

▶ **RELEASE NOTES**

Altair[®] Inspire[™] PolyFoam

2021.2

New Features and Enhancements 2021.2

Altair Inspire PolyFoam 2021.2 includes the following new features and enhancements.

Foaming

Multi-Physical blowing agent (PBA)

The actual blowing process of rigid PU foam is the physical blowing process in which a low-boiling liquid incorporated in the reaction mix is vaporized due to the heat of the reaction. Various PBA is used together or alone for responding to global climate change and good properties such as low-temperature foaming and low thermal conductivity. Since only one type of PBA could be set in the previous version, a new feature was added to enable multiple PBAs for user convenience in this version.

Users can set the number of physical blowing agents in the Mixing ratio tab of Materials window like the figure below. Material properties such as density, specific heat, conductivity, boiling temperature, and molecular weight need to be input as many as the number of PBA.

Change to Multiple

Insert data

Delete data

Blowing Agent	Mass (g)
1 1.0	5.0
2 2.0	7.0
3 3.0	3.0

Blowing Agent	Thermal Conductivity (W/(m*K))
1 1.0	0.12
2 2.0	0.1
3 3.0	0.13

Blowing Agent	Thermal Conductivity (W/(m*K))
1 1.0	0.011
2 2.0	0.016
3 3.0	0.008

Isocyanurate reaction (PIR)

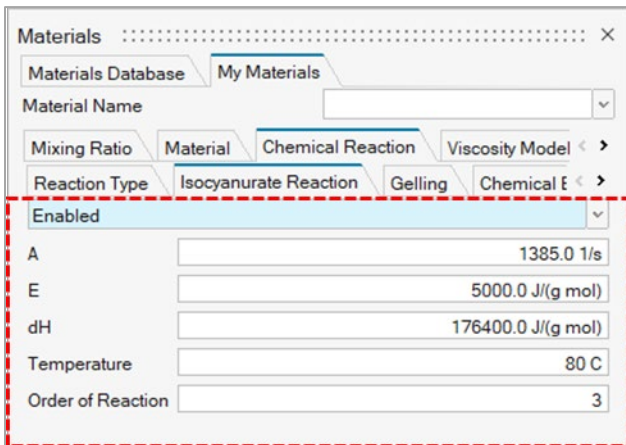
Analysis results now include an isocyanurate reaction result type. Poly-isocyanurate (PIR) foam is recognized as the efficient thermo-insulations utilized for constructions. Manufacturing processes of PIR foams are like those of rigid polyurethane (PUR) foams. Isocyanurate linkages are formed by cyclotrimerization of excess isocyanate compounds using suitable trimerization catalysts. The outstanding properties of PIR foams are inherent thermal stability and low flammability.

PIR reaction can be described by the following formula. There is a very complex reaction mechanism, but a simplified reaction equation is used for modeling.

$$3[NCO] = [PIR]$$

$$\frac{d[PIR]}{dt} = A_{PIR} \exp\left(-\frac{E_{PIR}}{RT}\right) [NCO]^n$$

The parameter input window of the kinetic equation is composed as follows, and the meaning of each is described below.

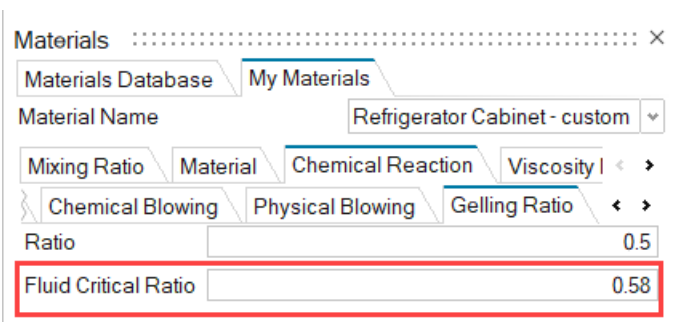


Parameter	Value	Units
A	1385.0	1/s
E	5000.0	J/(g mol)
dH	176400.0	J/(g mol)
Temperature	80	C
Order of Reaction	3	

- E: Activation energy of reaction
- dH: Heat of reaction
- Temperature: Reaction start temperature
- Order of reaction: Order of reaction in reaction kinetics (n)

Fluid critical gelling ratio

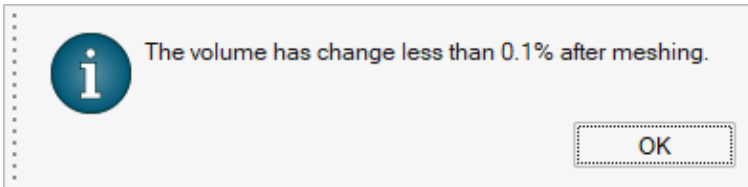
Fluid critical gelling ratio means the critical(limit) gelling ratio at which flow can occur. When the gelling ratio reaches this value, each element can no longer flow and does not foam, as if it had solidified. It is implemented for smooth rise at the final stage.



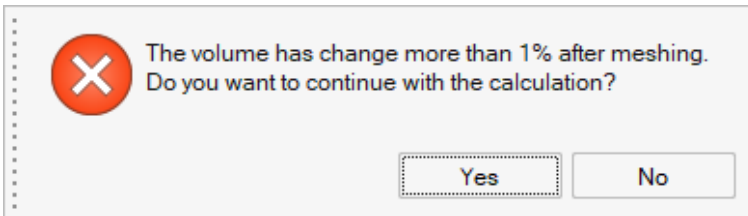
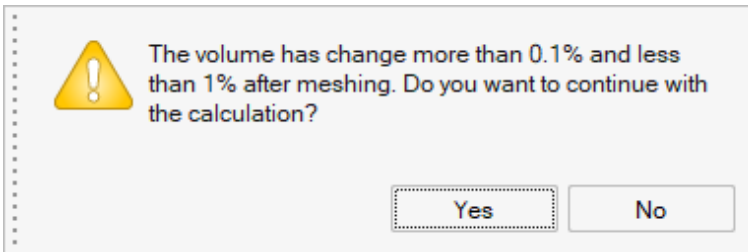
Parameter	Value
Ratio	0.5
Fluid Critical Ratio	0.58

Additional Changes and Enhancements for Foaming

- If Removed Volume% == 0: Nothing is shown
- If Removed Volume% <= 0.1%: Informational dialog appears



- If $0.1 < \text{Removed Volume\%} \leq 1\%$: Confirmation dialog appears. User can continue or stop the calculation



- **Square Vents Table:** Square vents can now be viewed in a table.

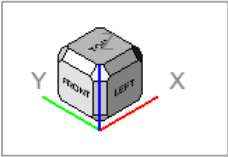
Location (mm)	X (mm)	Y (mm)	Z (mm)
1 (16.6568, -23.6567, 100.0)	1.76	1.76	1.76
2 (-20.9308, -25.8816, 100.0)	1.76	1.76	1.76

Buttons: Snap, Delete, Delete All

Geometry

View Cube

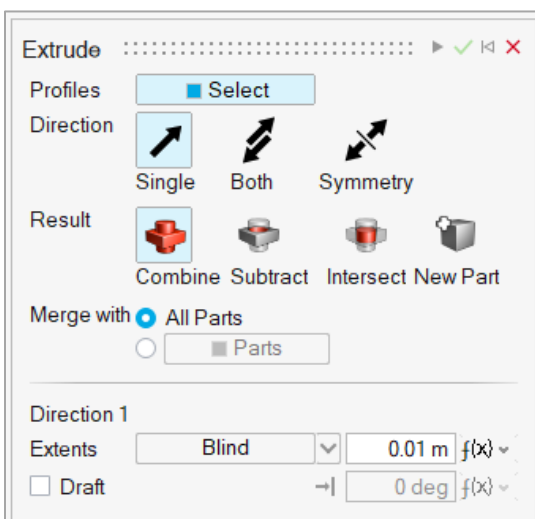
A new navigation cube has been added to the view controls in the lower left corner of the modeling window, replacing the old View Rotator.



- Clicking the arrows incrementally rotates the view. Left- and right-clicking increments by + and - 15 degrees while middle-clicking increments by 90 degrees.
- The display and behavior of the View Cube can be adjusted in the Preferences under **File**→**Preferences**→**Inspire**→**Visualization**.

Extrude Tool

Use the Extrude tool to sketch profiles in one or two directions. Create a new part or combine, subtract, or intersect the extruded shape with existing parts.



Pattern Tool

Use the Pattern tools to create a linear or circular pattern of parts or faces.



Circular Pattern ▶ ✓ ⏪ ✖

Entities to Pattern Parts ▼

Instances

Direction ↻ Select

Pattern by Number of copies
 Equal spacing

Angle f(x) ▼

No. of copies f(x) ▼

Linear Pattern ▶ ✓ ⏪ ✖

Entities to Pattern Parts ▼

Direction ↗ ↘
 Single Both

Instances

Direction 1 ↻ Select

Spacing f(x) ▼

No. of copies f(x) ▼

Offset Tool

Use the Offset tool on the Geometry ribbon to offset parts or surfaces.



Offset ▼ Parts ▼ ▶ ✓ ⏪ ✖

Parts

Surfaces

Offset ▼ Parts ▼ ▶ ✓ ⏪ ✖

Offset

Thicken

Additional Changes and Enhancements for Geometry

- The sketch Intersect tool can now be applied to parts or surfaces.
- Inspire now reads surface color meta data from Catia files.

Resolved Issues

- **Analysis showed the same results after changing the initial temperature of the foam part:** This issue has been resolved, and now changes to the initial temperature of the foam part will affect the analysis results.
- **PU disappeared in thin-layered areas when foaming starts:** The mass balancing algorithm has been upgraded to preserve mass conservation.
- **Excessive analysis calculation time under certain conditions:** The algorithm for movement and correction of fluid has been upgraded.
- **Air pockets in PU foam caused solver to crash:** The code has been upgraded to prevent crashing under these conditions.
- **The tab label “Foam Thixo Model” in the Materials window was unclear to many users:** Changed the tab label to “Foam Rheology Model” for clarity.
- **‘Run at model location’ option did not work:** This issue is fixed.
- **The nozzle table showed only the first line:** This visualization issue is fixed.

Known Issues

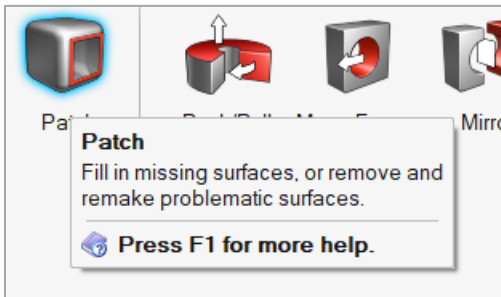
- Offline help fails to download and install correctly. Please use the following link to manually download the offline help:
https://2021.help.altair.com/2021.2/offlinehelp/polyfoam/InspirePolyFoam_2021.2_OfflineHelp_en_US.zip

Learn More About Inspire

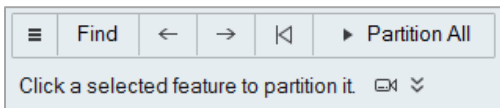
You can learn more about new and existing features in Inspire using the following resources:


In-Application User Assistance

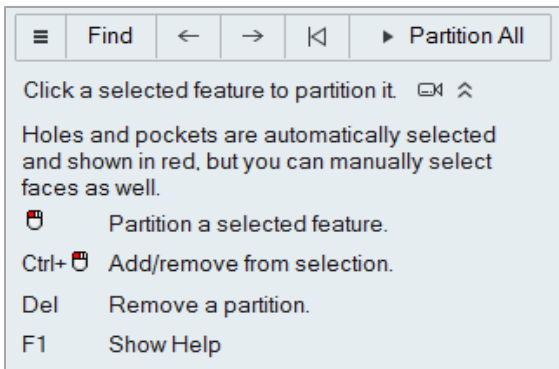
Inspire provides two types of user assistance. **Enhanced tooltips** appear when you hover over icons and other features. They describe what the tool does.



Workflow help appears when you select a tool that opens a guide bar or microdialog. The text prompts you what to do next.

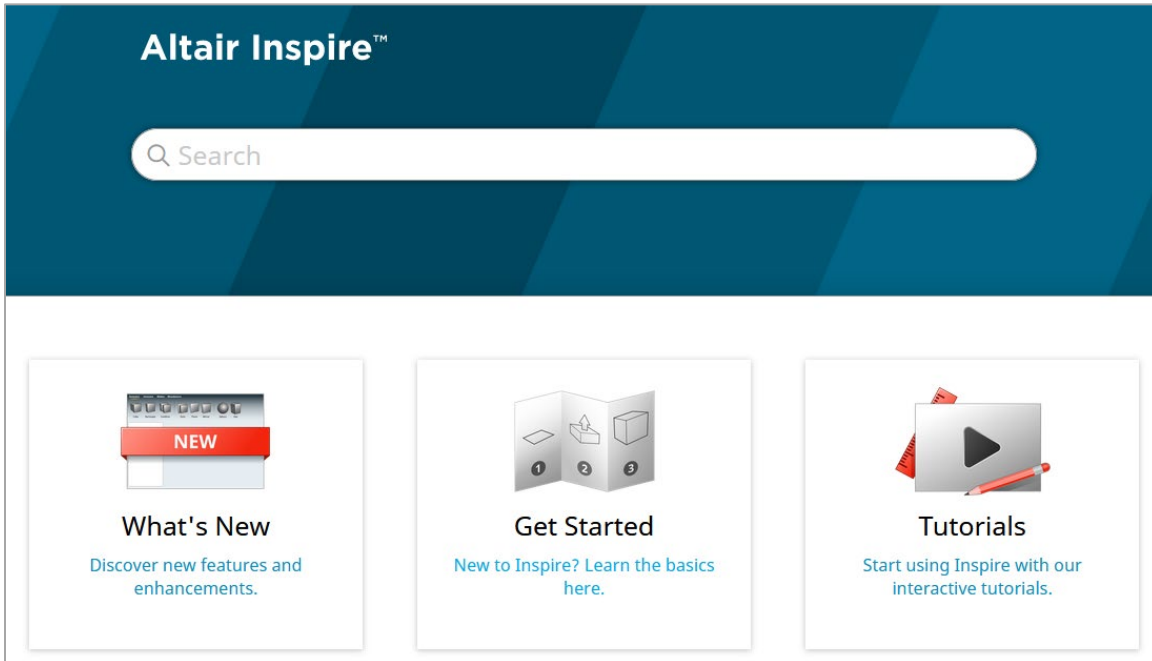


Click  to view additional tips and shortcuts. Some tools also include a video .



Online and Offline Help

Press **F1** or select **File > Help > Help** to view the online help.



You can download an offline version by selecting **File > Help > Download Offline Help**. An internet connection is required to download.

