

## **Symmetry** Tailored workspaces—optimized facility

Symmetry Flare workspace

# Tailored workspaces—optimized facility

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

The Symmetry\* 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.

### Process Equipment

The Symmetry platform gives you the ability to model any process 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 loads and then use dynamics to model items such as: peak flows, record or playback profiles, or connect directly to a dynamic flare header allowing for a deeper analysis of the capacity of the system.

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.

The Symmetry platform's dynamic capabilities provide the ability to model any relief scenario rigorously including detailed blowdown/ depressuring studies, fire scenarios with built-in heat input calculations (adding radiant heat transfer), equipment or utility system failures, startup, shutdown, and operating procedures. As is the case with steady state, the process and pipe workspaces can be seamless integrated into a dynamic flare scenario with the Symmetry Flare workspace for a comprehensive asset wide evaluation.



#### **Relief Valves**

The Symmetry Flare workspace offers a flexible, intuitive environment to ensure that relief valve design 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 the 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.

Scenarios with potential issues can then be modeled rigorously dynamically to predict and avoid detrimental failures.

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



#### Header Network

The Symmetry 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 and tips, with full kinetic energy tracking in steady state and dynamics.

A rigorous analysis can be applied; 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 calculation can be enabled to aid in brittle fracture, thermal contraction, or solid formation analysis.

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#### Stack and Tip

The flare tip unit operation can be linked to Flaresim\* flare systems design and analysis software, the flare radiation industry-standard software.

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

The Flaresim software integration allows scenarios of concern to be re-evaluated at any point in the relief system design, including changes to the

process.





For over 35 years, Flaresim software has been assisting engineers in the design and evaluation of flare systems, both onshore and offshore.

Used by more than 350 companies worldwide including consultants, flare system vendors, engineering and construction companies, and major operating companies.

Accurate modeling of thermal radiation, temperature, and noise footprints generated by flaring enables safe design and evaluation of the relief system.

Gas dispersion calculations are also available in Flaresim software to model flammability levels and dispersion of toxic pollutants and combustion products.



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The Symmetry platform advantage means rigorous thermodynamics, proven engine, and an enhanced user experience

The industry-recognized thermodynamics engine VMG Thermo has now been migrated to the Symmetry platform Fluid Engine, which continues to enable accurate prediction of properties and consistent characterization across models.

The Symmetry platform PIONA characterization provides a greater degree of flexibility to accurately represent your fluids, and the seamless blending of fluids, on a consistent slate of components within a single thermodynamic model.

The steady-state, dynamics, and network solver engines have been used for decades to solve challenging industrial problems.

This experience of building these solvers has been incorporated into the development of the Symmetry Flare workspace including kinetic energy

#### **Accurate Fluid Characterization**



tracking in a steady-state network, smooth transition to dynamics as well as the ability to have a dynamic and steady-state version of a flare network in the same case.

The Symmetry platform contains a variety of features including case studies, emission monitoring, and a new equipment database that enables asset-wide insight and analysis.



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