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Symmetry

Tailored workspaces—optimized facility

Process Software Platform Flare Workspace



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All-inclusive relief system analysis with integrated platform supply vessel (PSV), network header, and stack design

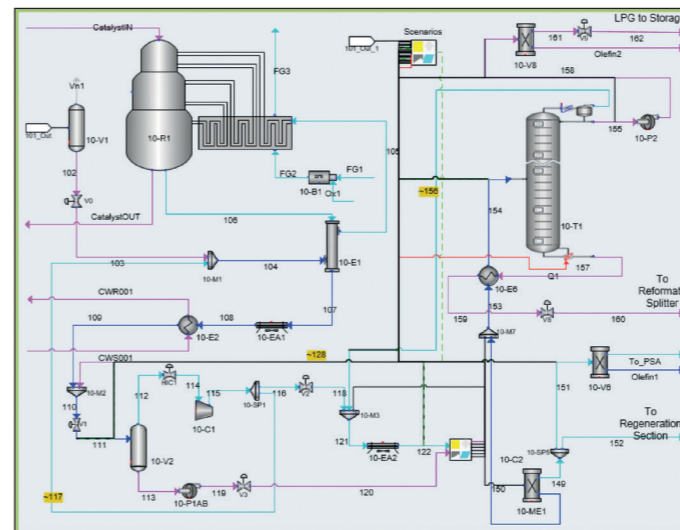
Symmetry\*, a process software platform, is a comprehensive simulator that empowers all aspects of your models from reservoir to product distribution.

The Symmetry platform uniquely integrates the modeling of fields, pipe networks, process plants and flare systems, providing an unprecedented level of collaboration and cooperation that enables teams to seamlessly transfer knowledge and expertise and maximize the total value of the asset.

The Flare workspace in the Symmetry platform offers a complete set of flare and relief system design tools that allows users to verify the performance of their entire safety system with steady-state or dynamics.

## Process Equipment

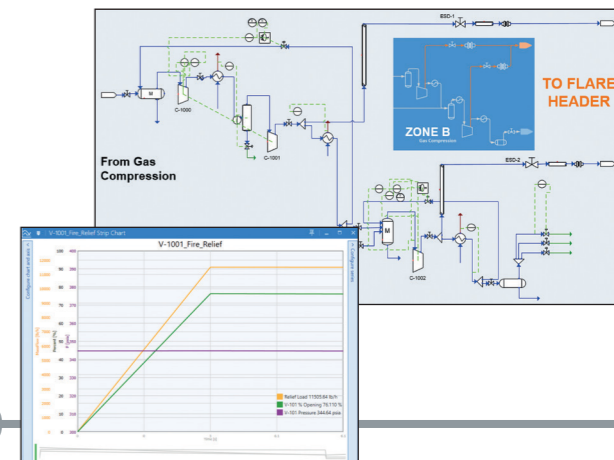
The Symmetry platform gives you the ability to model the relief system of any process in the Flare workspace in steady-state or dynamics. Integrated models can span a gathering network through gas processing and refining facilities. You can simulate the entire scope at once without error-prone data transfer and use the process model to identify relief scenarios including overpressure events, operational flaring, and blowdown.



## Relief Scenarios

The Symmetry platform enables you to combine steady-state and dynamics analysis in the same simulation as needed for each scenario. You can use steady state to quickly calculate required relief and use dynamics to model peak flows, record or playback profiles, or connect directly to a dynamic flare header.

Rigorously model any scenario in dynamics including detailed blowdown/depressuring studies, fire blowdown/depressuring studies, fire scenarios with built-in heat input calculations (including radiant heat transfer), equipment or utility system failures, startup, shutdown, and operating procedures. A variety of sequencing and control tools, including an event scheduler, cause and effect matrix, and control scheme modeling, offer complete modeling flexibility.

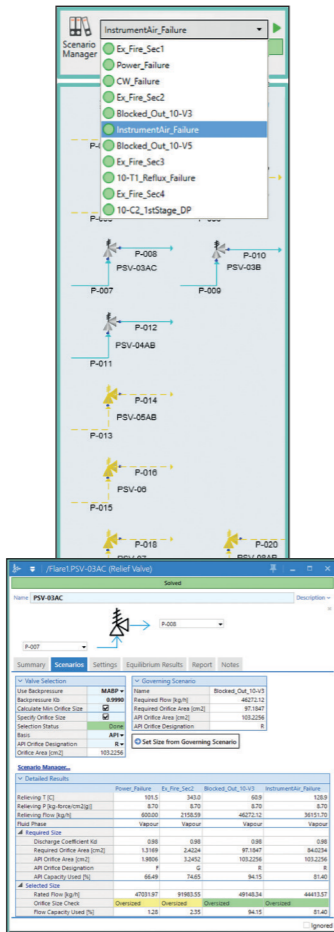


## Relief Valves

The Flare workspace offers a flexible, intuitive environment to ensure a relief valve installation is safe across all scenarios. Valves may be modeled as stand alone, with piping, or with the header network. The sizing and selection workflow determines the governing scenario and evaluates capacity of the selected orifice size (API or ASME). It provides warnings for undersized valves and significantly oversized valves that may chatter.

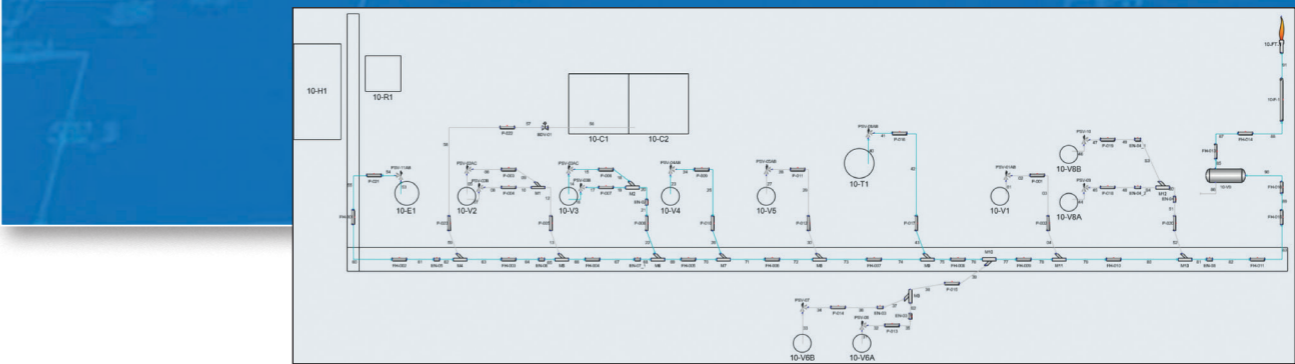
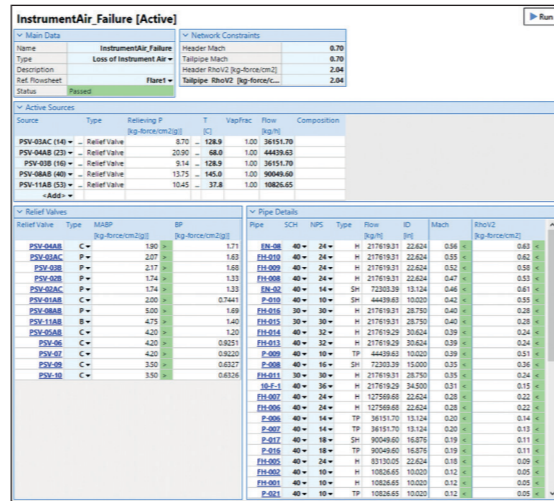
Inlet piping can be modeled to verify that inlet pressure losses will not cause stability issues: a steady-state model will check the 3% rule across all valves and scenarios. Then scenarios with potential issues can be modeled rigorously in dynamics to verify true potential for chatter.

Users can verify maximum allowed backpressure (MABP) along with inlet and tailpipe constraints at design or rated flow.



## Header Network

The Flare workspace provides tools to verify a header network design across global scenarios. It is capable of solving complex networks, including networks with loops and multiple stacks, with full kinetic energy tracking in steady state and dynamics. You can apply rigorous analysis where it matters; use steady-state simulation to evaluate the worst case instance of simultaneous relief, and then use dynamics simulation when the benefits of staggered flow may be significant. Seamless integration lets you check valve constraints and sizing using network-calculated backpressure. Rigorous heat transfer calculations can be enabled to aid in brittle fracture, thermal contraction, or solid formation analysis.



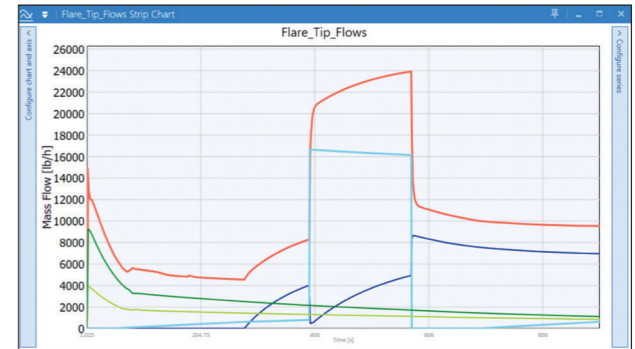
## Stack & Tip

The flare tip unit operation can be linked to Flaresim, the industry standard radiation software.

Verify the safety of your design by evaluating thermal radiation, noise, surface temperature of exposed objects, and flare gas dispersion using data from your network model across scenarios.

The Flaresim integration allows scenarios of concern to be reevaluated at any point in the relief system design, including possible changes to the process.

**flaresim**  
A Schlumberger Technology



## A unique scope of modeling tools advances the value and efficiency of safety simulation

The fully integrated Flare workspace enables models with the scope and flexibility to suit any application. You are empowered to analyze standalone components or complete systems with various levels of detail in steady state or dynamics.

### **Process and flare models**

An existing process model can define conditions for a relief valve sizing and installation model, which may evolve into a header-rating model with constraint evaluation across global scenarios. These flare models are easily updated when there are changes in the process.

### **Relief valve and network models**

A scenario-driven model of the header system can report an increase in backpressure on a relief valve, automatically trigger an update to valve rating calculations, and verify inlet losses at the new rated flow. Likewise, a change in relief valve size or type is automatically considered in the evaluation of header constraints.

### **Steady state and dynamics**

The unique level of integration between steady state and dynamics solvers in the Symmetry platform enables you to analyze the bulk of scenarios in steady state and invest in dynamics analysis where it matters.

Critical scenarios can be solved in dynamics, starting from the steady-state model and adding details and scheduled events for rigorous time-based analysis. Dynamics gives insight into the severity of constraint violations, including the duration of a violation and the real impact on equipment behavior. Taking into account system volumes and staggered relief times makes for a more realistic analysis and in many cases will result in conditions being farther from constraint violation or requiring less drastic (and expensive) upgrades to meet safety criteria.

Using the right tool for an application is seamless in the Flare workspace, without transfer of data across applications or a spread of models across separate environments, so you can reap the benefits with less effort.

## The symmetry platform advantage means rigorous thermodynamics, mature engines, and an enhanced user experience

The Flare workspace builds upon the legacy of VMGSim technology and helps you to get the most out of flare models. Industry-proven thermodynamics from VMGThermo enable accurate prediction of properties, consistent characterization across models, and detection of vulnerabilities like hydrate and solid formation.

The steady-state, dynamics, and network solver engines bring decades of experience solving related systems in the industry, with the steady-state network solver now adding kinetic energy tracking for flare applications. The Symmetry platform contains a variety of tools including case studies, emission monitoring, and a new equipment database that enables asset-wide insight and analysis.



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