

 **RELEASE NOTES**

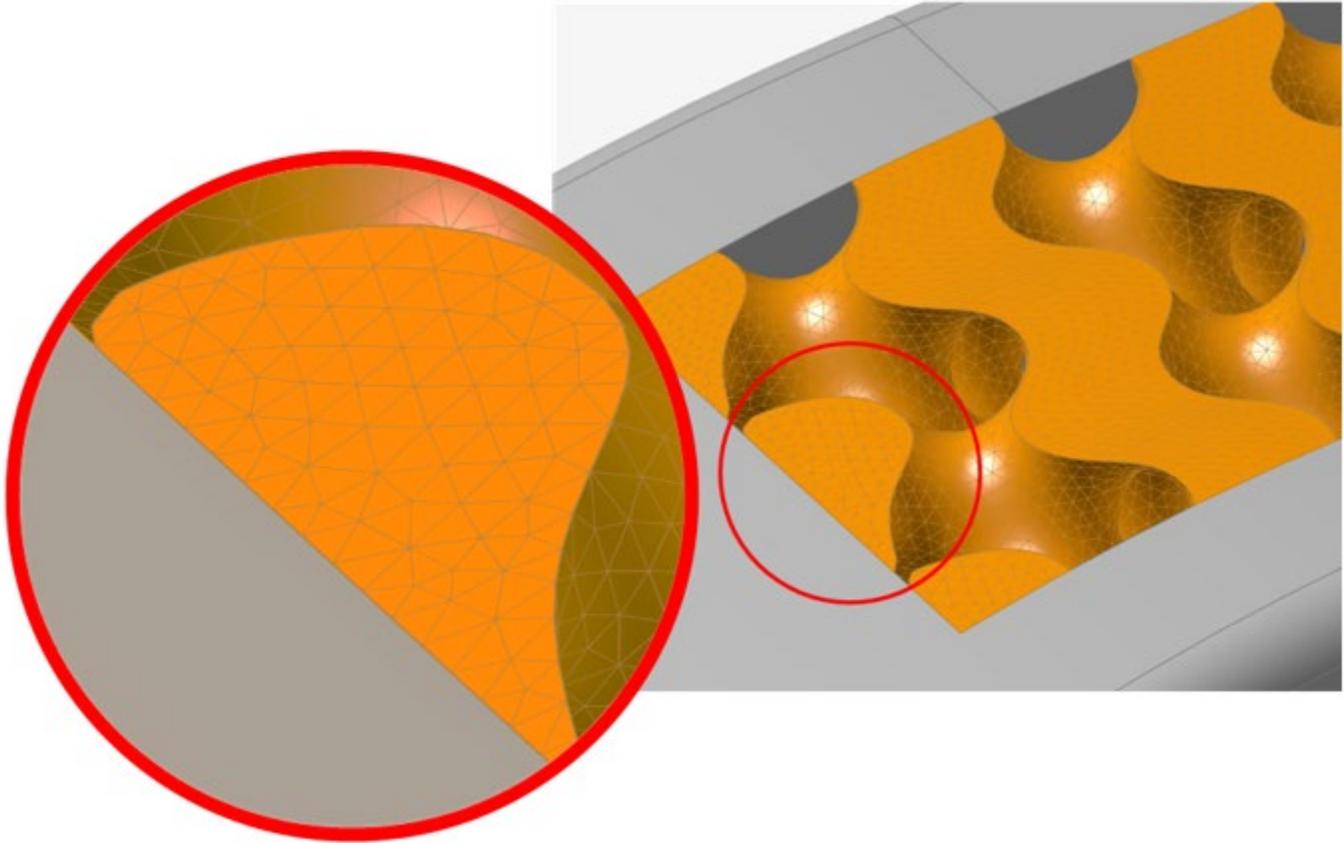
Altair[®] Inspire[™] 2024.1 and 2024.1.1

New Features and Enhancements 2024.1

Implicit Modeling

Convert to Triangle Mesh

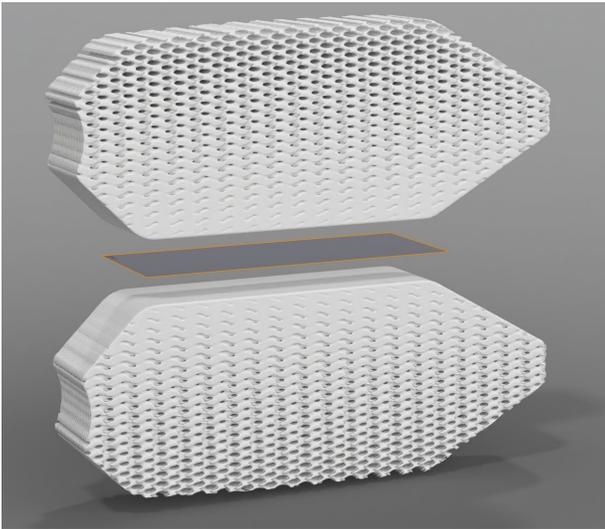
You can now convert your implicit model while maintaining the sharp boundaries of your original CAD or STL geometry.



For more information, see [Visualization Quality and Mesh Settings](#).

Mirroring

Implicit bodies can now be mirrored using reference planes, planar B-Rep surfaces, or a manually defined plane with a position and normal direction.

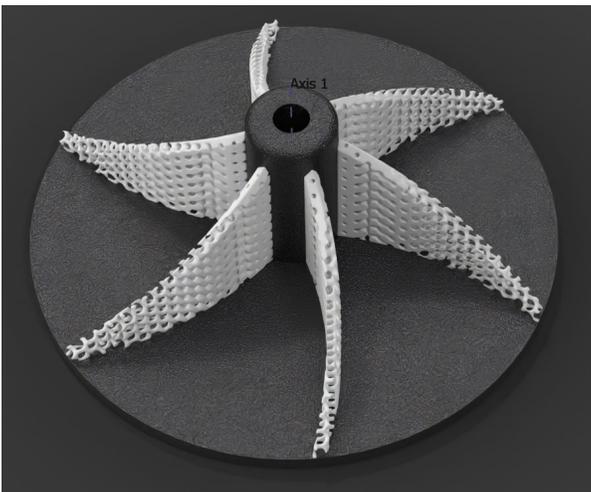


For more information, see [Mirror Implicit Geometry](#).

Patterning

Implicit bodies can be patterned to distribute bodies:

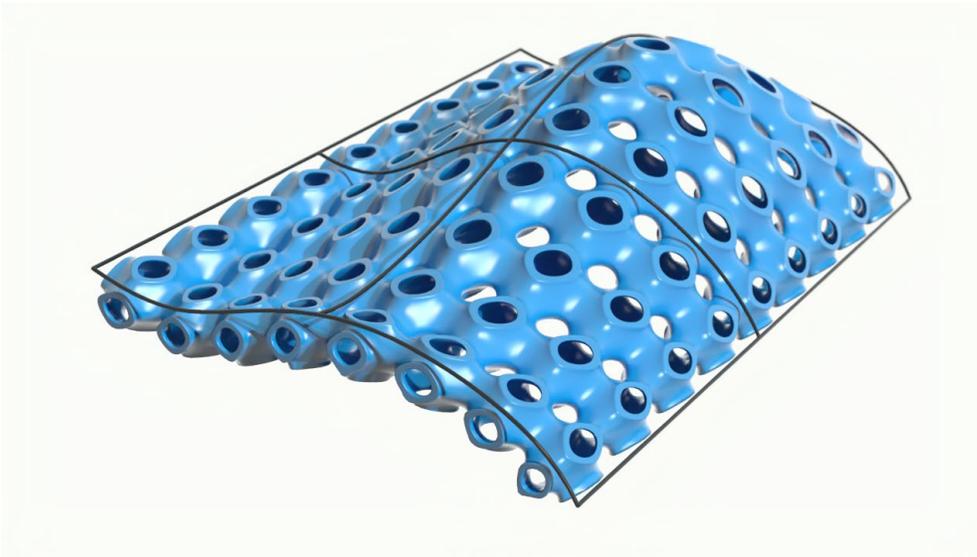
- Along three or fewer linear directions
- In a circular array around an axis
- At each position in a point cloud
- Conformally over a surface or along three or fewer curves



For more information, see [Pattern Implicit Geometry](#).

Conforming Lattice to Surface

Transform the lattice coordinate space from XYZ to UVW to match the parameterization of a surface and the distance to that surface so that lattice unit cells conform to a desired surface.



For more information, see [Create an Implicit Surface Lattice](#).

Point Cloud Sculpting

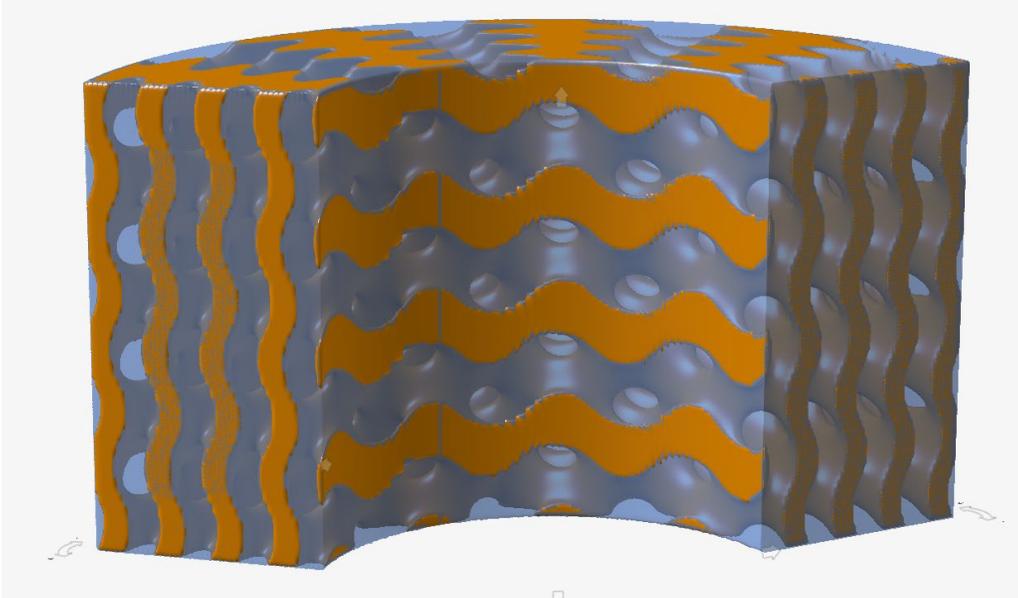
A new Background section has been added to the Point Cloud tool to take an existing field and use a point cloud to modify or sculpt it. This provides much finer control over the areas and strength of influence of each point and how it contributes to the created field.



For more information, see [Point Clouds in Implicit Modeling](#).

Lattice Extents

Cell-based lattices have additional options for fine-tuning the minimum and maximum positions of each coordinate system axis. This gives you more control over how the cell size is calculated using the “count” method, along with determining where the origin is for each axis.



Voronoi Stochastic Lattices

An option has been added to the Point-Edge Set tool in the Stochastic Lattice context to generate Voronoi edges for a set of input points.



For more information, see [Create an Implicit Stochastic Lattice](#).

Rendering

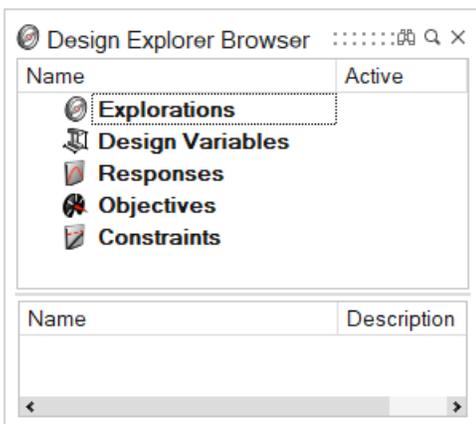
New Materials and Environments

The online library has been expanded to include new materials (such as wood, metal, rubber) and environments.

Fluids

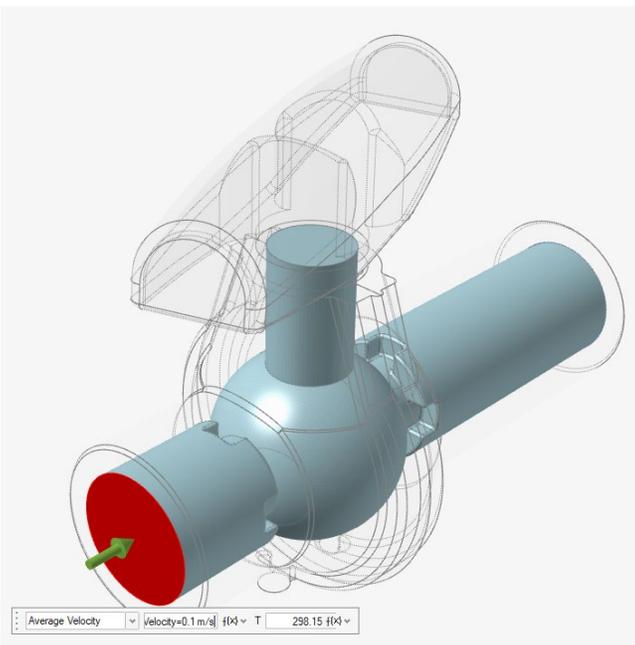
Design Explorer

You can now access Inspire's Design Explorer functionality from the Fluids ribbon.



Below is a sample Design Explorer setup for studying the impact of various valve opening positions (rotation angle) and the inlet velocity values on the inlet pressure.

- Create a new design variable (InletVelocity) during simulation setup.



- List of design variables (Valve Position and Inlet Velocity)

Design Explorer

Explorations | Design Variables | Responses | Goals

Active Exploration: DOE_1 Min/Max Check

Name	Active	Type	Value	Min	Max	Mode
ValvePosition	<input checked="" type="checkbox"/>	Angle	0.0 deg	0.0 deg	20.0 deg	Discrete Variable
InletVelocity	<input checked="" type="checkbox"/>	Velocity	0.1 m/s	0.1 m/s	0.5 m/s	Discrete Variable

- Create/track a response (Inlet Average Pressure)

Design Explorer

Explorations | Design Variables | Responses | Goals

Active Exploration: DOE_1 +

Name	Active	Response Type	Component
InletPressure	<input checked="" type="checkbox"/>	Boundary Condition	averagePressure

- Summary table of Inlet Pressure (response) across all combinations of valve position and inlet velocity

File Edit View Sketch Geometry PolyMesh PolyNURBS Implicit Modeling Structure Motion Fluids Design Explorer

Files Measure Move Variables Explorations Design Variables Responses Evaluate

Home Setup Run

Results Explorer

Exploration Name: DOE_1 Type: DOE

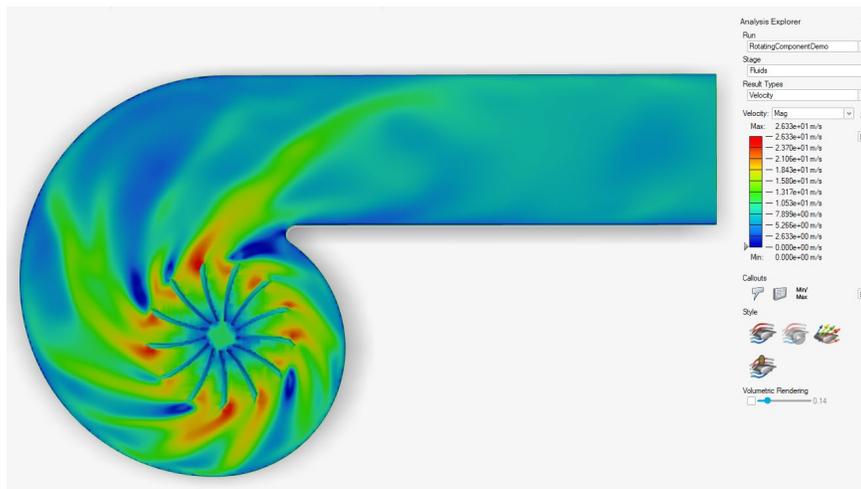
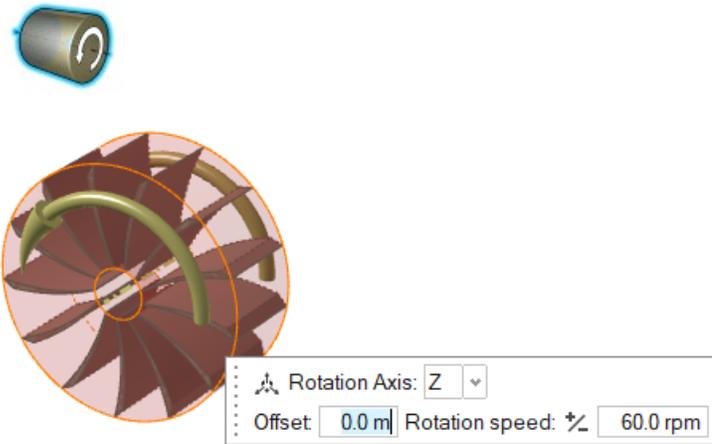
Summary | Linear Effects | Trade-off | Scatter Plot

	ValvePosition	InletVelocity	InletPressure
Nom	0.0 deg	0.1 m/s	39.063 Pa
Run 1	0.0 deg	0.1 m/s	39.063 Pa
Run 2	0.0 deg	0.25 m/s	184.582 Pa
Run 3	0.0 deg	0.4 m/s	441.077 Pa
Run 4	0.0 deg	0.5 m/s	671.719 Pa
Run 5	10.0 deg	0.1 m/s	92.455 Pa
Run 6	10.0 deg	0.25 m/s	485.22 Pa
Run 7	10.0 deg	0.4 m/s	1110.19 Pa
Run 8	10.0 deg	0.5 m/s	1690.38 Pa
Run 9	20.0 deg	0.1 m/s	257.839 Pa
Run 10	20.0 deg	0.25 m/s	1502.06 Pa
Run 11	20.0 deg	0.4 m/s	3756.84 Pa
Run 12	20.0 deg	0.5 m/s	5835.76 Pa

For more information, see [Design Explorer](#).

Rotating Parts

This new tool lets you designate an embedded solid as a rotating part and simulate its effect on fluid flow.

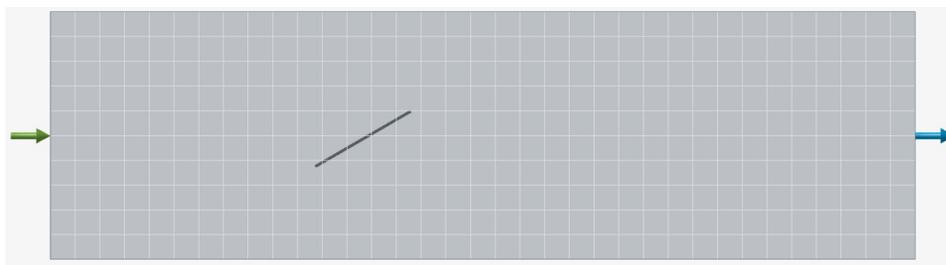


For more information, see [Rotating Component](#).

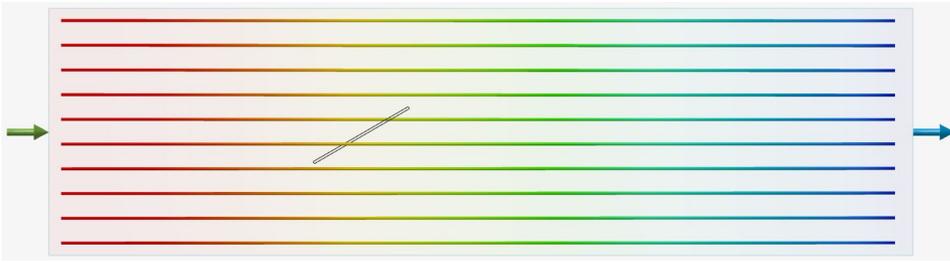
Thin Solids Detection

Inspire Fluids now simulates the flow of fluids around solids that are thinner than the voxel grid, producing more accurate results at a coarser grid resolution while saving computing time.

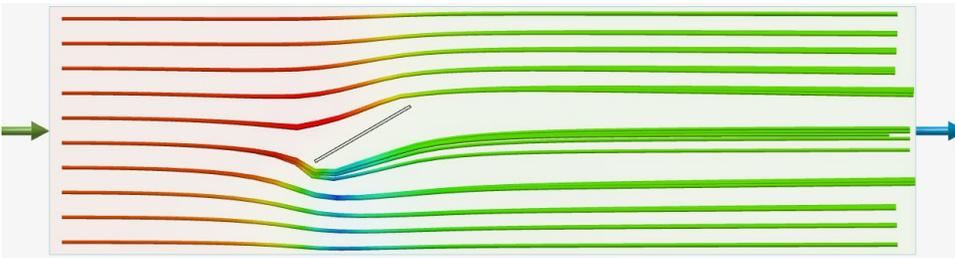
Example: Simulation setup of flow past a thin inclined plate with a voxel grid much coarser than the plate thickness.



Flow past a thin plate simulated with version 2024. Streamlines remain unaffected by the thin plate.



Flow past a thin plate simulated with version 2024.1. Streamlines are deflected due to the thin plate.



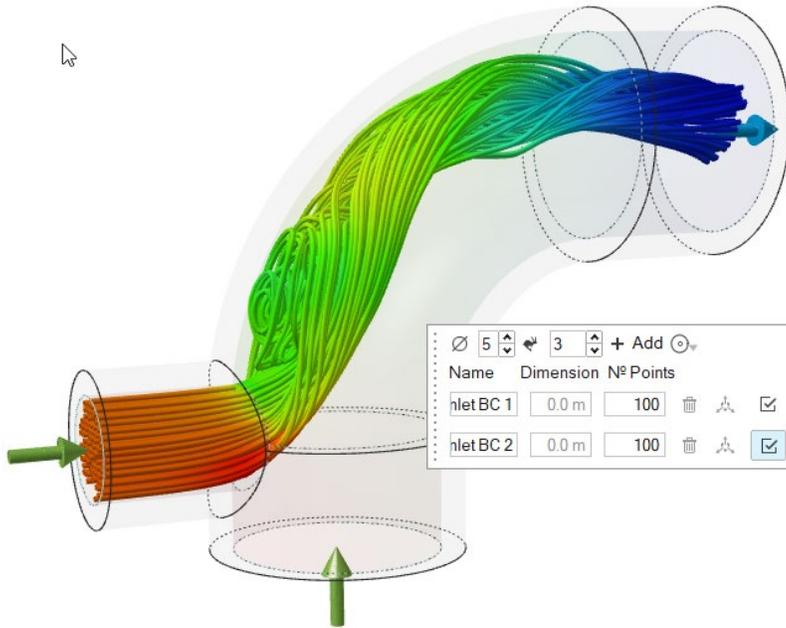
Faster Simulations

Inspire Fluids simulations are now up to two times faster compared to version 2024, depending on your hardware and other simultaneous activities. The following table shows the improved simulation times of air flow through a manifold on a grid of 2 million voxels on a laptop (CPU and GPU runs).

	2024 Simulation Time	2024.1 Simulation Time
GPU Simulation NVIDIA RTX 4000 Ada	63 seconds	37 seconds
CPU Simulation Intel Core i7-13850HX (28 threads)	741 seconds	300 seconds

Control Individual Inlet Streamlines

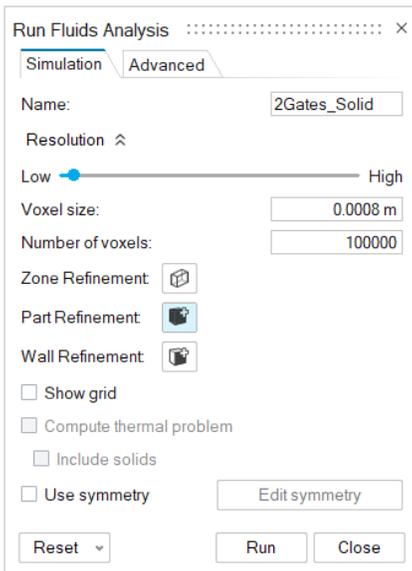
The streamlines dialog includes the option to activate or deactivate the streamlines originating from each inlet face independently.



For more information, see [Style Options](#).

Part-Based Grid Refinement

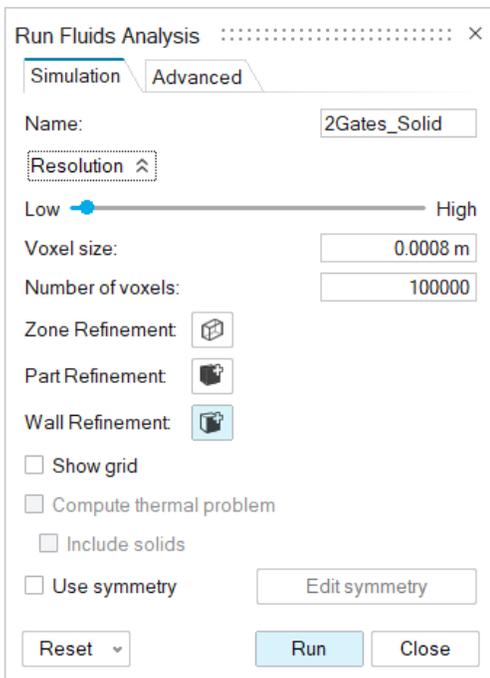
New controls in the Run Analysis window let you change the voxel grid resolution on one or more designated solid or fluid parts.



For more information, see [Set Up and Run a Fluids Simulation](#).

Wall Distance-Based Grid Refinement

New controls in the Run Analysis window let you change the voxel grid resolution of one or more parts within a specified distance from the part's wall boundaries.



For more information, see [Set Up and Run a Fluids Simulation](#).

Geometry

Extrude and Revolve Tools

When working with the Extrude and Revolve Tools, you can now select a sketch in the Model Browser to quickly select all its entities.

If you add sketch entities later, the new entities will also be extruded or revolved.

For more information, see [Extrude](#) and [Revolve](#).

Edit Control Points

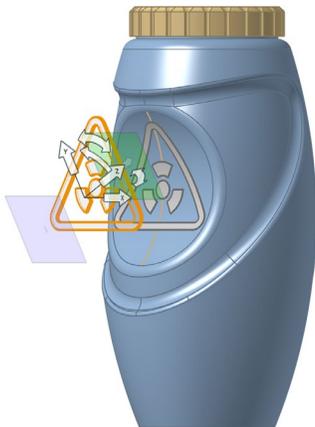
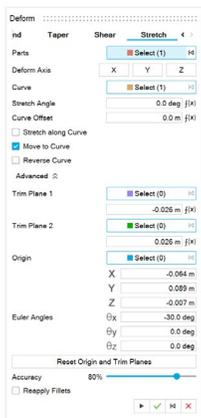
In the Simplify Curves tool, you can edit individual control points to modify a curve. Select the **Edit Control Points** checkbox and drag intermediate points to new locations to change the shape of a curve. End points are fixed and cannot be modified.



For more information, see [Simplify Curves](#).

Shear and Stretch Deformation

Shear and Stretch tabs have been added to the Deform tool to allow you to tilt or stretch objects along an axis or curve.

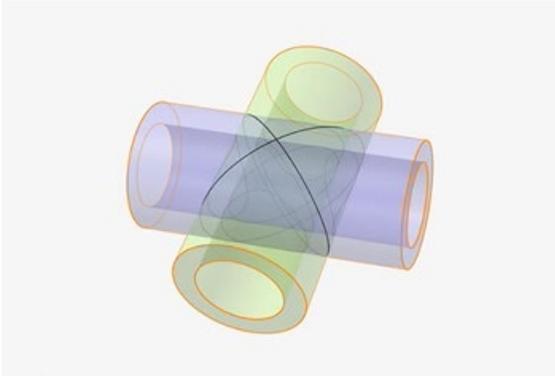


When adjusting deformation settings, a mesh preview is applied to provide optimum performance. When you apply the deformation, a Parasolid deformation is applied.

For more information, see [Shear](#) and [Stretch](#).

Curves from Surface Intersection

A From Surface Intersection tool has been added to allow you to extract curves from the intersection of two surfaces.



For more information, see [From Surface Intersection](#).

Tags Tool

This new tool allows you to assign metadata tags to entities in a model.

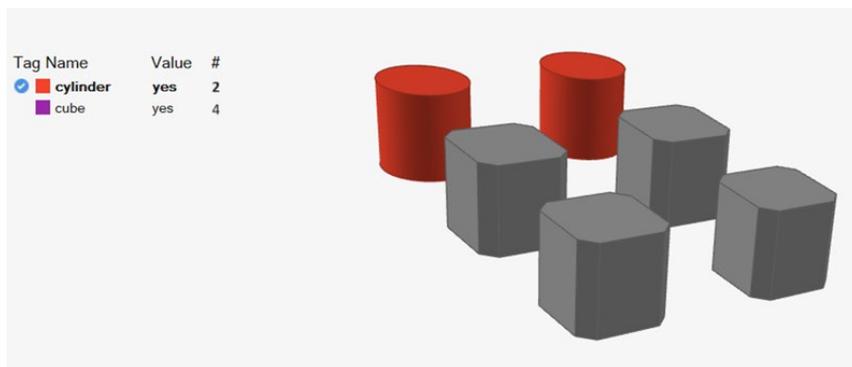
Each tag has a name, value, and color.

An entity can have multiple tags or no tags.

A tag can be assigned to multiple entities.

When **Import tags** and **Export tags** are enabled in **Preferences > Inspire > Geometry**, tags are included when you import or export Parasolid files.

When you select a tag in the legend, entities with the selected tag name and value are shown using the tag color:



For more information, see [Tags](#).

Sketching

Constraint Toolbar

This new toolbar provides quick access to sketch constraints to ensure the intended relationships between sketch entities remain intact or can be removed to create free-form objects.



Use the **Show Constraint Toolbar** checkbox under Sketching in **File > Preferences** to show or hide the toolbar.

Drag the Constraint toolbar to the left or right side of the workspace to dock it.

For more information, see [Sketch Constraints](#).

Structure

Improved Forces Tool

You can now apply forces to a spot.

For more information, see [Forces](#).

Review H3D Results

You can now open H3D analysis or optimization results to review H3D results directly from Inspire and generate PolyNURBS from topology optimizations performed outside Inspire.

For more information, see [Explore the Generated Shape](#).

Improved Variable Manager

The Variable Manager now calculates units as part of the expression and supports hundreds of unit types.

Derived units result from the combination of base units. For example, Kg*m/s^2 results in Newtons.

Variables can be assigned to the following contexts:

- Sketch dimensions
- Geometry operations
- Motion properties
- Move tool variables
- Implicit properties
- Fluid properties

For more information, see [Variables](#).

Integration of AMDC

The Altair Materials Data Center database allows you to manage and download materials.

The screenshot displays the Altair Material Data Center (AMDC) web application. At the top, there is a navigation bar with the Altair logo and the text 'Altair Material Data Center'. Below this, a search bar and a 'Quick Search' button are visible. The main content area shows a list of materials, with the first row displaying four cards for '0.5CrMoV' (Metals > Steel > Low-Alloyed). Each card lists the following properties:

- 0.5CrMoV** (Metals > Steel > Low-Alloyed)
- 7.85E-9 Mg/mm³** Density
- 1.588E5 MPa** Young's Modulus
- 0.3** Poisson's Ratio
- Yield Strength
- Ultimate Tensile Strength

Each card also includes 'Details' and 'Share' buttons. The interface includes a sidebar with filters for material type (Metals, Plastics, etc.), producer (Bilstein, Salzgitter), and provider (Altair, BaoSteel, etc.). At the bottom, there is a footer with the Altair logo, social media icons, and legal information.

For more information, see [Using the Altair Material Data Center](#).

Print3D

Integration of AMDC

Binder-sinter analysis has been integrated with the Altair Materials Data Center database, allowing you to manage and download materials. Also, new materials have been added to the database.

For more information, see [Print Part \(Sinter\)](#).

Motion

Design Exploration for Motion

Inspire Design Exploration now includes the ability to run Motion DOE and optimization studies. Many Motion inputs and components such as motors, actuators, springs, and initial conditions can be designated as variables and used in exploration studies to understand behavior such as minimizing motor torque, maximizing spring kinetic energy, and optimizing sketch geometry.

Results Explorer

Exploration Name: Optimization_2 Type: Optimization

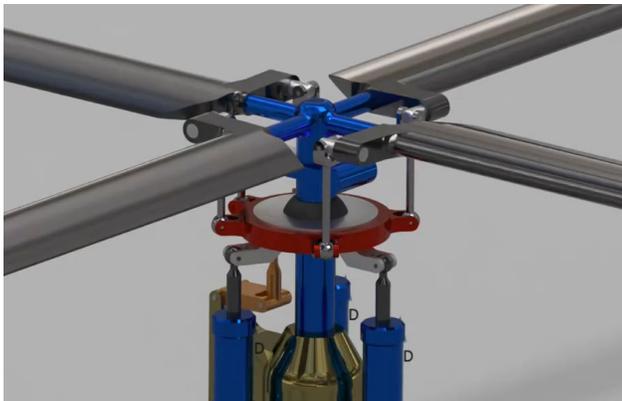
Summary Evaluation Iteration Scatter Plot

	K1	D1	Joint_ANG_DISP	ANG_VEL	Objective_1	Objective_2	Constraint_1	Constraint_2	Constraint_3	Constraint_4	Co
Run 42	28.613 N/mm	35.93 N*s/...	-75.976 deg	1.331 rad/s	-75.976 deg	1.331 rad/s	-75.976 deg	1.331 rad/s	1.331 rad/s	-75.976 deg	Feasi
Run 43	29.22 N/mm	35.605 N*s/...	-76.88 deg	1.372 rad/s	-76.88 deg	1.372 rad/s	-76.88 deg	1.372 rad/s	1.372 rad/s	-76.88 deg	Feasi
Run 44	28.09 N/mm	35.938 N*s/...	-75.2 deg	1.299 rad/s	-75.2 deg	1.299 rad/s	-75.2 deg	1.299 rad/s	1.299 rad/s	-75.2 deg	Feasi
Run 45	35.159 N/mm	24.054 N*s/...	-84.335 deg	2.148 rad/s	-84.335 deg	2.148 rad/s	-84.335 deg	2.148 rad...	2.148 rad/s	-84.335 deg	Violat
Run 46	40.31 N/mm	33.02 N*s/mm	-88.779 deg	2.078 rad/s	-88.779 deg	2.078 rad/s	-88.779 d...	2.078 rad...	2.078 rad/s	-88.779 deg	Violat
Run 47	29.784 N/mm	35.929 N*s/...	-77.628 deg	1.397 rad/s	-77.628 deg	1.397 rad/s	-77.628 deg	1.397 rad/s	1.397 rad/s	-77.628 deg	Feasi
Run 48	30.043 N/mm	35.886 N*s/...	-77.983 deg	1.414 rad/s	-77.983 deg	1.414 rad/s	-77.983 deg	1.414 rad/s	1.414 rad/s	-77.983 deg	Feasi
Run 49	27.329 N/mm	35.665 N*s/...	-74.058 deg	1.262 rad/s	-74.058 deg	1.262 rad/s	-74.058 deg	1.262 rad/s	1.262 rad/s	-74.058 deg	Feasi
Run 50	28.093 N/mm	35.842 N*s/...	-75.215 deg	1.301 rad/s	-75.215 deg	1.301 rad/s	-75.215 deg	1.301 rad/s	1.301 rad/s	-75.215 deg	Feasi

For more information, see [Design Exploration in Motion](#).

Animation Playback Using Quality Rendering

Motion animations can now be captured with Quality rendering. A video file is saved and replayed through the Animation panel.



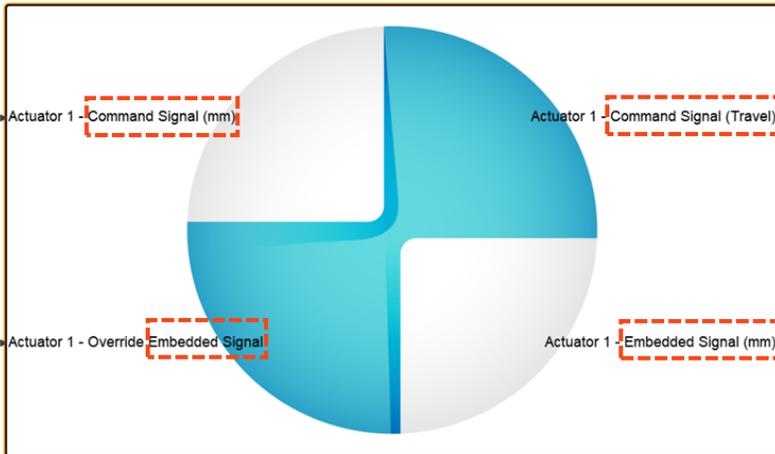
For more information, see [Animate and Record Results](#).

Additional Output Signals Support for Twin Activate

Twin Activate and FMU signal outputs are now supported for all motor and actuator input types, such as motor angle and actuator velocity. This gives you more freedom when controlling multibody plant models within Twin Activate or using an FMU.

Improved Multibody Plant Representation in Twin Activate

The representation of the multibody plant model in Twin Activate and FMU has been improved to better reflect the input and output options. Signals embedded in the plant are better distinguished from user-supplied command signals. Reference outputs for the embedded signals are automatically provided.



New Default Units (MMKS)

Motion runs now default to MMKS units (previously MKS). This will improve performance for most Motion runs. In some cases, the improvement can be significant.

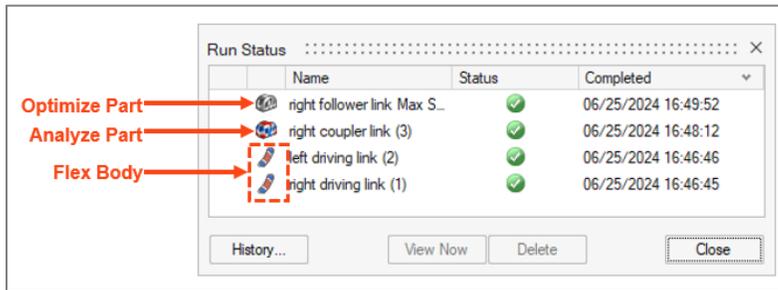
New Units Section Under Motion Preference

The solver units used for Motion runs are now located under the Inspire Motion, Analysis Preferences section. The default units are MMKS (previously MKS).

Preference	Value
Run Options	
Run history path	C:/Temp
Solver units	MMKS (mm kg N s)

Flex Body Representation in Run Status Dialog

When creating a flex body, the Run Status window now shows a flex body icon next to the run to avoid confusion with structures and topology optimization runs.



Flex Body Stress Recovery Now Turned on By Default

When you create a flex body, the option to calculate stress is turned on by default. Previously, you had to request stress via an option.



Python API

Geometry

- Added Deformation capabilities. You can now twist, bend, taper, shear, or stretch parts within a specified region.
- Added Simplify Curves capabilities. You can now modify curves by changing the number of control points and joining multiple curves.
- Added Curve from Surface Intersection capabilities. You can now extract a curve from the intersection of two surfaces.
- Enhanced Loft tool and Multi Sweep tool with guide curve continuity options.
- Enhanced Offset Curves tool with elevation type options.
- Enhancement Slice tool with slice with surface options.
- Enhanced the file save options with .3mf and .vdb extensions.

Implicit Modeling

- Added Mirror capabilities. Implicit bodies can now be mirrored using reference planes, planar B-Rep surfaces, or a manually defined plane with a position and normal direction.
- Added Pattern capabilities. Implicit bodies can now be patterned to distribute bodies:
 - Along three or fewer linear directions
 - In a circular array around an axis
 - At each position in a point cloud
 - Conformally over a surface or along three or fewer curves
- Added Point Cloud Sculpting capabilities. You can now have much finer control over the areas and strength of influence of each point and how it contributes to the created field.
- Added conform object capabilities. You can now transform the lattice coordinate space from XYZ to UVW to match the parameterization of a surface and the distance to that surface so that lattice unit cells conform to a desired surface.
- Added Voronoi Stochastic Lattices support. An option has been added to the Point-Edge Set tool in the Stochastic Lattice context to generate Voronoi edges for a set of input points.
- Enhanced lattice surface with extents options.

Structure

- Enhanced contacts resolution. You can now set the resolution of the contacts individually.
- Enhanced grounded connectors. Newly created grounded connectors will now be added to an active load case automatically.

Sketch

- Added Project capabilities. You can now project points, edges, or faces onto the sketch plane.
- Added Intersect capabilities. You can now extract curves resulting from the intersection of the sketch plane with selected parts or surfaces.

Enhancements

- When creating Motion analysis reports with multiple plots on a page, the plot page name will be used as the report page header. [INSPIRE-42877]
- A warning is now displayed when you attempt to make a rigid group a flexible body. [INSPIRE-36186]
- Added the ability to select sketches directly from the Extrude and Revolve tools. [INSPIRE-28953]

Resolved Issues

- Fixed an issue where solver expressions couldn't be edited using the Property Editor. [INSPIRE-42877]
- Fixed an issue where adding, editing, or deleting a mesh control on a flex body didn't invalidate Motion results. [INSPIRE-42631]
- Fixed an issue where numerical von Mises stress and strain results weren't displayed in the Compare table for flex body simulation. [INSPIRE-36119]
- Fixed an issue with input/output signals where some output components were unavailable for selection if entities had duplicate names. [INSPIRE-43722]
- Fixed an issue with live setters. [INSPIRE-42830]
- Fixed an issue with incorrect Implicit strut diameters. [INSPIRE-43498]
- Fixed an issue with screw connections where the head of the screw was bonded and not disabled. [INSPIRE-41884]

Known Issues

- The Tags tool's legend context menu has a **Select All** command that supports single-item selection only. This command will be removed. [MVSUN-2594]
- There are a few rare cases where CATIA and STEP models crash upon import. Switching the CAD Import Translator method to CT in Preferences resolves the issue. [INSPIRE-44483]
- Inspire can be slow to respond on Linux when holding Shift with the Force tool to apply a spot force. [INSPIRE-44386]
- Inspire crashes if you press H to hide a PolyNURBS and then hover over the control cage. [INSPIRE-44525]
- In some cases, the Design Explorer can fail with implicit models. Setting the **Multi Execution** option in the Evaluate Run dialog to 1 can allow the run to complete. [INSPIRE-44479]

New Features and Enhancements in 2024.1.1

Resolved Issues

- Fixed issue that could cause the application to crash after selecting curves in the Simplify Curves tool. [INSPIRE-45004, INSPIRE-44944]
- Fixed issue that could cause the application to crash when opening the Extrude tool without exiting the sketching context first. [INSPIRE-44765]
- Fixed issue that could cause the application to crash when using Undo after viewing analysis results. [INSPIRE-44782]
- Fixed issue that could cause the application to crash when rerunning a SimSolver analysis on a model containing seam welds. [INSPIRE-44782]
- Fixed issue that could cause the application to crash after editing seam weld parameters. [INSPIRE-44870]
- Fixed issue that could cause the application to crash when creating a system on a reference point. [INSPIRE-44817]
- Fixed issue that could result in decreased performance with large models. [INSPIRE-45036]
- Fixed issue that could cause models to be slow to respond after using **Convert to Triangle Mesh** with **Create sharp edges and specify mesh size** selected. [INSPIRE-45188]
- Fixed issue that could cause the application to hang when creating a stochastic lattice on some models. [INSPIRE-44912]
- Fixed issue with force creation on implicit models. [INSPIRE-44924]
- Fixed issue that could result in a VTK Output warning when switching a stochastic lattice **Generation Method** to Voronoi/Delaunay with no points selected. [INSPIRE-44863, INSPIRE-44923]
- Fixed issue that prevented implicit models from displaying after import. [INSPIRE-44868]

- Fixed issue that could cause the Construction History to display the incorrect state after editing an implicit construction feature. [INSPIRE-44867]
- Fixed issue that could cause an error in SimSolid analysis after creating a mass at a point. [INSPIRE-44985]
- Fixed issue that caused enforced displacements to display the incorrect direction in SimSolid analysis. [INSPIRE-45022]
- Fixed issue that could prevent fastener results from displaying after an OptiStruct analysis. [INSPIRE-45068]
- Fixed an issue that prevented responses from being created in the Design Explorer when the user interface language was set to Japanese. [INSPIRE-44988, INSPIRE-45028]
- Fixed issue that prevented units from displaying for design variables when the user interface language was not set to English. [INSPIRE-44832, INSPIRE-45195]

Known Issues

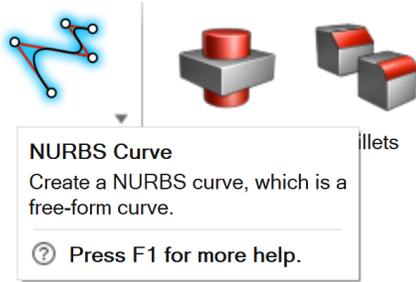
- The application can crash when using **Undo** after viewing SimSolid analysis results on Linux. [INSPIRE-44782]
- The application can crash when using **File > New** after running a SimSolid analysis on Linux. [INSPIRE-45821]

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 panel, guide bar, or microdialog. The text prompts you what to do next.



Click to place the control points.

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



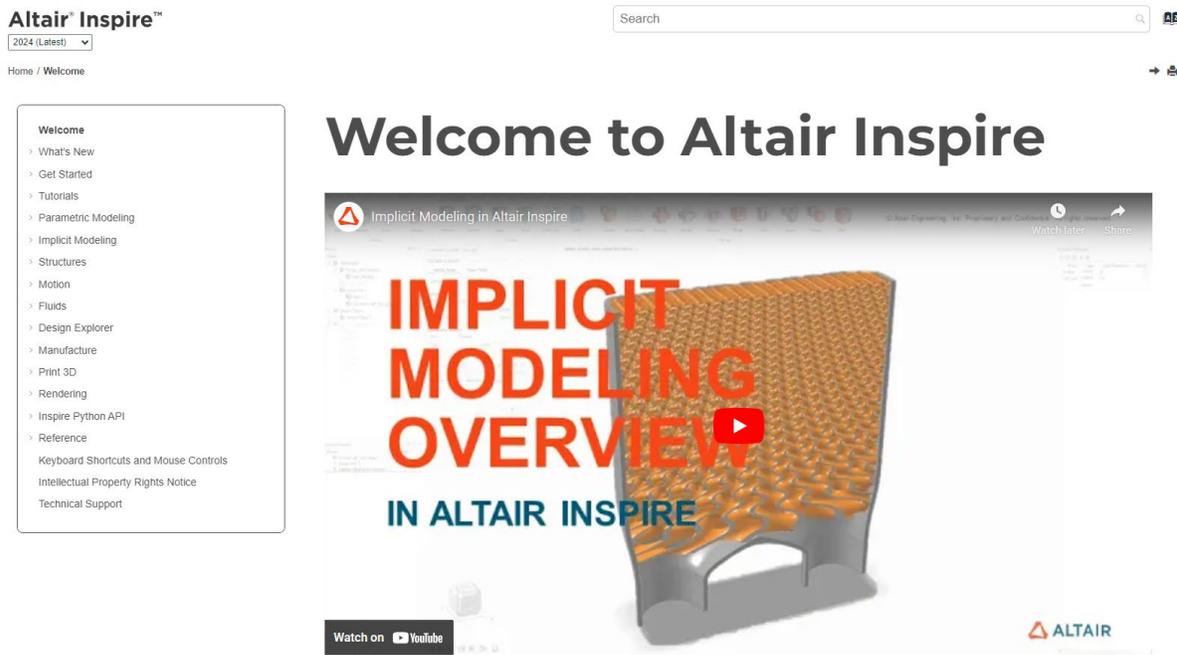
Click to place the control points.

To edit after creation, right-click the NURBS curve in the History Browser (F6), and then select Edit.

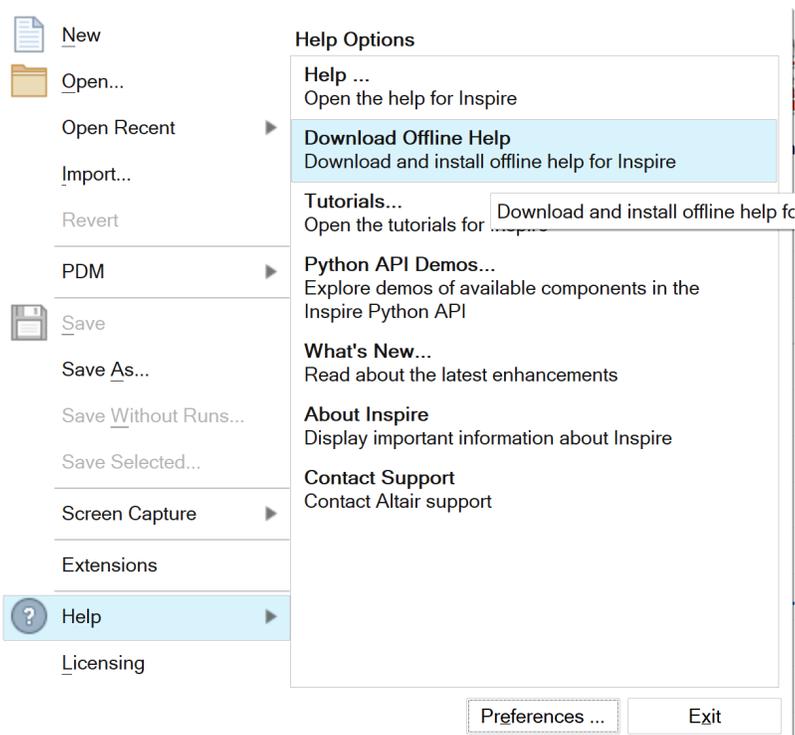
F1 Show Help

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.



Supported Languages

The language for the user interface and online help can be changed in the Preferences under Workspace > Language. User interface text is available in English, Chinese, French, German, Italian, Japanese, Korean, Portuguese, and Spanish.

The online and offline help is available in English at the time of release, and in Chinese, Japanese, and Korean generally 1 to 2 months after release. If a language is selected in the Preferences that is supported for the user interface text but not for the help, the English help is shown. Similarly, if an unsupported language is selected in the Download Offline Help dialog, the English offline help will be downloaded instead.