Aspen Plus®

Process modeling environment for conceptual design, optimization, and performance monitoring of chemical processes

Aspen Plus has a proven track record of providing substantial economic benefits throughout the process engineering lifecycle, from conceptual design and engineering to production. It brings the power of process simulation and optimization to the engineering desktop, and delivers a unique combination of modeling technology and ease of use. *Aspen Plus* enables companies to rapidly design new processes, deliver new products to market faster and optimize production.

Aspen Plus is a proven, industry-standard solution with over thirty years of success. Customers have recognized and reported:

- $15 million per year in incremental profitability from process optimization
- $10 million per year in capital savings resulting from improved designs
- $1 million per year of reduced labor costs from improved conceptual engineering workflow

The Challenge: Improve Engineering Efficiency, Lower Overall Costs

Across the chemical process industries, companies are faced with global economic challenges, dynamic market conditions, and competitive pressures to improve quality and reduce time-to-market. Companies must find innovative ways to reduce capital and operating costs and increase engineering efficiency so as to maximize plant and business performance and profitability.

The AspenTech Solution: Model the Chemical Process—Start to Finish

Fundamental to improving performance of the plant is an accurate representation of the basic processes. Companies need a solution that enables them to model their processes to develop insights to improve designs and optimize performance. *Aspen Plus* provides the solution to meet this need, solving the critical engineering and operating problems that arise throughout the lifecycle of a chemical process.

Aspen Plus predicts process behavior using engineering relationships such as mass and energy balances, phase and chemical equilibrium, and reaction kinetics. With reliable physical properties, thermodynamic data, realistic operating conditions, and rigorous equipment models, engineers are able to simulate actual plant behavior. Applications include:

- Improving engineering productivity and reducing costs
- Reducing energy consumption
- Improving product yields and quality
- Optimizing designs for large-scale integrated chemical plants
- Optimizing plant operations

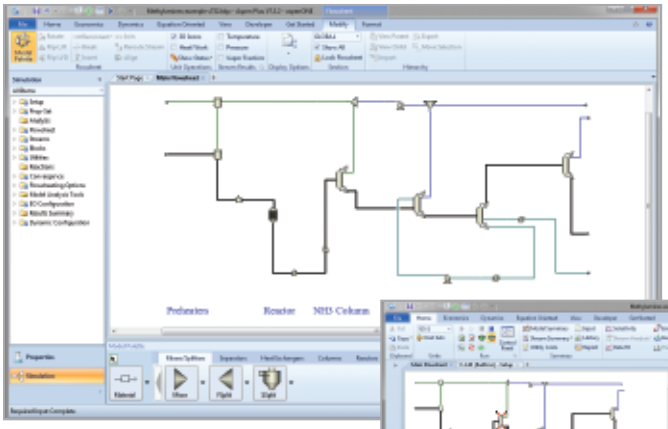
Aspen Plus Options*

The power and flexibility of *Aspen Plus* is further enhanced through a number of optional add-on applications:

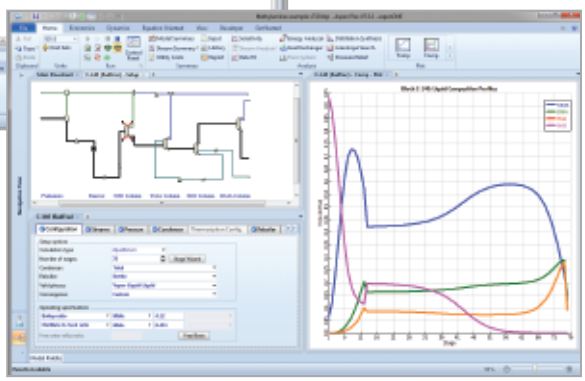
- **Aspen Plus® Dynamics:** Used for safety and controllability studies, sizing relief valves, and optimizing transition, startup, and shutdown policies
- **Aspen Rate-Based Distillation:** Accurately predict column performance over a wide range of conditions
- **Aspen Batch Modeler:** A system for modeling batch reactors and batch columns that can be used stand-alone or inside *Aspen Plus*
- **Aspen Polymers:** Extends *Aspen Plus* with a complete set of polymer thermodynamic methods and data, rate-based polymerization reaction models, and a library of industrial process models
- **Aspen Distillation Synthesis:** Includes visualization and analysis tools for conceptual design and troubleshooting of distillation schemes for complex mixtures
- **Aspen Plus® Optimizer:** Enables equation-oriented optimization and data reconciliation for complex, integrated processes
- **Aspen Energy Analyzer:** Evaluate energy efficiency and optimize heat exchanger network design
- **Aspen Exchanger Design & Rating:** Rate existing heat exchanger performance or find the optimal design for new exchangers
- **Aspen Process Economic Analyzer:** Provides an integrated solution to rapidly evaluate conceptual designs for capital and operating costs, resulting in economic optimization of designs early in the project

Aspen Plus Related Products

- **Aspen Simulation Workbook:** Provides easy and robust integration between Microsoft Excel® and AspenTech simulators, including *Aspen Plus*. Applications include supplementary design calculations and deployment of models in plant operations for decision support
- **Aspen Online Deployment:** Deploy models in real-time online applications, data reconciliation, equipment monitoring, and operator advisory



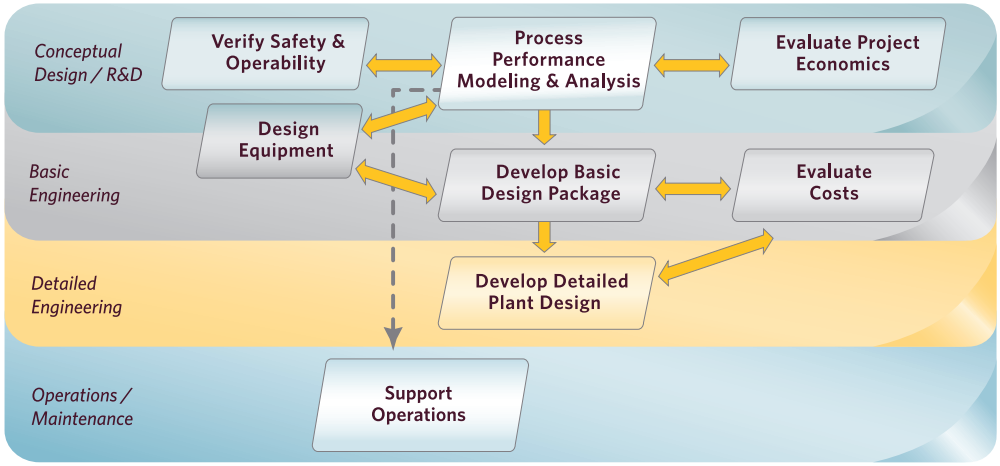
Experience greater ease-of-use and higher productivity with the new ***Aspen Plus***.



Use the customizable multi-panel workspace for quick access to data and results, as well as faster and easier plotting.

*These are the options available with V7.3.2 (Feb 2012) and higher.

Function	Benefit
Streamlines Workflow	
• Streamlines process design, heat exchanger design and rating, and preliminary cost estimation with other *aspenONE® Engineering* tools	• Improves engineering efficiency • Reduces project cycle time • Improves accuracy and cost-effectiveness of designs
Physical Property Models	
• World's largest database of pure component and phase equilibrium data for conventional chemicals, electrolytes, solids, and polymers • Regularly updated with data from U. S. National Institute of Standards and Technology (NIST) • Remotely access pure component properties using your iPhone®, iPod® touch, or iPad®[1] with *Aspen Properties Mobile™*	• Generates accurate simulation results that can be used with confidence • Improves efficiency by quick and easy access to the best available experimental property data and parameters • Simulates a wide range of processes out of the box • Enables the user to make reliable decisions whenever and wherever necessary
Energy & Environmental Solutions	
• Develop improved heat integrated designs • Calculates greenhouse gas emissions generated directly through chemical reactions and indirectly through energy use • Accurately design distillation equipment used for cleaning greenhouse gases	• Reduces operating, capital, and design costs while minimizing energy-related emissions • Automatically generates greenhouse gas reports for internal or external use • Improves investment decisions and ROI by accurately sizing key columns
Comprehensive Library of Unit Operation Models	
• Addresses a wide range of solid, liquid, and gas processing equipment • Build your own libraries using *Aspen Custom Modeler®* or programming languages	• Models a wide range of industrial processes including power, chemicals, specialty chemicals, polymers, metals and minerals, etc. • Simulate a wide range of special equipment for continuous batch and semi-batch processes
Model Deployment	
• Deploy *Aspen Plus* models for broader use through Microsoft Excel® using *Aspen Simulation Workbook* • Build open-loop operator advisory systems based on *Aspen Plus* models using *Aspen Online Deployment*	• Enhances the speed and consistency of the routine aspects of simulation, costing, and sizing • Provides the ability to leverage past AspenTech investments • Allows use of custom or third-party models in *Aspen Plus*
Workflow Automation	
• Automates tasks by linking process models to Microsoft Excel® using *Aspen Simulation Workbook* or Microsoft Visual Basic®	• Enhances the speed and consistency of the routine aspects of simulation, costing, and sizing
Open Environment for Third-Party Integration	
• Links to other widely used tools such as OLI's electrolyte package and Technip's SPYRO ethylene cracker models • Compatible with CAPE-OPEN-compliant equipment models within *Aspen Plus*	• Provides the ability to leverage past investments with AspenTech tools • Allows customers to use custom or third-party models inside an *Aspen Plus* simulation



aspenONE® Engineering addresses each phase of the process lifecycle, enabling companies to develop the most economical and reliable plants.

Empower Your Company to Succeed

aspenONE Engineering is an integrated lifecycle solution—from conceptual design through plant startup and operations support—enabling you to model, build, and operate safer, more efficient and more competitive process plants. AspenTech's Engineering Professional Services helps ensure that your project achieves its maximum potential by leveraging our unparalleled industry expertise to design, analyze, debottleneck, and improve plant performance. Combined with our world-class 24/7 technical support service, flexible training options, including online training from within the software, proprietary search engine to locate and re-use models and data, and local language product availability, AspenTech provides the resources to enable your company to meet and exceed its business objectives.

About AspenTech

AspenTech is a leading supplier of software that optimizes process manufacturing—for energy, chemicals, pharmaceuticals, engineering and construction, and other industries that manufacture and produce products from a chemical process. With integrated aspenONE® solutions, process manufacturers can implement best practices for optimizing their engineering, manufacturing, and supply chain operations. As a result, AspenTech customers are better able to increase capacity, improve margins, reduce costs, and become more energy efficient. To see how the world's leading process manufacturers rely on AspenTech to achieve their operational excellence goals, visit **www.aspentech.com**.

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aspenONE®

Worldwide Headquarters

Aspen Technology, Inc.
200 Wheeler Road
Burlington, MA 01803
United States

phone: +1-781-221-6400
fax: +1-781-221-6410
info@aspentech.com

Regional Headquarters

Houston, TX | USA
phone: +1-281-584-1000

São Paulo | Brazil
phone: +55-11-3443-6261

Reading | United Kingdom
phone: +44-(0)-1189-226400

Singapore | Republic of Singapore
phone: +65-6395-3900

Manama | Bahrain
phone: +973-17-50-3000

For a complete list of offices, please visit
www.aspentech.com/locations