

 | Brochure

Aspen Plus[®] : Process Simulation for Chemicals





Challenging Times, Countless Demands

Global economic uncertainty, dynamic market conditions and competitive pressures to improve quality and reduce time-to-market are making it more challenging for chemical manufacturers to achieve ambitious production and net zero targets. To compete in this quickly changing world, these companies must find innovative ways to reduce operating costs while maximizing performance, safety, sustainability, equipment health and overall plant efficiency.

Solution

Aspen Plus is the chemical industry's leading process simulation solution, helping plants optimize across design and operations for greater safety, efficiency, equipment health and profitability.

Built on over 40 years of innovation and domain experience, this powerful modeling technology enables optimization of throughput, product quality and energy use in processes involving batch, continuous, and mixed batch and continuous operations.

Optimize Across Design and Operations with Aspen Plus



Drive new innovations



Support product development



Achieve optimal process design



Remove process bottlenecks



Quickly adapt to changing conditions



Increase efficiencies



Make better economic decisions

Innovative features and an intuitive user interface allow you to quickly manage all types of chemical processes within a single environment—with the option to use models. Empower your workforce with model-based decision making to efficiently optimize plant design and operations while making progress on key sustainability goals.

Better Simulation Streamlines Engineering

Paramount to improving the performance of a plant is having an accurate representation of its design and operations. Companies need a solution that enables them to model their processes so they can develop insights to improve their designs and optimize their performance. Aspen Plus provides the solution to achieve these goals, solving the critical engineering and operating problems that arise throughout the lifecycle of a chemical process.

Aspen Plus can help you achieve a wide range of business goals. These include:

[Design Processes and Optimize Operations to Reduce Carbon Footprint](#)

[Improve Operational Decisions with Robust Models That Match Reality](#)

[Simulate Accurate High-Fidelity Models Faster with Industrial AI](#)

[Model Processes with Confidence Using a Solid Foundation of First Principles](#)

[Design and Optimize Polymer Production Using Proven Models and Data](#)

[Simplify Batch Process Development](#)

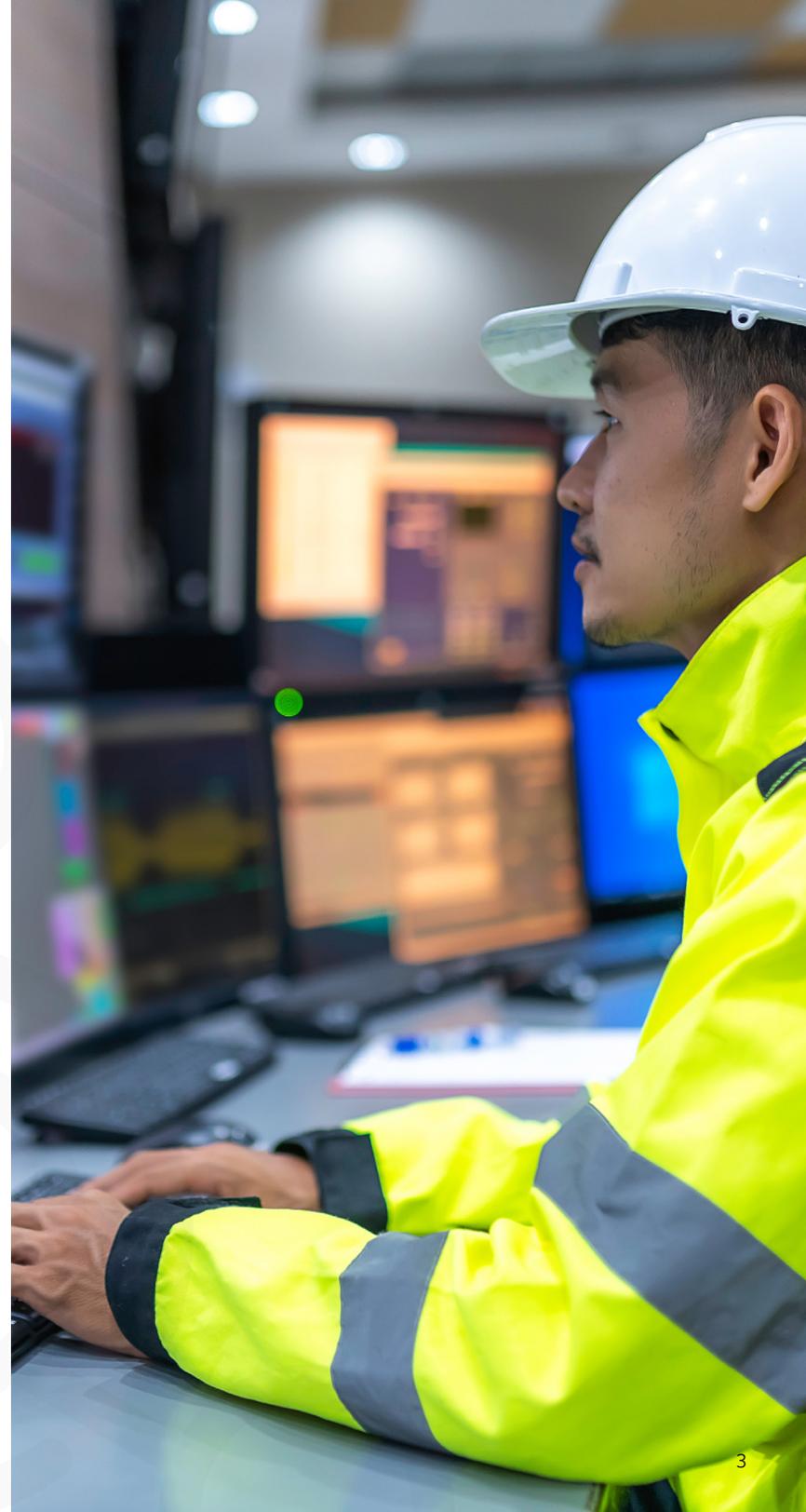
[Restore Optimal Column Performance, Optimize Column Designs](#)

[Design, Optimize and Scale-Up Solid Processes](#)

[Reduce CAPEX with Rapid Optioneering](#)

[Prevent Process Upsets and Mitigate Safety Incidents](#)

[Design and Optimize Special Processes and Equipment](#)



1 | Accelerate Sustainability

Design Processes and Optimize Operations to Reduce Carbon Footprint

- Overcome execution barriers for sustainability projects, gain quick insights into Scope 1 and Scope 2 emissions to improve new and existing processes
- Drive faster time-to-market for new processes and technologies
- Advance material circularity initiatives using pre-calibrated models for processes such as pyrolysis, glycolysis and more
- Develop, optimize and scale-up carbon capture processes
- Create optimal solutions for the hydrogen economy
- Accelerate innovation of bio-based processes by using rigorous bioreactor modeling with rate-based reaction models



Easy

100+ easy-to-use, pre-calibrated sustainability sample models

Seamless

Integrated tools for efficient technical and economic feasibility

Powerful

Robust hydrogen thermodynamics, new biomass library, emissions calculations based on latest standards

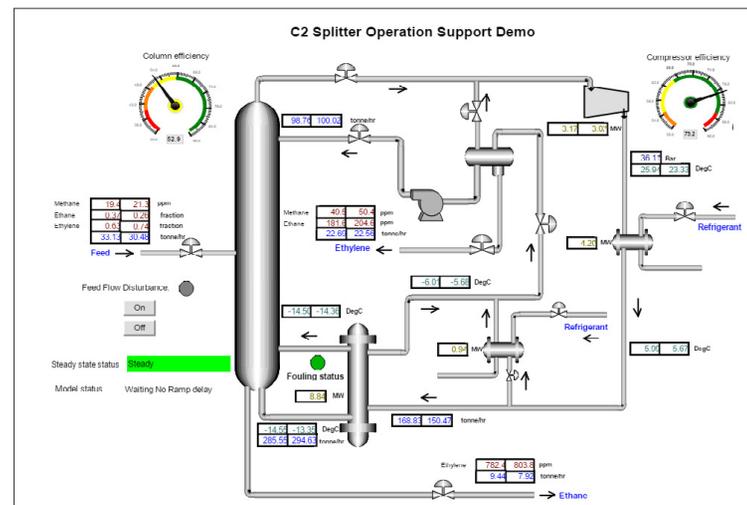
[Learn More](#)



2 | Digital Twin for Operations Decision Support

Improve Operational Decisions with Robust Models That Match Reality

- Make models that match reality by calibrating models to plant data for improved design and revamp with process understanding through validation with historical data
- Improve uptime and production rates by linking proven engineering models to real-time plant data
- Prepare models for deployment online by connecting and validating your models with plant historian within the Aspen Plus simulation environment
- Enable better operating decision-making for columns, exchangers and rotating equipment by using online models



Integrated

Model rigorous heat exchangers in larger process

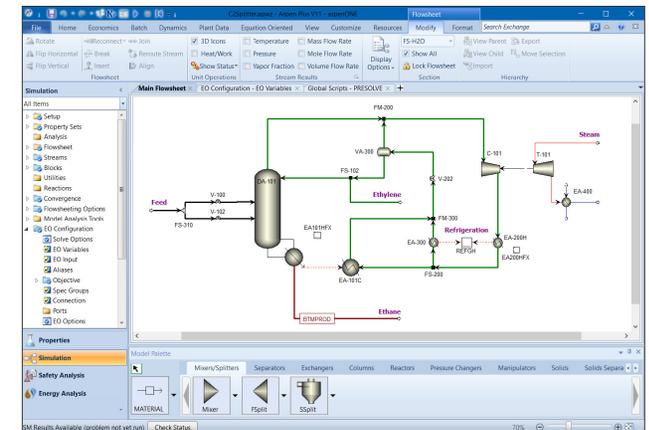
Innovative

Comprehensive set of rigorous HX

Data-Driven

Use equation-oriented modeling to compare to live data

[Learn More](#)

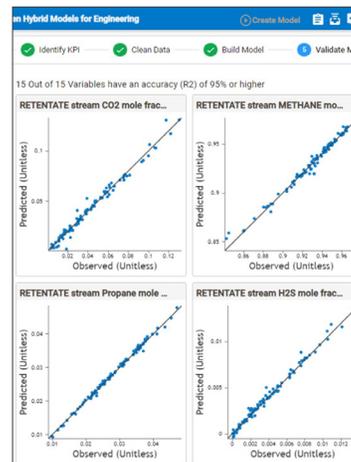
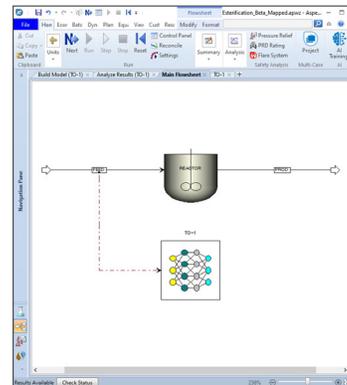




3 | Aspen Hybrid Models™

Simulate Accurate High-Fidelity Models Faster with Industrial AI

- Leverage the combined power of data, AI and engineering first principles to match models to your plant performance
- Create models with >99% accuracy across wide operating ranges
- Improve operations and planning decisions with highly accurate digital twin models
- Extend optimization scope by including complex units within closed loop optimization



Award-Winning

Named best modeling technology of 2021 by Hydrocarbon Processing

Integrated

Integrated tools extend the scope to planning and optimizing operations

Powerful

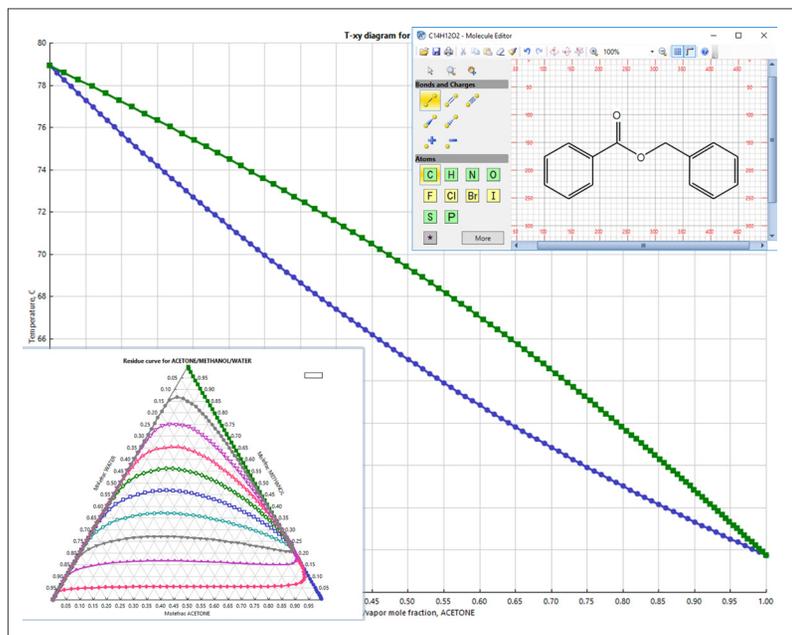
Backed by 40+ years of experience in first principles models

[Learn More](#)

4 | Leading Physical Properties Database

Model Processes with Confidence Using a Solid Foundation of First Principles

- Aspen Plus is known throughout the chemical industries to have the most complete set of physical properties data, built in collaboration with the National Institute of Standards and Technology (NIST).
- Supports a wide range of state-of-the-art methods and physical properties, including the predictive Peng-Robinson integration that calculates VLE and VLLE data from the structure.
- With reaction kinetics, thermodynamic data, and rigorous equipment models, engineers can simulate actual plant behavior while saving months of time and improving engineering accuracy.
- Aspen Plus is a former recipient of the prestigious R&D 100 Award for innovation in software from R&D Magazine.



Trusted

Industry gold standard

Comprehensive

Broad set of experimental data and methods

Customizable

Built-in libraries with in-house data

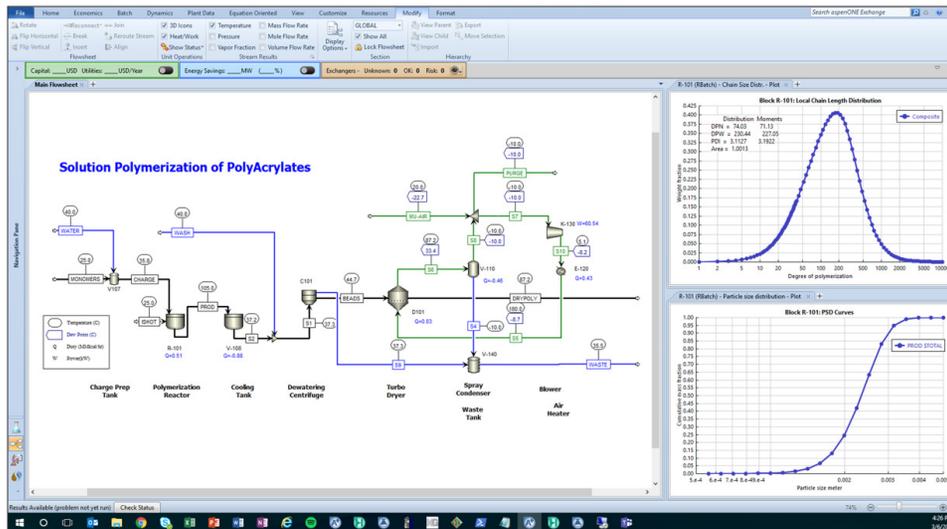
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5 | Polymer Process Modeling

Design and Optimize Polymer Production Using Proven Models and Data



- Access a complete set of polymer thermodynamic methods and data, rate-based polymerization reaction models and a library of industrial process models
- Comprehensive reaction kinetics models for bulk and emulsion free-radical polymerization, Ziegler-Natta and Metallocene polymerization, step-growth polymerization and polymer pyrolysis



Proven

Complete set of polymer reaction models

Capable

Handle solid polymers with extensive equipment models

Powerful

State-of-the-art models for polymer properties

[Learn More](#)



6 | Batch Process Improvement

Simplify Batch Process Development

- Support design and optimization of batch and continuous processes involving fluids and solids in the same engineering environment
- Use batch modeling within Aspen Plus to combine reaction kinetics with conceptual design, analysis and optimization of batch processes
- Accelerate new product development for a wide range of processes that include crystallization, drying, filtration, distillation and reactions
- Utilize interactive operational recipe visuals for faster troubleshooting

Integrated

Batch and continuous processes in a single environment

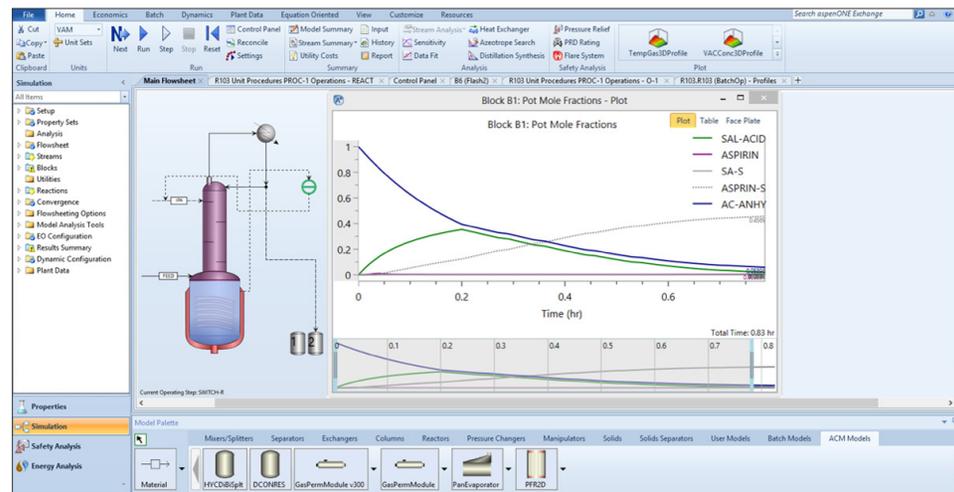
Seamless

Integrated tools from process development to design

Powerful

Backed by the best library of physical properties

[Learn More](#)





7 | Distillation Improvement, Design and Revamp

Model Processes with Confidence Using a Solid Foundation of First Principles

- Use hydraulic visualization for distillation, gain the unique insights necessary to quickly evaluate how changes to design and operating conditions will affect column performance
- Use second-generation rate-based calculations to accurately predict column separation efficiencies
- Conduct column design and rating with a built-in library of trays, packings and trusted correlations



Visualized

Bright, informative hydraulic plots

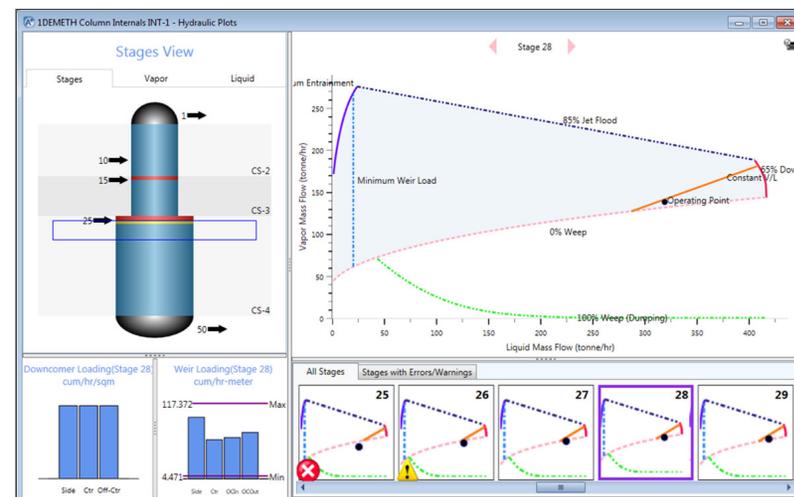
Streamlined

One tool with guided workflows

Validated

Correlations tested against vendor tools

[Learn More](#)



8 Solids Process Optimization

Design, Optimize and Scale-Up Solid Processes

- Leverage a comprehensive library of solids unit operations, such as dryers, granulators, crystallizers, fluidized beds, crushers, gas/solid and liquid/solid separators, classifiers and pneumatic conveying systems
- Reduce capital and energy costs while ensuring consistent particle size distribution
- Predict and visualize particle size distribution, moisture content and separation efficiency

Accessible

Models that grow with your expertise

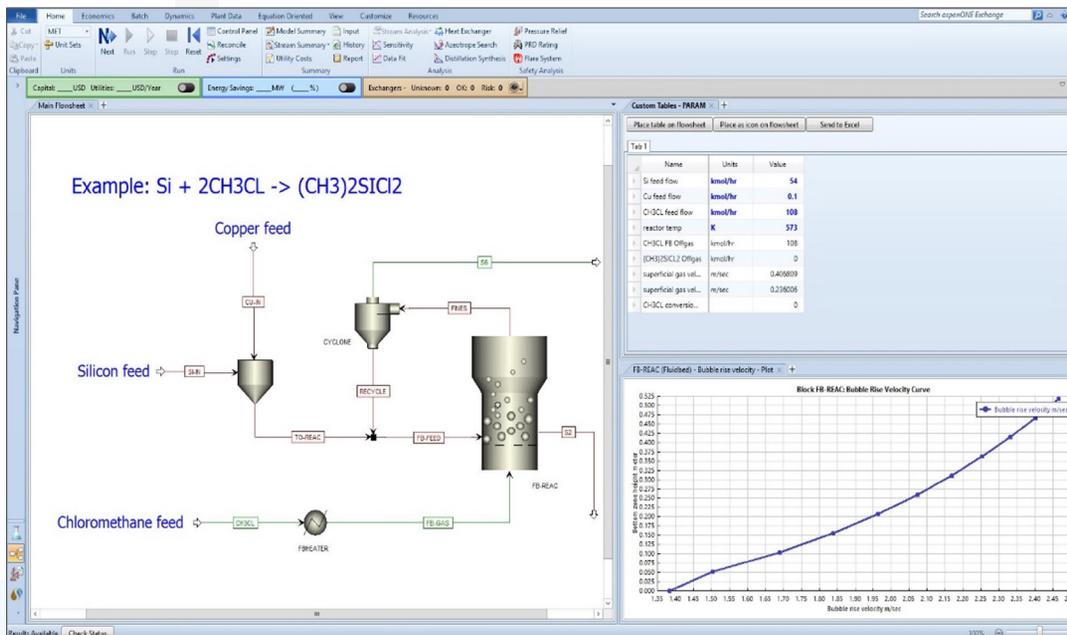
Accurate

Rigorously handle PSD and drying

Comprehensive

Breadth and accuracy of equipment models

[Learn More](#)



9 | Concurrent Conceptual Engineering

Reduce CAPEX with Rapid Optioneering

Activated Economic Analysis

- Assess model-based relative cost estimates during conceptual design

Activated Energy Analysis

- Evaluate design changes to optimize energy use
- Assess utility costs and greenhouse gases
- Compare heat and cooling demand with pinch theory

Activated Exchanger Design and Rating

- Specify or design rigorous heat exchanger models based on process constraints
- Optimize and troubleshoot exchanger performance without leaving the simulator environment
- Enable process engineers and thermal and mechanical specialists to collaborate effectively

Scalable

Design tools built on volumetric economic modeling

Robust

Consider CAPEX as you design

Seamless

Integrated tools that reduce iteration time

[Learn More](#)

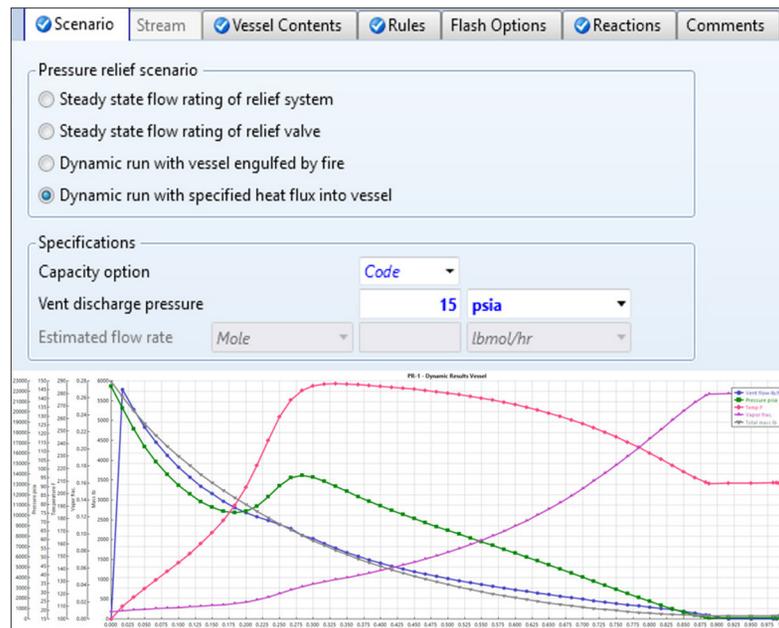
Economics		Energy		EDR Exchanger Feasibility			Greenhouse Gas Emissions	
Capital Cost	Utility Cost	Available Energy Savings		Unknown	OK	At Risk	Scope 1 CO2 equivalent	22.674 kg/hr
—	—	—	—	0	0	0	Scope 2 CO2 equivalent	0 kg/hr
USD	USD/Year	MW	% of Actual				Total Carbon Tax	0.36278 \$/hr



10 ▶ Process Safety Analysis

Prevent Process Upsets and Mitigate Safety Incidents

- Proactively plan transient plant behaviors for smoother startups, shutdowns and operational changes
- Reduce CAPEX and engineering time using a complete overpressure protection solution with expert-trusted calculations and guided workflows
- Ensure equipment and plant safety, operability and controllability; mitigate potential failures, while minimizing energy and material using insights from dynamic studies
- Size and rate process safety valves, calculate relief loads under various scenarios and evaluate reactive pressure relief



Accurate

Rigorous, validated calculations

Streamlined

Eliminate manual data transfer between tools

Proven

Ensure compliance with industry safety standards and generate documentation

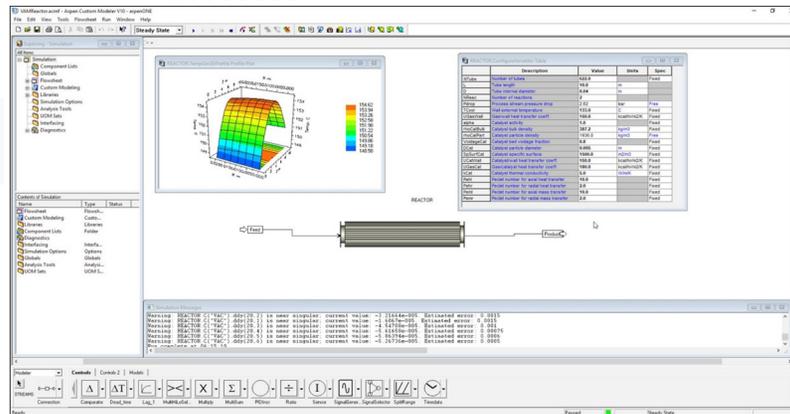
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11 | Optimization with Custom Equipment

Design and Optimize Special Processes and Equipment

- Build your own libraries of high-fidelity equipment models using Aspen Custom Modeler®
- Create, modify, compile and deploy custom models inside Aspen Plus
- Simulate steady-state and dynamic calculations



Flexible

Powerful modeling language designed for chemical engineers

Versatile

Use on its own or inside Aspen Plus or Aspen HYSYS®

Powerful

Backed by the best library of physical properties

[Learn More](#)

Conclusion

Aspen Plus is the market-leading process simulator built on decades of experience, feedback from top chemical companies and an award-winning physical properties database. With an integrated process modeling tool that combines economics, energy, safety and emissions analysis, users can attain value across an asset's entire lifecycle. Leveraging recent innovations in AspenTech simulators—combining data and machine learning with first principles fundamentals—users can create models that closely represent real plant behavior.

These accurate, high-fidelity models help organizations accelerate time-to-market for new processes and improve equipment and process efficiency for existing processes, all while visualizing and enhancing sustainability performance.

Visit [aspentech.com/aspentechplus](https://www.aspentech.com/aspentechplus) to learn more.





About Aspen Technology

Aspen Technology, Inc. (NASDAQ: AZPN) is a global software leader helping industries at the forefront of the world's dual challenge meet the increasing demand for resources from a rapidly growing population in a profitable and sustainable manner. AspenTech solutions address complex environments where it is critical to optimize the asset design, operation and maintenance lifecycle. Through our unique combination of deep domain expertise and innovation, customers in capital-intensive industries can run their assets safer, greener, longer and faster to improve their operational excellence.

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