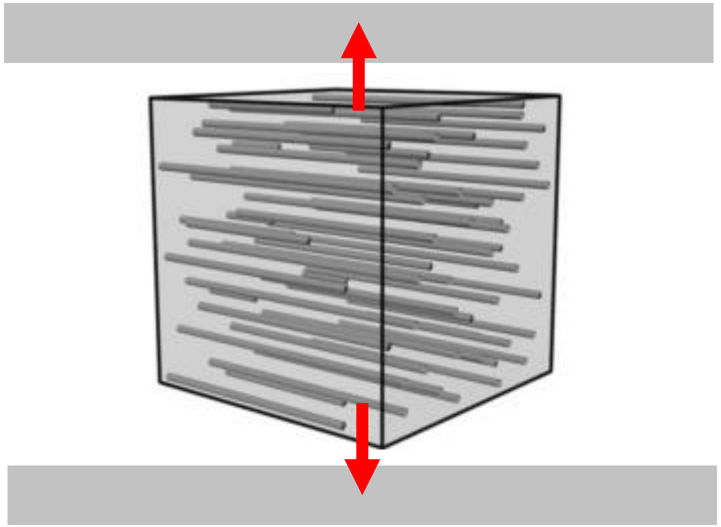


Beaumont

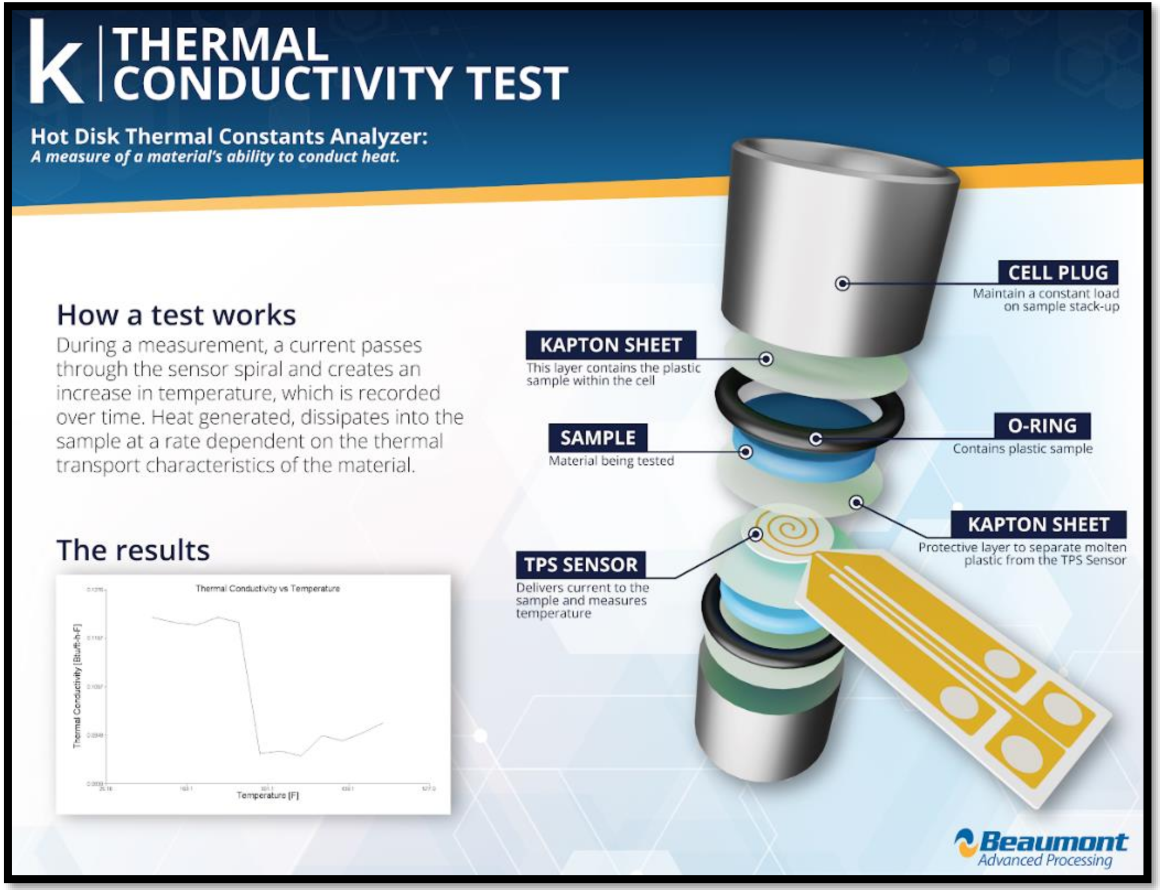
Isotropic vs. Anisotropic Fillers

- Carbon Fiber
    - Thermal Conductivity can be 10x lower through plane vs. axially along the fiber





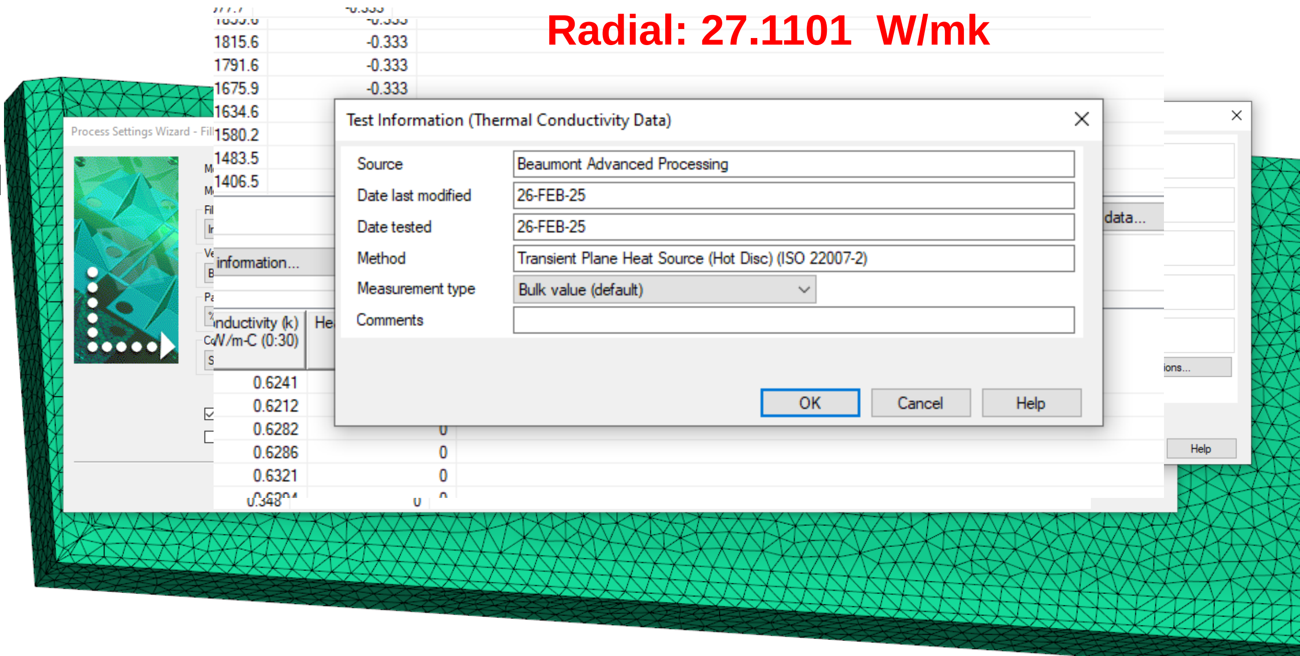
Transient Plane Source Method



Anisotropic Thermal Conductivity

- 2024 Release offered the ability to incorporate anisotropic thermal conductivity when considering fiber orientation in 3D analysis
- Prior versions would have listed ‘anisotropic-through-thickness’ thermal conductivity
- Now Bulk is recorded in the file to allow for decomposition of thermal conductivity

Axial: 1.5048 W/mk
Bulk: 6.3524 W/mk
Radial: 27.1101 W/mk



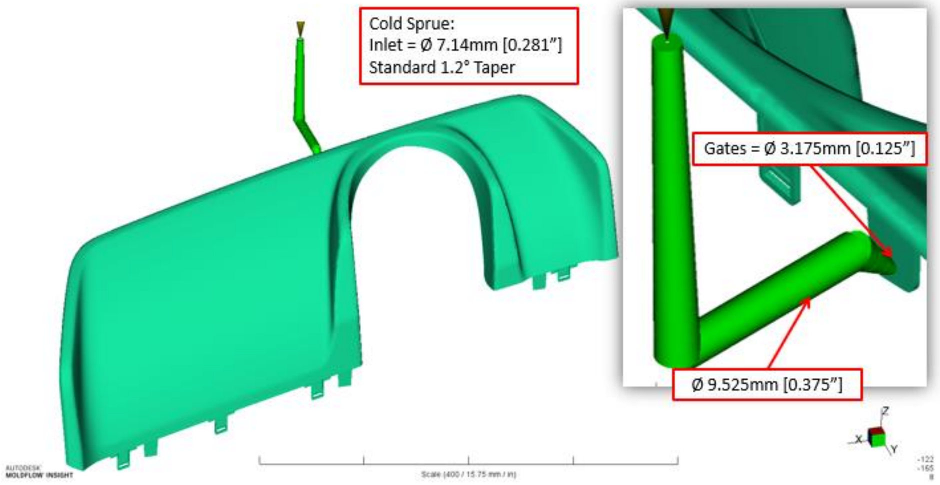
Beaumont

Case Study:
Slow Crystallization: Fitting Strategies for Copolyesters

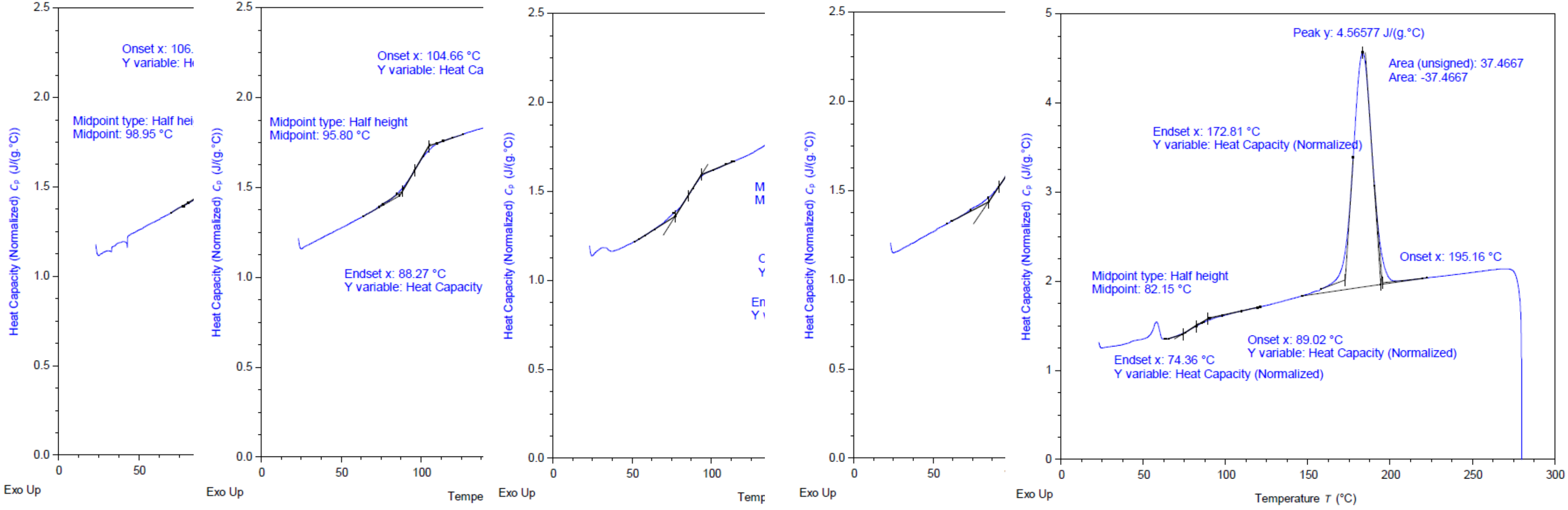
Slow Crystallization: Fitting Strategies for Copolyesters

Copolyesters

Typically Amorphous when molded

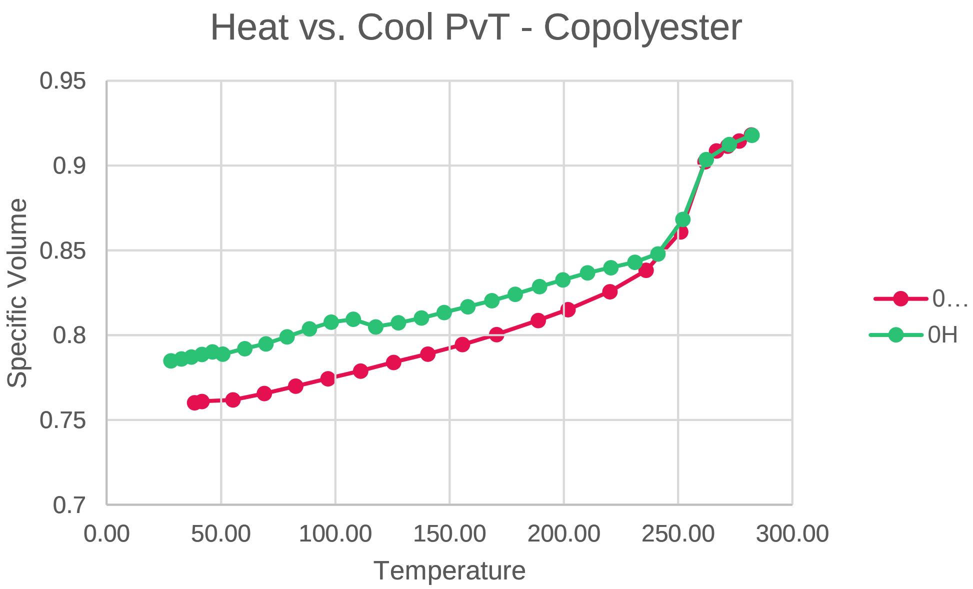


Slow Crystallization: Fitting Strategies for Copolyesters

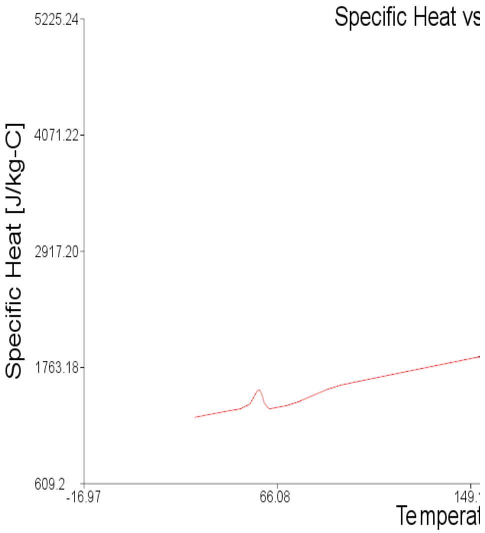


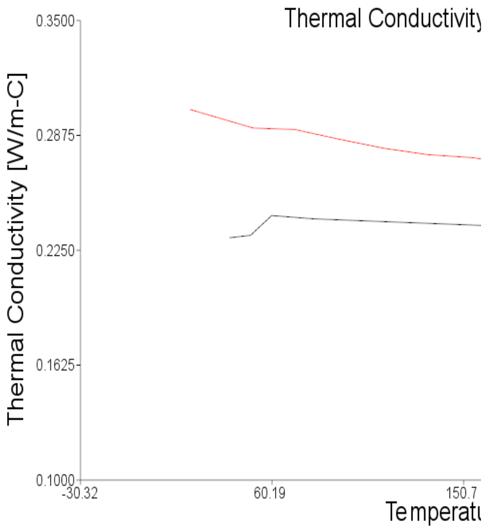
Slow Crystallization: Fitting Strategies for Copolyesters

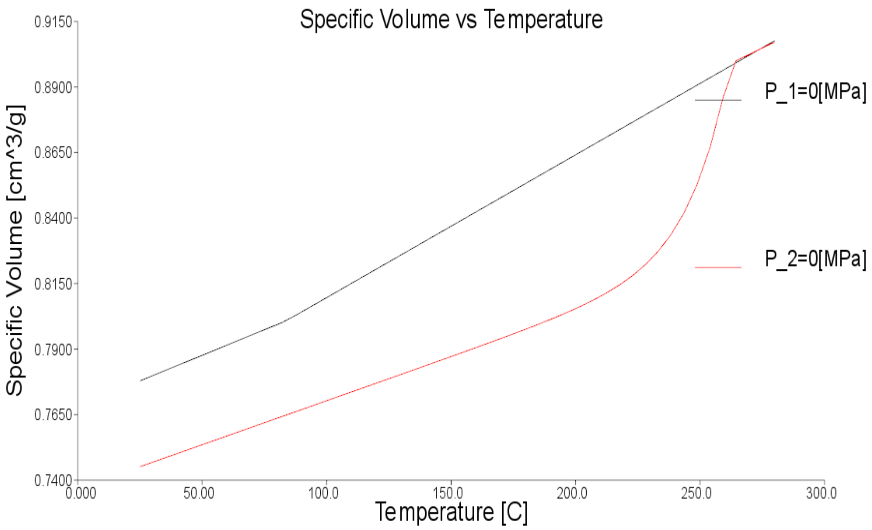
- Standard cooling curve
- Heating Curve



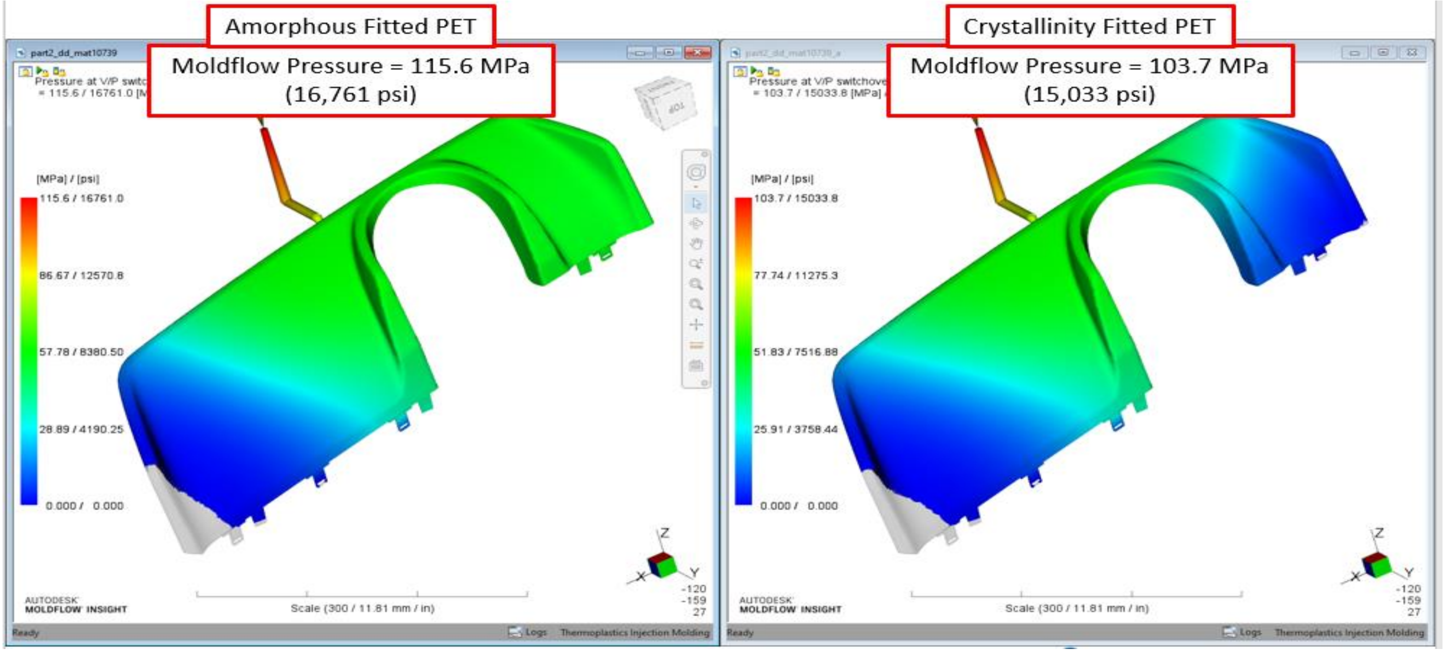
Slow Crystallization: Fitting Strategies for Copolyesters





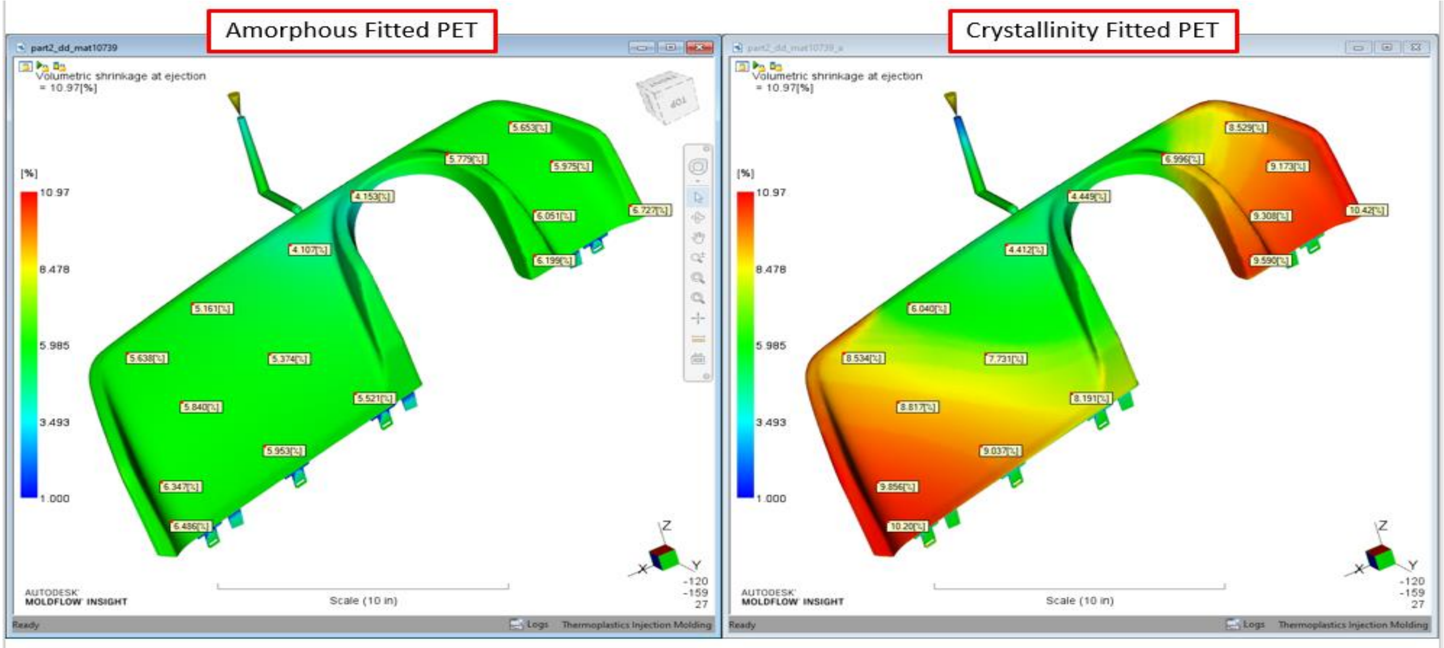


Slow Crystallization: Fitting Strategies for Copolyesters

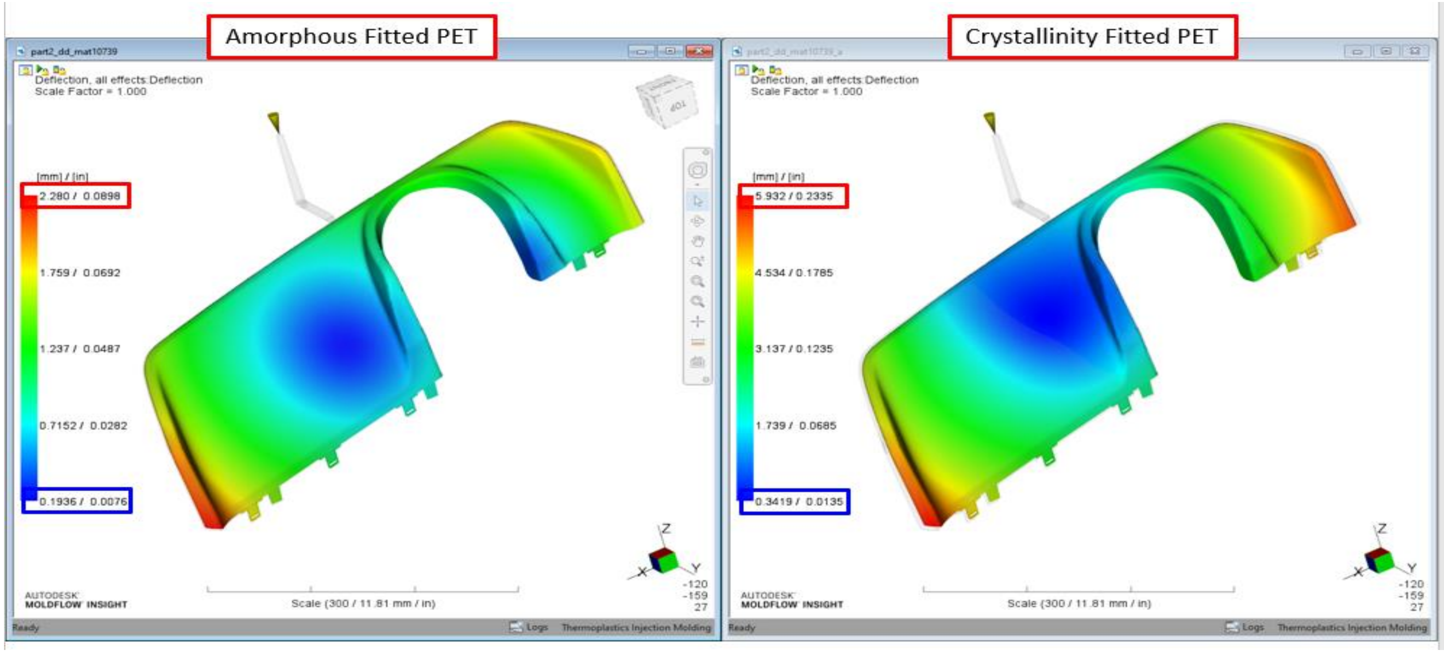


Beaumont

Slow Crystallization: Fitting Strategies for Copolyesters



Slow Crystallization: Fitting Strategies for Copolyesters



Beaumont

Thank You

Make Anything