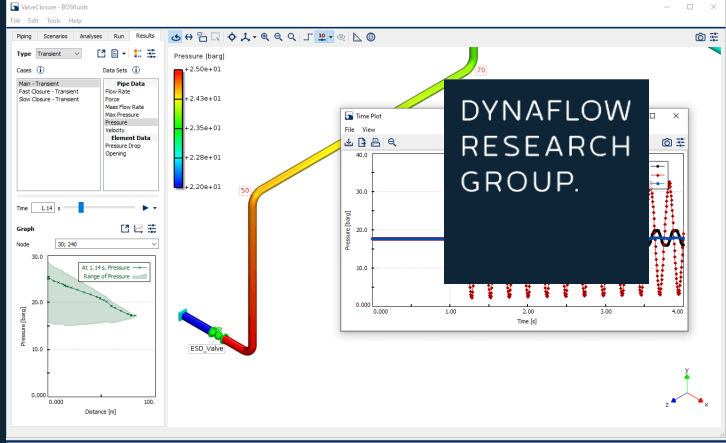
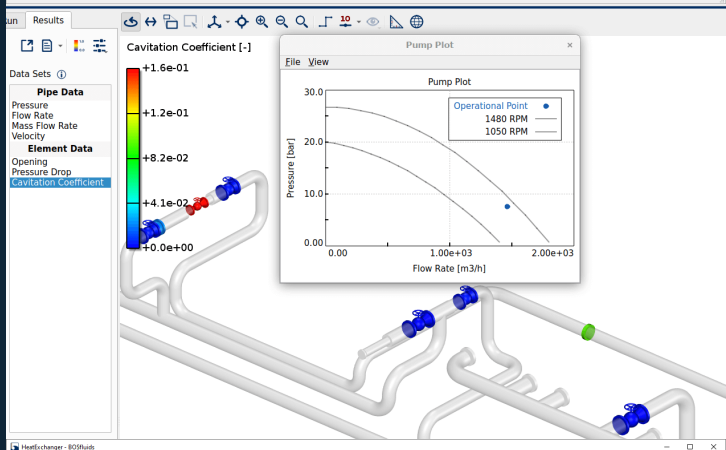
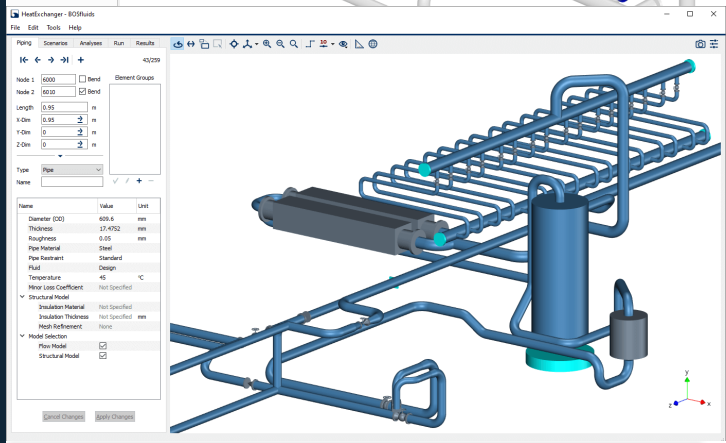
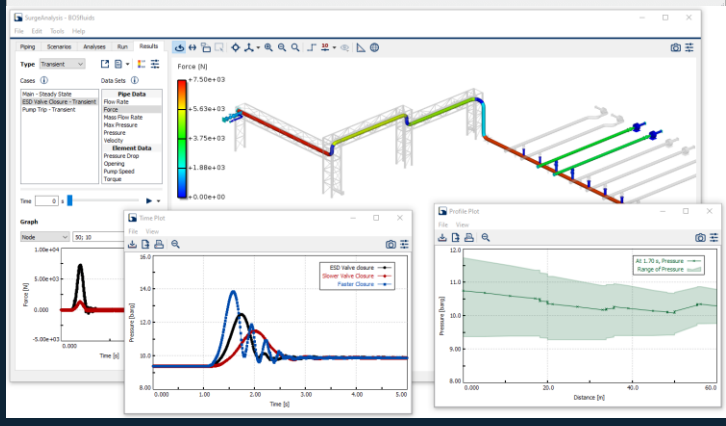
BOSfluids: Surge Analysis Simplified









Software Brochure | **2026**

BOSfluids is the **most intuitive and efficient tool** for the analysis of surge, water hammer, and general flow conditions within piping systems.

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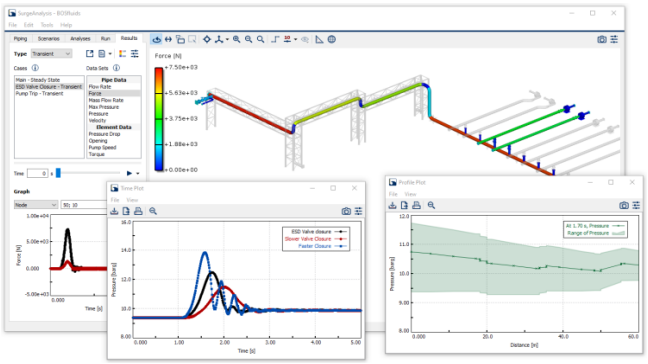
Surge Analysis Tool of Choice

BOSfluids® enables you to perform surge analyses in an interactive and visual way, giving you lots of opportunities to explore your problem space quickly and efficiently.

BOSfluids® is more than a surge analysis tool as it can simulate general steady-state and transient flow conditions in liquid or gas-carrying piping systems. In addition, it enables you to assess the effects of fluid-induced forces acting on the piping system through a structural solver interface.



FEATURES

- ✓ Steady-state analyses
- ✓ Transient flow analyses
- ✓ Cavitation and vapor models
- ✓ Tube rupture model
- ✓ Component database for materials, liquids, gases, equipment, and pipe schedules
- ✓ Transient upset scenarios for pumps and (relief) valves
- ✓ Intuitive user interface
- ✓ 3-D piping models
- ✓ Interactive 3-D viewer
- ✓ Structural solver interface
- ✓ CAESAR II® import & export
- ✓ Extensive post-processing capabilities
- ✓ Versatile and powerful scenario management

APPLICATIONS

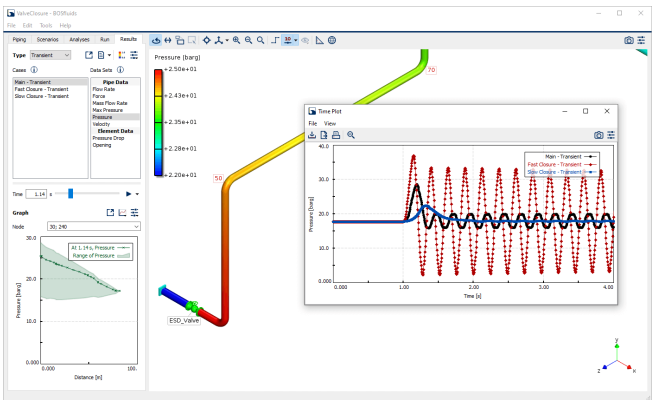
- ✓ Water hammer events
- ✓ Cooling water systems
- ✓ Firewater systems
- ✓ Deluge systems
- ✓ Potable drinking water systems
- ✓ Buried and above ground piping
- ✓ Process and plant design
- ✓ Offshore systems Gas and LNG

Water Hammer And Pressure Surges

Common problems in the Oil & Gas, Chemical, Power, and Water industries involve water hammer and pressure surges that are caused by transient events such as valve closure or pump failures.

These phenomena often play a role when evaluating the integrity of jetty on- and off-loading systems, (deluge) fire water systems, cooling water systems, and oil transport lines.

BOSfluids® uses a clear and detailed interface designed for strong interaction with frequently used pipe stress software packages. More than 35 years of experience with water hammer and surge problems has been incorporated in BOSfluids® and it is still being continuously updated to improve its simulation capabilities.

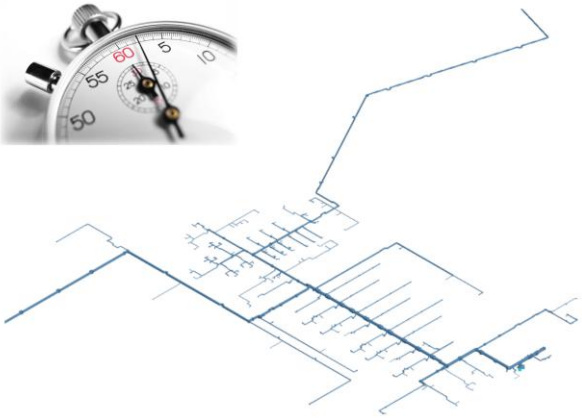


Fast Flow Solvers

BOSfluids® is equipped with very fast flow solvers with the capability to run multiple scenarios on multiple processor cores in parallel. The solvers run in the background, so you can start reviewing the analysis results from the finished scenarios while other scenarios are being executed.

The steady-state flow solver is based on a nonlinear, implicit solution method that takes the compressibility of gases into account, and also applies automatic refinement to obtain higher accuracy for gas-filled systems.

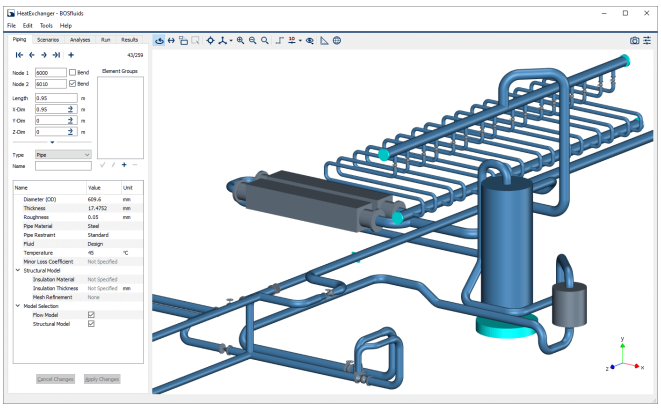
The transient solver uses the method of characteristics to solve the time-dependent, non-linear flow equations robustly and efficiently. By applying a novel grid coarsening method, it can execute transient analyses of very large piping systems in a short time. It implements multiple cavitation models for simulating the formation and collapse of vapor cavities in piping systems.



Intuitive User Experience

The BOSfluids® user interface streamlines the procedure for input, analysis, and post-processing of 2-D and 3-D piping models. The model is created by defining nodes and elements that are displayed in the interactive 2-D or 3-D viewer.

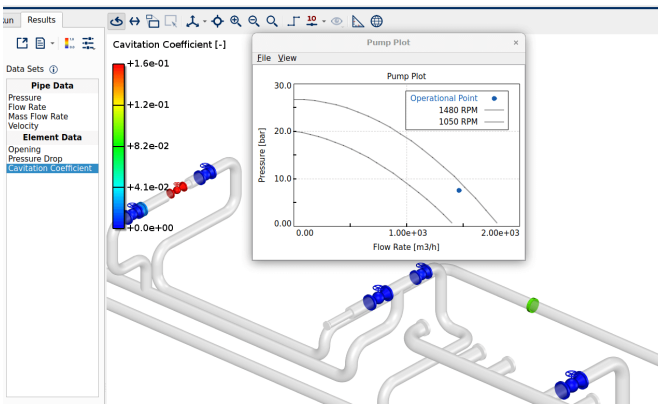
A collection of special flow elements enables you to build realistic models of actual piping systems. These flow elements include reducers, orifices, valves, check valves, air valves (vacuum breakers), safety relief valves and burst disks, regulator valves, pumps, surge vessels, and storage tanks. BOSfluids® also offers an element for simulating tube rupture in heat exchangers.



Digital Twin

With digital twin technology quickly advancing, BOSfluids® stands out by seamlessly integrating into this concept. Indeed, BOSfluids® is one of the only solutions on the market that is able to construct detailed 3-D piping models directly from the data stored in a digital twin.

This not only saves time, but it also reduces the scope for modelling errors and helps you to correlate the predicted flow conditions with the actual piping system. BOSfluids® is therefore an efficient and future-proof software solution for simulating a wide range of flow conditions in sophisticated piping systems.

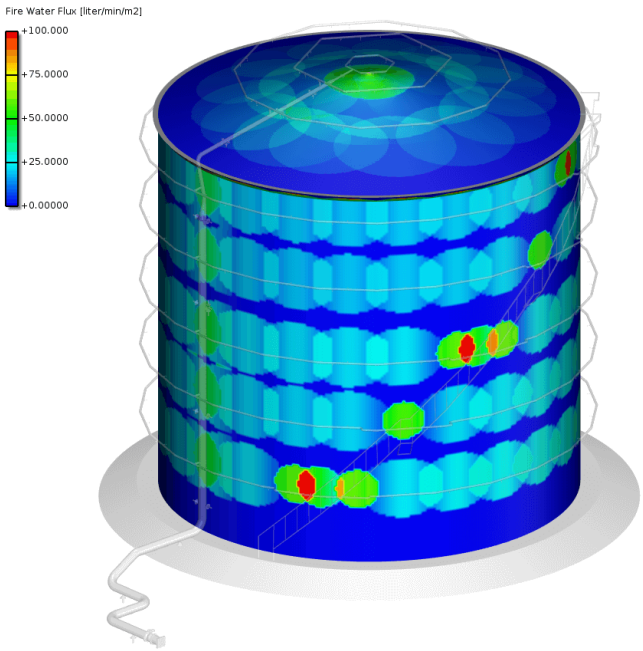


Extensive post-processing capabilities

Reviewing the fluid flow solution of a piping system can be rather complex. BOSfluids® helps you with this task by offering a wide collection of tools, including 2-D graphs of pressure and flow rates, 3-D visualization of various data sets, animation of time-dependent results, reports, and line graphs.

Fire Water Module

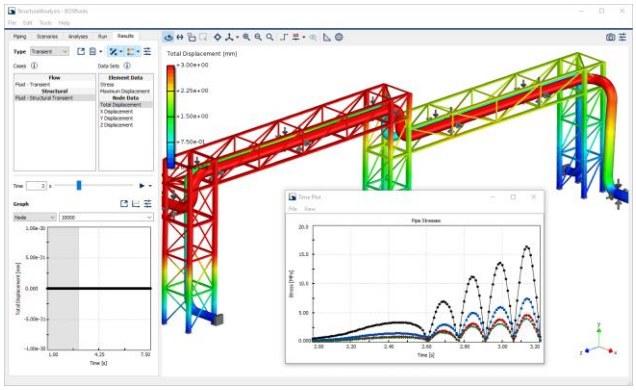
The BOSfluids Fire Water module provides a comprehensive set of tools for the design and evaluation of fire water systems. You can not only use those tools to assess the steady state flow conditions, but also to determine whether the system is able to withstand the transient pressures and loads that occur when the system is activated. The Fire Water module is available as an add-on to your BOSfluids license.



Import and Export Features

Because BOSfluids® piping models are 3-D models, exchanging models with pipe stress packages is relatively straightforward. In particular, BOSfluids® provides a bi-directional interface with Hexagon's pipe stress analysis software CAESAR II®, eliminating redundant work processes and thereby improving the quality of both pipe stress and fluid flow calculations.

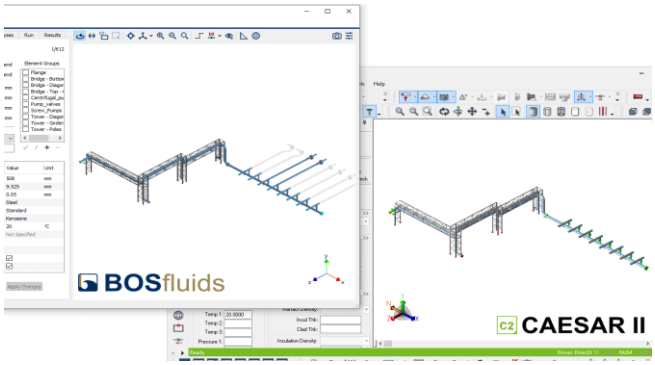
BOSfluids® can also import models from various file formats, including Piping Component Files (PCF) and EPANET model files. In addition, the geometry of a BOSfluids® model can be updated from an external model.



Structural Solver Interface

BOSfluids® includes a structural solver interface that makes it possible to perform a structural analysis and to review the resulting stresses and displacements without leaving the BOSfluids® interface.

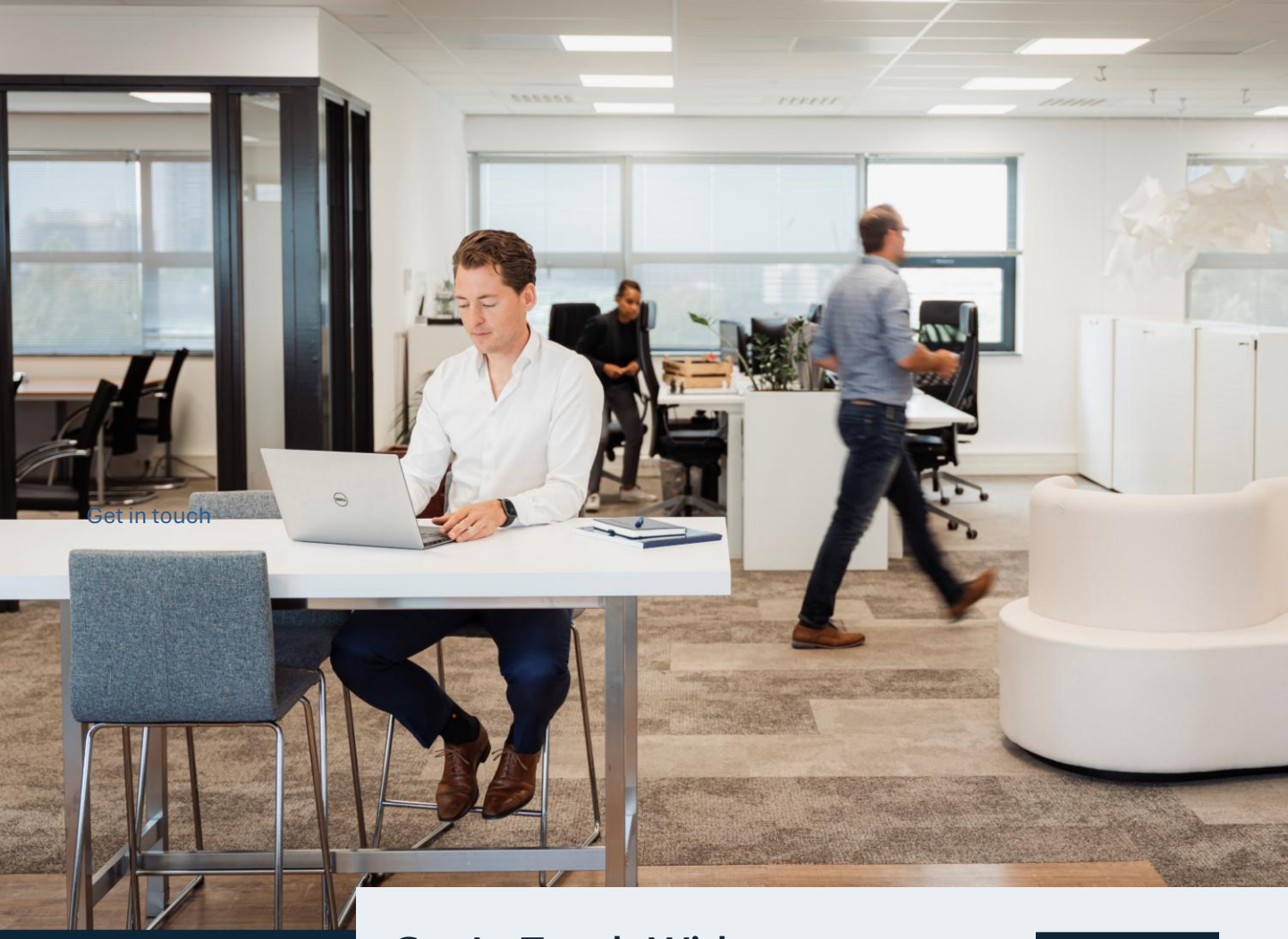
This requires the availability of a supported structural solver such as ANSYS. If such a solver is not available, you can export the fluid-induced forces and perform the structural analysis in a pipe stress package such as Hexagon's CAESAR II® and Bentley's AutoPIPE.



Feature overview

BOSfluids	Standard	Professional	Enterprise
Modelling Features			
Model builder (number of items not limited)	✓	✓	✓
Model importer (CII, Epanet, PCF, etc)	✓	✓	✓
Scenario builder	✓	✓	✓
Bill of Quantity report	✓	✓	✓
Viewer Features			
2-D network viewer and modeler	✓	✓	✓
3-D piping models and interface	✓	✓	✓
Model properties viewer	✓	✓	✓
Equipment			
Equipment database	✓	✓	✓
Valves including valve operations	✓	✓	✓
Centrifugal pumps	✓	✓	✓
Reciprocating pumps	✓	✓	✓
Surge vessels and tanks	✓	✓	✓
Control systems	✓	✓	✓
Fluids			
Fluid database	✓	✓	✓
Compressible fluids (gasses)	✓	✓	✓
Incompressible fluids (liquids)	✓	✓	✓
Formation and collapse of vapor cavities	-	✓	✓
Cavitation Index prediction	✓	✓	✓
Transient Events			
Water/gas hammer events	-	✓	✓
Pump Failure	-	✓	✓
Tube rupture events	-	✓	✓
Liquid flashing and choked flow in valves	-	✓	✓
Analysis Types and Options			
Pressure and (quasi) steady flow analysis	✓	✓	✓
Pressure surge analysis	-	✓	✓
Parametric analysis	✓	✓	✓
Definition of custom data sets	✓	✓	✓
Run analyses on multiple cores	✓	✓	✓
Structural Interface			
Beams and structural supports	-	✓	✓
Combined fluid-structure analysis	-	✓	✓
Hydrodynamic force calculation	-	✓	✓
License Access			
Local	✓	✓	✓
Global	-	-	✓
Fire Water Features *			
Sprinklers	✓	✓	✓
Surfaces	✓	✓	✓
NFPA Analysis	✓	✓	✓
Coverage Analysis	✓	✓	✓
Flood & Drain	-	✓	✓

* Add-on license



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