DYNAFLOW RESEARCH GROUP.

BOSfluids

What's new in BOSfluids 7.1

10 October 2023

New flow boundary conditions

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Flow continuation

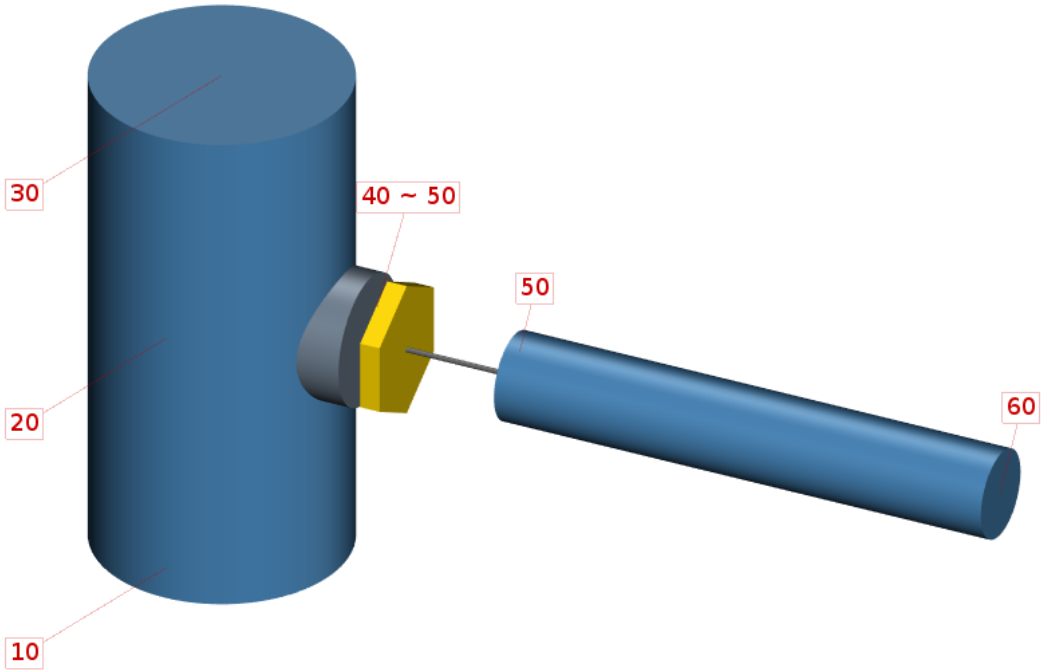
Introduce a geometrical discontinuity in the structural piping model without introducing a similar discontinuity in the flow model.

Periodic pressure & Periodic flow rate

Impose arbitrary, periodic flow boundary conditions. Specify a single period as a piece-wise

linear function of time. This period will be repeated throughout a transient or quasi steady state

analysis.



Improvement of valve elements

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Unified and improved check valve element

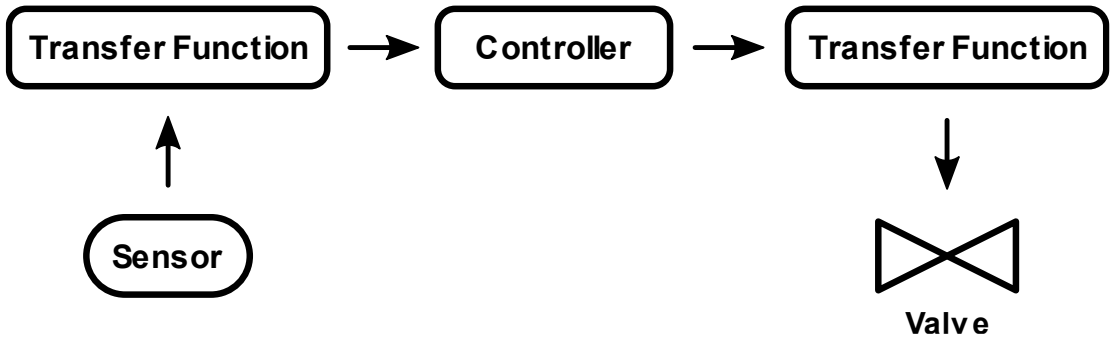
The different check valve types have been unified into a single Check Valve element type with a more intuitive set of input parameters.

Regulator valve based on PID controller including target pressure or flow rate

The Regulator Valve element type has been based on a new model that uses a Proportional Integral Differential (PID) control system for adjusting the valve opening. The new model also provides support for specifying a target flow rate in addition to a target pressure.

$$y(t) = y_s + \boxed{K\,e(t)} + \boxed{\frac{K}{T_I}\int_0^t e(\tau)\,d\tau} + \boxed{K\,T_D\frac{de(t)}{dt}}$$

$P \qquad I \qquad D$



Extension of Equipment element

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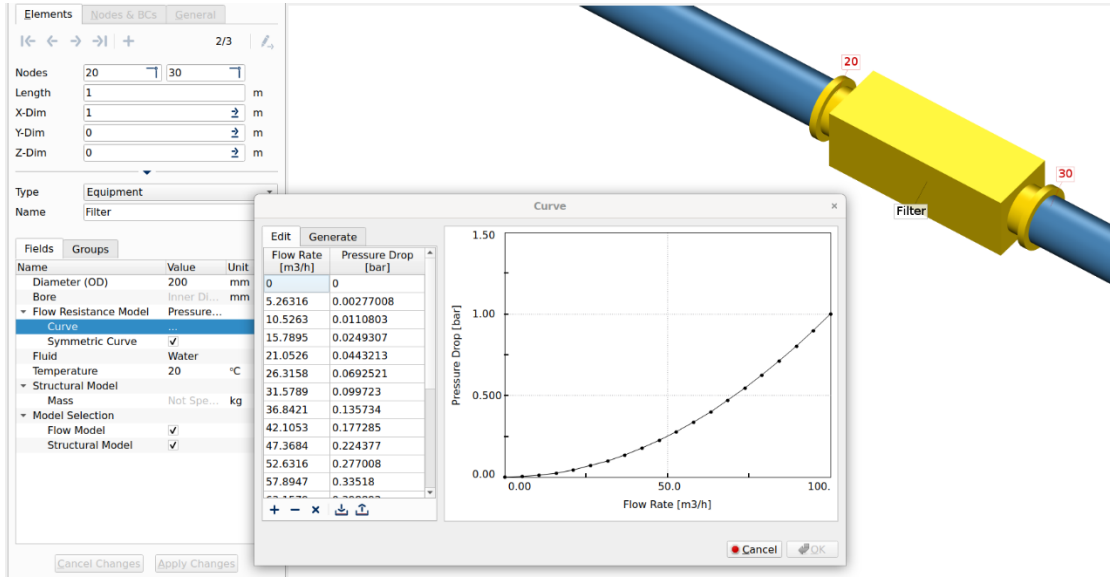
Specify pressure vs flow rate curve.

The Equipment element type has been extended with support for specifying the pressure drop as a piece-wise linear function of the flow rate. This makes it possible, among others, to model equipment over which the pressure drop can not be described by a constant friction factor, and to accurately model fittings for which detailed pressure drop data are available.



Improved support for modeling gases

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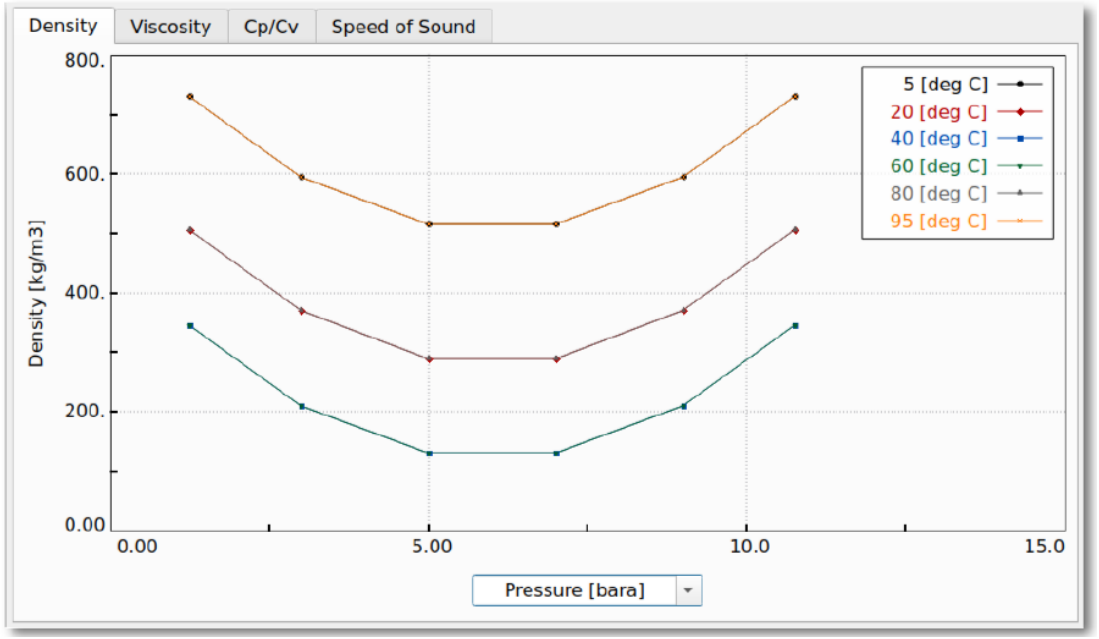
Custom Gas

Addition of a new Custom Gas type, for instance, enables you to specify a complete equation of state in the form of a table listing all relevant gas properties as a function of both the temperature and pressure.

AGA 8 Gas

The AGA Report No. 8 Part 1 equation of state has been replaced by the AGA Report No. 8 Part 2 equation of state. The latter involves the GERG-2008 method that covers a larger range of pressures and temperatures.



New Compressor element

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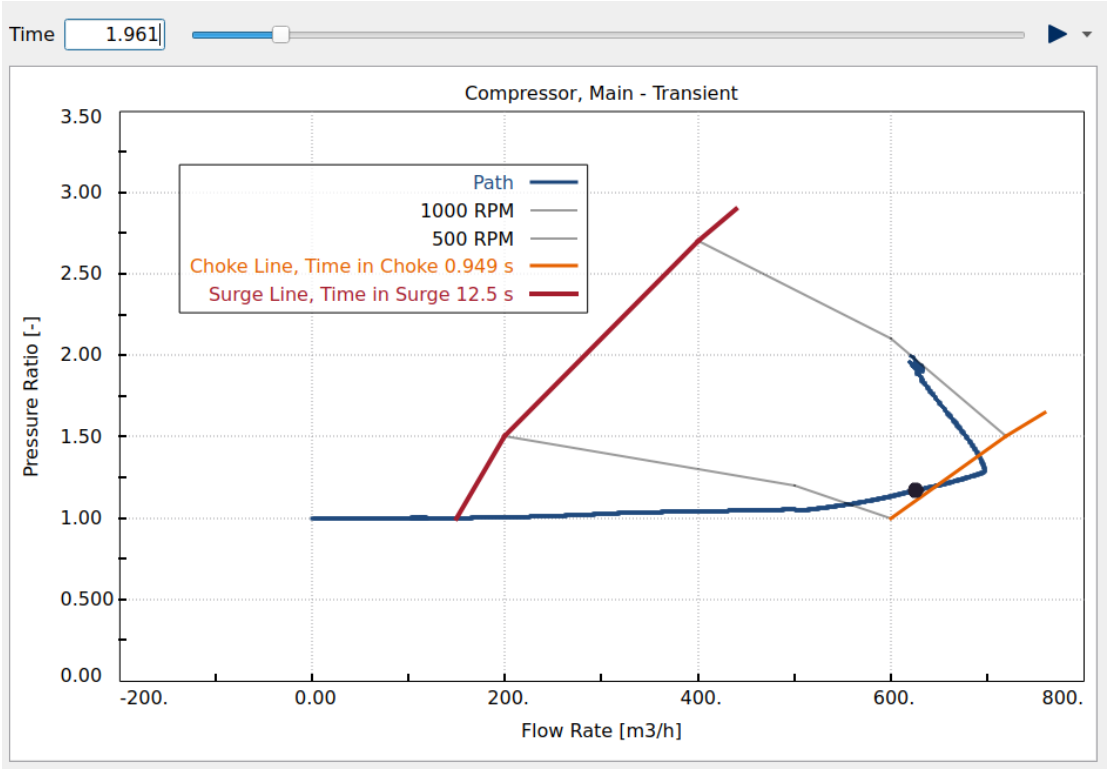
The new Compressor element type models the flow of a gas through a centrifugal or axial compressor. A Compressor element requires the specification of a compressor map with a least one speed line. You can optionally specify a surge and/or choke line to determine when and for how long a compressor operates in surge or choking conditions.



Improved simulation of cavitation

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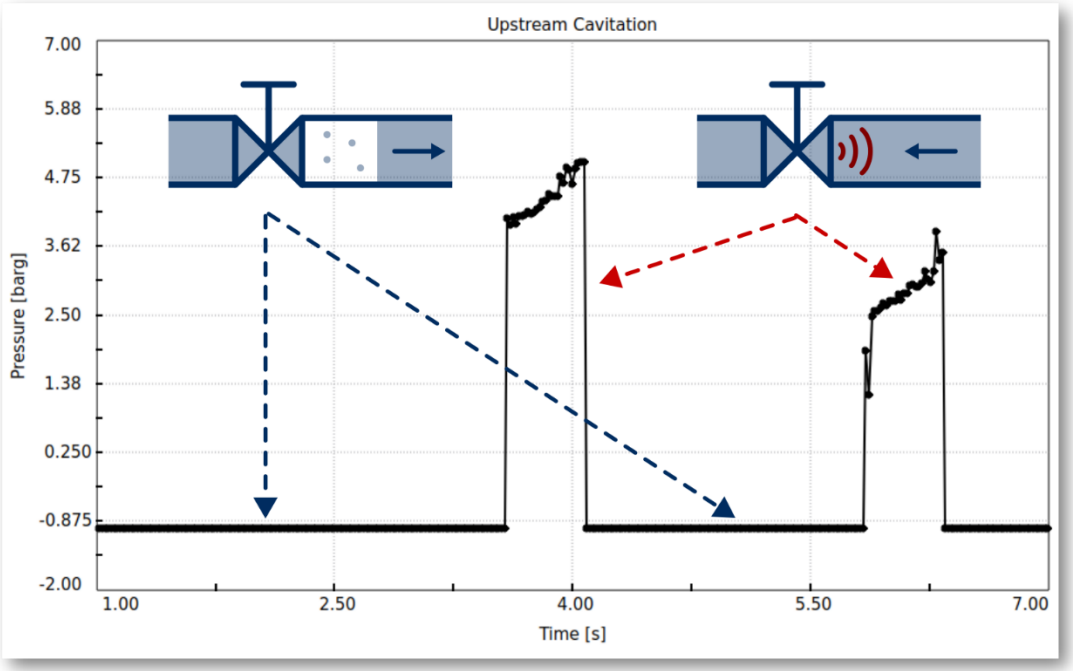
New cavitation model

The Homogeneous Vapor Cavity Model (HVCM) assumes that vapor cavities (bubbles) are dispersed homogeneously throughout the liquid, or collected in distinct, larger volumes, or combinations thereof. A continuous liquid fraction describes the size and distribution of the vapor cavities.

Better names for the existing cavitation models

The two existing cavitation models have been renamed to their common known names: Discrete Vapor Cavity Model (DVCM) and the Discrete Gas Cavity Model (DGCM).



Improved support for model verification

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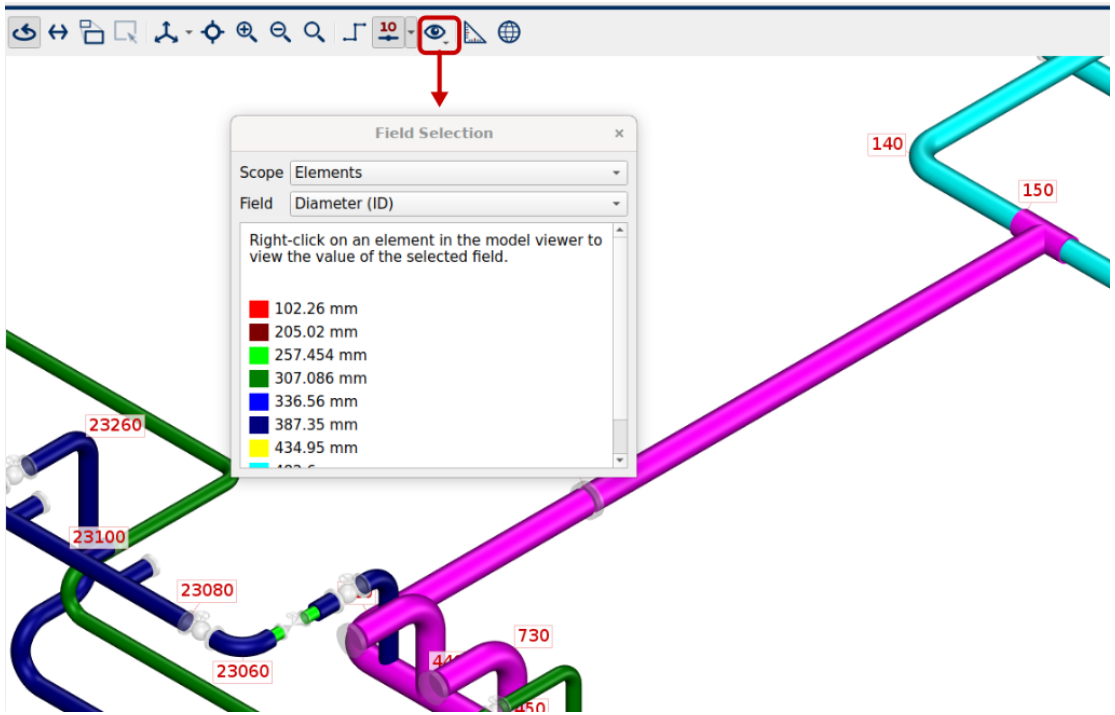
BOSfluids 7.1 brings improved support for verifying a model in a visual way. In particular, it can show, by means of colors and labels in the model viewer, the nominal pipe size, the pipe schedule, the inner pipe diameter, the force pairs, the element lengths, and other element properties. It can also show node properties, including elevations, flow boundary conditions and restraints.



Additional steady state output data

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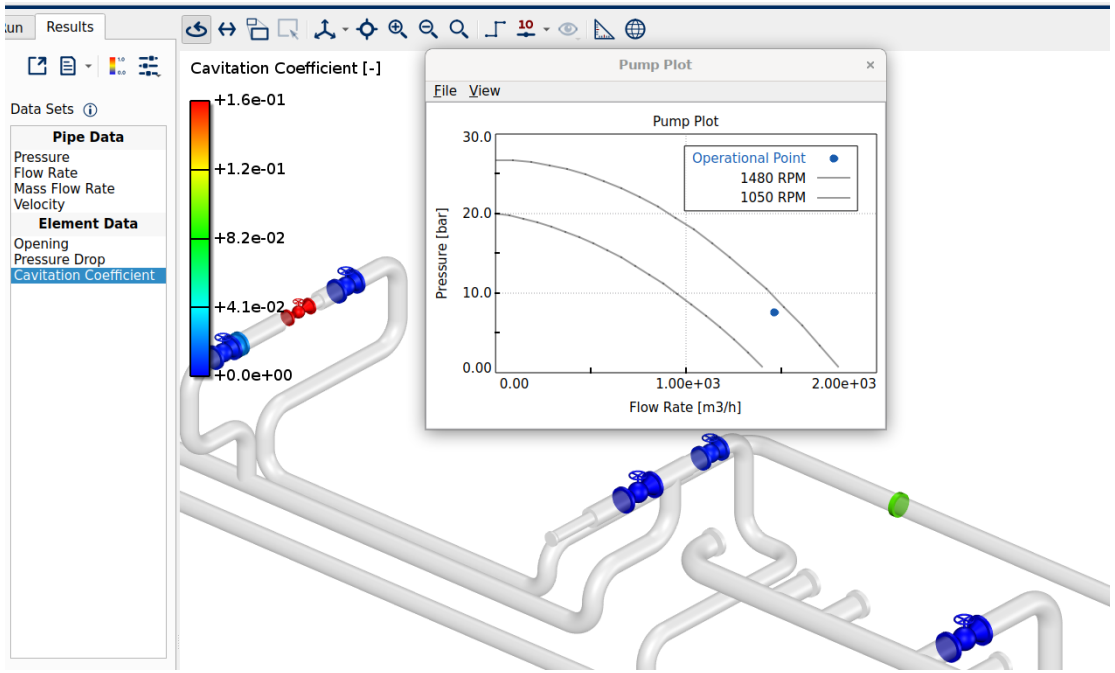
Pump Plot and Compressor Plot

BOSfluids 7.1 adds two new types of steady state graphs: the Pump Plot type and the Compressor Plot type. These will show the steady state operating point of a pump or compressor within its pump or compressor map. While the steady state operating point of a pump or compressor could be obtained from the regular steady state results, the graphical display of the operating point enables you to understand the performance of a pump or compressor in a more efficient and intuitive way.



Density and Wave Speed

Optionally select the output of additional element data sets, such as Density and Wave Speed.

Improved user interface

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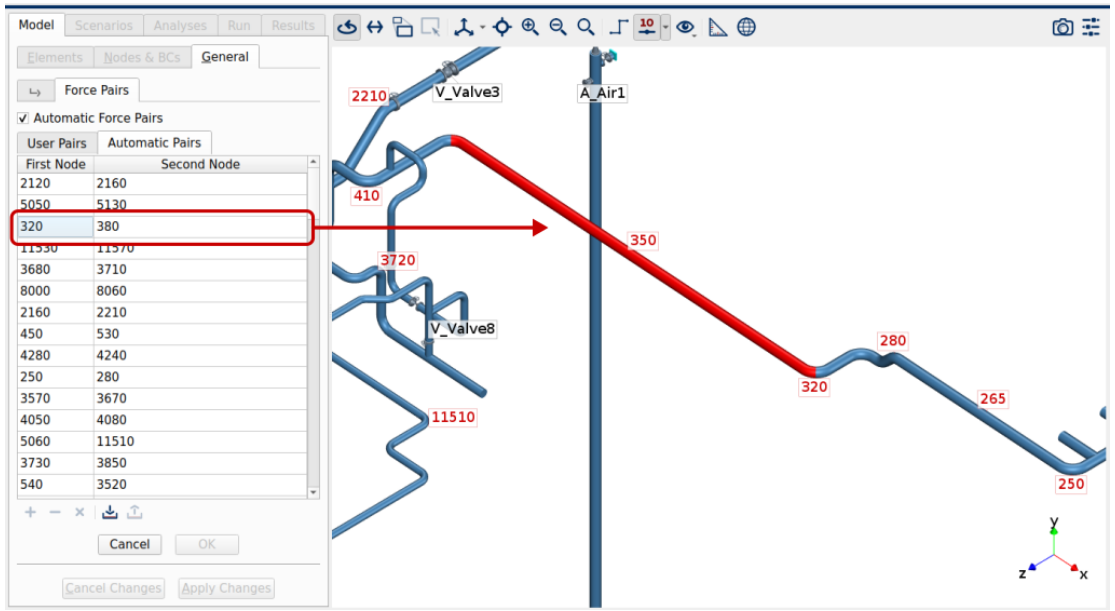
Many small and large improvements to the user interface that make BOSfluids even more efficient and versatile. For instance, many dialog boxes for entering model parameters are embedded in the main BOSfluids window instead of being shown in separate windows. This makes it possible to interact with the model viewer while the dialog box is active. In particular, when entering a reference to an element or a node, you can simply select the target item in the model viewer.



Improved user interface

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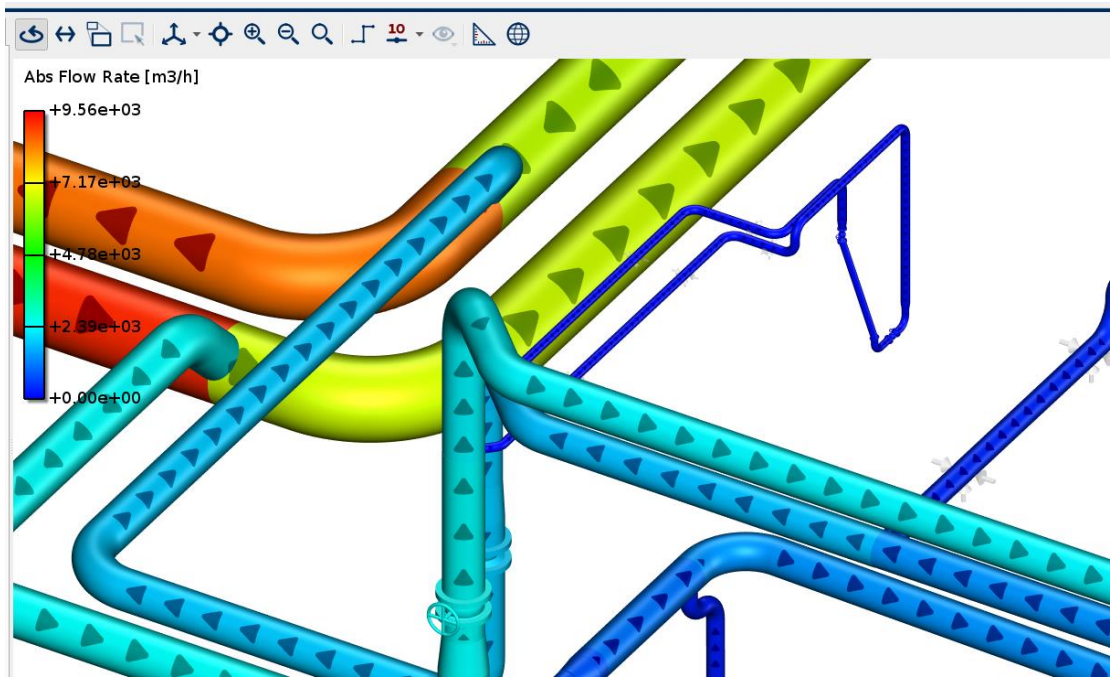
The model viewer can optionally show the orientation of pipe elements by means of direction markers. Those direction markers can also be used to indicate the flow direction in the Results tab page. This means that you no longer need to know the element orientation in order to determine the flow direction.



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