Aspen Engineering Suite

Release Notes

Version Number: V12
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aspenONE Engineering Overview

The aspenONE Engineering Suite

The aspenONE Engineering Suite is an integrated environment that provides business value through the creation, management, and deployment of process knowledge throughout the engineering enterprise.

The V12 releases of Aspen Engineering offer exciting new functionality and key enhancements that further advance AspenTech's products, helping customers to make faster decisions and operate more efficiently and profitably within the areas of engineering design, simulation, and optimization.

This document provides an overview of product functionality and details the new capabilities and major enhancements for each product in the Aspen Engineering Suite.

Key Capabilities

- Use consistent models to design, optimize, and improve your plant operations.
- Design and de-bottleneck plants and processes for maximum performance.
- Gain control of plants and processes from a business perspective.
- Look ahead to capitalize on opportunities and identify problems before they occur.
- Measure plant performance.
- Estimate capital and operation costs.

Accessing Documentation

There are several ways to access Product Help files and context-sensitive Help (these are available depending on the type of application):

- Clicking the **Help** button.
- Pressing **F1** while in the application.
- Accessing the application's **Help** menu.
- Clicking a Help icon. For example:

Documentation in PDF format can be found in the following ways:

- Installation Guides and Release Notes can be found by clicking the corresponding link on the Welcome page of the aspenONE Installer.

- Logging onto the AspenTech Customer Support site, clicking **Support** in the upper right-hand side and then clicking **Product Documentation**.
- Downloading all the available documentation (other than Help files) from the AspenTech Customer Support website via the zip file of the aspenONE Documentation.

For Aspen Plus, Aspen HYSYS, Aspen Exchanger Design and Rating, Aspen Economic Evaluation, Aspen DMC3 Builder, and Aspen Fidelis Reliability only, you can access additional documents by:

- Clicking the Aspen Knowledge icon on the Resources ribbon. (All products except Economic Evaluation.)
- Entering a search string within the Search Aspen Knowledge search box – available in the upper-right corner of the application. (All products except Economic Evaluation.)
- Clicking Aspen Knowledge from the Help menu (Economic Evaluation only).

For Aspen Plus and Aspen HYSYS only, you can use Aspen Knowledge In-Context to access relevant Aspen Knowledge material, including literature, training, eLearning content, Knowledge Base articles, content from the HTFS Research Network, and videos. The  icon indicates that Aspen Knowledge In-Context recommendations are available for the current form.

What's New in V12

The What's New section provides information about new features and functionality in the V12 Aspen Engineering products.

Aspen Multi-Case (New)

Product Description

Aspen Multi-Case provides multi-core and high-performance computing capabilities for Aspen HYSYS and Aspen Plus, allowing you to run multiple simulations simultaneously and visualize results. Aspen Multi-Case serves as a single platform that allows you to seamlessly transition between setting up cases, configuring runs, concurrently running simulations, and analyzing results. By leveraging the parallelization capabilities for Aspen HYSYS and Aspen Plus, Aspen Multi-Case enables you to run a large number of simulations quickly and easily.

The project configuration and results are saved in a database. To share projects between different users, you can export projects from the database and import them into another database as needed.

Aspen Multi-Case offers the following benefits:

- Seamless case configuration without the need to open Aspen Plus or Aspen HYSYS.
- Provides advanced data analysis and visualization capabilities.
- Allows analysis of complex design problems involving multiple files and flowsheet topologies.
- Results in an improved simulation workflow when optimizing across several design scenarios.
- Eliminates the need to transfer data to Excel for analysis and visualization.

Interactive visualization helps you analyze results across multiple cases. Results visualization options include plots (both two-dimensional and three-dimensional), tables (including aggregation and filtering capabilities), and matrices.

You can create an Aspen Multi-Case project linked to your current simulator case from within Aspen HYSYS and Aspen Plus.

For further information regarding Aspen Multi-Case, see the *Aspen Multi-Case Help*.

Aspen Plus

Product Description

Aspen Plus® is the AspenTech state-of-the-art steady-state simulation system that can be used for modeling a variety of industrial processes including chemical, petrochemical, energy, metals, and refining. Batch flowsheets allow you to model integrated batch processing units within the steady-state plant model. Aspen Plus contains a comprehensive library of unit operation models and allows you to easily plug in proprietary custom models. In addition, Aspen Plus provides full Windows® interoperability to facilitate the process and design engineer's work processes. Aspen Plus with the Aspen Plus Optimizer and Aspen OnLine modules provides the framework to make optimization (including closed loop real-time optimization) a natural extension to simulation, process control, and decision making. Aspen Plus automatically installs and works with the following separately licensed sub-products:

- Aspen Distillation Synthesis, allows you to construct ternary maps and do azeotrope searches on multi-component mixtures, as well as use the ConSep unit operation model for distillation design.
- Aspen Rate-Based Distillation, allows you to perform rate-based distillation calculations using the RadFrac unit operation model.
- Aspen Plus Optimizer allows you to perform optimization calculations in the equation-oriented environment.
- Aspen Polymers allows you to model processes involving polymers and oligomers. It includes databases, property methods and models, and reaction kinetics models required to simulate polymerization reactors and processing plants.
- Aspen Plus Dynamics, which enables dynamic simulation. To install this product, select the Aspen Plus Dynamics option.

Aspen Plus is a mixed simulation and optimization environment supporting both sequential modular and equation-oriented solution techniques for process flowsheets.

New Features and Enhancements in V12

Aspen Plus V12 includes new features in the following areas:

- Aspen Multi-Case
- Aspen Knowledge In-Context
- Plant Data
- General Usability
- Engineering Improvements
- Safety Analysis
- Physical properties

Aspen Multi-Case

Aspen Multi-Case is a new product that provides multi-core and high-performance computing capabilities for Aspen HYSYS and Aspen Plus, allowing you to run multiple simulations simultaneously and visualize results. Aspen Multi-Case serves as a single platform that allows you to seamlessly transition between setting up cases, configuring runs, concurrently running

simulations, and analyzing results. By leveraging the parallelization capabilities for Aspen HYSYS and Aspen Plus, Aspen Multi-Case enables you to run a large number of simulations quickly and easily.

You can create projects that are associated with HYSYS and Aspen Plus case files ("base cases") and define scenarios for comparison and visualization. The project types available in Aspen Multi-Case support the following key workflows:

- Case Study projects offer an improved version of the HYSYS Case Study / Aspen Plus Sensitivity Analysis due to easier configuration and high-performance computing.
- Multi-File Analysis projects support multiple files and flowsheet topologies in order to help you analyze multiple design configurations and operating conditions for a large number of scenarios.
- Reduced Order Model projects allow you to generate data that can be used in the AI Model Builder.

Aspen Multi-Case offers the following benefits:

- Seamless case configuration without the need to open Aspen Plus or Aspen HYSYS.
- Provides advanced data analysis and visualization capabilities.
- Allows analysis of complex design problems involving multiple files and flowsheet topologies.
- Results in an improved simulation workflow when optimizing across several design scenarios.
- Eliminates the need to transfer data to Excel for analysis and visualization.

Aspen Multi-Case supports distributed deployment, enabling you to leverage multi-core machines on-premises or in the cloud and run the simulations in parallel. For multi-user machines (such as Windows Server), Aspen Multi-Case allows multiple users to work on the same machine and ensures that other users are prevented from editing your projects.

Interactive visualization helps you analyze results and analyze results across multiple cases. Results visualization options include plots (both two-dimensional and three-dimensional), tables (including aggregation and filtering capabilities), and matrices.

For further information regarding Aspen Multi-Case, see the Aspen Multi-Case Help.

You can create an Aspen Multi-Case project linked to your current simulator case from within Aspen HYSYS and Aspen Plus. To do so, on the **Home** ribbon tab | **Multi-Case** group, click **Project**. A new Aspen Multi-Case project is automatically created and appears in your web browser. The new Aspen Multi-Case project will be a Case Study project with the current simulator case attached as a base case. See Creating an Aspen Multi-Case Project in the Aspen Plus help.

Aspen Knowledge In-Context

Aspen Plus V12 features Aspen Knowledge In-Context, which delivers curated, featured content that is seamlessly integrated within the Aspen Plus flowsheet. This tool allows you to access relevant Aspen Knowledge material within Aspen Plus, providing relevant information that reflects your specific flowsheet topology and interactions with the process model. For example, content regarding Aspen Exchanger Design & Rating appears when you are working with an Activated Heat Exchanger. As a result, you can easily obtain the information needed to complete your current workflow.

You can access targeted information from our database, including literature, training, eLearning content, Knowledge Base articles, content from the HTFS Research Network, and videos.

Aspen Knowledge In-Context provides the following benefits:

- Aids you in solving complex asset optimization challenges in an easy-to-use interface.
- Facilitates improved search and discovery and successful knowledge delivery.
- Makes it easier for you to locate the necessary information to troubleshoot convergence or modeling errors.
- Provides best practices guidance and model building assistance.
- Provides convenient access to eLearning content.

- Allows you to share feedback with AspenTech to facilitate improved content delivery.

The  icon is used to indicate that Aspen Knowledge In-Context recommendations are available for the current Aspen Plus form. Aspen Knowledge In-Context recommendations are available for forms with context-sensitive help within Aspen HYSYS and Aspen Plus.

Plant Data

Plant Data now includes seamless transition with Aspen OnLine, including an option to publish a model originally developed in Plant Data to Aspen OnLine. If you open the model file from Aspen OnLine's Offline or Online folder, you can make changes within Plant Data which are stored in the Aspen OnLine project. You can also edit features, such as scheduling, which are only relevant when the project is open in Aspen OnLine. You can perform Offline-to-Online within Plant Data and, if there are no model changes, use the variable list in Aspen OnLine without having to regenerate it.

Data Conditioning includes new features for identifying data to exclude from runs. You can mark slices manually as bad or mark a pattern as bad and let AI methods mark all similar slices as bad. Outlier detection helps identify data sets as outliers that you want to exclude. And smart sampling lets you pick a representative sample of the data to run if you have too many cases to run all of them.

Pre-Averaged Data Mode allows you to work more simply with data that has already been averaged. This mode works only with a single data import from Excel or a historian of a set of data points which are equally spaced in time. For more information, see Pre-Averaged Data Mode in the Aspen Plus help.

Many grids in Plant Data now have filtering options similar to those in other Aspen Plus and Aspen HYSYS forms. You can filter the items displayed in the grid by the contents of any column. Time ranges can be filtered to a specific interval. In some tables you can customize the columns displayed with the Table Layouts feature.

When you create model snapshots, the default names are now based on the run sequence names. This makes it easier to identify which snapshot comes from which run sequence.

General Usability Improvements

The plot configuration for parity plots (such as Estimated vs. Experimental) has been re-ordered. Now you pick the variable first, and then the data groups to plot from a list which only includes data groups containing that variable. This lets you generate parity plots with multiple data groups, using a different symbol for each group.

Plots you create in BatchSep can now be saved under the **Plots** folder of the BatchSep block and restored from this form and edited in ways already available for batch flowsheet plots. This only applies to new plots created in version V12; plots created in earlier versions cannot be saved in this way.

In custom reaction kinetics, many new variables are available, mainly specialized ones which require specific types of reactor, stream, or phase, such as number average and volume average particle diameter (based on particle size distribution) and the time (in batch reactors). Property sets are also available. These variables support the specification of rates for heterogeneous catalyst reactions, reactions involving electrolytes, mass-transfer-limited reactions, decay equations, calculations of ratios like flow/holdup which may allow scaling rules, and reactions involving polymer and non-conventional components.

In BatchOp, when you calculate pressure and specify the volume, you can now specify the pot geometry rather than specifying the volume directly. The options include horizontal and vertical vessels and various head types as in BatchSep.

More blocks now have animated flowsheet diagrams. These include:

- **BatchOp**, on the **Setup | Specifications** sheet

You can pause the run during the integration step of a BatchSep block using a Pause button on that BatchSep block's animated diagram. During the pause, you can examine results (including the Time Profiles of the BatchSep block) but you cannot edit input or interact with most other controls. You can stop the entire flowsheet run from the ribbon or resume the run from the BatchSep animated diagram.

When you export binary data sets from TDE to Data Set forms, Aspen Plus now writes a description into the Data Set describing the components and range of data, similar to what was already done for pure component data sets.

The **Regression | Input | Setup** sheet now has a **Run** button that lets you run just that regression. The **Regression | Results | Parameters** sheet now has an **Update Parameters** button that lets you copy results from regressions to parameter input forms if you have not selected the option to automatically copy them. The **Setup** sheet also has an option to run an analysis using the regression results immediately after finishing the regression, and the plot wizard can plot these analysis results. This allows you to quickly detect inconsistencies between the model conditions and regression conditions which might lead to poor fits.

The Pitzer electrolyte ternary parameters GMPTPS, GMPTP1, GMPTP2, GMPTP3, and GMPTP4 have been converted into electrolyte pair parameters. This allows them to be stored in the Aspen Properties Enterprise Database. No such parameters are in the delivered database, but if you make a custom database with a PITZER databank containing these parameters, the model can now use them without you defining them in every model. Instead of using the **Electrolyte Ternary** form to enter the parameters, you now enter them on the **Electrolyte Pair** form. When you load files with data for these parameters from past versions, they will automatically be converted to use the new format. These changes do not affect model results. For more information, including instructions for building a custom databank with Pitzer parameters entered into your simulations, see the help for the Pitzer model.

In the **Find Compounds** dialog box, you can now search for compounds by CAS number if you enter digits and a hyphen (to match at least one whole section of the number).

Engineering Improvements

Aspen Plus can now make use of hybrid equipment and sensor models created in Aspen AI Model Builder. These models are installed on your computer in the same way as exported ACM models and become available in the **Hybrid Models** and **Hybrid Sensors** tabs of the Model Palette.

Custom reaction kinetics in a General reaction set is now supported in equation-oriented (EO) modeling, in the reactors RCSTR and RPlug. All custom kinetics variables from V11 are supported, as are true component concentration and pH (when the block is in true approach), mass/molar/volume flowrate and volume holdup (for liquid and vapor phase only), active cross-sectional area for RPlug, and catalyst mass. No solid phase variables are supported. Reactors using unsupported custom variables will run in the perturbation layer.

Reaction kinetics are now reported in individual RCSTR, RPlug, RBatch, and BatchOp blocks. An option in the Block Options form of each block controls whether this report is generated. The reports include rates and the terms in the rate expression for power law, LHHW, and general reactions, and the variables and terms of custom reactions.

Crystallization reactions now include an option to model the kinetics of agglomeration of crystals. The crystal agglomeration model uses the same general form and size-dependent kernels as the mixed agglomeration model from the Granulator block but uses a time-dependent kernel specific to crystallization.

You can now connect Aspen Plus heat streams to energy ports of CAPE-OPEN unit operation models. The duty of an inlet heat stream is provided to the block as an input. The duty of an outlet heat stream is set by the block.

When you specify pad gas for the initial contents of an initially empty BatchOp block, you can now specify the initial temperature of the pad gas. This allows the pad gas option to be used when the vessel is initially empty. When there is some charge, but pad gas is added to a specified pressure, the pad gas has the same temperature as the initial charge, as in past versions.

In addition to the other types of fittings, you can now specify globe valves in Pipe.

A new packing correlation from Sulzer is included in V12. This includes new packing types, materials, and dimensions:

- NexRing #0.6, #0.7, #1, #1.2, #1.5, #2, #3 (new type and dimensions)
- AYPlus DC standard (new type and dimension)
- CYPlus standard (new type and dimension)
- MellapakPlus 202.Y 352.Y 602.Y (new dimensions only)
- Mellagrid 40AF (new dimensions only)
- Mellapak plastic 125X (new material and dimensions)
- MellapakPlus plastic 252.Y (new material and dimensions)

Other previously available Sulzer packings are also supported by the new correlation, except I-Ring, Kerapak, and Nutter ring #1.75. The old correlation will be used for those. When you open a file from earlier versions which contains a Sulzer packing supported by the new correlation, you will be prompted whether to upgrade to the new correlation.

Starting in V12 RadFrac can compute load streams in problems configured for two liquid phases (including free-water and dirty-water).

It's now possible to use version 7 of SPYRO from Technip, with both Kinetic Scheme KS9306 and 7, in Aspen Plus. If you were previously using version 6, some changes in the configuration file are necessary. For details, see Using SPYRO in the Aspen Plus help.

Physical Property Improvements

HCOMB is a new property-set property for the heat of combustion of nonconventional components.

You can now click **BIP Completeness** on the parameter input sheets for binary interaction T-dependent parameters to see a grid displaying the completeness of binary interaction parameters entered on that sheet. The components are listed in rows and columns, and for each pair of parameters, a white cell indicates there is no data, and a colored cell and a single-letter abbreviation indicates the source of data in use for that parameter. See the help on these sheets for the key identifying the source types.

In data regressions, a new plot of deviation of any property vs. temperature is now available.

In pure component analysis, a new equation-of-state alpha function test is available. This lets you confirm the parameters for your alpha function (for one of the Peng-Robinson or Redlich-Kwong-Soave variations which support alpha functions) are thermodynamically consistent over the temperature range of interest. For more information, see Pure Component Properties in the help.

Ternary data is now available from NIST TDE and can be added to **Data** forms in your project. Other updates from NIST include a new database version with updated data and 512 new compounds, and an updated version of REFPROP.

In Aspen Properties Database Manager, there is new a command which streamlines the process for switching from LocalDB to a SQL server on the local computer. See Configuring Windows to Not Use LocalDB in the Aspen Plus help for details. There is also now a **For cloud deployment** checkbox available when registering databases on a SQL server on the local computer which stores the database name as **localhost** rather than the computer name. This makes the local configuration suitable for use as a base image for a cloud deployment.

You can now export assays characterized in Aspen Assay Management to input (.inp) files which can be opened within Aspen Plus. The generated input files are compatible with Aspen Plus V10 and later versions. When you open the exported .inp file in Aspen Plus, the following information is specified within the Assay/Blend object manager in the Properties environment based on your specifications in Aspen Assay Management:

- Distillation yield curve data (on the **Basic Data** | **Dist Curve** sheet)
- Property curve data (on the **Property Curves** form)

The PURE38 databank is based on the 2019 public DIPPR release. The DIPPR compounds in the database are the same ones as in PURE37, but these additional heating fluids have been added:

Alias	Name
THERM59	Therminol 59
THERM62	Therminol 62
THERM72	Therminol 72
THERM75	Therminol 75
THERMD12	Therminol D-12
THERMLT	Therminol LT
THERMVLT	Therminol VLT
THERMVP3	Therminol VP-3
THERMXP	Therminol XP

In addition, the data for Therminol 55 (THERM55) and Therminol VP-1 (THERMVP1) has been updated based on the latest Eastman Chemical technical bulletins.

Safety Analysis Improvements

Improved Datasheets Workflow

The workflow for creating ABE datasheets in order to document PRD calculations has been improved and streamlined in Aspen Plus V12, including the following changes:

- The new Safety Datasheets ribbon tab makes necessary commands more easily accessible (such as connecting to a workspace or closing the connection).
- You can use the new Live Link option to automatically transfer all data for mapped objects to Aspen Basic. Changes in the simulation are automatically transferred to applicable datasheets. As a result, you no longer need to return to the Mapper view and click Refresh to transfer data.
- When the Live Link is option is selected, you can use the contextual Datasheet button to view or create datasheets related to the Safety form. When you click the Datasheet button, a drop-down appears, displaying relevant Safety datasheet templates based on the current form and Safety calculations. This list includes both existing datasheets and those available for creation. This option eliminates the need to perform mapping if you only need to document a single system or calculation.

Fire Disengagement Calculations

Optionally, you can enable prediction of two-phase relief flow for Wetted (API) fire scenarios using the Calculate Vapor/Liquid Disengagement drop-down list. Vapor/liquid disengagement is calculated using DIERS methods to predict whether a period of two-phase relief will occur. Aspen Plus predicts the initial liquid level at which two-phase flow begins and ends, as well as the required orifice area needed for adequate protection during the period where two-phase flow occurs.

Support for API 520 Part 1 10e (2020) for Sizing Calculations

The Safety Preferences Manager now allows you to select API 520 Part 1 10e (2020) as the API 520 Part 1 Edition for Sizing Calculations. The 10th edition includes updates to the liquid viscosity correction factor equation and steam superheat correction factor tables. As a result, selecting this option leads to differences in results for the Capacity-Certified Liquid, Non-Capacity-Certified Liquid, and Steam relieving methods.

Ability to Perform Line Sizing Calculations for Non-Sizing Cases

Previously, line sizing calculations were only performed for the scenario designated as the Sizing Case on the Scenarios tab.

In V12, the Current Scenario drop-down list on the Line Sizing tab allows you to select the desired scenario, and then click Run Line Sizing to perform line sizing calculations. The Run For All Scenarios button performs line sizing calculations for all specified scenarios.

Safety Analysis Enhancements

- Hydraulics Tee calculations are fully supported. The settings specified in the Tee Settings group on the Calculation Settings view are now applied correctly. Static Pressure, Total Pressure Balance, Miller Charts, Gardel, and Simple fitting loss methods are available. Additionally, the Fixed k value option allows you to use the V11 method, where Tees are implemented as a combination of a bleed and flow resistance.
- The maximum Number of Vessels for Unwetted (API) and Wetted (API) Fire scenarios was increased from 3 to 9.
- The Molecular Weight and Compressibility Factor Z values are now reported in the Relieving Properties group of the Fluid Properties tab.
- The new Relief Composition tab allows you to view the relief composition for relieving load calculations for the scenario. It contains a table that lists the fraction represented by each component from the selected component list.
- For the Semi-Dynamic Flash calculation method, when you select the Store per-step compositions for semi-dynamic fire calculations check box on the Scenarios tab of the Preferences Manager, a new tab on the Stepwise Flash Data dialog box displays the stream composition on a step-by-step basis. A column appears for each component in the stream. The row selected for relief is highlighted in the composition table.

Compatibility Notes for V12

This section describes the differences that you might encounter between Aspen Plus V12 and Aspen Plus V11. In most cases, previous Aspen Plus input files and backup files are completely compatible with Aspen Plus V12.

When you open a file from a previous version, Aspen Plus displays the **Upward Compatibility** dialog box. If you select **Maintain Upward Compatibility for Features Listed Below** then Aspen Plus ignores the new features in all the areas mentioned on the dialog box (which may include new pure component databanks, property methods, built-in parameters, ADA/PCS procedures, calculated molecular weights obtained from formulas, and checking of user-specified sequence, depending on the version of Aspen Plus used to create the file).

Costing results from Exchanger Design & Rating or Economic Evaluation may change from one version to the next due to updated cost data.

Data for components in the NIST database can change from one database version to another, as NIST acquires and analyzes more data for those components. In the other databanks, specific changes may occur as noted below. If you have other versions installed, you can register another version of NIST in Aspen Properties Database Manager and on the **Components | Specifications | Enterprise Database** sheet specify to use that version instead of NISTV120.

New features in other areas, as noted below, may still cause different results in the new version. Flowsheet convergence may follow a different path in some cases, and flowsheets which converge only with difficulty in one version are especially likely to converge differently or fail to converge. These changes may have greater impact in flowsheets with loose tolerances due to convergence paths being different. AspenTech makes every effort to avoid making changes that result in incompatibilities with previous versions. The changes discussed in this section were necessary to correct problems (such as wrong results), to implement new features, or to improve ease-of-use.

The most important areas where you might encounter differences between Aspen Plus V12 and earlier versions are:

Fortran Compiler

Aspen Plus V12 was compiled with the Intel Fortran compiler 2017 and Microsoft Visual Studio 2017 as a 64-bit program. User Fortran models compiled with different compilers or compiler versions may not work, or may run but not be able to write to the history file, report file, and control panel. Only user models compiled with 64-bit compilers will work.

Calling 64-Bit Fortran from Other Languages

A compatibility issue in moving to 64-bit Fortran was missed in the documentation for V11. While compiling your Fortran code as 64-bit with the Intel compiler generally is sufficient as long as you did not specify the bit-width of certain types of variables, when calling from other languages there are important changes. The key changes:

- Integer variables should be declared as 64-bit integers (VBA LongLong)
- The hidden string length arguments remain 32-bit integers but instead of placing them immediately after each CHARACTER variable in the argument list, they are now all added at the end of the argument list in the same order as the CHARACTER arguments.

For more information, see **Calling Summary File Toolkit Routines** in *Aspen Plus Summary File Toolkit.* Search the Knowledge Center for this document.

File Menu

The **File** menu has been reorganized. **Version Comparison** and **Edit Compound File** can now be found under the **Tools** sub-menu. **Recent Files** can be found under **Open**, which also features a new command there to open files from the Examples folder.

Plant Data

Two kinds of databases are used with Plant Data with names based on names you specify. Each database name is limited to 128 characters total.

- The distance database contains the project name, the data conditioning run name, and about 17 other characters.
- The variable list database name contains the model name without extension twice, and about 26 other characters.

Avoid using very long names for the model file, project, and data conditioning run names to avoid running into this limit.

Concentration Variables in EO RCSTR, RPlug, and Valve

In past versions, mole concentration variables in ACM-based models in EO (including the built-in RCSTR, RPlug, and Valve) were wrongly assigned the MOLE-DENSITY physical type, and mass concentration variables were wrongly assigned the DENSITY physical type. This also affects variables in custom reactions copying these types of variables in those blocks for use in calculating a custom term. Now these are correctly assigned the MOLE-CONC and MASS-CONC physical types. For many users this will not have any impact, since these types have equivalent units, and in all built-in units sets they have the same units. Additional units have been added so that both pairs of concentration and density units support the same units, so there will not be any issue importing these variables from previous versions of Aspen Plus. However, if you are using a custom unit set where these types do not have the same units, the units these variables appear in have changed in V12. If you are running the model in Aspen OnLine, the required physical type for mapping these variables has changed.

Columns

In Column Analysis, when you specify the overall section efficiency on the **Design Parameters** sheet, RadFrac now scales the reported section height by dividing by the efficiency. This better

reflects the intent of this efficiency (adding more real trays to meet the separation effectiveness of the specified number of theoretical trays) and is consistent with the treatment of pressure drop with respect to efficiency.

In rate-based RadFrac blocks, the way the HETP is calculated for binary systems has changed. You will see different HETP values on the **Efficiencies and HETP | Packing HETP** sheet for such systems and the help attached to that sheet explains the calculation.

The calculation of **% Downcomer backup (Aerated)** for trays with **Lattice** downcomers was incorrect in previous versions. The absolute **Downcomer backup (Aerated)** was correct but the percentage result will be different in V12.

A change made in version V9 was missed in earlier compatibility notes. The pressure drop correlation used with Sulzer-Nutter float valve trays, Koch-Glitsch Ballast trays, and Koch-Glitsch Flexitrays (other than the fixed valve type S) in Column Analysis was updated. Starting in V12, you can check the **Use legacy pressure drop correlation** box on the **Design Parameters** sheet to use the correlation used in V8.8 and in legacy sizing and rating forms.

Batch Flowsheet Results

By default, stream results forms in batch flowsheets and certain profiles in BatchOp now update only when the simulation is paused or stopped. This improves performance of batch flowsheet runs. Strip charts still update continuously. There is an option on the **Batch Options | Setup | Main** sheet which restores the behavior of version V11 where these forms update after every time step.

As a side-effect of this performance enhancement, all batch flowsheet models saved from earlier versions will lose profile results and time plots when opened in V12. You can run the simulation again to regenerate these results.

FluidBed

The default convergence method for holdup and pressure calculations was changed in this release from Brent (the original method used in FluidBed) to RootN1 (a method used widely throughout Aspen Plus). This method solves some problems Brent cannot, and may lead to different results than in past versions for some problems. Select Brent for these options on the **FluidBed | Input | Convergence** sheet to restore the behavior of previous versions.

Super-saturation Results

BatchOp and RCSTR were not using the same definition of super-saturation in the results as in the input. Where C is the concentration and Csat is the saturated concentration:

- On the **Results | Crystallization** sheet of both blocks, relative super-saturation was formerly reporting C/Csat and now correctly reports (C-Csat)/Csat (the fraction by which the concentration exceeds saturation).
- On the **Profiles | Crystallization** sheet of BatchOp, super-saturation was formerly reporting C/Csat and now correctly reports C-Csat (the amount in concentration units by which the concentration exceeds saturation).
- Super-saturation was added to the Results form, and relative super-saturation was added to the Profiles form, as defined above.

Stream Property Analysis

When analyzing stream properties for a stream that has both input and results calculated in the current session, as in the case of a tear stream you may have initialized, Aspen Plus now uses the stream results for the analysis. Previously, it always used the input if there was any input; this could have caused the analysis to overwrite the stream results, or fail with an error if the input did not include a composition.

Chemistry

When selecting the **Concentration basis for Keq** for reactions in Chemistry blocks, the options **Mole-frac** and **Molal** have been changed into **Mole gamma** and **Molal gamma**, respectively. This better reflects the meaning of these options and establishes consistency with the similar option for equilibrium reactions in Reaction blocks, where **the Keq basis** field has been renamed to **Concentration basis for Keq** for consistency.

Calculation Options

The default for the phase equilibrium check on the **Setup | Calculation Options | Check Results** sheet is now to issue a warning, the default tolerance is 0.1, and the default minimum mole fraction is now 1.0E-10. These settings help Aspen Plus better detect situations in which the flash calculation produces an invalid result. You may observe warnings related to this check generated in cases which did not generate warnings in previous versions (usually in cases where a result did not make physical sense).

When a liquid phase is missing during EO synchronization of a three-phase stream, and that phase is not dropped, the SM liquid-liquid split algorithm from the **Setup | Calculation Options | Flash Convergence** sheet is now used to determine a pair of components most likely to result in a liquid-liquid phase split. If the new algorithm is selected, and this results in initialization problems that lead to EO convergence problems, try selecting the original algorithm.

Polymer Reactions

In free-radical reactions, the calculation of terminal double bonds represented by TDBFLOW had twice the contribution it should have had from termination by disproportionation reactions. Other attributes such as MWW, MWN, LCB, and FLCB which are calculated in part based on TDBFLOW were also affected. These results are corrected in V12 and differ from previous versions by an amount depending on the prevalence of termination by disproportionation within your reaction system.

In V9, the molecular weight distribution plots from blocks with polymer reactions were changed so that the weight fractions for each site were normalized against the total polymer at that site. In V8.8 and earlier, these plots showed weight fractions normalized against the total polymer at all sites, resulting in a set of site curves that sum to the cumulative molecular weight distribution. The former presentation was more informative, as it shows the relative contribution of each site, and so we have reverted to the plots from V8.8. Only the plots from unit operation models were affected; the values of molecular weight distributions and other attributes in streams were not affected by either change.

Physical Properties

In past versions, the results for ideal gas heat capacity (CPIG) calculated with DIPPR equation 107 might become very wrong at very low temperatures due to a bug in the handling of a numerical overflow condition. The actual temperature at which the bug occurs depends on the values for elements 3 and 5 of CPIGDP and is only likely even at cryogenic temperatures when one of these elements is unusually large. The values are correct at higher temperatures. The problem has been fixed and values for ideal gas heat capacity (and properties using it) may change in V12 only in cases where you were getting the wrong results in the past.

Errors in the way symmetric and unsymmetric electrolyte NRTL methods (ENRTL-RK and ENRTL-SR) calculate mixture entropy and Gibbs free energy (GMX, SMX) using the apparent component approach caused these properties to not always agree with the results using the true component approach. In cases in which this was true, the results for those properties using the apparent component approach will be different in V12, but they will now agree in true and apparent approaches.

When NIST TDE performs consistency tests, it applies only the EOS and endpoint tests to high-pressure data sets (P > 500 kPa) because the other tests may not be accurate in such conditions.

This change was introduced in the TDE delivered with V11 but first reported in compatibility notes with V12.

In past versions, the D2887 property sets D2887T, D2887WT, and D2887CRV were calculated using liquid volume percent, even though the actual ASTM distillation curve D2887 is weight basis and the help claimed they were on weight basis. Starting in V12 they actually are calculated on weight basis and D2887TLV, D2887LV, and D2887CVV have been added to calculate the properties on liquid volume percent.

When you regress property parameters in V12, by default an analysis is run after the regression to check the results against the experimental data. This check helps you detect cases where the regressed parameters perform poorly, which is generally because some specification for the regression differs from the configuration of your main model. The default plot for the regression plots the result of this analysis, rather than the results calculated within the regression itself as in past versions. These extra calculations cause the regression to take longer, but usually the extra time is negligible. In rare cases the analysis may lead to property errors.

In the new version of NIST-TRC in the NISTV120 database, one compound was removed. That compound was H2-N5 which was a duplicate of H2-PARA. If you were using it, please switch to H2-PARA.

The parameters for H2O-CO2 and H2O-H2S for the CPA model were updated based on a new regression. Results will change but should better predict the water content of natural gas streams with high acid gas content.

The parameters UFGRP and UFGRPD, which contain the UNIFAC constituent groups of molecules for standard UNIFAC and Dortmund-Modified UNIFAC, respectively, were incorrect in PURE36 and PURE37 released with Aspen Plus V10 and V11 for certain components. In V12 these errors have been fixed in those databanks and in PURE38. For some components, the group numbers were incorrect but represented valid groups, or the quantities of a group were incorrect, and you would have gotten incorrect results in any calculations using them. In other cases, invalid group numbers appeared in the databanks and you would have gotten errors attempting to use them. The affected compounds are:

Alias	Name	CAS Number
CH3BR	METHYL-BROMIDE	74-83-9
C3H6S	TRIMETHYLENE-SULFIDE	287-27-4
C4H10O-D1	METHYL-ISOPROPYL-ETHER	598-53-8
C4H10O2-N2	ISOBUTENE-GLYCOL	558-43-0
C6H10S	DIALLYL-SULFIDE	592-88-1
C6H12-4	CIS-2-HEXENE	7688-21-3
C6H13N-D3	N-ETHYL-2-METHYLALLYLAMINE	18328-90-0
C6H16O3SSI	3-TRIMETHOXYSILYL-1-PROPANETHIOL	4420-74-0
C7H5N3O6	2,4,6-TRINITROTOLUENE	118-96-7
C7H10S-D1	2,3,5-TRIMETHYLTHIOPHENE	1795-05-7
C7H16O-E2	ETHYL-TERT-PENTYL-ETHER	919-94-8
C8H8S	THIAINDAN	4565-32-6
C9H10S	2-METHYL-THIAINDAN	6165-55-5
C9H15N	TRIALLYLAMINE	102-70-5
C9H22O3SSI	3-MERCAPTOPROPYL-TRIETHOXYSILANE	14814-09-6
C10H20-D3	1,1-DIETHYLCYCLOHEXANE	78-01-3

Databanks PURE20, PURE22, and PURE24 are no longer delivered. These are superseded by later versions of PURE which include more recent data from DIPPR and other sources.

- Each of these databanks is from a version of Aspen Plus more than ten years old. They were intended only for users who require complete compatibility with results from previous versions. Because most users have now updated their simulations to newer database versions, these old versions are being dropped to reduce the size of the database delivered with each installation.
- It is possible to use the Aspen Properties Enterprise Database to preserve copies of these databanks if you still need to use them. A copy of the enterprise database from an earlier version (V7.3 through V11) which still contains these databanks is required; this can be downloaded from AspenTech Support. See Maintaining Access to Retired Databanks in the Aspen Plus help for details.
- When you open files which reference these databanks, the **Upward Compatibility** dialog box will appear. An option at the bottom of the dialog box lets you choose to either **Upgrade retired databanks** or **Keep retired databanks**. Choosing upgrade replaces PURE20, PURE22, and PURE24 with PURE38. The keep option requires a database containing the retired databanks.

In previous versions, the **Polymer Attributes** sheet for reactors using Step-Growth reactions reported incorrect values for DPW, MWW, and PDI attributes. The Step-Growth Model cannot calculate higher moments and as a result cannot calculate these attributes. In V12 the results for them will be blank.

Safety Analysis

Improved Line Sizing Results

In V12, a number of changes were made to line sizing in the **Safety Analysis** environment:

- In V11, the reference conditions used for pressure drop calculations incorrectly discarded energy. In Aspen Plus V12, the correct reference conditions are used for pressure drop calculations.
- In the Safety Analysis environment, when performing rigorous Aspen Hydraulics line sizing in V11, for the inlet pressure drop, swage calculation settings were applied to inlet pressure drop calculations and the full pressure drop (including recoverable losses) was incorrectly included in results.

In Aspen Plus V12:

- For the inlet pressure drop, inlet pressure drop calculations use the Crane – Homogeneous fitting loss method and exclude acceleration pressure drop.
- The performance of the outlet pressure drop was improved, and the calculated pressure drop results are more accurate.
- In the Safety Analysis environment, when performing rigorous Aspen Hydraulics line sizing in V11, the tolerances for an Aspen Plus PH or PS flash were not tight enough to obtain accurate derivative-based properties over small variations in pressure for single-component systems. This reduced the accuracy of the sonic velocity calculations and line choke pressure. In Aspen Plus V12, flash tolerances were tightened for these flashes in the Safety Analysis environment (including for Hydraulics-based line sizing).
- In Aspen Plus V11, the **Inlet Pressure Drop [%]** column on the **Scenarios** tab reported the inlet pressure drop as a percentage of the maximum allowable pressure, and the **Outlet Pressure Drop [%]** column reported the outlet pressure drop as a percentage of the maximum allowable pressure. In V12, both these values are reported as percentages of the set pressure.
- In V11, an excessively low critical velocity could be reported for Hydraulics line sizing on a system with all liquid relief. This was resolved in V12.

As a result of these improvements, you will notice differences in line sizing results in Aspen Plus V12.

Updates to Storage Tank Calculations

- In previous versions, for Storage Tank vent calculations under API 2000 6e or API 2000 7e, evaporation rate was doubled if Volatile Liquid selection was Yes. This was corrected in V12.
- In previous versions, wetted area calculations for tank emergency relief for horizontal tanks were not consistent with the wetted area calculations for horizontal vessels. The tank calculations were changed to agree with the vessel calculations in V12.

Updates to Fire Scenario Calculations

- In previous versions, there was an issue with required orifice area calculation in the flash table for Supercritical Fire scenarios, which could also lead to selecting the wrong relieving condition in certain scenarios. Note that only the required area within the flash table was incorrect; the required area on the scenario was calculated correctly. This issue was corrected in V12.
- Previous versions did not correctly calculate the wetted area for vertical vessels with ellipsoidal heads at low liquid levels. This issue was corrected in V12.

Retired Features

Importing DXF files into the Icon Editor has not worked since the support for exporting DXF files was removed in version V7.3.2, but a nonfunctional **Import DXF** command remained. That command has now been removed.

The Aspen Process Manual button on some forms has been discontinued. To access the content it provided, visit the Knowledge Center or click the In-Context Guidance button.

Aspen OTS Framework is no longer available in V12. We recommend that you use Aspen Operator Training to accomplish the same tasks instead. Aspen Operator Training supersedes and improves upon the functionalities available in Aspen OTS Framework, as well as offering additional features. For further information about Aspen Operator Training, refer to the Aspen Operator Training Help.

In V12, aspenONE Exchange has been replaced with Aspen Knowledge. Aspen Knowledge is a web-hosted collection of resources such as help documentation, technical articles, models, literature, and on-demand training that you can view. It includes all the materials available in aspenONE Exchange, as well as additional features (such as Aspen Knowledge In-Context). For further information, see the Aspen Knowledge Overview topic in Aspen Plus help.

The OLI Interface

Product Description

Aspen OLI™ Interface is a layered product that lets you make full use of the OLI Engine, Chemistry Wizard, and Chemistry Generator products from OLI Systems Inc. within the Aspen Engineering Suite environment. The Aspen OLI Interface enables process engineers to quickly and reliably perform process modeling and analysis of aqueous electrolyte systems. Together with Aspen Plus®-based solids and electrolytes modeling technology, Aspen OLI Interface provides the chemical process industries with comprehensive capability to model aqueous electrolyte systems over the complete concentration range, including most of the elements in the periodic table. The OLI property method provides accurate results for the thermodynamic and transport properties of aqueous mixtures and associated immiscible organic mixtures. Aspen OLI Interface refers to the interface that enables you to use OLI products and capabilities within the Aspen Engineering Suite environment. This manual provides instructions on how to use the combined features of the Aspen OLI Interface and the software you license separately from OLI Systems Inc. These combined products are referred to as Aspen OLI.

New Features and Enhancements in V12

There are no New Features or Enhancements listed for this release.

Compatibility Notes for V12

There are no compatibility notes listed for this release.

Aspen Properties

Product Description

Aspen Properties® is AspenTech's physical property calculation and analysis tool. You can use Aspen Properties to prepare a complete property package to represent an industrial process for use with Aspen Plus, Aspen Plus Dynamics (Aspen Dynamics), Aspen Custom Modeler, and Aspen HYSYS Petroleum Refining (RefSYS), and Aspen Exchanger Design and Rating (HTFS+). Aspen Batch Process Developer (Batch Plus) also uses Aspen Properties to model non-ideal solutions for vapor emissions calculations. You can use Aspen Properties to estimate a wide range of properties from molecular structure, regress parameters from laboratory data, and analyze the behavior of chemical and petroleum systems.

New Features and Enhancements in V12

Aspen Properties V12 includes new features and enhancements in the following areas:

General Usability Improvements

When you export binary data sets from TDE to Data Set forms, Aspen Properties now writes a description into the Data Set describing the components and range of data, similar to what was already done for pure component data sets.

The **Regression | Input | Setup** sheet now has a **Run** button that lets you run just that regression. The **Regression | Results | Parameters** sheet now has an **Update Parameters** button that lets you copy results from regressions to parameter input forms if you have not selected the option to automatically copy them. The **Setup** sheet also has an option to run an analysis using the regression results immediately after finishing the regression, and the plot wizard can plot these analysis results. This allows you to quickly detect inconsistencies between the model conditions and regression conditions which might lead to poor fits.

The Pitzer electrolyte ternary parameters GMPTPS, GMPTP1, GMPTP2, GMPTP3, and GMPTP4 have been converted into electrolyte pair parameters. This allows them to be stored in the Aspen Properties Enterprise Database. No such parameters are in the delivered database, but if you make a custom database with a PITZER databank containing these parameters, the model can now use them without you defining them in every model. Instead of using the **Electrolyte Ternary** form to enter the parameters, you now enter them on the **Electrolyte Pair** form. When you load files with data for these parameters from past versions, they will automatically be converted to use the new format. These changes do not affect model results. For more information, including instructions for building a custom databank with Pitzer parameters entered into your simulations, see the help for the Pitzer model.

In the **Find Compounds** dialog box, you can now search for compounds by CAS number if you enter digits and a hyphen (to match at least one whole section of the number).

You can now click **BIP Completeness** on the parameter input sheets for binary interaction T-dependent parameters to see a grid displaying the completeness of binary interaction parameters entered on that sheet. The components are listed in rows and columns, and for each pair of

parameters, a white cell indicates there is no data, and a colored cell and a single-letter abbreviation indicates the source of data in use for that parameter. See the help on these sheets for the key identifying the source types.

Property Sets

HCOMB is a new property-set property for the heat of combustion of nonconventional components.

Plotting

The plot configuration for parity plots (such as Estimated vs. Experimental) has been re-ordered. Now you pick the variable first, and then the data groups to plot from a list which only includes data groups containing that variable. This lets you generate parity plots with multiple data groups, using a different symbol for each group.

In data regressions, a new plot of deviation of any property vs. temperature is now available.

In pure component analysis, a new equation-of-state alpha function test is available. This lets you confirm the parameters for your alpha function (for one of the Peng-Robinson or Redlich-Kwong-Soave variations which support alpha functions) are thermodynamically consistent over the temperature range of interest. For more information, see Pure Component Properties in the help.

Excel Calculator

Now you can open a non-Aspen Properties Excel workbook while you have an Aspen Properties workbook open without disrupting the function of the Aspen Properties workbook. However, you are still limited to using only one Aspen Properties workbook at a time. If you try to open a second Aspen Properties workbook, it will prevent you from doing so and ask you to close the Aspen Properties workbook first.

NIST Data

Ternary data is now available from NIST TDE and can be added to **Data** forms in your project. Other updates from NIST include a new database version with updated data and 512 new compounds, and an updated version of REFPROP.

Aspen Properties Database Manager

There is new a command which streamlines the process for switching from LocalDB to a SQL server on the local computer. See Configuring Windows to Not Use LocalDB in the Aspen Properties help for details. There is also now a **For cloud deployment** checkbox available when registering databases on a SQL server on the local computer which stores the database name as **localhost** rather than the computer name. This makes the local configuration suitable for use as a base image for a cloud deployment.

Aspen Assay Management

You can now export assays characterized in Aspen Assay Management to input (.inp) files which can be opened within Aspen Properties. The generated input files are compatible with Aspen Properties V10 and later versions. When you open the exported .inp file in Aspen Properties, the following information is specified within the Assay/Blend object manager based on your specifications in Aspen Assay Management:

- Distillation yield curve data (on the **Basic Data** | **Dist Curve** sheet)
- Property curve data (on the **Property Curves** form)

Databanks

The PURE38 databank is based on the 2019 public DIPPR release. The DIPPR compounds in the database are the same ones as in PURE37, but these additional heating fluids have been added:

Alias	Name
THERM59	Therminol 59
THERM62	Therminol 62
THERM72	Therminol 72
THERM75	Therminol 75
THERMD12	Therminol D-12
THERMLT	Therminol LT
THERMVLT	Therminol VLT
THERMVP3	Therminol VP-3
THERMXP	Therminol XP

In addition, the data for Therminol 55 (THERM55) and Therminol VP-1 (THERMVP1) has been updated based on the latest Eastman Chemical technical bulletins.

Compatibility Notes for V12

This section describes the differences that you might encounter between Aspen Properties V12 and Aspen Properties V11. In most cases, previous Aspen Properties input files and backup files are completely compatible with Aspen Properties V12. AspenTech makes every effort to avoid making changes that result in incompatibilities with previous versions. The changes discussed in this section were necessary to correct problems, to implement new features, or to improve ease-of-use.

Data for components in the NIST database can change from one database version to another, as NIST acquires and analyzes more data for those components. In the other databanks, specific changes may occur as noted below. If you have other versions installed, you can register another version of NIST in Aspen Properties Database Manager and on the **Components | Specifications | Enterprise Database** sheet specify to use that version instead of NISTV120.

Fortran Compiler

Aspen Properties V12 was compiled with the Intel Fortran compiler 2017 and Microsoft Visual Studio 2017 as a 64-bit program. User Fortran models compiled with different compilers or compiler versions may not work, or may run but not be able to write to the history file, report file, and control panel. Only user models compiled with 64-bit compilers will work.

DIPPR Ideal Gas Heat Capacity

In past versions, the results for ideal gas heat capacity (CPIG) calculated with DIPPR equation 107 might become very wrong at very low temperatures due to a bug in the handling of a numerical overflow condition. The actual temperature at which the bug occurs depends on the values for elements 3 and 5 of CPIGDP and is only likely even at cryogenic temperatures when one of these elements is unusually large. The values are correct at higher temperatures. The problem has been fixed and values for ideal gas heat capacity (and properties using it) may change in V12 only in cases where you were getting the wrong results in the past.

Mixture Entropy and Gibbs Free Energy

Errors in the way symmetric and unsymmetric electrolyte NRTL methods (ENRTL-RK and ENRTL-SR) calculate mixture entropy and Gibbs free energy (GMX, SMX) using the apparent component approach caused these properties to not always agree with the results using the true component approach. In cases in which this was true, the results for those properties using the apparent component approach will be different in V12, but they will now agree in true and apparent approaches.

NIST TDE Consistency Tests

When NIST TDE performs consistency tests, it applies only the EOS and endpoint tests to high-pressure data sets (P > 500 kPa) because the other tests may not be accurate in such conditions. This change was introduced in the TDE delivered with V11 but first reported in compatibility notes with V12.

Property Sets

In past versions, the D2887 property sets D2887T, D2887WT, and D2887CRV were calculated using liquid volume percent, even though the actual ASTM distillation curve D2887 is weight basis and the help claimed they were on weight basis. Starting in V12 they actually are calculated on weight basis and D2887TLV, D2887LV, and D2887CVV have been added to calculate the properties on liquid volume percent.

Regression

When you regress property parameters in V12, by default an analysis is run after the regression to check the results against the experimental data. This check helps you detect cases where the regressed parameters perform poorly, which is generally because some specification for the regression differs from the configuration of your main model. The default plot for the regression plots the result of this analysis, rather than the results calculated within the regression itself as in past versions. These extra calculations cause the regression to take longer, but usually the extra time is negligible. In rare cases the analysis may lead to property errors.

Chemistry

When selecting the **Concentration basis for Keq** for reactions in Chemistry blocks, the options **Mole-frac** and **Molal** have been changed into **Mole gamma** and **Molal gamma**, respectively. This better reflects the meaning of these options and establishes consistency with the similar option for equilibrium reactions in Reaction blocks in Aspen Plus.

Databanks

In the new version of NIST-TRC in the NISTV120 database, one compound was removed. That compound was H2-N5 which was a duplicate of H2-PARA. If you were using it, please switch to H2-PARA.

The parameters for H2O-CO2 and H2O-H2S for the CPA model were updated based on a new regression. Results will change but should better predict the water content of natural gas streams with high acid gas content.

The parameters UFGRP and UFGRPD, which contain the UNIFAC constituent groups of molecules for standard UNIFAC and Dortmund-Modified UNIFAC, respectively, were incorrect in PURE36 and PURE37 released with Aspen Properties V10 and V11 for certain components. In V12 these errors have been fixed in those databanks and in PURE38. For some components, the group numbers were incorrect but represented valid groups, or the quantities of a group were incorrect, and you would have gotten incorrect results in any calculations using them. In other cases, invalid group numbers appeared in the databanks and you would have gotten errors attempting to use them. The affected compounds are:

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C6H16O3SSI	3-TRIMETHOXYSILYL-1-PROPANETHIOL	4420-74-0
C7H5N3O6	2,4,6-TRINITROTOLUENE	118-96-7
C7H10S-D1	2,3,5-TRIMETHYLTHIOPHENE	1795-05-7
C7H16O-E2	ETHYL-TERT-PENTYL-ETHER	919-94-8
C8H8S	THIAINDAN	4565-32-6
C9H10S	2-METHYL-THIAINDAN	6165-55-5
C9H15N	TRIALLYLAMINE	102-70-5
C9H22O3SSI	3-MERCAPTOPROPYL-TRIETHOXYSILANE	14814-09-6
C10H20-D3	1,1-DIETHYLCYCLOHEXANE	78-01-3

Retired Features

Databanks PURE20, PURE22, and PURE24 are no longer delivered. These are superseded by later versions of PURE which include more recent data from DIPPR and other sources.

- Each of these databanks is from a version of Aspen Plus more than ten years old. They were intended only for users who require complete compatibility with results from previous versions. Because most users have now updated their simulations to newer database versions, these old versions are being dropped to reduce the size of the database delivered with each installation.
- It is possible to use the Aspen Properties Enterprise Database to preserve copies of these databanks if you still need to use them. A copy of the enterprise database from an earlier version (V7.3 through V11) which still contains these databanks is required; this can be downloaded from AspenTech Support. See Maintaining Access to Retired Databanks in the Aspen Properties help for details.

When you open files which reference these databanks, the **Upward Compatibility** dialog box will appear. An option at the bottom of the dialog box lets you choose to either **Upgrade retired databanks** or **Keep retired databanks**. Choosing upgrade replaces PURE20, PURE22, and PURE24 with PURE38. The keep option requires a database containing the retired databanks.

Aspen Custom Modeler

Product Description

Aspen Custom Modeler enables you to quickly create custom models to incorporate your company's unique expertise and knowledge, enabling you to fully leverage the benefits of process simulation throughout your company.

Aspen Custom Modeler is designed to enable the quick and easy development and deployment of custom process models. Aspen Custom Modeler models can be used within AspenTech's other

simulation tools, such as Aspen Plus, Aspen HYSYS, Aspen PIMS, and Aspen Plus Dynamics, making innovation fully available and part of standard process design and operations studies. This enables you to fully leverage your existing models and helps to ensure consistency of simulation results.

New Features and Enhancements in V12

You can now copy and paste changes from the **Specification Status** window into a **Flowsheet Constraints** window in the format for the constraints section.

Compatibility Notes for V12

ACM V12 is a 64-bit product. It may not work with the 32-bit products from V10 and earlier. Also, you cannot export a model from ACM V12 for use with PIMS V12, which is a 32-bit product. Export the model from ACM V10 to use it with PIMS V12. For models that need to be compiled, only Visual Studio 2017 and Intel Fortran 2017 Professional Edition or higher, 64-bit are supported.

Supported Compilers

You need not have any compilers installed on your computer to use most of the features of Aspen Custom Modeler. However, some optional capabilities do require a compiler. Below is a summary of capabilities that require a compiler:

Activity	Supported Compilers
Creating Procedures in FORTRAN	Intel FORTRAN 2017 Professional Edition or higher, 64-bit. The compiler must be configured so that it can be used from the command line,
Creating Procedures in C++ or exporting standalone reaction models for use in Aspen Plus	Microsoft Studio 2017 Professional edition or higher, 64-bit. Exporting unit operations to Aspen Plus or HYSYS no longer requires a compiler.
Creating custom forms	Microsoft Visual Basic 2017 Professional edition or higher, 64-bit.

What's Fixed in V12

There are no fixed issues listed for this release.

Aspen Model Runner

Product Description

Aspen Model Runner enables you to distribute completed simulation models within your company and to your customers and collaborators. Aspen Model Runner provides control over changes to the model and protects the intellectual property within the model.

To use it, export your simulation from Aspen Custom Modeler as an Aspen Model Runner simulation. The contents of the simulation file are encrypted to prevent viewing or editing of the contents.

You then distribute the Aspen Model Runner file to the end user. The end user needs to install and license Aspen Model Runner. They can then open and run the simulation. Within Aspen Model Runner, they can use all of the Aspen Custom Modeler features relevant to running a simulation, but they cannot edit the simulation or view the content of the models.

Aspen Model Runner also supports Aspen Plus Dynamics (Aspen Dynamics) simulations. It is also supported by Aspen Simulation Workbook, which can be used to develop a customized user interface for your simulation.

New Features and Enhancements in V12

There are no new features or enhancements for this release.

Compatibility Notes for V12

There are no compatibility notes for this release.

Aspen Plus Dynamics

Product Description

Aspen Plus Dynamics complements the steady-state simulation capabilities of Aspen Plus, and delivers the benefits of dynamic modeling to the Petrochemicals, Chemicals, and Specialty Chemicals industries throughout plant operation and engineering organizations. You can use it to study and understand the dynamics of real plant operations, thereby achieving increased operability, safety, and productivity.

Aspen Plus Dynamics is closely integrated with other AspenTech products. With Aspen Plus Dynamics you can transform an Aspen Plus steady-state simulation into a rigorous dynamic simulation within a few minutes. You can also use Aspen Custom Modeler to customize the Aspen Plus Dynamics models.

New Features and Enhancements in V12

There are no New Features or Enhancements listed for this release.

Compatibility Notes for V12

There are no Compatibility Notes listed for this release.

What's Fixed in V12

There are no fixed issues listed for this release.

Aspen Adsorption

Product Description

Aspen Adsorption is a comprehensive flowsheet simulator developed for the design, simulation, optimization, and analysis of adsorption processes.

It enables you to:

- Simulate a wide and varied range of industrial gas adsorption processes.
- Develop and identify optimal adsorbents, design better adsorption cycles and improve plant operations.

New Features and Enhancements in V12

You can now specify the duty directly for the internal heat exchanger of the gas bed, either as a constant value per node or as a linear profile, specifying the duty of the first and last nodes.

Compatibility Notes for V12

There are no Compatibility Notes listed for this release.

Aspen Chromatography

Product Description

Aspen Chromatography is a comprehensive flowsheet simulator used for design and simulation of batch and continuous chromatographic processes.

It addresses the needs of both engineers and scientists to model and understand the separation and purification processes normally found in the pharmaceutical, biotechnology, fine chemical and food product businesses. Through the application of Aspen Chromatography, significant benefits in design, yield, product quality, capacity and reduced operating costs are possible.

New Features and Enhancements in V12

There are no new features or enhancements for this release.

Compatibility Notes for V12

There are no Compatibility Notes for this release.

Aspen Utilities Planner

Product Description

Aspen Utilities Planner is a tool for optimizing fuel, steam, and power processes. These utility processes often represent significant operating costs, sometimes second only to the purchase of raw materials.

In Aspen Utilities Planner, a single rigorous model of the utilities system is used to address all the important business processes associated with the purchase, generation, use, and distribution of utilities on industrial sites. This approach ensures that all decisions are made on the same basis and are therefore mutually consistent and compatible.

New Features and Enhancements in V12

Model Library Updates

The model library has been updated. In addition to adding more explanation and specifications to some existing models, Aspen Utilities Planner now provides several new models to enable utilities optimization in a wider scope beyond steam and power system. The new models include heaters, compressors, heat exchangers, valves and separators.

The following new models have been added:

- SF_HeatEx
- FF_HeatEx
- AF_HeatEx
- Fuel_Heater
- Fuel_Valve
- Air_Valve
- Compressor
- Fuel_Flash
- AirHeader

The following models have been updated:

- FeedAir
- FeedFuel
- Boiler
- DF_Boiler
- HRSG
- AS_HeatEx
- General Model

Refer to the "Model Library" section in the online help for more details.

Generate Online Projects

The **Online Model Setup** and **Online Model Deployment** groups of the **Aspen Utilities** ribbon in Excel allow you to collect and validate plant data, test and verify data reconciliation and model optimization in Excel environment with an offline Aspen Utilities Planner model. The Aspen Utilities ribbon can be activated by installing the Aspen Utilities Excel Add-In.

Some prerequisites should be met before using this functionality:

- Aspen Utilities flowsheet simulation model is completed and converged.
- Contract and optimization profiles are created via Editors.
- Offline optimization can run successfully.
- Related flowsheet variables and equations are defined in AUP. Online related scripts, such as PreRecon, PostRecon, PreOpt and PostOpt, are defined within Flowsheet level.
- All required plant tags and test data are collected in Excel format. AspenTech recommends you have at least four different data sets to test both reconciliation and optimization model under different operating scenarios. These scenarios should cover the operation in which major equipment, such as boilers, gas turbines, HRSG, etc., are either in service or shutdown.

The workflow to perform the online model setup and the online model deployment is as follows:

1 Create a Tag Data Dictionary worksheet.

2 Import the tag dictionary to create the All Tags and Variables worksheet.

3 Load data plant.

4 Automatically setup reconciliation model and online optimization model.

5 Test reconciliation and optimization workflow in the Excel environment.

6 Generate Variables and Tags files to be imported in an Aspen OnLine project.

Refer to the "Generating Online Projects" section in the online help for more details.

Compatibility Notes for V12

Better Stream Characterization

Apply rigorous characterization for fuel streams and air streams.

Fuel Streams

- Molar or Mass composition can be specified for gaseous fuel.
- More properties are estimated when doing elemental analysis for solid and liquid fuel. The following properties are now calculated:
  - High heating value
  - Low heating value
  - O2 stoichiometric demand
  - Hydrogen index
  - Carbon index
  - Sulfur index
- Temperature and Pressure are part of fuel stream specification, so the enthalpy can be rigorously calculated.

Air Streams

- N2 and Cl2 are also considered in mass composition. Now the mass composition contains:
  - N2
  - O2
  - CO2
  - SOX
  - NOX
  - Cl2
- Pressure is a part of the stream specifications. Enthalpy can be estimated when temperature, pressure and composition are properly specified.
- The global parameter, **ConstantCpAir**, is used to keep the upper compatibility of models.

More Accurate Flue Gas Temperature Estimation in Boiler, DF_Boiler and HRSG Models

During the Fossil Fuel combustion, the following reaction occurs:

$$2H+1/2O2 \rightarrow H2O\ (liquid) \rightarrow H2O(vapor)$$

Part of the energy input from fuel and air is used to evaporate generated water from liquid phase to vapor phase. Fuel hydrogen content must be estimated from the fuel compositions to calculate the amount of water generated and the total latent heat required. And therefore predict the boiler flue gas temperature accurately. In V12, the fuel hydrogen content is taken into consideration to estimate the flue gas temperature because of the accurate fuel composition specification for variety of fuel types. This improvement also leads to a more accurate boiler efficiency calculation for a given flue gas temperature, oxygen content in the stack and fuel compositions according to ASME PTC 4.1 guidance.

What's Fixed

ID	Issue Description	Issue Resolution
20533	Cannot handle manual shutdown of the equipment properly in Aspen Utilities Planner.	This issue has been fixed in V12.
21794	Gas Turbine gives 0 value of air and fuel stream required when model ran with actual efficiency curves.	This issue has been fixed in V12.
160283	Display error message with exact value which is causing an issue.	This issue has been fixed in V12.
383314	Invitsa project - Air_Mix model gives incorrect Optimization Result in DF_Boiler.	This issue has been fixed in V12.
393500	Energy Cost Summary incorrect for Total Usage type Contracts and contracts with fixed costs > $0.	This issue has been fixed in V12.
393503	Energy Cost Summary incorrect for Total Usage type Contracts and contracts with fixed costs > $0.	This issue has been fixed in V12.
400552	PumpList PowerRequired (PR) Units of Measure not captured when added to Demand Profile database - causes Excel Interface to break.	This issue has been fixed in V12.
404531	Emergency Patch 04 November 14, 2018, Patch ID: 6666005703 causes incorrect results in Gas Turbine & HRSG blocks.	This issue has been fixed in V12.
415449	Online Cost Calculation Script fails if a contract is linked to a block inside a Hierarchy block.	This issue has been fixed in V12.
427389	URGENT: Error message pops up when adding availability profiles to editor in Aspen Utilities V9.	This issue has been fixed in V12.
442021	Defect in the error diagnostics function.	This issue has been fixed in V12.
448941	Removing non used variables from multistage turbine.	This issue has been fixed in V12.
465688	Allow model to point to the correct database.	This issue has been fixed in V12.
466900	Fuel energy flow is fixed by default which needs to be freed when using the efficiency lookup table.	This issue has been fixed in V12.
472507	Invista Project - how to enter Switching Costs of drives in PumpLists and DriveLists.	This issue has been fixed in V12.
483413	(AUP V9) Error occurs when user rename Area in Editor.	This issue has been fixed in V12.

Aspen HYSYS

Product Description

Aspen HYSYS® is AspenTech's process modeling tool for steady-state simulation, design, performance monitoring, optimization, and business planning for the oil and gas production, gas processing, and petroleum refining industries. Aspen HYSYS is built upon proven technologies, and more than 30 years of experience supplying process simulation tools to the oil and gas and refining industries. It provides an intuitive and interactive process modeling solution that enables engineers to create steady-state models for plant design, performance monitoring, troubleshooting, operational improvement, business planning, and asset management.

Aspen HYSYS offers significant advancement in simulation technology. As with every AspenTech product, it reflects our commitment to delivering Process Asset Lifecycle Management within a platform that is the world leader in ease of use and flexibility and sets the standard for an open engineering environment.

New Features and Enhancements in V12

New features and enhancements were added in the following areas in HYSYS V12:

- Aspen Multi-Case
- Aspen Knowledge In-Context
- Support for Hybrid Models
- General HYSYS Improvements
- HYSYS Properties Improvements
- Safety Analysis Improvements
- Equation-Oriented Modeling Improvements
- Plant Data Improvements

Aspen Multi-Case

Aspen Multi-Case is a new product that provides multi-core and high-performance computing capabilities for Aspen HYSYS and Aspen Plus, allowing you to run multiple simulations simultaneously and visualize results. Aspen Multi-Case serves as a single platform that allows you to seamlessly transition between setting up cases, configuring runs, concurrently running simulations, and analyzing results. By leveraging the parallelization capabilities for Aspen HYSYS and Aspen Plus, Aspen Multi-Case enables you to run a large number of simulations quickly and easily.

You can create projects that are associated with HYSYS and Aspen Plus case files ("base cases") and define scenarios for comparison and visualization. The project types available in Aspen Multi-Case support the following key workflows:

- Case Study projects offer an improved version of the HYSYS Case Study / Aspen Plus Sensitivity Analysis due to easier configuration and high-performance computing.
- Multi-File Analysis projects support multiple files and flowsheet topologies in order to help you analyze multiple design configurations and operating conditions for a large number of scenarios.

- Reduced Order Model projects allow you to generate data that can be used in the AI Model Builder.

Aspen Multi-Case offers the following benefits:

- Seamless case configuration without the need to open Aspen Plus or Aspen HYSYS.
- Provides advanced data analysis and visualization capabilities.
- Allows analysis of complex design problems involving multiple files and flowsheet topologies.
- Results in an improved simulation workflow when optimizing across several design scenarios.
- Eliminates the need to transfer data to Excel for analysis and visualization.

Aspen Multi-Case supports distributed deployment, enabling you to leverage multi-core machines on-premises or in the cloud and run the simulations in parallel. For multi-user machines (such as Windows Server), Aspen Multi-Case allows multiple users to work on the same machine and ensures that other users are prevented from editing your projects.

Interactive visualization helps you analyze results and analyze results across multiple cases. Results visualization options include plots (both two-dimensional and three-dimensional), tables (including aggregation and filtering capabilities), and matrices.

For further information regarding Aspen Multi-Case, see the Aspen Multi-Case Help.

You can create an Aspen Multi-Case project linked to your current simulator case from within Aspen HYSYS and Aspen Plus. To do so, on the **Home** ribbon tab | **Multi-Case** group, click **Project**. A new Aspen Multi-Case project is automatically created and appears in your web browser. The new Aspen Multi-Case project will be a Case Study project with the current simulator case attached as a base case.

Aspen Knowledge In-Context

HYSYS V12 features Aspen Knowledge In-Context, which delivers curated, featured content that is seamlessly integrated within the Aspen HYSYS flowsheet. This tool allows you to access relevant Aspen Knowledge material within Aspen HYSYS, providing relevant information that reflects your specific flowsheet topology and interactions with the process model. For example, content regarding Aspen Exchanger Design & Rating appears when you are working with an Activated Heat Exchanger. As a result, you can easily obtain the information needed to complete your current workflow.

You can access targeted information from our database, including literature, training, eLearning content, Knowledge Base articles, content from the HTFS Research Network, and videos.

Aspen Knowledge In-Context provides the following benefits:

- Aids you in solving complex asset optimization challenges in an easy-to-use interface.
- Facilitates improved search and discovery and successful knowledge delivery.
- Makes it easier for you to locate the necessary information to troubleshoot convergence or modeling errors.
- Provides best practices guidance and model building assistance.
- Provides convenient access to eLearning content.
- Allows you to share feedback with AspenTech to facilitate improved content delivery.

The  icon is used to indicate that Aspen Knowledge In-Context recommendations are available for the current Aspen HYSYS form. Aspen Knowledge In-Context recommendations are available for forms with context-sensitive help within Aspen HYSYS and Aspen Plus.

Support for Hybrid Models

HYSYS V12 supports models exported from AI Model Builder through the Hybrid Model unit operation. The Hybrid Model unit operation is available on the External Model ply of the Model Palette.

The Hybrid Model unit operation provides an AI-based model to simulate a piece of plant equipment, which can be any type of equipment which the AI system is capable of modeling. This allows you to leverage machine learning to improve your simulation. The model must be exported from AI Model Builder.

Hybrid Models combine data and first-principle domain knowledge to build and deploy fit-for-purpose models, offering the following benefits:

- More accurate interpolation and extrapolation
- Faster convergence
- Capable of combining real plant data with simulation data to more accurately represent actual equipment

Note: The creation of HYPlan models has been deprecated and replaced with the new Hybrid Model operation.

General HYSYS Improvements

Usability Improvements

- Extensive changes were made to the **File** menu to improve usability. The locations of the **File** menu items are now more intuitive, making the tasks performed via this menu quicker and easier.
- You can now add **Fitting Type** variables to the PFD Table for the Pipe Segment. To view the PFD Table, right-click the Pipe Segment and click **Show Table**.
- Previously, when copying and pasting or importing objects or sub-flowsheets between HYSYS cases, the associated fluid package was automatically imported as well. In Aspen HYSYS V12, a dialog box appears, displaying the following message: **Would you like to import the fluid packages used in imported objects?**
  - If you click **Yes**, the associated fluid package is imported.
  - If you click **No**, the associated fluid package is not imported. Instead, the copied objects use the default fluid package used in the current flowsheet.
- For Compressor plots, the plot properties specified on the **Graph Control** view are now saved.

Spreadsheets

The robustness and usability of the Spreadsheet unit operation was improved in V12.

- On the **Spreadsheet** tab, for imported variables, you can now disconnect multiple cells and then right-click and select **Disconnect** from the Object Inspect menu to disconnect the variables simultaneously.
- When copying and pasting variables within the same Spreadsheet, the pasted variables retain the same units of measures as the original variables.

Workbooks

The Workbook features the following improvements:

- The maximum **Number of Columns** allowed for export to Excel was increased to 16,382.
- The organization and selection of Heat Exchanger Performance Table variables is more intuitive and user-friendly.

Column Analysis Improvements

- A **CUSTOM** tray type is now available. You can use the **CUSTOM** tray type to represent irregular geometry types or geometry types that are not available as Tray Types within the Column Analysis library. This Tray Type is only available in Rating mode.
- A **Lattice** downcomer arrangement is now available for Sieve trays. This modern style of tray allows greater liquid load than conventional tray and up to 12 downcomers per tray. In these trays, the downcomers on each tray are rotated 90 degrees from the downcomers on adjacent trays, so the overall grid of downcomers looks like a lattice. Only portions of the bottom of each downcomer are open, allowing them to distribute the liquid as well as avoiding dropping liquid too close to the downcomers on the tray below. All downcomers on lattice trays must have the same width and the same height. Lattice downcomers are only available in Rating mode.
- When copying and pasting a Column sub-flowsheet, all associated Column Internals are now copied as well.
- A new packing correlation from Sulzer is included in V12. This includes new packing types, materials, and dimensions:
  - NexRing #0.6, #0.7, #1, #1.2, #1.5, #2, #3 (new type and dimensions)
  - AYPlus DC standard (new type and dimension)
  - CYPlus standard (new type and dimension)
  - MellapakPlus 202.Y 352.Y 602.Y (new dimensions only)
  - Mellagrid 40AF (new dimensions only)
  - Mellapak plastic 125X (new material and dimensions)
  - MellapakPlus plastic 252.Y (new material and dimensions)

Other previously available Sulzer packings are also supported by the new correlation, except I-Ring, Kerapak, and Nutter ring #1.75. The old correlation will be used for those.

Unit Operations

- A new Multiplier unit operation was added in HYSYS V12. This unit operation multiplies the component flow rates and the total flow rate of a material stream by a factor that you supply on the **Design** tab | **Parameters** page. It is useful when other conditions during the simulation determine the flow rate of the stream.
- For Pumps, the **Brennen Method** is now available as a calculation mode for NPSH Required. This is the method used to calculate NPSH required in Aspen Plus (Brennen, C. E. (1994). *Cavitation and bubble dynamics.* Oxford, England: Oxford University Press.). When this option is selected, you must specify the suction specific speed.

Pro/II to HYSYS Converter

Starting in V12, the Pro/II to HYSYS Converter converts the **AMIN** method from Pro/II to the **Acid Gas – Chemical Solvents** property package in HYSYS. See the Compatibility Notes for further details.

HYSYS Properties Improvements

Dynamics Mode Supported for Columns using the Acid Gas - Chemical Solvents Property Package

Dynamics mode is now supported for columns that use the **Acid Gas - Chemical Solvents** property package. A new **Reduced Order Model** option is available on the **Enthalpy & Fugacity Models** drop-down list on the **Phase Handling** tab of the Fluid Package property view. This option provides faster performance and allows you to run Acid Gas cases in Dynamics mode.

When this option is selected, a predefined reduced order model is used for the Acid Gas simulation. This model is used for calculations in vapor and liquid phases. The properties used in the equilibrium flash (such as the fugacity coefficient of the components and phase enthalpy) are calculated using this reduced order model.

Improved Parameters for Heat Transfer Fluid Components

In HYSYS V12, the parameters for the following heat transfer fluid components were updated based on experimental data from the current literature:

- THEOL-55
- THEOL-59
- THEOL-66
- THEOL-75
- THEOL-LT
- THEOLD12
- THEOLVP1

As a result, the property curves for these components now closely match the latest publications.

Reference

"Heat Transfer Fluids." *Therminol*, Eastman Chemical Company, www.therminol.com/heat-transfer-fluids.

Improvements to the CPA Property Package

In HYSYS V12, the parameters for two water-acid gas systems (H2O-CO2 and H2O-H2S) were updated for the **CPA** property package based on a new regression from the following GPA reports:

- Gillespie, P. C. and Wilson, G. M. "Vapor-Liquid Equilibrium Data on Water-Substitute Gas components: N2-H2S, H2-H2O, CO-H2O, H2-CO-H2O, and H2S-H2O." RR-41, GPA. Tulsa, OK. 1980.
- Gillespie, P. C. and Wilson, G. M. "Vapor-Liquid and Liquid-Liquid Equilibria: Water-Methane, Water-Carbon Dioxide, Water-Hydrogen Sulfide, Water-n-Pentane, Water-Methane-n-Pentane." RR-48, GPA. Tulsa, OK. April 1982.

An additional association term for the interaction (CPAVIJ) was introduced to the binary interaction parameters, and the available experimental data was re-fitted with both Vapor-Liquid-Equilibrium and Liquid-Liquid-Equilibrium data included. Results will now more accurately predict the water content of natural gas streams with high H2S and CO2 content. These improvements will assist in modeling the glycol dehydration process using the **CPA** package.

Table 1: Predicted water content in gas mixtures*, experimental data from Clark (1999)

T (°F)	P (psia)	H2O content, mole fraction		
		Experimental	V11	V12
120	500	3.90E-03	3.71E-03	4.02E-03
120	750	2.90E-03	2.59E-03	2.93E-03
120	1150	2.30E-03	1.83E-03	2.21E-03
120	4000	2.00E-03	9.39E-04	1.81E-03
120	5000	2.10E-03	8.71E-04	1.88E-03
120	6000	2.10E-03	8.32E-04	1.94E-03

* The gas phase composition is 65% CH4, 1% N2, 14% CO2, and 20% H2S

Clark, M. A. "Experimentally Obtained Saturated Water Content, Phase Behavior and Density of Acid Gas Mixtures." MSc Thesis, July 1999. Univ. of Calgary, Calgary, Alberta, Canada.

In HYSYS V11, while the CPA package was capable of modeling the phase equilibria of mercury and hydrocarbons, it focused primarily on C5 and heavier hydrocarbons. In V12, new binary interaction parameters for mercury, light hydrocarbons (C1 to C4), and CO2 were added to the CPA property package. The latest experimental data in the GPA report RR-224 (Butala, S. J. M.; Wilson, G. M. and Jasperson, L. V. "Elemental Mercury Equilibrium in Selected Saturated Hydrocarbons." RR-224, GPA. 2016) was fitted, and interaction parameters for Hg-CH4, Hg-C3H8, Hg-isoC4H10 and Hg-CO2 were determined. The regression results now match the experimental data more closely.

Make sure to click **Upgrade Parameters** on the **Set Up** tab of the Fluid Package form to take advantage of the latest improvements.

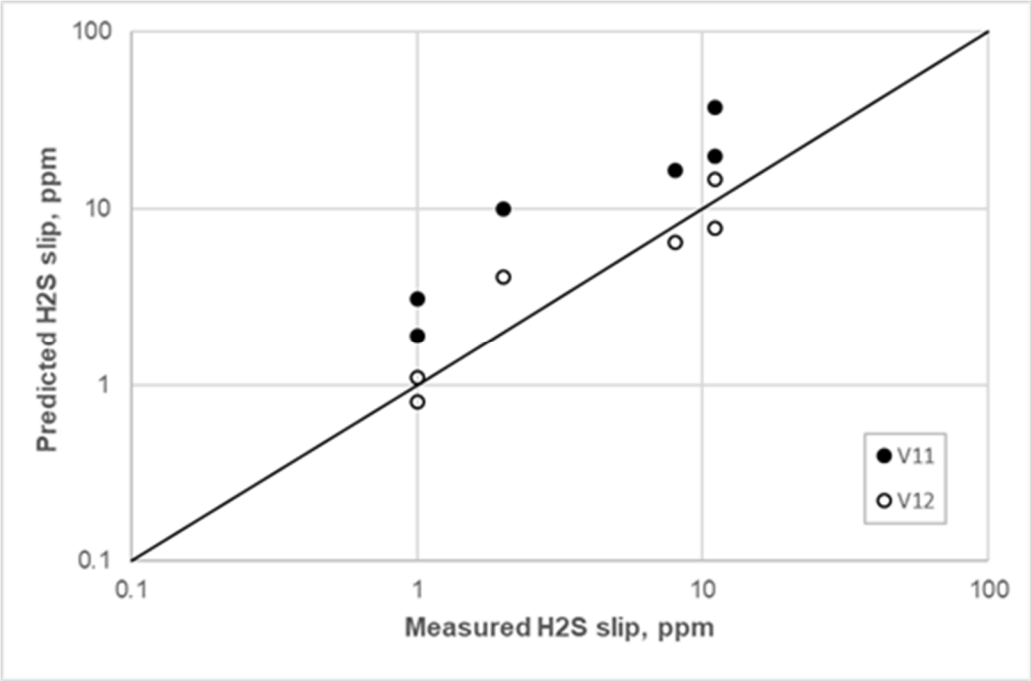
Improvements to the Acid Gas - Chemical Solvents Property Package

In previous versions, for the **Acid Gas - Chemical Solvents** property package, isoPentane and Argon were considered solvents, so their predicted solubilites were much higher in magnitude than expected. This led to inaccurate results. In V12, isoPentane and Argon are treated as Henry components, resulting in more accurate predictions. Due to the lack of experimental data regarding IC5 and amines, NC5 parameters are used for IC5.

The heat stable salts model in the **Acid Gas - Chemical Solvents** property package was improved after validating the model using data from Sulphur Experts. Previously, the predictions did not match field data when the solvents included heat stable salts. The **Acid Gas - Chemical Solvents** property package sometimes over-predicted the salting effect of formic acid (HCOOH), acetic acid (CH3COOH), thiocyanic acid (HSCN) and thiosulfuric acid (H2S2O3). Since HYSYS only considered the first order of dissociation for H3PO4 for the **Acid Gas - Chemical Solvents** property package, this sometimes led to an under-prediction of the impact of H3PO4 on lean amine loading.

The following heat stable salts were updated in V12: phosphoric acid (H3PO4), formic acid (HCOOH), acetic acid (CH3COOH), thiocyanic acid (HSCN) and thiosulfuric acid (H2S2O3). For formic acid (HCOOH), acetic acid (CH3COOH), thiocyanic acid (HSCN) and thiosulfuric acid (H2S2O3), four dissociation reactions were replaced with five rigorous equilibrium reactions to ensure more accurate modeling. The complete dissociation of H3PO4 (including the second and third dissociation reactions) is now considered, leading to more accurate results. Additionally, the relevant electrolyte interaction parameters were updated for those heat stable salt ions. As a result, the **Acid Gas - Chemical Solvents** property package results are now consistent with the data.

The following figure demonstrates how the predicted H2S slip is more accurate after improvements to the Heat Stable Salts:



The modeling of hydrocarbons and BTEX (benzene, toluene, ethyl-benzene and xylene) solubilities with the **Acid Gas - Chemical Solvents** property package was validated in V12 using plant data from Sulphur Experts and the following literature:

- Skinner, F. D., Reif, D. L., Wilson, A. C., & Evans, J. M. (1997, January 1). "Absorption of BTEX and Other Organics and Distribution Between Natural Gas Sweetening Unit Streams." Society of Petroleum Engineers.
- Harbison, J. L. & Dingman, J. C. "Mercaptan removal experiences in DGA sweetening of low pressure Gas." In: Proceedings Gas Conditioning Conference. University of Oklahoma Extension Division; 1972.

Prediction for CO2 absorption using MDEA was improved in V12 to better reflect field data. Using plant data from Sulphur Experts, the model for CO2 absorption was validated and improved. In HYSYS V11 and earlier versions, CO2 absorption was under-predicted.

Make sure to click Upgrade **Parameters** on the **Set Up** tab of the Fluid Package form to take advantage of the latest improvements.

Improvements to Aspen Properties HYSYS SRK Property Package

The Aspen Properties **HYSYS SRK** property package features improved performance in HYSYS V12. Also, a new **Property Calculation Options** group is now available on the **Set Up** tab of the **Fluid Package** form, allowing you to specify additional parameters.

Water Identification for Aspen Properties SRK and MXBonnel Packages

The new **Water Identification Method** group for the Aspen Properties **SRK** and **MXBonnel** property packages allows you to stabilize water your case.

Relative Humidity Property Available

A new **Relative Humidity** correlation is available under the **Standard** correlation type on the Correlation Manager. The relative humidity of a vapor is the partial pressure of water vapor in a given vapor divided by vapor pressure of water at the given temperature.

Safety Analysis Improvements

Improved Datasheets Workflow

The workflow for creating ABE datasheets in order to document PRD calculations has been improved and streamlined in HYSYS V12, including the following changes:

- The new **Safety Datasheets** ribbon tab makes necessary commands more easily accessible (such as connecting to a workspace or closing the connection).
- You can use the new **Live Link** option to automatically transfer all data for mapped objects to Aspen Basic. Changes in the simulation are automatically transferred to applicable datasheets. As a result, you no longer need to return to the Mapper view and click **Refresh** to transfer data.
- When the **Live Link** is option is selected, you can use the contextual **Datasheet** button to view or create datasheets related to the Safety form. When you click the **Datasheet** button, a drop-down appears, displaying relevant Safety datasheet templates based on the current form and Safety calculations. This list includes both existing datasheets and those available for creation. This option eliminates the need to perform mapping if you only need to document a single system or calculation.

Fire Disengagement Calculations

Optionally, you can enable prediction of two-phase relief flow for **Wetted (API)** fire scenarios using the **Calculate Vapor/Liquid Disengagement** drop-down list. Vapor/liquid disengagement is calculated using DIERS methods to predict whether a period of two-phase relief will occur. HYSYS predicts the initial liquid level at which two-phase flow begins and ends, as well as the required orifice area needed for adequate protection during the period where two-phase flow occurs.

Support for API 520 Part 1 10e (2020) for Sizing Calculations

The Safety Preferences Manager now allows you to select **API 520 Part 1 10e (2020**) as the API 520 Part 1 Edition for Sizing Calculations. The 10th edition includes updates to the liquid viscosity correction factor equation and steam superheat correction factor tables. As a result, selecting this option leads to differences in results for the **Capacity-Certified Liquid**, **Non-Capacity-Certified Liquid**, and **Steam** relieving methods.

Ability to Perform Line Sizing Calculations for Non-Sizing Cases

Previously, line sizing calculations were only performed for the scenario designated as the Sizing **Case** on the **Scenarios** tab. In V12, the **Current Scenario** drop-down list on the **Line Sizing** tab allows you to select the desired scenario, and then click **Run Line Sizing** to perform line sizing calculations. The **Run For All Scenarios** button performs line sizing calculations for all specified scenarios.

Safety Analysis Enhancements

- Hydraulics Tee calculations are fully supported. The settings specified in the **Tee Settings** group on the **Calculation Settings** view are now applied correctly. Static Pressure, Total Pressure Balance, Miller Charts, Gardel, and Simple fitting loss methods are available. Additionally, the **Fixed k value** option allows you to use the V11 method, where Tees are implemented as a combination of a bleed and flow resistance.
- The maximum **Number of Vessels** for **Unwetted (API)** and **Wetted (API)** Fire scenarios was increased from 3 to 9.
- The **Molecular Weight** and **Compressibility Factor Z** values are now reported in the **Relieving Properties** group of the **Fluid Properties** tab.
- The new **Relief Composition** tab allows you to view the relief composition for relieving load calculations for the scenario. It contains a table that lists the fraction represented by each component from the selected component list.

- For the Semi-Dynamic Flash calculation method, when you select the **Store per-step compositions for semi-dynamic fire calculations** check box on the **Scenarios** tab of the Preferences Manager, a new tab on the **Stepwise Flash Data** dialog box displays the stream composition on a step-by-step basis. A column appears for each component in the stream. The row selected for relief is highlighted in the composition table.

Equation-Oriented Modeling Improvements

Support for Column Analysis in EO

The Column includes a new **Configure** page on the **Equation Oriented** tab. The **Configure** page lets you:

- Perform additional configuration for EO solving.
- Enable Column Analysis variables in Equation Oriented mode.
- Many variables from Column Analysis are supported in Equation Oriented mode. These variables are mapped to equivalent EO variables.

Crude Oil Property Blending for EO

HYSYS V12 supports the propagation and mixing of refining property slates in the EO Sub-Flowsheet. These are the result of mixing property slates that originated from different assays. Property blending occurs when multiple feed streams with different assays are attached to a unit operation. You can now mix property slates for the following HYSYS unit operations:

- Columns
- Mixers (including Mixer chains)
- Separators
- Component Splitters
- Heat Exchangers

Support for Additional Unit Operations

The Multiplier unit operation is supported within the EO Sub-Flowsheet. The Multiplier is used to multiply the flow rate of a Material Stream. This unit operation multiplies the component flow rates and the total flow rate of a material stream by a factor that you supply on the **Design** tab | **Parameters** page. The Multiplier is supported in open form and mapped to a rigorous EO model.

Equation-Oriented Modeling Enhancements

- The functionality for adding and deleting variables and copying and pasting SM variables to EO Configuration forms (such as the **Specification Group** form, the **EO Inputs** form, and the **Measurements** form) has improved substantially in HYSYS V12.
- The **Specifications** form and the **Specifications** page for individual unit operations and streams now include additional buttons to allow you to update the Specification Group selections quickly and easily. Clicking **Enable All** selects the check boxes for all Specification Groups. Clicking **Disable All** clears the check boxes for all Specification Groups. When you add variables to the forms used for EO configuration, additional fields are populated using information from the selected variables. This reduces the amount of information that you must specify manually.
- Starting in V12, the LNG Exchanger supports delta temperature specifications on different sides, flow ratio specifications, and duty ratio specifications in EO. You can also define the component group individually for each LNG pass (or side).
- For Air Coolers only, you can use the Additional perturbation model options group to add Air Cooler results variables. EO perturbation generally only supports specifications on inlet and outlet streams of the unit operation. This group allows you to select Air Cooler variables to be perturbed; these variables will be exposed as EO variables. Variables are available for both the **Air Cooler Simple Design** and **Rigorous Air Cooler** models.

- For Measurements, you can now view and edit the units for Plant values and Offset values to improve ease of use when entering data.
- You can now specify a component group for multiple unit operations simultaneously. To do so, select the desired unit operations on the PFD. Right-click the selection, and then select **Change Component Group** from the shortcut menu to access the **Change Component Group of Selected Objects** dialog box.

Plant Data Improvements

Plant Data now includes seamless transition with Aspen OnLine, including an option to publish a model originally developed in Plant Data to Aspen OnLine. If you open the model file from Aspen OnLine's Offline or Online folder, you can make changes within Plant Data which are stored in the Aspen OnLine project. You can also edit features, such as scheduling, which are only relevant when the project is open in Aspen OnLine. You can perform Offline-to-Online within Plant Data and, if there are no model changes, use the variable list in Aspen OnLine without having to regenerate it.

Data Conditioning includes new features for identifying data to exclude from runs. You can mark slices manually as bad or mark a pattern as bad and let AI methods mark all similar slices as bad. Outlier detection helps identify data sets as outliers that you want to exclude. Smart sampling lets you pick a representative sample of the data to run if you have too many cases to run all of them.

Pre-Averaged Data Mode allows you to work more simply with data that has already been averaged. This mode works only with a single data import from Excel or a historian of a set of data points which are equally spaced in time. For more information, see Pre-Averaged Data Mode.

Many grids in Plant Data now have filtering options similar to those in other Aspen Plus and Aspen HYSYS forms. You can filter the items displayed in the grid by the contents of any column. Time ranges can be filtered to a specific interval. In some tables you can customize the columns displayed with the Table Layouts feature.

When you create model snapshots, the default names are now based on the run sequence names. This makes it easier to identify which snapshot comes from which run sequence.

Compatibility Notes for HYSYS V12

This section describes the differences that you might encounter between HYSYS V12 and HYSYS V11. In most cases, previous HYSYS files are completely compatible with HYSYS V12.

The most important areas where you might encounter differences between HYSYS V12 and earlier versions are as follows:

- HYSYS Properties
- HYSYS Unit Operations
- Safety Analysis
- Plant Data
- Pro/II to HYSYS Converter
- Retired Features

HYSYS Properties

In the **Options** group on the **Set Up** tab of the Fluid Package view, the **Indexed Viscosity** drop-down list was renamed **Viscosity Method** for clarity.

Improved Parameters for Heat Transfer Fluid Components

In previous versions of HYSYS, some properties for heat transfer fluids were not up-to-date.

In HYSYS V12, the parameters for the following heat transfer fluid components were updated based on experimental data from the current literature:

- THEOL-55
- THEOL-59
- THEOL-66
- THEOL-75
- THEOL-LT
- THEOLD12
- THEOLVP1

As a result of these improvements, you may notice differences in the following properties for the components listed above:

- Vapor pressure
- Liquid density
- Vapor density
- Liquid enthalpy
- Vapor enthalpy
- Heat of vaporization
- Liquid heat capacity
- Vapor heat capacity
- Liquid viscosity
- Vapor viscosity
- Liquid thermal conductivity
- Vapor thermal conductivity
- Vapor pressure (Antoine)
- Bubble pressure (Antoine)

Reference

"Heat Transfer Fluids." *Therminol*, Eastman Chemical Company, www.therminol.com/heat-transfer-fluids.

CPA Package Improvements

The parameters for H2O-CO2 and H2O-H2S for the CPA property package were updated based on a new regression. Results will change but should better predict the water content of natural gas streams with high H2S and CO2 content.

HYSYS Unit Operations

Pipe Segments

In previous versions, for a Pipe Segment with the **Tulsa Unified Model (3-Phase)** correlation selected, the calculation of properties for the second liquid (if applicable) used the **Tulsa Unified Model (2-Phase)** method. In HYSYS V12, this calculation correctly uses the **Tulsa Unified Model (3-Phase)** correlation in this instance. As a result, you may notice differences in results in HYSYS Steady State cases containing a Pipe Segment with the **Tulsa Unified Model (3-Phase)** correlation selected that also contain a second liquid phase (which can be either an aqueous or a heavier oil phase).

Safety Analysis

Improved Line Sizing Results

In V12, a number of changes were made to line sizing in the Safety Analysis environment:

- In V11, the reference conditions used for pressure drop calculations incorrectly discarded energy. In HYSYS V12, the correct reference conditions are used for pressure drop calculations.
- In the Safety Analysis environment, when performing rigorous Aspen Hydraulics line sizing in V11, for the inlet pressure drop, swage calculation settings were applied to inlet pressure drop calculations and the full pressure drop (including recoverable losses) was incorrectly included in results.
- In HYSYS V12:
  - For the inlet pressure drop, inlet pressure drop calculations use the **Crane – Homogeneous** fitting loss method and exclude acceleration pressure drop.
  - The performance of the outlet pressure drop was improved, and the calculated pressure drop results are more accurate.
- In the Safety Analysis environment, when performing rigorous Aspen Hydraulics line sizing in V11, the tolerances for a HYSYS PH or PS flash were not tight enough to obtain accurate derivative-based properties over small variations in pressure for single-component systems. This reduced the accuracy of the sonic velocity calculations and line choke pressure. In HYSYS V12, flash tolerances were tightened for these flashes in the Safety Analysis environment (including for Hydraulics-based line sizing).
- In HYSYS V11, the **Inlet Pressure Drop [%]** column on the **Scenarios** tab reported the inlet pressure drop as a percentage of the maximum allowable pressure, and the **Outlet Pressure Drop [%]** column reported the outlet pressure drop as a percentage of the maximum allowable pressure. In V12, both these values are reported as percentages of the set pressure.
- In V11, an excessively low critical velocity could be reported for Hydraulics line sizing on a system with all liquid relief. This was resolved in V12.
- As a result of these improvements, you will notice differences in line sizing results in HYSYS V12.

Updates to Storage Tank Calculations

- In previous versions, for Storage Tank vent calculations under API 2000 6e or API 2000 7e, evaporation rate was doubled if **Volatile Liquid** selection was **Yes**. This was corrected in V12.
- In previous versions, wetted area calculations for tank emergency relief for horizontal tanks were not consistent with the wetted area calculations for horizontal vessels. The tank calculations were changed to agree with the vessel calculations in V12.

Updates to Fire Scenario Calculations

- In previous versions, there was an issue with required orifice area calculation in the flash table for Supercritical Fire scenarios, which could also lead to selecting the wrong relieving condition in certain scenarios. Note that only the required area within the flash table was incorrect; the required area on the scenario was calculated correctly. This issue was corrected in V12.
- Previous versions did not correctly calculate the wetted area for vertical vessels with ellipsoidal heads at low liquid levels. This issue was corrected in V12.

Plant Data

Two kinds of databases are used with Plant Data with names based on names you specify. Each database name is limited to 128 characters total.

- The distance database contains the project name, the data conditioning run name, and about 17 other characters.
- The variable list database name contains the model name without extension twice, and about 26 other characters.

Avoid using very long names for the model file, project, and data conditioning run names to avoid running into this limit.

Pro/II to HYSYS Converter

Starting in V12, the Pro/II to HYSYS Converter converts the **AMIN** method from Pro/II to the **Acid Gas – Chemical Solvents** property package in HYSYS.

Columns are converted into Column Sub-Flowsheets. However, Tower unit operations are not supported as part of the Acid Gas column. In cases where **AMIN** is the only method used in the Pro/II case, and the case contains a column, you must manually modify the .inp file prior to conversion. Perform the following steps:

1. Open the desired .inp file.
2. In the .inp file, add an **additional METHOD SYSTEM** that is supported by the Pro/II to HYSYS Converter. The Pro/II Converter will convert the **AMIN** method to the **Acid Gas – Chemical Solvents** property package and convert the placeholder method to an appropriate HYSYS property package. After conversion, you can delete this unused fluid package, if desired. The first **METHOD SYSTEM** in the image below provides an example.

```
METHOD SYSTEM(VLLE)=GPSA, MEOH=OFF, SET=GPSA01, DEFAULT
METHOD SYSTEM=AMIN, TRANSPORT=PETR, MEOH=OFF, SET=AMIN01
```

3. In the .inp file, for each column, add **METHOD SET=AMIN01** as the final line. See the example below.

```
COLUMN UID=CC-802, NAME=AMINE REGENERATOR
    PARAMETER TRAY=10,IO=1000
    FEED 13,3,TSEPARATE/17,1,TSEPARATE, SEPARATE
    PRODUCT  OVHD(M)=S62, BTMS(WT)=S63,125755.9936523
    CONDENSER TYPE=PART, PRESSURE=1.099999969482
    DUTY  1,1,,CONDENSER
    DUTY  2,10,,REBOILER
    PSPEC PTOP=1.199999969482, DPCOLUMN=0.3
    PRINT PROPTABLE=PART
    ESTIMATE MODEL=CONVENTIONAL, RRATIO=3
    SPEC ID=COL6SPEC1, STREAM=S63, RATE(KGM/H), COMP=1,WET, DIVIDE, &
              STREAM=S63, RATE(KGM/H), COMP=6,WET, &
              VALUE=0.02800000086427
    SPEC ID=COL6SPEC2, STREAM=S62, TEMPERATURE(C), VALUE=46
    VARY DNAME=CONDENSER
    VARY DNAME=REBOILER
    TFLOW TOT(V)=14,2, TOT(L)=18,9
    REBOILER TYPE=KETTLE
    METHOD SET=AMIN01
```

Retired Features

aspenONE Exchange

In V12, aspenONE Exchange has been replaced with Aspen Knowledge. Aspen Knowledge is a web-hosted collection of resources such as help documentation, technical articles, models, literature, and on-demand training that you can view. It includes all the materials available in aspenONE Exchange, as well as additional features (such as Aspen Knowledge In-Context). For further information, see the *Aspen HYSYS Help*.

What's Fixed in Aspen HYSYS V12

Aspen HYSYS V12 includes a significant number of software fixes that further improve the product.

Because of the number of defects fixed is large, the section below contains a select subset of all defect fixes. If you are interested in a particular defect that you do not see listed here or want to view a more comprehensive list, contact your Support representative.

A selected list of the most important fixes is included, highlighting particular areas of interest.

General Aspen HYSYS Interface/Usability

ID	Issue Description	Issue Resolution
21068	When printing the **Feeds/Products** datasheet for the **Performance** tab of the column, the datasheet headers always reported values on a molar basis, even if a different basis was selected on the Column Profiles view.	This issue is fixed in V12.
21275	If the name of a hidden object contained quotation marks (""), right-clicking the flowsheet and selecting **Reveal Hidden Objects** from the shortcut menu would not cause the object to reappear on the flowsheet.	HYSYS V12 allows you to use quotation marks in object names.
217270	Issues occurred when using formulas with Boolean operators and "if" statements within the Spreadsheet operation.	Formulas within the Spreadsheet now support Boolean operators and "if" statements.
253807	The **View All Correlation Plots** button appeared on **Worksheet** tab | **Properties** page, even though none of the available correlations could be plotted.	The **View All Correlation Plots** button was removed from the **Worksheet** tab | **Properties** page of the Material Stream view.
281746	The Variable Navigator did not support use of the keyboard in all areas.	The usability with the Variable Navigator was improved by allowing greater use of the keyboard, resulting in simpler navigation.
398611	When attempting to print to a PDF or view Print Preview for a Case Study, some printed results were inaccurate.	This issue is fixed in V12.
415953	The entire component list could not be added at once to a user-defined workbook template; instead, you needed to add each component individually.	The Variable Navigator now supports adding the entire component list at once.

ID	Issue Description	Issue Resolution
419078	After creating a custom unit set with custom units of measure, each time the HYSYS case was re-opened, additional unit sets and units of measure were automatically created. A number was appended to name of each additional unit set, and an additional asterisk (*****) was appended to the name of each additional unit of measure.	In HYSYS V12, these unnecessary unit sets and units of measure are no longer created.
430926	The type for the Process Utilities Manager could not be modified.	The Process Utilities Manager displays the utility type with a new column. A blue arrow icon indicates a cold stream, and a red arrow icon indicates a hot stream. The utility type can be defined from the utility temperatures for the inlet and outlet streams.
432925	For integration between HYSYS and Aspen Simulation Workbook (ASW), when the number of phases changes within HYSYS, information appeared in incorrect columns in ASW.	This issue is fixed in V12.
436411	When attempting to save a HYSYS case to a shared folder with a UNC (Universal Naming Convention) path, the following error message appeared: **When a case contains Plant Data information, it cannot be saved to a share folder**. This error message sometimes appeared even for HYSYS cases that did not use the Plant Data feature.	This issue is fixed in V12.
438647	Dragging and dropping variables directly from the **Worksheet** tab of a stream or unit operation into a Stripchart, did not work in HYSYS Dynamics V11.	Dragging and dropping variables directly from the **Worksheet** tab of a stream or unit operation into a Stripchart is fully supported in V12.
438861	When the Fuel EF value for a Utility was modified, the Carbon Emissions reported on the Overall Summary differed from the value reported on the Stream Level Summary.	This issue is fixed in V12.
441813	The **Valve type** variable could not be added to the PFD Table.	The **Valve type** variable is available for the PFD Table.
452352	When running a case repeatedly, in some instances, a memory leak occurred.	This issue is fixed in V12.
454441, 455795	For some very large cases, after deleting substantial segments of the case, each time the case was saved after minor changes, the file size increased.	This issue is fixed in V12.

ID	Issue Description	Issue Resolution
459249	When an external module called from a HYSYS Macro/User Variable caused a floating point overflow or underflow, HYSYS sometimes failed due to an unexpected state in the floating point status word.	This issue is fixed in V12.
467920	HYSYS Extension forms using a custom, manually configured graphic on the UI were unable to properly render certain **Rect**, **Ellipse**, **Poly**, and **Arc** shapes based on the color attributes applied to them.	This issue is fixed in V12.
473015, 473409	In some cases, clicking **Order/Hide/Reveal** on a tab of the Workbook caused HYSYS to fail.	Inconsistencies from hidden streams in the workbook that were removed from either in the main flowsheet or a nested sub-flowsheet are fixed in V12.
496258	Printing a datasheet for a stream that contained unsupported characters (such as "") caused HYSYS to fail.	Unsupported characters are replaced by a valid string to allow HYSYS to print the required symbols.
499135	The Case Study was unable to modify composition values that came from columns.	Specified values are now available to be modified as independent variables within Case Studies.
513518	In some cases, attempting to print the Datasheet report for a Material Stream caused HYSYS to fail.	This issue is fixed in V12.
533244	When adding some fitting-specific variables to the Workbook, HYSYS sometimes failed.	This issue is fixed in V12.
533292	In rare instances, a memory leak occurred when running and saving the same case repeatedly.	The memory leak is fixed in V12.

Aspen HYSYS Properties

ID	Issue Description	Issue Resolution
21656	Internal parameters for Peng Robinson equation of state packages were not recalculated when opening a corrupted case created in a previous version.	A new **Re-calculate internal parameters for PR-type EOS during recall case** check box is available on the **Property System** tab of the **Session Preferences** view. This option allows you to force HYSYS to re-calculate internal parameters for Peng Robinson-based EOS packages when recalling cases that might be corrupted.
316803	It was unclear to users that both Vapor and Liquid phase values needed to be specified for Tabular Packages.	In V12, a warning message notifies you that both the liquid and vapor phase tabular options must be specified to enable tabular enthalpy calculations.

ID	Issue Description	Issue Resolution
396196	Switching from the Properties environment to the Simulation environment was slow for cases that included both petroleum assays and Oil Manager assays.	Performance is improved in this situation in V12.
403550	When opening a V7.3 HYSYS case that included an Aspen Properties package using one of the retired databanks, such as **PURE13**, in HYSYS V11, the databank was not upgraded.	When this HYSYS case is opened in HYSYS V12, the retired databank is automatically upgraded to the primary pure databank in V12 (**PURE38**).
405651	If both the **Peng-Robinson** property package and the **Acid Gas – Chemical Solvents** property package used the same component list, when using Oil Manager, HYSYS V11 failed while performing oil blend calculations.	This issue is fixed in V12.
419303	For cases with very large component lists without specified compositions, when the default **Stability Test Parameters Method** was selected, HYSYS sometimes encountered issues when performing phase stability calculations, leading to unstable phase calculations. A potential workaround was to switch to the **HYSIM Flash** or **Aspen Flash** method.	This issue is fixed in V12.
431994	Attempting to import a *.aprbkp file containing hypothetical components and using a secured database into HYSYS was unsuccessful, since HYSYS was unable to obtain parameters such as molecular weight and boiling point.	HYSYS V12 can obtain limited parameters (such as molecular weight and boiling point) from the *.aprbkp file using a secured database for hypothetical components only.
458295	When opening a case with an Amine package in V11, the package was removed since Amines were no longer supported.	Amine packages are automatically converted to Acid Gas packages.
489310	The component **HYDROGEN-PARA** was not available for **REFPROP** in HYSYS V11.	In V12, **HYDROGEN-PARA** is available in **NISTV120** and **APV120**.
496789	Issues occurred when updating a user property that had been attached to a material stream.	This issue is fixed in V12.
497416	On the **Phase Handling** tab for the **Acid Gas - Chemical Solvents** property package, the **Valid Phases** drop-down list contained a **Vapor-Liquid-Liquid** option. However, the algorithm did not actually calculate this phase.	The **Vapor-Liquid-Liquid** option was removed for the **Acid Gas - Chemical Solvents** property package.
510052	In rare instances, when using Emissions Manager before saving the case, HYSYS failed.	This issue is fixed in V12.

ID	Issue Description	Issue Resolution
521573	In some cases, HYSYS encountered issues when attaching a reaction set where the name included dashes (**-**) to an Aspen Properties fluid package.	This issue is fixed in V12.
526519	When the component list order changed or if it was modified, the PFD table experienced difficulty when updating the associated names and values, in some cases even displaying incorrect values.	In V12, the PFD table handles component list changes and updates properly.
534364	Opening a case containing a **CPA** fluid package without components in the component list sometimes caused HYSYS to fail.	This issue is fixed in V12.

Aspen HYSYS Unit Operations

ID	Issue Description	Issue Resolution
27106	HYSYS V11 did not allow you to export a component stage efficiency from a Spreadsheet to a Tower.	In V12, the component efficiency variables now appear in the Variable Navigator.
396879	The **Wet bulb temperature** value for air that was reported for the Stream Saturator was inaccurate.	This issue is fixed in V12.
401077	For Compressors using **Off-Design Correction**, surge and stonewall curves were not corrected in the same fashion as performance curves.	In HYSYS V12, the **Off-Design Correction** was corrected for surge and stonewall curves for the Compressor.
401507	In some cases, the calculated Actual Volume Flow value on the Spreadsheet operation appeared as empty due to a calculation order issue.	This issue is fixed in V12.
404474	HYSYS failed when a Column included a reaction set with an unsupported configuration.	HYSYS no longer fails in this instance.
410291	In rare instances, running a column with the Column Temp Spec caused HYSYS to fail.	This issue is fixed in V12.
414361	When using Extension unit operations in the case, after switching the Properties environment and returning to the Simulation environment, Stream Cutter operations were sometimes added to the flowsheet.	If the Extension unit operation uses the same fluid package as the attached stream, Stream Cutter operations will not be added.
418545	Attempting to convert a Sulsim cases containing an unconverged Reaction Furnace to a HYSYS case caused the Sulsim Converter to experience issues.	This issue is fixed in V12.

ID	Issue Description	Issue Resolution
424982	In HYSYS V11, dummy Flash vessels were mapped and included in the Activated Economics calculations by default, and the **Include for Costing** check boxes (available on the **Rating** tab | **Vessels** page of the Column view) were selected.	In HYSYS V12, if you create a column using the Input Expert or load a case saved before V10, the **Include for Costing** check box is automatically cleared for both dummy Sump and dummy Flash vessels. If you did not use the Input Expert, you must manually clear these check boxes.
429760	When **Step convergence** was reached for the Hyprotech SQP Optimizer, an error message appeared. Step convergence means that the optimizer requires further attempts to find the line search. This number is controlled by the **Max. feasible point** option.	When **Step convergence** is reached, it is reported as a warning rather than an error.
440171	The Adjust Block asked the user to stop if the Adjust reached the minimum or maximum iterations. If HYSYS was running invisibly, HYSYS would stop solving.	In V12, if the user enables the send errors to trace option, HYSYS will also send the message to the trace window.
441147	The Fluid Package Transition did not properly transfer a viscosity parameter.	This issue is fixed in V12.
441395	When specifying actual Hot Side stream to Cold Side stream for a Rigorous EDR Plate model, the HYSYS results did not match the Rigorous Plate results.	This issue is fixed in V12.
441934	Pushing the composition from multiple Spreadsheets to a stream did not work.	This issue is fixed in V12.
442022	In HYSYS V10 and V11, the **Slug Analysis** results for the Pipe Segment differed from those shown in HYSYS V8.8 and V9.	In HYSYS V12, Slug Analysis results are consistent with V8.8 and V9 results.
443193	After adding a Material Stream and clicking the **Emissions** button on the **Worksheet** tab | **Emissions** | **Combustion** page, deleting the Material Stream caused HYSYS V11 to fail.	This issue is fixed in V12.
446902	The Component Splitter sometimes could not converge if the split type for one or more components was **Fraction in Products**, and the split fraction was too small in relation.	This issue is fixed in V12.

ID	Issue Description	Issue Resolution
452005	In HYSYS V11, for Valves where the **Use sizing methods to calculate Delta P** and **Handle multi-phase flows rigorously** check boxes were both selected, the **Mass Flow** was incorrectly reported as an infinite value when the **Valve Opening** value was set to 0.	This issue is fixed in V12.
452771	For Valves with the **Valve Opening** value set to 0, the valve enthalpy was set to 0 for the Material Stream, but the enthalpy upstream of the valve was a small negative integer, resulting in a consistency error.	This issue is fixed in V12.
459574	In rare instances, entering the Properties environment and then returning to the Simulation environment caused HYSYS to fail due to issues with building heat curves for the column reboiler.	This issue is fixed in V12.
461128	Some calculation modes for the Pipe Segment did not support choking calculations; however, this was not clearly indicated to users.	A warning message appears if choking is not supported for the current calculation mode. For those cases, you can use Aspen Hydraulics and/or the Mach number extension to find the choked fluid state.
463847	For the Gibbs Reactor, inconsistent results for enthalpy were reported at the same temperature and pressure conditions.	This issue is fixed in V12.
470281	When using Activated EDR Analysis, hovering over the EDR status icon caused the unit sets to change for the current exchanger.	This issue is fixed in V12.
473347	If a Rigorous EDR Air Cooler was copied and pasted without its attached streams, Aspen HYSYS stopped working	This issue is fixed in V12.
486908	HYSYS stored all available information for data transfer to Aspen Process Economic Analyzer (APEA) and Aspen Basic Engineering (ABE). Saving this information was time-consuming and resulted in slower performance.	In V12, HYSYS does not store all the available information to be transferred to APEA and ABE by default; this results in improved performance. To activate the saving option, click **Options** | **Simulation** | **File Options** and select the **Full export of ABE and APEA data on saving case** check box.
490378	The Hot Side selection for the heat exchanger was not persistent for Rigorous EDR exchangers.	This issue is fixed in V12. In addition, the **Switch Stream** button is now disabled when the heat exchanger is inside a column flowsheet, indicating to users that this is not a valid workflow.

ID	Issue Description	Issue Resolution
491875, 525212	In rare instances, copying/pasting an existing Pipe Segment and then editing the Rating information caused HYSYS to fail.	This issue is fixed in V12.
493605	When the negative friction gradient was calculated for the Pipe Segment, shear stresses were not calculated.	This issue is fixed in V12.
493678	In rare instances, when changing the number of increments for the Pipe Segment, slug flow results were inconsistent.	This issue is fixed in V12.
506908	In some instances, after changing the number format (which is located in **Region settings** in Windows) to ',' (comma), the property data transferred to Rigorous EDR and/or the calculated results were incorrect.	This issue is fixed in V12.
510831	Inconsistency errors could occur when the Tee had a very small negative flow value (smaller than 10e-16).	This issue is fixed in V12.
511087	When a Set operation was used to connect a stream inside a hidden template or sub-flowsheet to stream in another flowsheet, interacting with the streams sometimes caused HYSYS to fail.	This issue is fixed in V12.
513699	An obsolete Vessel Mole Fraction was available for selection in the PFD Data Table.	The Vessel Mole Fraction is no longer available in the PFD Data Table.
516236	In V11, the Tee only sent the properties of the inlet stream and sent them to the outlet streams according to the split fraction; if flash calculations were not performed for the outlet streams, associated electrolyte properties were not updated.	This issue is fixed in V12.
511913	HYSYS handles multiple fluid packages in a single column incorrectly when the fluid packages used different component lists.	This issue is fixed in V12.
522982	If target variable for an Adjust block used phase liquid volume flow at standard conditions(Liquid phase), and the target value was set to a Spreadsheet cell that used Liq Vol Flow as the variable type, a type mismatch warning appeared.	In V12, if both types are in the category of volumetric flow (or mass flow), a warning message does not appear.
525473	The Model Summary Grid did not accurately report Delta Pressure and Delta Temperature values for the Pipe Segment.	The variables are correctly shown in the Model Summary Grid, as well as other new available variables.

ID	Issue Description	Issue Resolution
527485	In rare instances, adding a Set operation to the case caused HYSYS to experience issues.	This issue is fixed in V12.
527876	HYSYS did not include a warning message when a mismatch between EDR and HYSYS temperatures occurred.	A message in the status bar now warns against a mismatch between EDR and HYSYS temperatures. This warning appears when the temperature difference is greater than 1 °C. When this message appears, you should review the property ranges on the EDR tab.
528439	In rare instances, HYSYS experienced issues when the file contained many Rigorous Air Coolers and/or Fired Heaters.	This issue is fixed in V12.
540846	When disconnecting streams from a Rigorous Air Cooler, in some cases, the reference to the streams were not deleted by HYSYS; this caused issues with saving the file.	This issue is fixed in V12.
547399	In rare instances, breaking a stream connection to an Absorber column caused HYSYS to fail.	This issue is fixed in V12.

BLOWDOWN Technology / Depressuring Utility

ID	Issue Description	Issue Resolution
385366	When attempting to run a case in Dynamics mode, if the **End Time** field on the Integrator was set to a finite numerical value (rather than **<Non Stop>**), the following error message appeared for the Depressuring Utility: **Step size or flows possibly too large**.	This issue is fixed in V12.
418127	Issues occurred when three BLOWDOWN unit operations attempted to perform their component mapping simultaneously.	This issue is fixed in V12.
453962	Attempting to run BLOWDOWN with an overly large and complex discharge flare network was unsuccessful.	In V12, when attempting to run BLOWDOWN in such a situation: • The status bar displays the following message: **Number of unit operations exceeds allowable limit.** • The **Run Control** tab displays **Number of unit operations connected to downstream of the orifice(s) in the discharge section exceeds allowable limit** in the **Run Status** group.

Safety Analysis

ID	Issue Description	Issue Resolution
431633	In the Safety Analysis environment, when using the Datasheets feature to transfer PRDs to Aspen Basic Engineering, the **AZ Continuous List Relief Valves** Datasheet displayed extraneous decimal places in the orifice designation.	This issue is fixed in V12.
441190	After deleting the flowsheet unit operation which owns a relief system without deleting the system itself from the database of PSV data, the system was not accessible from the Safety Analysis environment; however, it remained in the database of PSV data and still appeared in reports and datasheets.	In V12, the extra systems are deleted so that they will not appear in any reports or datasheets.
444056	In cases where the .mdb file was out of sync with the HYSYS case file, when entering the Safety Analysis environment, HYSYS sometimes failed.	This issue is fixed in V12.
445460	In some cases, opening a case created in HYSYS V10 or an earlier version that contained custom orifices in V11 caused HYSYS to fail.	This issue is fixed in V12.
450653	In the Safety Analysis environment, when performing rigorous Aspen Hydraulics line sizing in V11, for the inlet pressure drop, swage calculation settings were applied to inlet pressure drop calculations and the full pressure drop (including recoverable losses) was incorrectly included in results.	In HYSYS V12: • For the inlet pressure drop, inlet pressure drop calculations use the **Crane – Homogeneous** fitting loss method and exclude acceleration pressure drop. • The performance of the outlet pressure drop was improved, and the calculated pressure drop results are more accurate. These changes cause differences in results compared to V11.
454038	In some cases, attempting to save a HYSYS case containing Emissions Manager data as an XML file caused HYSYS to fail.	Saving an XML file is supported for HYSYS cases using Emissions Manager.
458923	After entering the Safety Analysis environment, opening a PRD form, closing and re-opening the case, and then entering the Safety Analysis environment again and saving the case as a new file, HYSYS failed when opening the new file.	This issue is fixed in V12.

ID	Issue Description	Issue Resolution
465238	In the Safety Analysis environment, when performing rigorous Aspen Hydraulics line sizing in V11, the tolerances for a HYSYS PH or PS flash were not tight enough to obtain accurate derivative-based properties over small variations in pressure for single-component systems. This reduced the accuracy of the sonic velocity calculations and line choke pressure.	In V12, flash tolerances were tightened for these flashes in the Safety Analysis environment (including for Hydraulics-based line sizing).
473517	HYSYS V11 did not allow you to fully configure inlet pipes and outlet pipe details for Rupture Disks; instead, you were only able to use equivalent lengths.	In V12, **Rating** mode is available for line sizing for Rupture Disks.
477732 , 535905	In rare cases, upgraded Safety V10 cases saved from V11 would then cause HYSYS to fail upon loading the case.	This issue is fixed in V12.
498420	In rare cases, Hydraulics line sizing calculations would erroneously fail.	This issue is fixed in V12.
503317	In rare cases, a Hydraulics line sizing calculation for a Supercritical stream that identifies as liquid phase erroneously failed.	This issue is fixed in V12.
504401	In rare cases, HYSYS failed when closing Safety forms or entering/exiting the Safety Analysis environment.	This issue is fixed in V12.
515928	Pressure drop was not applied for tees in Hydraulics line sizing, and changes in inclination angle were not handled correctly.	This issue is fixed in V12.
528069	There was an issue with required orifice area calculation in the flash table for Supercritical Fire scenarios, which could also lead to selecting the wrong relieving condition in certain scenarios. Note that only the required area within the flash table was incorrect; the required area on the scenario was calculated correctly.	This issue is fixed in V12.
534904	If the design temperature was 38 °C and the set pressure was within range, the Safety Analysis environment failed to find an API 526 valve.	This issue is fixed in V12.
538151	In Safety Analysis, when a previously calculated Control Valve Failure, Fire, or Exchanger Tube Rupture Case was then changed to user-entered/reference, the calculated orifice area was not correct.	This issue is fixed in V12.

ID	Issue Description	Issue Resolution
541676	If you changed the scenario name to include non-ASCII characters, and then selected the scenario reference stream, both the stream and calculated values appeared as empty, and the scenario name could not be changed.	In V12, HYSYS prevents you from changing the scenario name to include non-ASCII characters.
544316	Wetted area calculations for tank emergency relief for horizontal tanks were not consistent with the wetted area calculations for horizontal vessels.	The tank calculations were changed to agree with the vessel calculations.

Equation Oriented Modeling

ID	Issue Description	Issue Resolution
469398	Within the EO Sub-Flowsheet, when calculating analytical derivatives, the component mapping was incorrect; as a result, sometimes Columns that converged successfully in **Sequential Modular** mode were unable to converge in **Equation Oriented** mode.	This issue is fixed in V12.
473677	Within the EO Sub-Flowsheet, when calculating analytical derivatives, the component mapping was incorrect; as a result, sometimes Columns that converged successfully in **Sequential Modular** mode were unable to converge in **Equation Oriented** mode.	This issue is fixed in V12.
486498	When you set up a case study in HYSYS V12 using variables from a Spreadsheet and then solved the case in **Equation Oriented** mode, the case study was not updated.	This issue is fixed in V12.
511937	Sometimes the product stream exiting the EO Sub-Flowsheet was not updated after solving in **Equation Oriented** mode.	This issue is fixed in V12.
518781	Within the EO Sub-Flowsheet, unit operations and streams encountered issues when switching to **Equation Oriented** mode when the name for one of the operations contained special characters (such as “”).	In V12, the following error message appears in left panel trace window: **Name working in EO must start with an alphabetic or numeric character.**

ID	Issue Description	Issue Resolution
519964	Within the EO Sub-Flowsheet, the definition for the hot side delta temperature equation in PML was different than the definition in HYSYS SM. In PML, the hot side delta temperature equation was the outlet temperature minus the inlet temperature, whereas in HYSYS SM, the positive and negative streams could be user-specified. This discrepancy affected the Heat Exchanger and LNG Exchanger in EO when they used the delta temperature specification.	This issue is fixed in V12.
529293	When specifying the compressor outlet pressure as a constant EO variable, after solving in **Equation Oriented** mode, the Pressure Ratio changed.	This issue is fixed in V12.
546185, 546264	In a nested EO Sub-Flowsheet, an inconsistency error occurred for a Column in SM after the case solved successfully in **Equation Oriented** mode.	This issue is fixed in V12.
547203	In some cases, when efficiency was specified on the feed stage, the Column could not solve in **Equation Oriented** mode.	This issue is fixed in V12.

Aspen HYSYS Dynamics

New Features and Enhancements V12

The following new features was added in HYSYS Dynamics V12:

Dynamics Mode Supported for Columns using the Acid Gas - Chemical Solvents Property Package

Dynamics mode is now supported for columns that use the **Acid Gas - Chemical Solvents** property package. A new **Reduced Order Model** option is available on the **Enthalpy & Fugacity Models** drop-down list on the **Phase Handling** tab of the Fluid Package property view. This option provides faster performance and allows you to run Acid Gas cases in Dynamics mode.

When this option is selected, a predefined reduced order model is used for the Acid Gas simulation. This model is used for calculations in vapor and liquid phases. The properties used in the equilibrium flash (such as the fugacity coefficient of the components and phase enthalpy) are calculated using this reduced order model.

Compatibility Notes

This section describes the differences that you might encounter between HYSYS Dynamics V12 and HYSYS Dynamics V11. In most cases, previous HYSYS input files and backup files are completely compatible with HYSYS Dynamics V12.

Retired Features

Aspen OTS Framework

Aspen OTS Framework is no longer available in V12. We recommend that you use Aspen Operator Training to accomplish the same tasks instead. Aspen Operator Training supersedes and improves upon the functionalities available in Aspen OTS Framework, as well as offering additional features. For further information about Aspen Operator Training, refer to the *Aspen Operator Training Help*.

What's Fixed in Aspen HYSYS Dynamics V12

Aspen HYSYS Dynamics V12 includes a significant number of software fixes that further improve the product.

Because of the number of defects fixed is large, the section below contains a select subset of all defect fixes. If you are interested in a particular defect that you do not see listed here or want to view a more comprehensive list, contact your Support representative.

ID	Issue Description	Issue Resolution
21351	In Aspen HYSYS Dynamics, when the integration step size was too small as compared to the residence time of the Heat Exchanger, a numerical error was sometimes introduced, resulting in an energy imbalance.	If the ratio of the residence time of the Heat Exchanger and the integration step size is greater than 20, a warning message appears in the trace window once per session.
387391, 498994	The **Dynamics** tab | **Holdup** page of the Separator had a display issue where the **Aqueous** and **Liquid** labels and values were swapped with each other.	This issue is fixed in V12.
388697	On the **Monitor** tab of the Selector Block, if the input was from a Spreadsheet, the values appeared with their internal units.	In V12, if the input of Selector Block is obtained from a Spreadsheet, then its value and units are the same as those in the Spreadsheet.
399298	In HYSYS Dynamics V11, the **Close component material and energy balances** option on the Integrator was not used for calculations of holdup for Heat Exchangers.	In HYSYS V12, when this option is selected, it is applied to Heat Exchangers as well, allowing you to fix material balance errors in cases with significant phase transitions.
400909	HYSYS Dynamics performed enthalpy step calculations for the Relief Valve to determine changes in the rho, density, and pressure in order to calculate a slope to be used in **HEM** calculation method. In some cases, the slope was inaccurate, and the parameters calculated for the Relief Valve were incorrect.	In HYSYS V12, if the slope is inaccurate, an additional step of comparison to the enthalpy of the inlet stream is performed.
438646	HYSYS Dynamics V11 did not retain any modifications to the size and position of Strip Charts. Instead, each time the case was opened, the Strip Charts appeared as small floating windows.	This issue is fixed in V12.

ID	Issue Description	Issue Resolution
441486	Integration errors were only reported in the trace window the **Truncate volume integration errors** check box was selected.	In V12, integration errors are reported in the trace window even when the **Truncate volume integration errors** check box is cleared.
447734	The **Enable implicit static head calculations** check box on the Integrator seen in previous versions was not included in V11.	The **Enable implicit static head calculations** check box is available again in V12.
444733	In HSYSY Dynamics V11, the tank holdup was not initialized correctly when new components were added while pausing the integrator. Continuing the integrator after adding the components led to instability due to incorrect initialization.	This initialization logic was fixed in V12.
465080	In HYSYS Dynamics, Spreadsheet values were propagated to linked unit operations, even when the **Ignored** check box was selected for the Spreadsheet.	Specifications are no longer updated when the **Ignored** check box is selected for the Spreadsheet.
473248	In HYSYS Dynamics, in some cases, the Integrator was unable to run due to a change to the handling of compressor and pump inertia in V11, where the calculation of the dN/dt term (differentiation of speed with respect to time) was modified.	In HYSYS V12, the calculation of the dN/dt term is handled the same as in V10.
474197	In HYSYS Dynamics V11, the behavior of the **Fail to Open** and **Fail to Close** malfunction scenarios for the Relief Valve did not match customer expectations.	In V11 CP1, these scenarios were changed to **Relief Valve Delay to Open** and **Relief Valve Delay to Close**. • For the **Relief Valve Delay to Open** scenario, when the inlet pressure of the Relief Valve exceeds the set pressure, the opening of the valve is delayed by the user-specified amount of time. • For the **Relief Valve Delay to Close** scenario, when the inlet pressure of the Relief Valve exceeds the set pressure, the closing of the valve is delayed by the user-specified amount of time.
485812	In Aspen HYSYS Dynamics, in the Event Scheduler's Configuration window, the **Current SP** value was not updated in real-time while the Integrator was running.	This issue is fixed in V12.

ID	Issue Description	Issue Resolution
503275	In HYSYS Dynamics cases, for the Pipe Segment: • The HTC was dependent on the pipe length. • The Reynold's number was calculated incorrectly.	This issue is fixed in V12.
504069	In rare instances, clearing the **Ignored** check box for a Pipe Segment and attempting to run the case in Dynamics mode caused HYSYS to fail.	This issue is fixed in V12.
511976	In HYSYS V11, the default value for **the K Value Damp Factor** for the Valve was 0.05.	The default value was corrected to 0.95 in HYSYS V12.
544352	HYSYS failed when importing a Dynamics template with multiple component lists.	This issue is fixed in V12.

Aspen HYSYS Upstream

Product Description

HYSYS Upstream™ extends the upstream capabilities of the HYSYS simulation environment in two main areas:

- Thermodynamics: HYSYS Upstream extends HYSYS capabilities using the key upstream thermodynamic methods, Black Oils and PVT.
- Hydraulics: HYSYS Upstream delivers mechanisms for integrating with production field models with built-in industry-leading well and flowline modeling tools including PIPESIM from Schlumberger, Aspen Hydraulics, and OLGA from Scandpower.

Using HYSYS Upstream allows consistent thermodynamics and models across an integrated asset. These holistic models create powerful tools to make better decisions on Oil and Gas assets to improve the return on capital.

New Features and Enhancements V12

There are no new features or enhancements listed for this release.

Compatibility Notes

There are no compatibility notes listed for this release.

What's Fixed in Aspen HYSYS Upstream V12

Aspen HYSYS Upstream V12 includes a significant number of software fixes that further improve the product.

Because of the number of defects fixed is large, the section below contains a select subset of all defect fixes. If you are interested in a particular defect that you do not see listed here or want to view a more comprehensive list, contact your Support representative.

ID	Issue Description	Issue Resolution
407805	Dynamics cases using the HYSYS-OLGA Link were unable to integrate beyond 500,000 seconds of simulation time.	This issue is fixed in V12.
412665	When using the HYSYS-OLGA Link, disconnecting and reconnecting HYSYS streams to Boundaries/Sources in OLGA multiple times could add extra blank rows to the stream connection matrices.	This issue is fixed in V12.
473379	For the OLGA Link, attempting to connect the OLGA inlet sometimes resulted in the following error message for a boundary stream: **The source name is not valid**.	This issue is fixed in V12.
480828	For an Aspen Hydraulics case that included a Complex Pipe with ~250 pipe segments, performance was slow when adding or deleting pipe segments.	In V12, the performance is improved in such cases.

Aspen HYSYS Petroleum Refining

Product Description

Aspen HYSYS Petroleum Refining is an integrated multi-user environment allowing engineers to store, share, and process multiple unit operation and petroleum refinery simulation data.

Aspen HYSYS Petroleum Refining adds advanced features to HYSYS that dramatically improve simulation refinery-wide. Aspen HYSYS Petroleum Refining provides the technology framework to support steady state process design, dynamic operability and management, asset planning and utilization.

New Features and Enhancements V12

The following new features and enhancements were added in release V12:

- New Resid Hydroprocessor Unit
- Delayed Coker Enhancements
- New Molecule-Based Reactor Builder
- HYSYS Petroleum Refining Troubleshooting Guidance
- FCC Best Practices Guidance
- General Refining Enhancements
- Aspen Assay Management Improvements

New Resid Hydoprocessor Unit

A new Resid Hydroprocessor unit is available in HYSYS V12. The Resid Hydroprocessor is similar to the Hydrocracker, except for the following features:

- Handling of Concarbon and Metals: The Resid Hydroprocessor predicts the Concarbon, Nickel, and Vanadium content of the product stream and models catalyst deactivation due to metals.
- Support for parallel reactors within the system: The **Single Stage Parallel** option places the reactors in parallel. Each parallel reactor has a separate feed; however, all reactors share a common high-pressure separator, where the liquid product is separated from the recycle hydrogen. This enables higher inputs and processing amounts.
- Four common Resid Hydroprocessor configurations are available in Aspen HYSYS:
  - Single Stage Resid Hydroprocessor (with reactors arranged in a series)
  - Single Stage Resid Hydroprocessor (with reactors arranged in parallel)
  - Two Stage, One HPS Hydrocracker
  - Two Stage, Two HPS Hydrocracker

Delayed Coker Enhancements

The Delayed Coker now includes the following additional product properties:

- **CCR**: The addition of this property reduces tuning time substantially. Only applicable for Light Gas Oil or Medium Gas Oil.
- **RON**: Only applicable for naphtha cuts.
- **MON**: Only applicable for naphtha cuts.
- **Cetane Index**: Only applicable for Light Gas Oil or Medium Gas Oil.
- **Flash Point**: Only applicable for naphtha cuts.
- **Pour Point**: Only applicable for Light Gas Oil or Medium Gas Oil.
- **HHV**: High heating value for the coke.
- **LHV**: Low heating value for the coke.

The Delayed Coker also includes the following improvements for V12:

- When adding a Delayed Coker to the flowsheet, you can opt to use enhanced separation. When this option is selected, a short-cut distillation column is used to calculate liquid distillate products.
- This option allows you to simultaneously tune the delayed coker and the built-in fractionator system. The fractionator system is designed as semi-VLE (vapor-liquid equilibrium) system. It includes a set of flash units for the bottom, which are used to estimate the CCR% of the recycle bottom oil and the contributions from operating conditions (for example, wash oil and temperatures of bottom flash).
- For **Enhanced Separation Mode**, you can specify the Combined Feed Volume Ratio, Bottom Separation Inlet Temperature, and Fresh Feed to Bottom Separation Ratio in the **Bottom Separation Specifications** group.
- The new **Feed CCR to Coking Alpha** and **Feed CCR to Coking Coefficients** fields let you specify the activity for Concarbon that affects coking pathways. These parameters are used to tune the coke yield response to the feed CCR. You can adjust these values to make the response stronger or weaker.
- The **Calibrate PONA Basis** drop-down list lets you select the desired PONA basis (**Volume Basis** or **Weight Basis**).
- You can now use the **PONA Specific Gravity Curves** dialog box to view and/or edit the base curves for the Standard Gravity of the PONA fractions by boiling point.
- You can select the basis on which to report the yields: **Fresh Feed Basis** or **Total Feed Basis**. Also, for the **Normal** Separation Mode, in the **Fresh Feed SG** field, you can specify the fresh feed specific gravity.
- The Delayed Coker now reports the **Furnace Total Heat Load** (energy input to the furnace / total heat duty) and the **Furnace outlet lump composition** (compositions of the furnace outlet stream in terms of kinetic lumps).

New Molecule-Based Reactor Builder

HYSYS V12 includes a new tool called the Molecule-Based Reactor Builder. This tool is available on the **Simulation** tab | **Model Configuration** page of the Molecule-Based Reactor. The Molecule Based Reactor Builder is intended for advanced users with expertise in refining chemistry and modeling.

The Molecule-Based Reactor Builder lets you:

- Use the Molecule-Based Reactor framework to implement your own kinetic models in Aspen HYSYS.
- Load your chemistries, reactions, and kinetics into the Molecule-Based Reactor in Aspen HYSYS.
- Convert your reaction network and species to an Equation Oriented-based reactor model without needing to perform any hard coding.

AspenTech provides a set of predefined files, including configuration files used to define the reactor network, species and property definitions, reactions, rate laws, property estimation, and user-defined variables.

HYSYS Petroleum Refining Troubleshooting Guidance

The *Aspen HYSYS Help* now provides specific troubleshooting guidance for convergence and calibration issues occurring in Aspen Petroleum Refining.

FCC Best Practices Guidance

The *Aspen HYSYS Help* now includes detailed best practices guidance in areas such as designing the FCC, specifying catalyst data, advanced tuning parameters, FCC feed characterization, and product properties.

General Refining Enhancements

- For the FCC, the **Reactor Section** tab | **Advanced** page and **Operation** tab | **Advanced** page both include a new **Naphtha Delumping Factor** field , which allows for different rates of change for the light naphtha and the heavy naphtha with changes in the naphtha yield. The default factor is 2, which means the very lightest part of the naphtha (155 °F) will change at two times the rate of the very heaviest part of the naphtha (430 °F). If you consider that response to be too strong or too weak, you can edit this factor.
- **TBP** is now an available **Specification Type** for Refining Short-Cut Columns. If you select the **TBP** radio button on the **Design** tab | **Specs** page, you can directly specify the true boiling point cuts. This simplifies integration between Aspen Assay Management and PIMS.
- The FCC catalyst database was improved in V12. The catalyst factors that are automatically delivered (available in the **\Aspen HYSYS\RefSYS\refreactor\FCC\catlibrary** folder) were updated. New catalyst factors obtained from Refining Process Services (RPS) are now available. Additionally, obsolete catalyst factors were removed.
- You can optionally choose to bypass a small amount of feed to certain reactors within the Catalytic Reformer by specifying the fraction or mass flow that will bypass each individual reactor.
- For the Molecule-Based Reactor, you can opt to use the Attribute Reaction Model (ARM). This model reduces the number of variables, resulting in faster performance and more efficient and robust predictions. The ARM will model the attributes or pieces of the molecules, such as sidechains, 1-ring aromatic cores, and 2-ring aromatic cores. By using the attributes rather than the molecules, the number of reaction equations is greatly reduced.

Aspen Assay Management Improvements

Custom Libraries Available in HYSYS

In HYSYS V12, you can add custom Aspen Assay Management libraries. Custom assay libraries are managed using the **Manage Custom Libraries** form. You can create, add, modify, delete, and remove custom assay libraries. Initially, the **Manage Custom Libraries** form contains the System Custom Assay Library provided by AspenTech.

- Additional custom assay libraries can reside on a personal computer as well as on any computer or server on the network. People who have access to the server or to the computer where the libraries reside can access any library file.
- Data in the built-in Aspen Assay Library cannot be updated directly. However, you can bring any assay you want to update into the Model Assays environment and modify it using more recent data. You can then re-characterize the assay and save it to your own custom assay library.

Ability to Match Whole Crude Properties, Assay Cut Properties, or Both on a Property-by-Property Basis

In past versions, you could choose to **Match Whole Crude Properties** or **Match Cut Properties** when performing the characterization process. However, for some properties, matching the cut properties produces more accurate and relevant results, while for other properties, whole crude properties are the best choice.

In V12, Aspen Assay Management allows you to specify which option to prioritize on a property-by-property basis when performing the characterization process. Both the **Characterize Assay** split button on the **Input Assay** form and the **Characterize** split button on the **Assay Management** ribbon tab were transformed into regular buttons. Instead, the **Options** tab now contains a **Property Match Setting** table. This table allows you to select whether to match assay cuts, whole crudes, or match both for each individual property by clicking the **Cut**, **Bulk**, or **Both** radio button in the associated row.

Improved Consistency Between Inputs and Results

In V12, a number of improvements were made to ensure consistency between inputs and results for Aspen Assay Management.

- In previous versions of HYSYS, the **IBP cut point** and **FBP cut point** specified on the **Assay Settings** dialog box were only used by the D86 distillation method. In HYSYS V12, all distillation methods (TBP, D86, D1160, and D2887) use the values specified on this form.
- While Aspen Assay Management V11 consistently matched between the 5% and 95% distillation points, the 0% and 100% points did not always match correctly. In V12, the 0% and 100% distillation points successfully match the input data for whole crude cuts. For TBP, D86, and D1160 curve types, the inputs will match the 0% and 100% distillation points. The D2887 conversion method stops at 5%, and the 0% distillation point is not used to calculate the TBP curve; as a result, for D2887 curve types, the 5%, 95% and 100% distillation points will match the inputs.
- The TBP, D86, D2887, and D1160 distillation results shown on the **Distillation** tab of the **Conventional Results** form will now match those shown on the **Results** tab | **Boiling Curves** page of a Petroleum Assay Analysis attached to the assay stream.

Improved Handling of GC (Gas Chromatography) Components

- In HYSYS V12, new mappings were added between additional properties in the HYSYS Simulation environment and Aspen Assay Management. For further details, refer to "Additional GC Property Mappings between Aspen Assay Management and HYSYS" in the *Compatibility Notes for Aspen HYSYS V12* topic.

- The labels on the **Options** tab of the **Input Assay** form were updated to describe the available options more clearly. The label for the **Component consistency** drop-down list was changed to **GC component treatment**. The labels for the options were updated as well:
  - **Match lab measurement** is now **Properties of hypos**.
  - **Enforce consistency on pure component** is now **Separate Components**.
- A new **Lightest GC** drop-down list was added. This drop-down list lets you customize the definition of GC (Gas Chromatography) pure components by specifying the cutoff point between light ends and GC components. The drop-down list contains each pure component in the component list that has a boiling point greater than 36 °C. The default selection is the lightest component that has a boiling point greater than 36 °C (usually n-Pentane).
  - Components that are lighter than the selected component are treated as **Separate Components** in the simulation flowsheet.
  - Components that are heavier than the selected component are treated as **Properties of hypos** and will not have individual composition values in the flowsheet.

Access to Commercial Library Data

Starting in V12, Aspen Assay Management provides access to Chevron's comprehensive, popular, and respected crude assay library database. The Chevron Assay Library includes more than 2500 assays for over 1000 unique crudes and provides licensed users with an unparalleled capability for modeling crude distillation operations. Combining the capabilities of Aspen Assay Management with the Chevron Assay Library provides more accurate evaluations of crude purchase choices and plant operations.

You can acquire the Chevron Assay Library that can be used in AspenTech’s products from Equinox Software and Services Pvt. Ltd., India (EQNX). Equinox will directly provide independent contracting, licensing, and delivery of the Chevron Assay Library to AspenTech customers.

To learn more about using commercial library data, click **Commercial Library** on the **Manage Custom Libraries** dialog box or the **Add Assays** dialog box. On the **Commercial Library** dialog box, you can click **Commercial Library Information** to open an Aspen Knowledge Base item describing how licensed users can purchase commercial assay libraries.

Distillation Improvements

When converting a distillation method to TBP, there is a maximum allowable temperature difference for which the conversion is valid. When the difference is greater than this value, the delta must be separated into several steps. The **Use Temperature Limits for Distillation Conversions check** box is now available on the **Assay Settings** dialog box, allowing you to apply temperature limits. When this check box is selected, if the distillation input exceeds the deltas specified in the following references, the conversion splits into separate terms:

- For ASTM D86: "Procedure 3A1.1: Interconversion of ASTM D86—TBP Distillations at Atmospheric Pressure." *API Technical Data Book, Sixth Edition*, p. 3-7 (1994).
- For ASTM D2887: "Procedure 3A1.1: Conversion of Simulated ASTM D2887 to True Boiling Point Distillation at Atmospheric Pressure." *API Technical Data Book, Sixth Edition*, p. 3-13 (1994).

Selecting this check box will ensure that your results are consistent with those provided by Oil Manager. When the check box is cleared, the method from V11 and earlier versions will be used, and your results will be consistent with those seen in previous versions.

Backblending Usability Improvements

The **BackBlending** form was redesigned to improve usability. The workflow for this form was also updated to be more intuitive.

In HYSYS V11, the **BackBlending** form contained two separate tabs: a **Light Streams** tab and a **Heavy Streams** tab. In HYSYS V12, these tabs were combined into a single form, with separate columns for each stream. To add streams, click **Click to Add Stream** on the column header. The

Set New Stream dialog box lets you specify whether each cut is a Light Stream or a Heavy Stream.

Also, you can now easily define pure components for Heavy Streams.

Improvements to Handling of Hypothetical Components

In previous versions, component lists for assays needed to contain both pure components and hypothetical components, rather than only hypothetical components. HYSYS V12 allows you to define hypothetical components in the light end range for assays. Component lists containing only hypothetical components are now supported for assays.

Improved Consistency between Molecular Characterization and Molecule Based Reactor Properties

In V11, when the same assay was viewed on the Molecular Methods form and attached to a stream in the HYSYS flowsheet, differences in properties sometimes occurred. This was caused by certain large molecules that were not transferred from Molecular Characterization to the Molecule Based Reactor. Molecular information that was too light or too heavy was lost. Now, both large molecules and small molecules (from HC, S1, and N1 classes) are transferred from Molecular Characterization to the Molecule Based Reactor. Results matching for all carbon and temperature ranges is supported. Assay properties and stream properties should now match when the Molecular Characterization parameters are set for low carbon distribution.

In V12, Molecular Characterization results and Molecule Based Reactor results are significantly more consistent. This includes the conservation of materials and properties during transitions. An updated list of Molecular Characterization / Molecule Based Reactor molecules is used to transfer information from Molecular Characterization to Molecule Based Reactors. As a result, the properties for Molecular Characterization and the Molecule Based Reactor will match significantly better for light end cuts , including the following properties:

- Distillation Properties
- CarbonBywt
- NitrogenByWt
- SulfurByWt
- OxygenByWt
- AromByWt
- NaphthenesByWt
- StdLiquidDensity
- KinematicViscosity
- Reid Vapor Pressure
- ConradsonCarbonByWt
- MONClear
- RONClear
- CetaneNumber

In V12, the size of the Molecule Based Reactor library was increased. You can also now select the molecule library used to perform molecular characterization for an assay using the **Molecule Library** drop-down list the **Assay Management** ribbon tab | **Molecular Methods** group.

Ability to Export Assays to Aspen Plus Input Files

You can export characterized assays to input (.inp) files, which can be opened within Aspen Plus. The generated input files are compatible with Aspen Plus V10 and later versions. When you open the exported .inp file in Aspen Plus, the following information is specified within the **Assay/Blend** object manager in the Properties environment based on your specifications in Aspen Assay Management:

- Distillation yield curve data (on the **Basic Data** form | **Dist Curve** sheet)

- Property curve data (on the **Property Curves** form)

Aspen Assay Management Enhancements

- The new **Viscosity Fitting Method** drop-down list on the **Option** tab of the **Input Assay** form allows you to choose the viscosity fitting method used during characterization. The **Linear Fit** method matches the viscosity using a spline fit on the index values of the input and then shifts property values to match more closely. The **Linear Regression** method ensures that the log-log fit is linear and the viscosity curve is smoother.
- In V12, you can modify the temperature range for the **Edit Formula** panel. You can either select the **Current Cut** option to use the temperature range of the cut used by the property or specify the **Initial Temperature** and **Final Temperature**.
- In V12, you can display the distillation curve by non-cumulative yield percentage in the Distillations plot by selecting the **Non-Cumulative Composition** check box.
- In V12, you can use the **Display Overlapped Cut** option to display the overlapped cuts in an assay in the Properties plot.

Compatibility Notes

This section describes the differences that you might encounter between HYSYS Petroleum Refining V12 and HYSYS Petroleum Refining V11. In most cases, previous HYSYS files are completely compatible with HYSYS Petroleum Refining V11.

Treatment of Assay Characterization Options

In V12, the **Characterize Assay** split button on the **Input Assay** form and the **Characterize** split button icon on the **Assay Management** ribbon tab were transformed into regular buttons. Instead, the **Options** tab now contains a **Property Match Setting** table. This table allows you to select whether to match assay cuts, whole crudes, or match both for each individual property by clicking the **Cut**, **Bulk**, or **Both** radio button in the associated row.

By default, when you open a case created in a previous version in HYSYS V12, the **Bulk** radio button is selected for all properties.

Updated Labels on Options Tab

On the **Options** tab of the **Input Assay** form, the label for the **Component consistency** drop-down list was changed to **GC component treatment**. The labels for the options were updated as well:

- **Match lab measurement** is now **Properties of hypos**.
- **Enforce consistency on pure component** is now **Separate Components**.

Elimination of Tabs on BackBlending Form

In HYSYS V11, the **BackBlending** form contained two separate tabs: a **Light Streams** tab and a **Heavy Streams** tab. In HYSYS V12, these tabs were combined into a single form, with separate columns for each stream.

If you open a case created in a previous version in HYSYS V12, the cuts listed on the **Light Streams** and **Heavy Streams** tabs will appear as separate columns within the **BackBlending** form.

- Data from the **Light Streams** tab will be included in **Light Stream** columns.
- Data from the **Heavy Streams** tab will be included in **Heavy Stream** columns.
- Pure component values specified on the **Light Streams** tab will be carried over to the **Heavy Stream** columns.

Additional GC Property Mappings between Aspen Assay Management and HYSYS

In HYSYS V12, new mappings were added between the following properties in the HYSYS Simulation environment and in Aspen Assay Management.

Aspen Assay Management Name	HYSYS Name	GC (Gas Chromatography) Property
n-C11	n-C11	Pn C11 n-C11 Wt Pct
n-C11	n-C11	Pn C11 n-C11 Vol Pct
6-Carbon-Olefins	N/A	On C6 Wt Pct
6-Carbon-Olefins	N/A	On C6 Vol Pct
7-Carbon-Olefins	N/A	On C7 Wt Pct
7-Carbon-Olefins	N/A	On C7 Vol Pct
8-Carbon-Olefins	N/A	On C8 Wt Pct
8-Carbon-Olefins	N/A	On C8 Vol Pct

When an assay is characterized and attached to a stream in the HYSYS Simulation environment, if you click **View Properties** on the **Worksheet** tab | **Composition** page of the stream and then select one of the updated properties, property values now appear for the hypothetical components.

Changes to Assay Settings

In HYSYS V11, streams with petroleum assays attached and Petroleum Assay Analyses were inconsistently calculated based on different IBP and FBP values.

- The **IBP cut point** and **FBP cut point** values specified on the Assay Settings dialog box were applied for D86 assay calculations.
- The values from stream correlations available from the Correlation Manager were sometimes used.
- Internal HYSYS values were sometimes used.

This led to inconsistent distillation results.

In HYSYS V12, the **IBP cut point** and **FBP cut point** values specified on the **Assay Settings** dialog box are used for all distillation method calculations. The only exception is for the stream correlations, where the Correlation Manager values will override the Assay Settings if they are within the Assay Settings range (that is, the Correlation Manager IBP is greater than the Assay Settings IBP or the Correlation Manager FBP is less than the Assay Settings FBP). Since the IBP is used to calculate kinetic lumps for HYSYS Petroleum Refining, you may notice differences in results.

Note: You may notice differences in results compared to V11 on the **Results** tab | **Molecular Information** page of the Petroleum Assay Analysis if both of the following conditions are met:

- Distillation input data is specified for the assay.
  -and-
- Molecular data has been loaded on the **Advanced Analytical** tab of the **Molecular Methods** form.

Improved Consistency Between Inputs and Results

While Aspen Assay Management V11 consistently matched between the 5% and 95% distillation points, the 0% and 100% points did not always match correctly. In V12, the 0% and 100% distillation points successfully match the input data for whole crude cuts. For TBP, D86, and D1160 curve types, the inputs will match the 0% and 100% distillation points. The D2887 conversion

method stops at 5%, and the 0% distillation point is not used to calculate the TBP curve; as a result, for D2887 curve types, the 5%, 95% and 100% distillation points will match the inputs.

Viscosity Overlapping Cut Fitting

Previously, only the longest chain of continuous cuts was considered when calculating the kinematic viscosity for overlapping cuts during conventional characterization. In V12, a new algorithm is applied:

- If cuts overlap, but only one of the cuts has viscosity input data, then the viscosity input data should be matched even though the cut overlaps with other cuts.
- If both overlapping cuts have viscosity input values, then the cut that is part of the larger non-overlapping chain will be matched. The viscosity input value of the other cut will be ignored.

Example:

Here is an input summary table for an assay. The A cut overlaps with the Heavy Naphtha cut.

Input Summary | Pure Component | Distillation Data | Option

	Whole Crude	Butane and Lighter	Lt. Naphtha	Hvy Naphtha	Kerosene	Diesel	Vacuum Gas Oil	Vacuum Residue	A	Click to Add Cut
Initial Temperature: (C)	IBP	IBP	15.5556	73.8889	165.5556	248.8889	343.3333	537.7778	80.0000	
Final Temperature: (C)	FBP	15.5556	73.8889	165.5556	248.8889	343.3333	537.7778	FBP	200.0000	
StdLiquidDensity (kg/m3)	768.3592	571.4182	653.4319	759.8672	803.6672	844.6988	884.5935	965.0631		
CarbonByWt (%)	85.659	82.581	83.748	86.077	85.988	86.305	86.318	86.455		
HydrogenByWt (%)	14.222	17.419	16.252	13.923	14.002	13.515	13.134	12.584		
PourPoint (C)	-65.045			-85.827	-51.436	-10.445	35.148	40.797		
TotalAcidNumber (mg...	0.020	0.000	0.001	0.005	0.040	0.035	0.042	0.066		
SulfurByWt (%)	0.113	0.000	0.000	0.001	0.010	0.176	0.493	1.143		
KinematicViscosity (cSt)...	1.357	0.401	0.485			5.937	64.378	50687.618	0.700	
KinematicViscosity (cSt)...	1.028	0.346	0.408	0.602	1.275	3.645	25.528	5865.765		
KinematicViscosity (cSt)...	0.910	0.325	0.378			2.976	17.591	2455.840	0.500	
MercaptanSulfurByWt (...	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
NitrogenByWt (%)	0.018	0.000	0.000	0.012	0.005	0.005	0.055	0.221		
ConradsonCarbonByWt...	0.382						0.075	15.415		

During the characterization:

- If the Heavy Naphtha cut has no kinetic viscosity input value but the A cut does, then the kinematic viscosity input value for the A cut will be matched.
- If both cuts have kinetic viscosity input values, since the Heavy Naphtha cut is continuous with the rest of the cuts, the kinematic viscosity input value of the Heavy Naphtha cut will be matched, and the kinetic viscosity input value for the A cut will be ignored.

You will encounter differences in Properties and Simulation results and better transfer in V12.

Improved Handling of Light Pure Component Viscosity Values

In versions prior to V12, the lower limit for the predicted value of kinematic viscosity is 0.2 cSt. When the predicted value is below 0.2, then 0.20001 will be used as the kinematic viscosity value. This may cause the bulk viscosity to be lower than it should be.

Starting in V12, if the predicted value for kinematic viscosity is lower than 0.2, it will be left empty to ensure a better bulk viscosity prediction.

Note: This only applies to conventional characterization.

Fine Tune Algorithm

When using Aspen Assay Management, an error in the Fine Tune algorithm caused hidden or removed molecules to be included. This led to unexpected results when molecular characterization was performed. In HYSYS V12, this error was fixed.

Improved Octane Number Results

In Assay Management V12, the Molecular Characterization feature includes significant improvements to Octane Number results based on updates to corresponding physical properties and correlations.

Retired / Deprecated Features

ASW Front-End and ASW Dataset Editor are no longer available in Aspen HYSYS V12. However, the newer streamlined Excel-based Planning Model Update (PMU) workflow supersedes and improves upon the functionalities offered by the ASW Front-End and ASW Dataset Editor. We recommend that you use the PMU workflow to accomplish the same tasks that would be previously performed using these tools.

PMU templates for FCC units, Catalytic Reformers, and Hydrocrackers are available through the AspenTech Support Center (https://esupport.aspentech.com). These templates allow you to calibrate your HYSYS model to plant data from Excel, use the HYSYS rigorous model to run simulations (also referred to as predictions) from Excel, and run case studies to examine the effect of perturbations of individual variables. You can compare input and results for various data sets, create LP base and shift vectors for the LP submodel update, and track HYSYS and LP model predictions closely against plant data. You can also configure your own planning model update tools and quickly create new data sets.

The PMU templates can be automatically configured to match any possible reactor configuration in HYSYS. These templates provide a customizable Excel interface, so you can add as many additional inputs or pull as many results from HYSYS to Excel as you want. They are highly customizable, allowing you to link input or results variables from anywhere in your flowsheet, pull the convergence status after a simulation run, and change units.

For further information, refer to the *Aspen HYSYS Petroleum Refining Planning Model Update (PMU) Template User's Guide*, which is available on the Support site.

HYPlan Models (Deprecated)

In V12, the creation of HYPlan models has been deprecated and replaced with the new Hybrid Model operation.

What's Fixed in V12

Aspen HYSYS Petroleum Refining V12 includes a significant number of software fixes that further improve the product.

Because of the number of defects fixed is large, the section below contains a select subset of all defect fixes. If you are interested in a particular defect that you do not see listed here or want to view a more comprehensive list, contact your Support representative.

A selected list of the most important fixes is included, highlighting particular areas of interest.

Aspen HYSYS Petroleum Refining

ID	Issue Description	Issue Resolution
121380	The FCC did not offer a convenient way to control the change in heavy naphtha independent of the change in light naphtha.	A new **Naphtha Delumping Factor** field was added for the FCC in V12. This field allows for different rates of change for the light naphtha and the heavy naphtha with changes in the naphtha yield.

ID	Issue Description	Issue Resolution
429817	Adding or removing streams from the Petroleum Shift Reactor after loading the associated CME file sometimes caused HYSYS to fail.	This issue is fixed in V12.
462739	On the column plots for the Boiling Point Assay, the values for the liquid portion of the stage were incorrect. The TBP Curve of the vapor was reported instead.	This issue is fixed in V12
462871	The FCC only reported the PONA curve values for the basis on which they were calibrated.	In V12, the PONA curve values are reported on both a volume and a weight basis.
465729	The Delayed Coker did not appropriately account for the distillate recycle feed in the mass balance.	This issue is fixed in V12.
469626	The **Bromine Number [%]** correlation appeared as **<empty>.**	The **Bromine Number [%]** correlation value is reported correctly.
469974	When attempting to run pre-calibration or calibration for a two-stage Hydrocracker, in some instances, the case was unable to converge, and a message indicated that the calibration ratio factor was not specified.	This issue is fixed in V12.
472891	The Validation Wizard for the FCC displayed the mass flows for an additional feed.	In V12, the Validation Wizard for the FCC displays the mass flows for only the fresh feeds, as expected.
475185	The Catalytic Reformer sometimes used the thermodynamics data when the feed had a property slate/altered thermodynamic properties.	This issue is fixed in V12.
480975	Distillation curves were inconsistent between the Refining Short-Cut Column Rigorous Calibration results and the Petroleum Assay Analysis results for the product stream.	A correction was made to the initialization performed for the top stage.
483616	Adding certain Catalytic Reformer, FCC, or Hydrocracker variables to a Case Study via either drag and drop or the **Send To** | **Case Studies** option caused HYSYS to fail when the case study was run	This issue is fixed in V12.
486467	In some instances, when a Petroleum Shift Reactor was linked to a Spreadsheet, updating the values on the Spreadsheet did not cause the Petroleum Shift Reactor to solve.	This issue is fixed in V12.
492322	The pressure response for the Delayed Coker drum was often observed to be too small.	For V12, a pressure activity was added for coke and light ends so that the response can be tuned to match expectations.

ID	Issue Description	Issue Resolution
496495	The FCC Delumper included components that did not come from the oil feed.	The FCC Delumper was updated to exclude components that did not come from the oil feed. Prior to V12, this could lead to small differences in boiling ranges for the product compared to what was calibrated.
502341	If not all of the product streams had been specified for a Refining Short-Cut Column, and then some of the product names were changed, attempting to perform rigorous calibration sometimes caused HYSYS to fail.	This issue is fixed in V12.
526209	In rare instances prior to V12, the product heater was very difficult to converge for the HCR.	For V12, this was changed to a single phase to improve the model stability.

Assay Management in HYSYS

ID	Issue Description	Issue Resolution
385247	On the Assay Management user interface, when the default distillation units were changed, the results display did not update accordingly.	This issue is fixed in V12.
403426	Accessing the Distillation plot when the **95%** Distillation value was blank on the **Distillation Data** tab caused the application to fail.	This issue is fixed in V12.
430694	In cases where Assay Manager predicted very low compositions for certain components, some viscosity properties were not calculated properly, leading to the reporting of infinite values for viscosity.	This issue is fixed in V12.
430891	In HYSYS V11, streams with petroleum assays attached and Petroleum Assay Analyses were inconsistently calculated based on different IBP and FBP values. • The **IBP cut point** and **FBP cut point** values specified on the **Assay Settings** dialog box were applied for D86 assay calculations. • The values from stream correlations available from the Correlation Manager were sometimes used. • Internal HYSYS values were sometimes used. This led to inconsistent distillation results.	In HYSYS V12, the **IBP cut point** and **FBP cut point values** specified on the **Assay Settings** dialog box are used for all distillation method calculations. The only exception is for the stream correlations, where the Correlation Manager values will override the Assay Settings if they are within the Assay Settings range (that is, the Correlation Manager IBP is greater than the Assay Settings IBP or the Correlation Manager FBP is less than the Assay Settings FBP). Since the IBP is used to calculate kinetic lumps for HYSYS Petroleum Refining, you may notice differences in results.

ID	Issue Description	Issue Resolution
469985	When converting an assay from Oil Manager to Assay Management, if the assay contained multiple hypothetical component groups, and **Use Existing Fluid Package** was selected on the **Oil to Assay Manager Conversion** dialog box, the distillation results were sometimes incorrect. If you converted from the Simulation environment, the existing fluid package was always used.	In V12, a warning message appears in this scenario, notifying you that you should convert the assay from within the Properties environment.
469984	The first column on the **Distillation Data** tab did not support copying and pasting multiple rows of data.	The **Distillation Data** tab fully supports copying and pasting multiple rows of data.
469988	If a Boiling Point Curves Analysis was already created for a stream, and then an assay was attached to the stream, the Boiling Point Curves Analysis was not deactivated as expected.	In such cases, the Boiling Point Curves Analysis does not solve and displays the following error message: **Stream composition from Petroleum Refining Assay. Please use Petroleum Assay Utility instead.**
470005	When copying and pasting streams that include a property slate but no attached assay, HYSYS encountered issues.	HYSYS automatically converts the property slate to an assay.
480642	The distillation data in the Petroleum Assay Analysis was incomplete for streams with solid phases.	In V12, solids are treated like water and are removed in this situation; the properties are calculated based on the other components.
486916	Importing from a crude template in V10 did not work if the cut vectors (columns) in the template were formulas, rather than static values.	This issue is fixed in V12.
503474	When using the **BackBlending** option for assay characterization, the following properties blending calculations did not provide the expected results: Sulfur, Nitrogen and Conradson Carbon. As a result, the total whole crude properties value reported on the **Conventional Results** form was incorrect.	The objective function for contaminant properties now uses the correct evaluation method, and this issue is fixed.
503583	In some Assay Management cases, negative molecular weight values were reported for hypothetical components.	This issue is fixed in V12.
505526	The gross heating value reported within the assay results and the results for a material stream with the assay attached sometimes differed from the data on the **Input Assay** form.	For V12, the same correlation is used for calculations in both areas.

ID	Issue Description	Issue Resolution
512567	When printing a datasheet for a Petroleum Assay Analysis, D1160 data was not included.	This issue is fixed in V12.
523889	Import a .afam case with user properties with names longer than 12 characters caused HYSYS to fail.	The 12-character restriction for user property names was removed.

Aspen HYSYS Thermodynamics COM Interface

Product Description

Aspen HYSYS Thermodynamics COM Interface is a user-friendly application for advanced thermodynamic calculations. It uses the COMThermo Engine for all thermophysical property and phase equilibrium calculations. Aspen HYSYS Thermodynamics COM Interface provides the essential tools to research and create the best possible Fluid Packages for use in your engineering applications by fitting model parameters to laboratory measurements and analyzing the quality and suitability of the models.

New Features and Enhancements in V12

There are no new features or enhancements listed for this release.

Compatibility Notes for V12

There are no compatibility notes listed for this release.

Exchanger Design and Rating

This section describes the New Features for the Aspen Exchanger Design and Rating applications, which include the following:

- New Features and Enhancements for the Exchanger Design and Rating Programs
- Exchanger Design and Rating Integration with Aspen HYSYS and Aspen Plus
- Aspen Air Cooled Exchanger
- Aspen Coil Wound Exchanger
- Aspen Fired Heater
- Aspen Plate Exchanger
- Aspen Plate Fin Exchanger
- Aspen Shell & Tube Exchanger
- Aspen Shell & Tube Mechanical
- Aspen HTFS Research Network

Exchanger Design and Rating Programs V12

Description

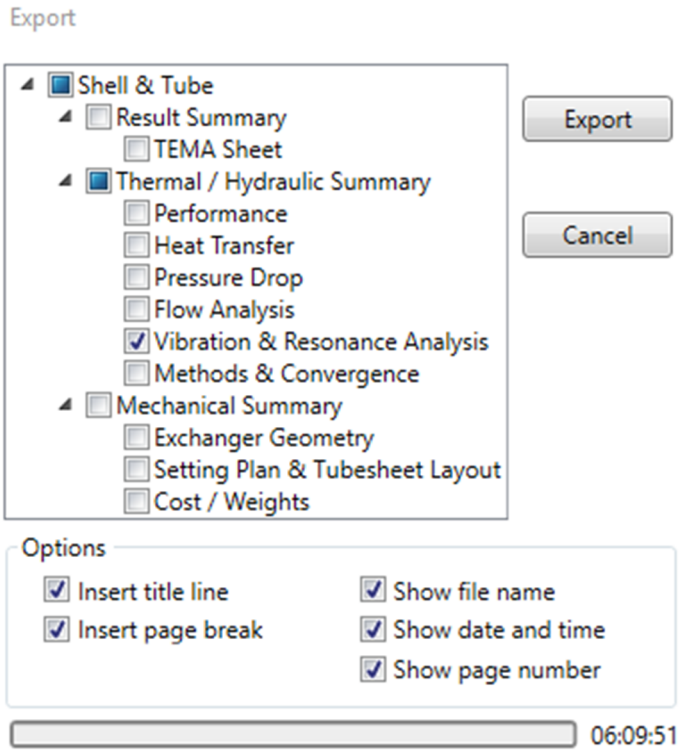
The Aspen Exchanger Design & Rating (EDR) suite includes a number of programs for the thermal design, mechanical design, cost estimation, and drawings for heat exchangers and pressure vessels.

New Features and Enhancements in V12

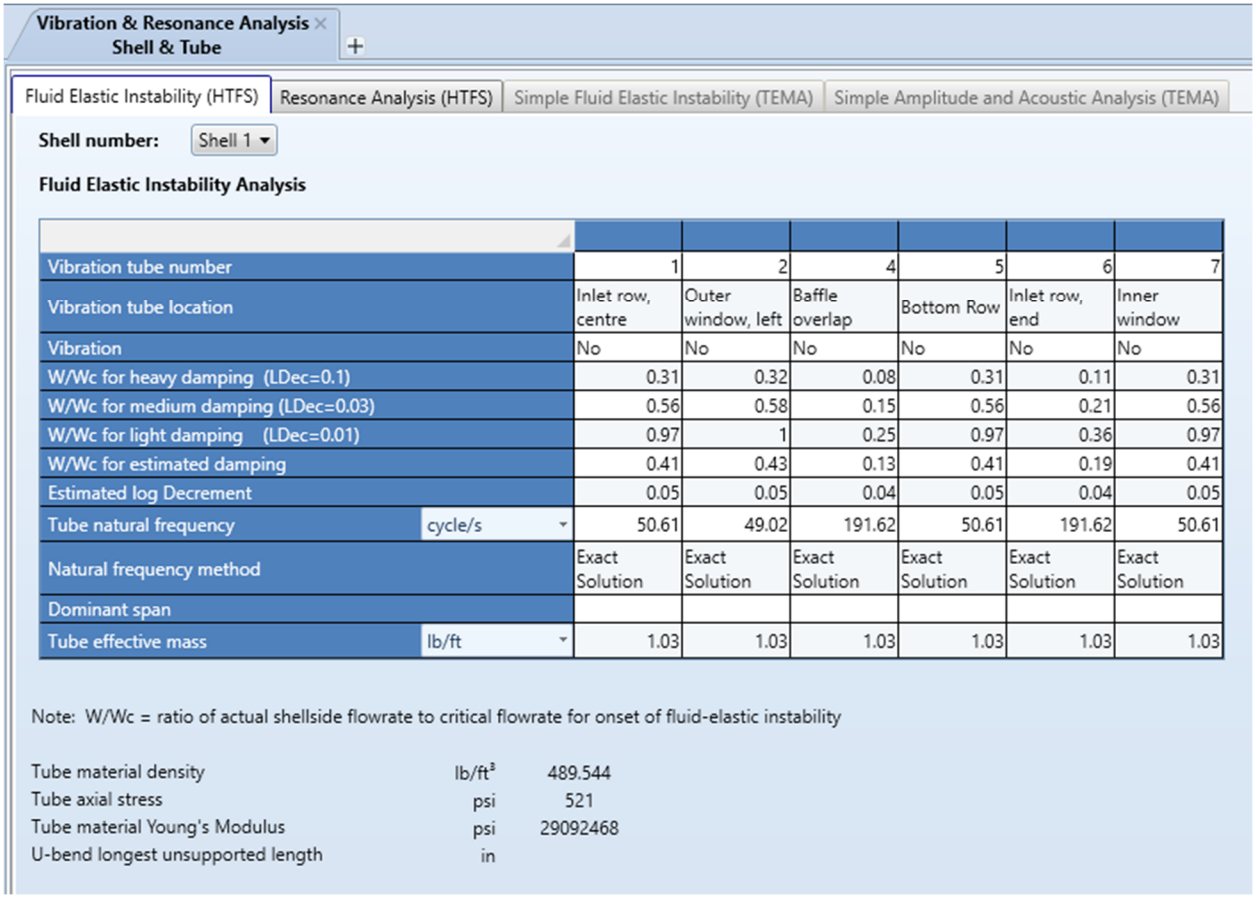
Improved Word Export

The export to word functionality for all main EDR programs has been improved. Additional results forms are now available to export and the layout of the exported word file will more closely match the layout of the results form. The export selection dialog is now structured in the same way as the program's navigation tree.

Select a node to export the data on the corresponding result form.



The exported word document will have the same data shown in the results form.



Vibration & Resonance Analysis
Shell & Tube

Fluid Elastic Instability (HTFS) | Resonance Analysis (HTFS) | Simple Fluid Elastic Instability (TEMA) | Simple Amplitude and Acoustic Analysis (TEMA)

Shell number: Shell 1

Fluid Elastic Instability Analysis

Vibration tube number		1	2	4	5	6	7
Vibration tube location		Inlet row, centre	Outer window, left	Baffle overlap	Bottom Row	Inlet row, end	Inner window
Vibration		No	No	No	No	No	No
W/Wc for heavy damping (LDec=0.1)		0.31	0.32	0.08	0.31	0.11	0.31
W/Wc for medium damping (LDec=0.03)		0.56	0.58	0.15	0.56	0.21	0.56
W/Wc for light damping (LDec=0.01)		0.97	1	0.25	0.97	0.36	0.97
W/Wc for estimated damping		0.41	0.43	0.13	0.41	0.19	0.41
Estimated log Decrement		0.05	0.05	0.04	0.05	0.04	0.05
Tube natural frequency	cycle/s	50.61	49.02	191.62	50.61	191.62	50.61
Natural frequency method		Exact Solution	Exact Solution	Exact Solution	Exact Solution	Exact Solution	Exact Solution
Dominant span							
Tube effective mass	lb/ft	1.03	1.03	1.03	1.03	1.03	1.03

Note: W/Wc = ratio of actual shellside flowrate to critical flowrate for onset of fluid-elastic instability

Tube material density	lb/ft^3	489.544
Tube axial stress	psi	521
Tube material Young's Modulus	psi	29092468
U-bend longest unsupported length	in	

Fluid Elastic Instability Analysis (HTFS)

Shell Number 1

Vibration tube number		1	2	4
Vibration tube location		Inlet row, centre	Outer window, bottom	Baffle overlap
Vibration		No	No	No
W/Wc for heavy damping (LDec=0.1)		0.03	0.03	0.01
W/Wc for medium damping (LDec=0.03)		0.05	0.06	0.02
W/Wc for light damping (LDec=0.01)		0.08	0.11	0.04
W/Wc for estimated damping		0.04	0.06	0.02
Estimated log Decrement		0.04	0.04	0.04
Tube natural frequency	cycle/s	195.73	195.73	441.86
Natural frequency method		Exact Solution	Exact Solution	Exact Solution
Dominant span				
Tube effective mass	lb/ft	1.51	1.51	1.51

Vibration tube number		5	6	8
Vibration tube location		Bottom Row	Inlet row, end	Outer window, top
Vibration		No	No	No
W/Wc for heavy damping (LDec=0.1)		0.02	0.03	0.04
W/Wc for medium damping (LDec=0.03)		0.03	0.05	0.07
W/Wc for light damping (LDec=0.01)		0.05	0.08	0.12
W/Wc for estimated damping		0.03	0.04	0.06
Estimated log Decrement		0.04	0.04	0.04
Tube natural frequency	cycle/s	195.73	195.73	195.73
Natural frequency method		Exact Solution	Exact Solution	Exact Solution
Dominant span				
Tube effective mass	lb/ft	1.51	1.51	1.51

Note: W/Wc = ratio of actual shellside flowrate to critical flowrate for onset of fluid-elastic instability

Tube material density	489.544	lb/ft^3
Tube axial stress	3703	psi
Tube material Young's Modulus	29675110	psi
U-bend longest unsupported length		in

Compatibility Notes for V12

This section describes the differences that you might encounter between Aspen EDR V12 and Aspen EDR V11.1.

EDR V12 integrates *only* with Aspen Plus V12 and Aspen HYSYS V12. This means *only* EDR V12 models can be integrated in Aspen Plus V12 and Aspen HYSYS V12 flowsheets.

Aspen Air Cooled Exchanger

Product Description

Aspen Air Cooled Exchanger (AirCooled) is a program for the Design, Rating/Checking, and Simulation of air coolers and other tubular crossflow heat exchangers. The program can be used standalone by the thermal specialist for exchanger design or as an integrated product with AspenTech's steady-state process simulation programs Aspen Plus and Aspen HYSYS.

When used as a stand-alone program in design mode, AirCooled can determine the optimum heat exchanger configuration that satisfies the specified heat duty, allowable pressure drop, and/or maximum velocity. AirCooled can find a design with the air flowrate specified or it can optimize the air flow and the exchanger surface area requirement. The program can also be used to check and rate heat exchangers for required process duties and has various simulation modes to calculate the expected performance of a geometrically-specified exchanger.

When integrated with Aspen Plus or Aspen HYSYS, AirCooled provides engineers with the ability to rigorously model heat exchanger operation and identify capital saving opportunities in the overall process configuration. Bottlenecks can be identified, process improvements can be modeled for various process operating scenarios, and costly maintenance schedules can be optimized.

New Features and Enhancements for V12

The following new features and enhancements were added in release V12:

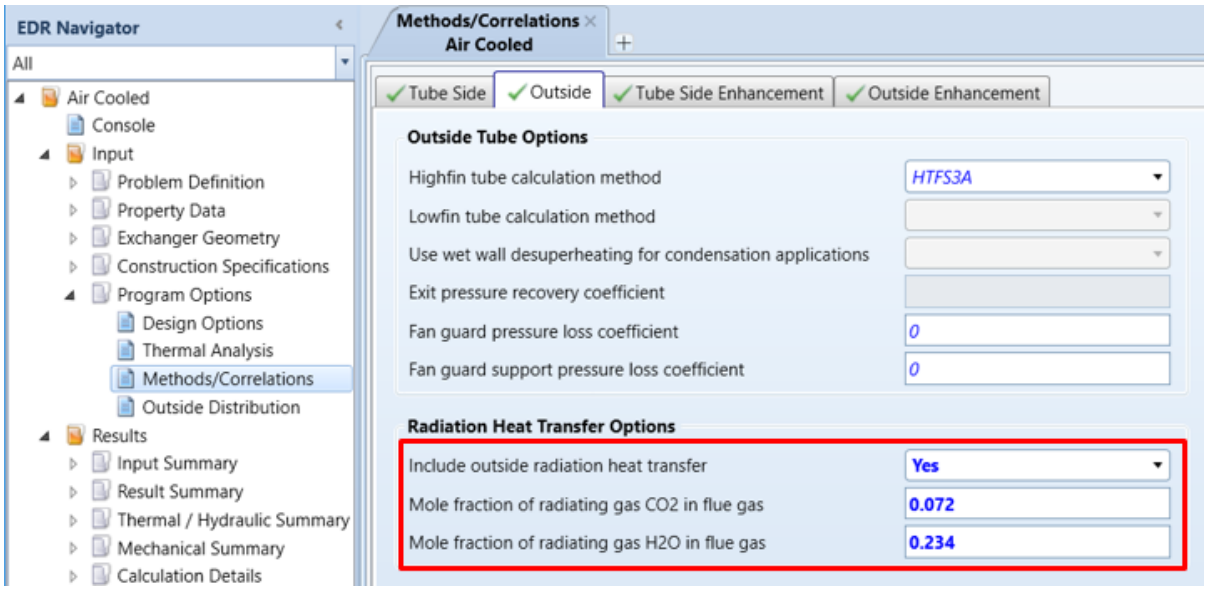
- Improve radiative heat transfer model for heat recovery bundles
- HTRI Xace dbo file conversion
- Add tube surface option (smooth or commercial) on the friction factor calculation
- Add scaling factors of outside pressure drop
- Improve the tube layout diagram to show different tube types

Improve radiative heat transfer model for heat recovery bundles

When you select Yes for "Include outside radiation heat transfer" in the | Input | Program Options | Methods/Correlations | Outside tab, the two new inputs will be enabled for entering the user-specified values. They are Mole fraction of CO2 in flue gas and Mole fraction of H2O in flue gas. More details can be found in the online help. Please note that the input of the Mole fraction of radiating gases in flue gas in V11.1 or prior to it is phased out in V12. Below are compatibility notes for the versions prior to V12:

1 For an AirCooled file containing a user-specified value of the Mole fraction of radiating gases in flue gas, the program in V12 or after will transfer this value to the Mole fraction of radiating gas CO2 in flue gas and use a default value (0.00001) of the Mole fraction of radiating gas H2O in flue gas.

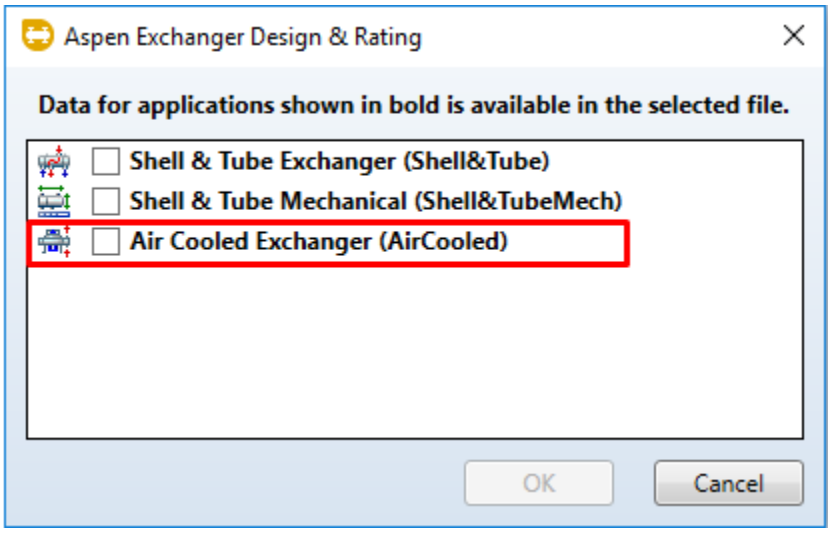
2 For an AirCooled file containing a default value (0.22) of the Mole fraction of radiating gases in flue gas, the program in V12 or after will use default values for Mole fractions of CO2 (0.12) and H2O (0.10).



HTRI Xace dbo file conversion

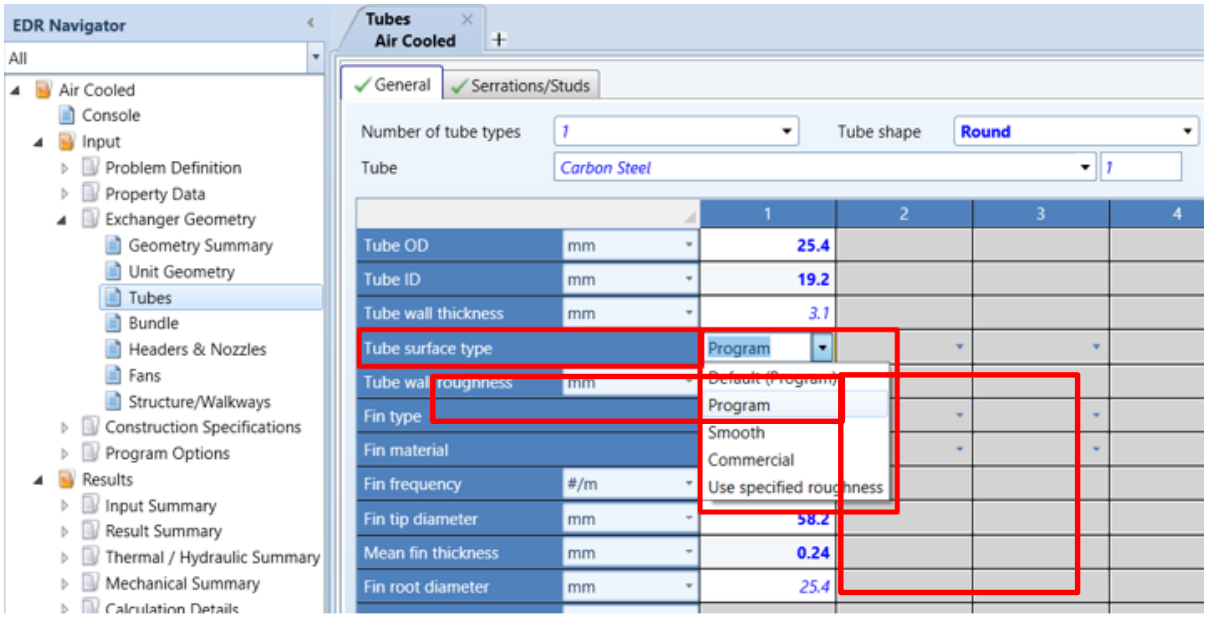
Like converting HTRI dbo files to Aspen Shell & Tube Exchanger and Aspen Shell & Tube Mechanical, now you can convert HTRI Xace dbo files to Aspen AirCooled program.

From the main program menu, Select File | Open. Choose the option HTRI output file (*.DBO) in the Files of Type dropdown menu and click Open button. The Aspen Exchanger Design & Rating window will be displayed to allow user to select AirCooled application for the file conversion.



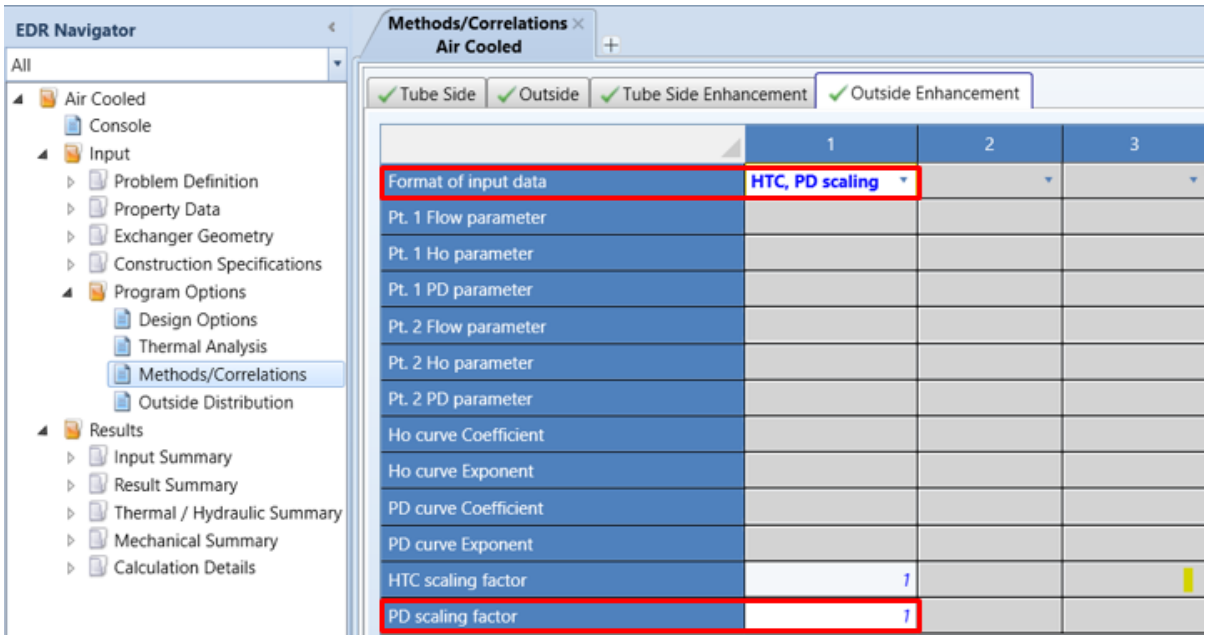
Add tube surface option on the friction factor calculation

The relative roughness of the inside tube surface affects the calculated tube side pressure drop. Similar to Aspen Shell & Tube Exchanger, this feature is to allow you to select their desired tube surface option for calculating tube side friction factor or friction pressure drop.



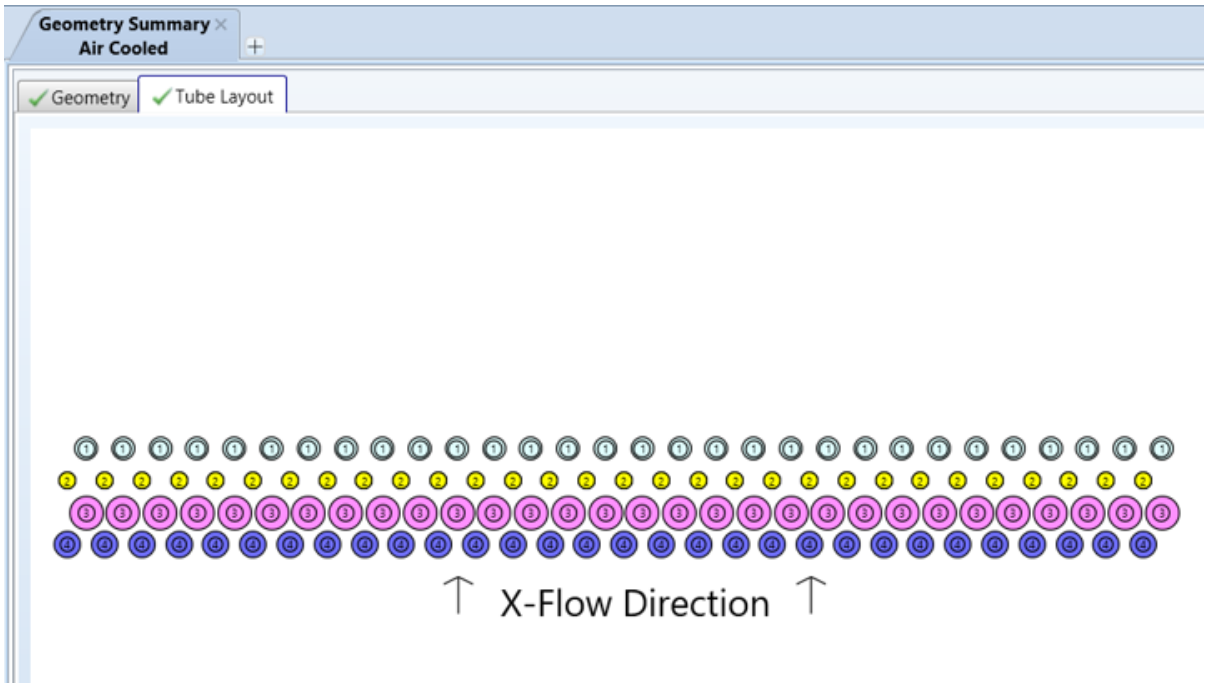
Add scaling factors of outside pressure drop

The option is to allow you to specify scaling factor(s) for matching expected outside pressure drop.



Improve the tube layout diagram to show different tube types

Now you can view the improved tube layout diagram with different tube types such as finned tube and plain tubes.



Compatibility Notes for V12

Aspen Air Cooled Exchanger V12 can be installed and used at the same time as V11.1 and other previous versions of Aspen Air Cooled Exchanger.

64-bit EDR

Aspen Air Cooled Exchanger V12 is 64-bit and must be used with 64-bit Aspen Plus and Aspen Properties. Air Cooled Exchanger V12 can use either Aspen Properties V11 or V12, depending on which version is registered. Air Cooled Exchanger V12 will automatically use the registered 64-bit of Aspen Properties if an earlier 32-bit version of Aspen Properties is registered.

Air Cooled Exchanger V12 can only import from Aspen Plus V11 or V12. If you try to import from a 32-bit version of Aspen Plus you will get an error that EDR is unable to create the Aspen Plus data extraction component. Because of differences in architectures, Air Cooled Exchanger V12 can import from any version of Aspen HYSYS, including 32-bit versions (V8.8, V9.0, V10).

Air Cooled Exchanger V12 integrates *only* with Aspen Plus V12 and Aspen HYSYS V12. This means *only* Air Cooled Exchanger V12 models can be integrated in Aspen Plus V12 and Aspen HYSYS V12 flowsheets.

What's Fixed in V12

ID	Issue Description	Issue Resolution
536212	Fix B-JAC Propylene Glycol mixture description to mol % based rather than wt %	This issue has been fixed in V12.
520321	Report correct values for Tube Length and Bundle Length when US units are selected in Multi Service spreadsheet	This issue has been fixed in V12.

ID	Issue Description	Issue Resolution
503018	Display the correct form name in input warning message 8103	This issue has been fixed in V12.
480112	Display the correct variable description (X-side inlet pressure) in warning/error message	This issue has been fixed in V12.
453554	Provide a result warning message when the radiation heat transfer model is used with no CO2 or H2O	This issue has been fixed in V12.
399891	Display the correct results in Tubeside Detailed plot from viewing "Averaging Row" or "Averaging Pass"	This issue has been fixed in V12.
398456	Improve limit extrapolation of molecular weight to avoid getting input checking error	This issue has been fixed in V12.

Aspen Fired Heater

Product Description

Aspen Fired Heater is for the simulation and rating of furnaces and fired heaters. The program calculates heat transfer and other key parameters in a variety of tube configurations in both box and cylindrical fireboxes using the well stirred, imperfectly stirred or long-furnace models. In addition, the heat transfer in up to nine convection banks can be handled.

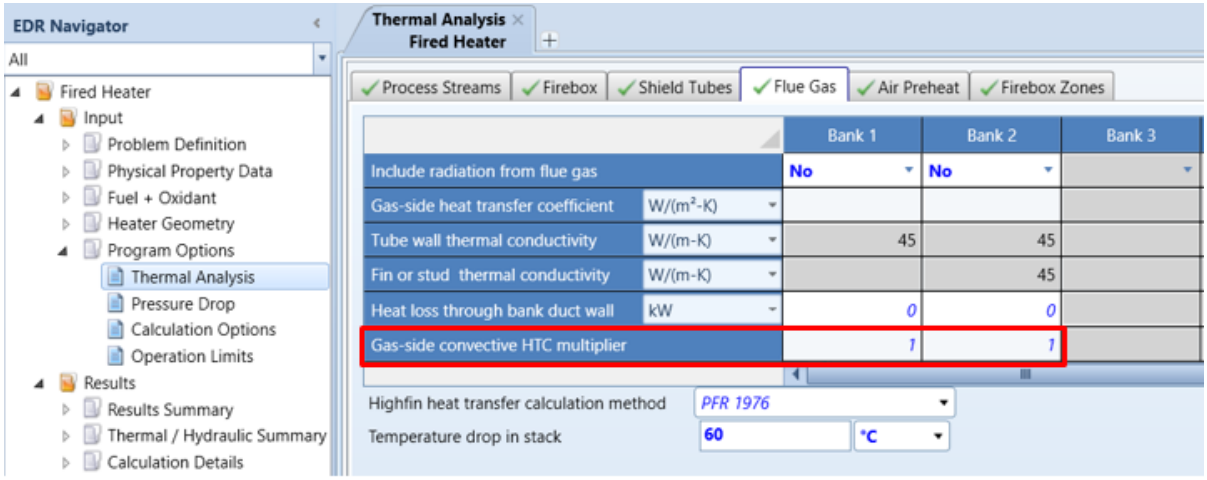
New Features and Enhancements

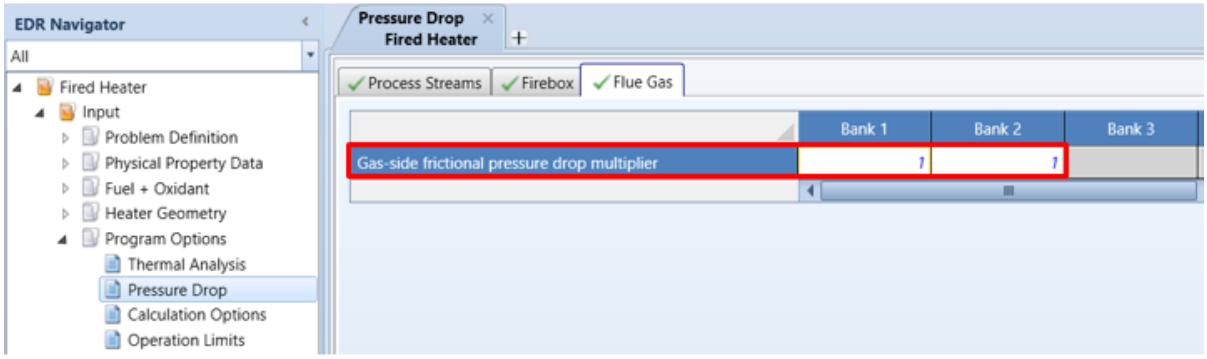
The following new features and enhancements are added in release V12:

- Add scaling factors for gas-side heat transfer coefficient and gas-side pressure drop
- Add gas-side acid dew point

Add Scaling Factors for Gas-Side Heat Transfer Coefficient and Gas-Side Pressure Drop

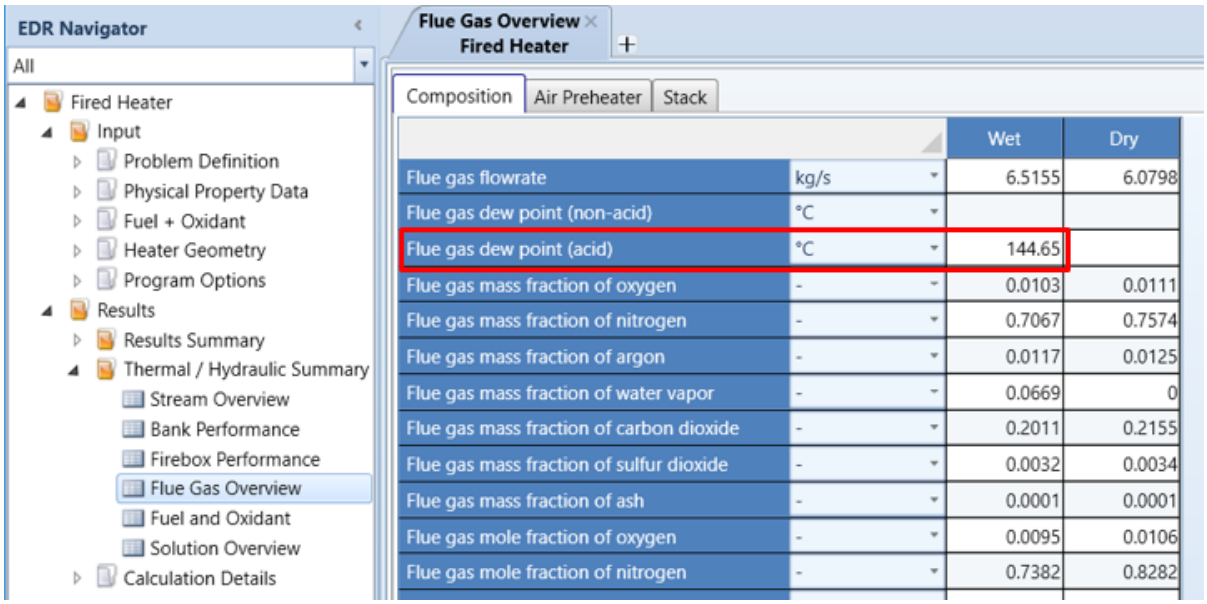
Now you can specify scaling factor(s) for matching expected gas-side heat transfer coefficient or/and gas-side pressure drop.





Add Gas-Side Acid Dew Point

You can review the gas-side (flue gas) acid dew point from the Results folder. The calculated value is based on the guideline in E.6.2.1 Recommend Minimum Metal Temperatures (Figure E-4) of API Standard 560 Fired Heaters for General Refinery Service, 3rd Ed.



Compatibility Notes for V12

Aspen Fired Heater V12 can be installed and used at the same time as V11.1 and other previous versions of Aspen Fired Heater.

Fired Heater V12 is compatible with all 64-bit versions (V12 and V11) of Aspen Properties.

64-bit EDR

Aspen Fired Heater V12 is 64-bit and must be used with 64-bit Aspen Properties. Fired Heater V12 can use either Aspen Properties V11 or V12, depending on which version is registered. Fired Heater V12 will automatically use the registered 64-bit of Aspen Properties if an earlier 32-bit version of Aspen Properties is registered.

Aspen Fired Heater V12 can only import from Aspen Plus V11 or V12. If you try to import from a 32-bit version of Aspen Plus you will get an error that EDR is unable to create the Aspen Plus data extraction component. Because of differences in architectures, Aspen Fired Heater V12 can import from any version of Aspen HYSYS, including 32-bit versions (V8.8, V9.0, V10).

Aspen Fired Heater V12 integrates only with Aspen HYSYS V12. This means only Aspen Fired Heater V12 models can be integrated in Aspen HYSYS V12 flowsheets.

What's Fixed in V12

ID	Issue Description	Issue Resolution
533695	Fix convection section solution error calculation reported in Solution Overview	This issue has been fixed in V12.
535313	Fix HYSYS flue gas stream outlet pressure to be the same as the flue gas or oxidant stream inlet pressure	This issue has been fixed in V12.
528439	Fix a crash when multiple rigorous Fired Heater models are running at the same time in HYSYS	This issue has been fixed in V12.
518760	Improve patching of vapor mass fraction values in physical property tables	This issue has been fixed in V12.
445712	Fix mismatch stream heat duty reported in FiredHeater Summary and Stream Overview	This issue has been fixed in V12.
436286	Fix firebox stream mass velocity and velocity reported in Stream Details	This issue has been fixed in V12.

Aspen Plate Exchanger

Product Description

Aspen Plate Exchanger enables the optimum design, rating, and simulation of plate and frame heat exchangers.

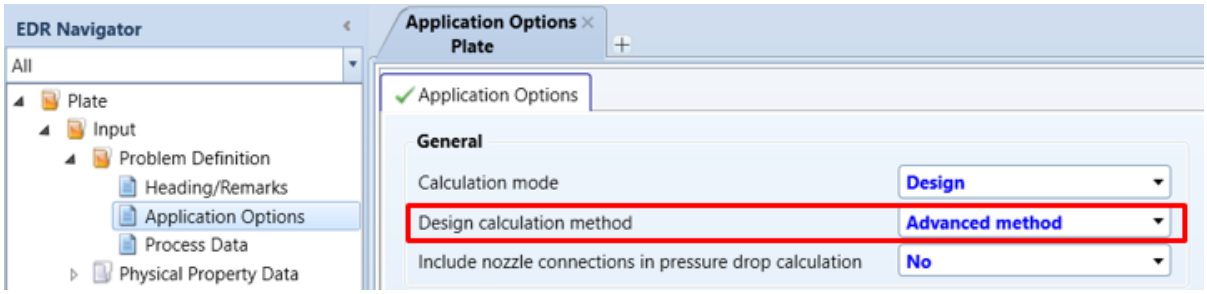
New Features and Enhancements V12

The following new features and enhancements were added in release V12:

- Design using full checking
- Allow specify nozzles to account for total pressure drop

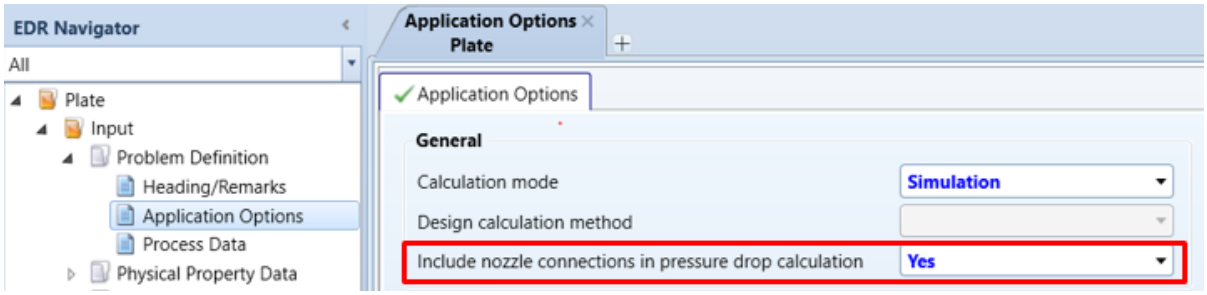
Design Using Full Checking

Now you can select the design with full checking algorithm (Advanced method) that would run the checking mode calculation for each design plate geometry to provide more consistent results between Design mode and Rating / Checking mode (using design conditions and design geometry) especially for the phase-change application.

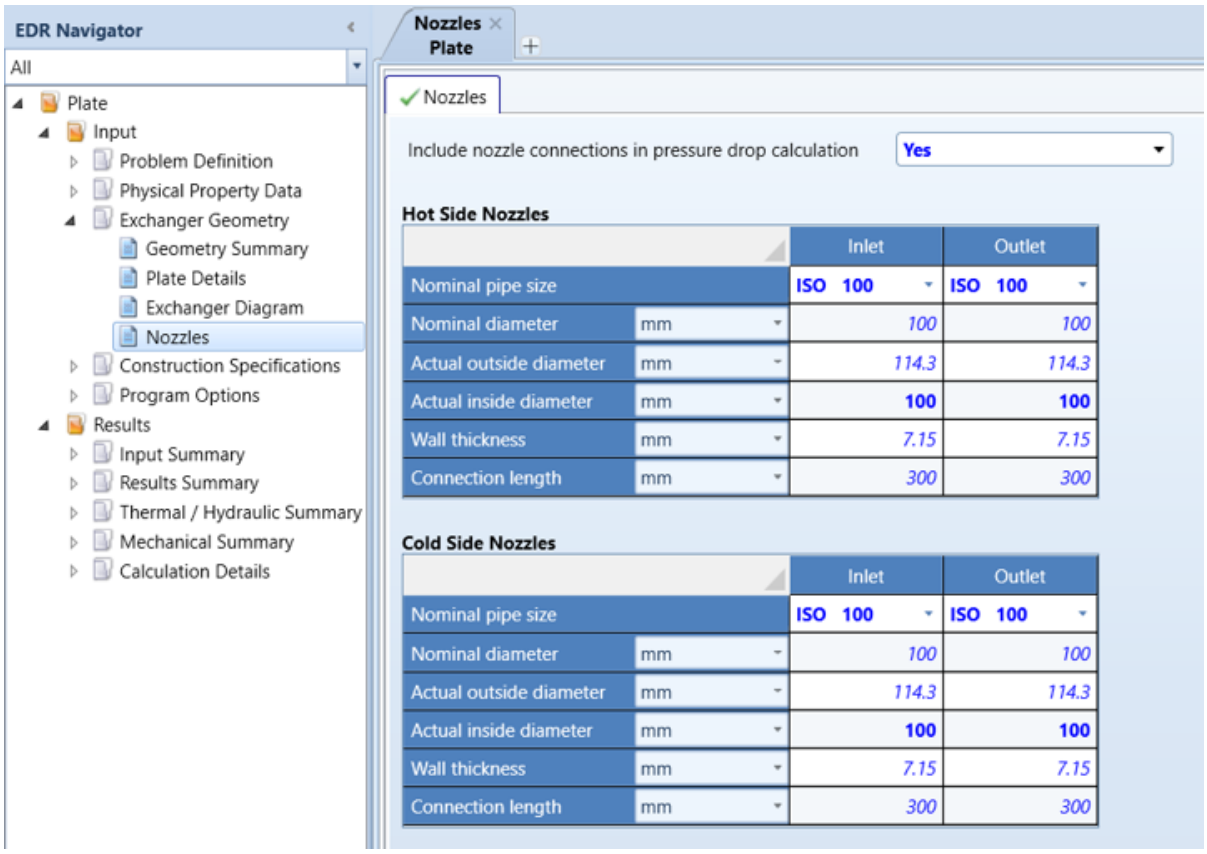


Allow Specify Nozzles to Account for Total Pressure Drop

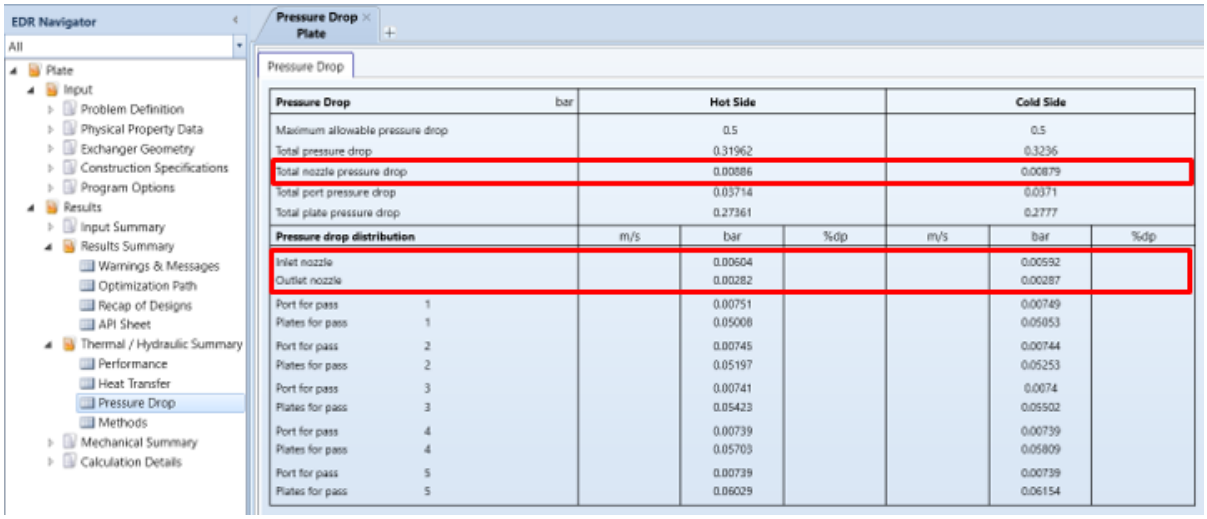
Now you can specify nozzle sizes to account for total pressure drop for cold-side (CS) and hot-side (HS) streams by selecting Yes for Include nozzle connection in pressure drop calculation from | Input | Problem Definition | Application Options | Application Options tab.



You can enter CS and HS nozzle sizes from | Input | Exchanger Geometry | Nozzles | Nozzles tab.



You can also view the calculated total HS and CS nozzle pressure drops as well as HS and CS inlet/outlet nozzle pressure drops from | Results | Thermal / Hydraulic Summary | Pressure Drop tab.



Compatibility Notes for V12

Aspen Plate Exchanger V12 can be installed and used at the same time as V11.1 and other previous versions of Aspen Plate Exchanger.

64-bit EDR

Aspen Plate Exchanger V12 is 64-bit and must be used with 64-bit Aspen Plus and Aspen Properties. Aspen Plate Exchanger V12 can use either Aspen Properties V11 or V12, depending on which version is registered. Aspen Plate Exchanger V12 will automatically use the registered 64-bit of Aspen Properties if an earlier 32-bit version of Aspen Properties is registered.

Aspen Plate Exchanger V12 can only import from Aspen Plus V11 or V12. If you try to import from a 32-bit version of Aspen Plus you will get an error that EDR is unable to create the Aspen Plus data extraction component. Because of differences in architectures, Aspen Plate Exchanger V11 can import from any version of Aspen HYSYS, including 32-bit versions (V8.8, V9.0, V10).

Aspen Plate Exchanger V12 integrates *only* with Aspen Plus and Aspen HYSYS V12. This means *only* Aspen Plate Exchanger V12 models can be integrated in Aspen Plus and Aspen HYSYS V12 flowsheets.

What's Fixed in V12

ID	Issue Description	Issue Resolution
487743	Fix the viscosity of the non-Newtonian fluid reported in API sheet	This issue has been resolved in V12.

Aspen Plate Fin Exchanger

Product Description

Aspen Plate Fin Exchanger lets you simulate the performance of plate-fin heat exchangers. It simulates either the large brazed aluminum cores used for cryogenic duties (up to 20 process streams), or units in other metals used for duties at ambient temperatures or above. It also provides facilities for doing a "first shot" design of this type of exchanger and for modeling thermosiphon reboilers.

New Features and Enhancements for V12

No new features or enhancements are listed for this release:

Compatibility Notes for V12

Coexistence

Aspen Plate Fin Exchanger V12 can coexist with versions V11.1 and earlier.

64-bit EDR

Aspen Plate Fin Exchanger V12 is 64-bit and must be used with 64-bit Aspen Plus and Aspen Properties. Aspen Plate Fin Exchanger V12 can use either Aspen Properties V11 or V12, depending on which version is registered. Aspen Plate Fin Exchanger V12 will automatically use the registered 64-bit of Aspen Properties if an earlier 32-bit version of Aspen Properties is registered.

Aspen Plate Fin Exchanger V12 can only import from Aspen Plus V11 or V12. If you try to import from a 32-bit version of Aspen Plus you will get an error that EDR is unable to create the Aspen Plus data extraction component. Because of differences in architectures, Aspen Plate Fin

Exchanger V12 can import from any version of Aspen HYSYS, including 32-bit versions (V8.8, V9.0, V10).

Aspen Plate Fin Exchanger V12 integrates *only* with Aspen HYSYS V12. This means *only* Aspen Plate Fin Exchanger V12 models can be integrated in Aspen HYSYS V12 flowsheets.

What's Fixed in V12

ID	Issue Description	Issue Resolution
240928	Fix so that all fins for a stream are the same height in design mode.	This issue has been fixed in V12.
402694	Display geometry results in Mechanical Summary for streams specified as "No flow (ignore)".	This issue has been fixed in V12.
449045	Added an error message that crossflow streams cannot have multiple main inlets at the different axial lengths.	This issue has been fixed in V12.
432321	Fix crash with cases that have 17 or more streams.	This issue has been fixed in V12.
476939	Fix HYSYS case not opening properly.	This issue has been fixed in V12.

Aspen Shell & Tube Exchanger

Product Description

Aspen Shell & Tube Exchanger (Shell&Tube) is a program for the Design, Rating/Checking and Simulation of shell and tube, double pipe, and multi-tube hairpin heat exchangers. The program can be used standalone by the thermal specialist for exchanger design or as an integrated product with AspenTech's steady-state process simulation programs Aspen Plus and HYSYS.

When used as a stand-alone program in design mode, Shell&Tube can determine the optimum heat exchanger configuration that satisfies the specified heat duty, allowable pressure drop, and/or maximum velocity. The program can also be used to check and rate heat exchangers for required process duties.

When integrated with Aspen Plus or HYSYS, Shell&Tube provides engineers with the ability to rigorously model heat exchanger operation and identify capital saving opportunities in the overall process configuration. Bottlenecks can be identified, process improvements modeled for various process operating scenarios, and costly maintenance schedules optimized.

New Features and Enhancements V12

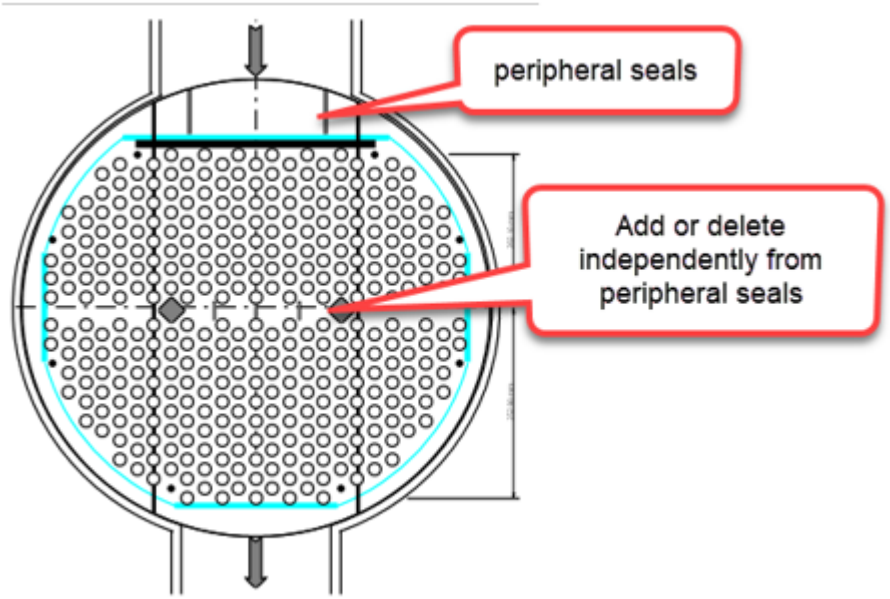
The following new features and enhancements were added in release V12:

- Implemented independent calculation of cross flow for existing layouts with both peripheral and pass partition sealing strips.
- Implemented in-flow direction for triangular layout generation for unbaffled units with side location shell nozzles
- Added entrainment calculations for X-shell flooded evaporators
- Added the option to report shell side velocities based on full flow
- Added liquid-only area fraction for vaporizers and liquid-only area fraction for subcooling the condensate

- Added for falling film evaporators the entrained liquid mass flow rate and the minimum flowrate for full wetted surface

Implemented Independent Calculation of Cross Flow for Existing Layouts with Both Peripheral and Pass Partition Sealing Strips

Now for existing layouts, you can review the performance impact of adding or deleting pass partition sealing strips independently of the peripheral sealing strips.

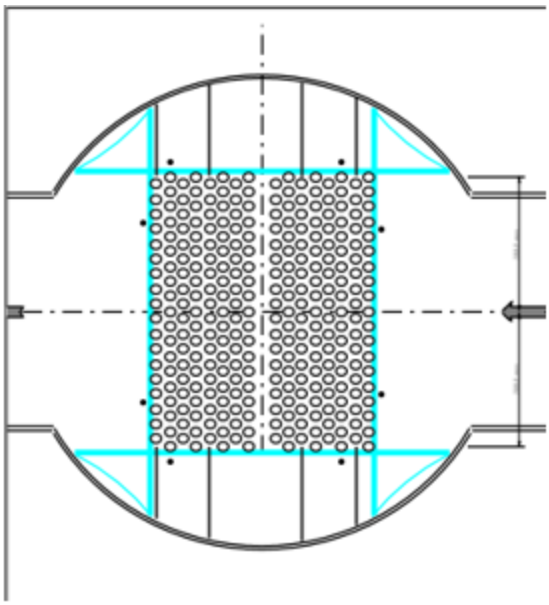


The effect of any changes to sealing strips or other means to block pass lanes will be reflected in the cross flow fractions and thus in the heat transfer calculations.

Implemented In-Flow Direction for Triangular Layout Generation for Unbaffled Units with Side Location Shell Nozzles

For units with shell side nozzles located on the side (right or left) and using triangular pitch with no baffles, the program will now orient the layout in the flow direction.

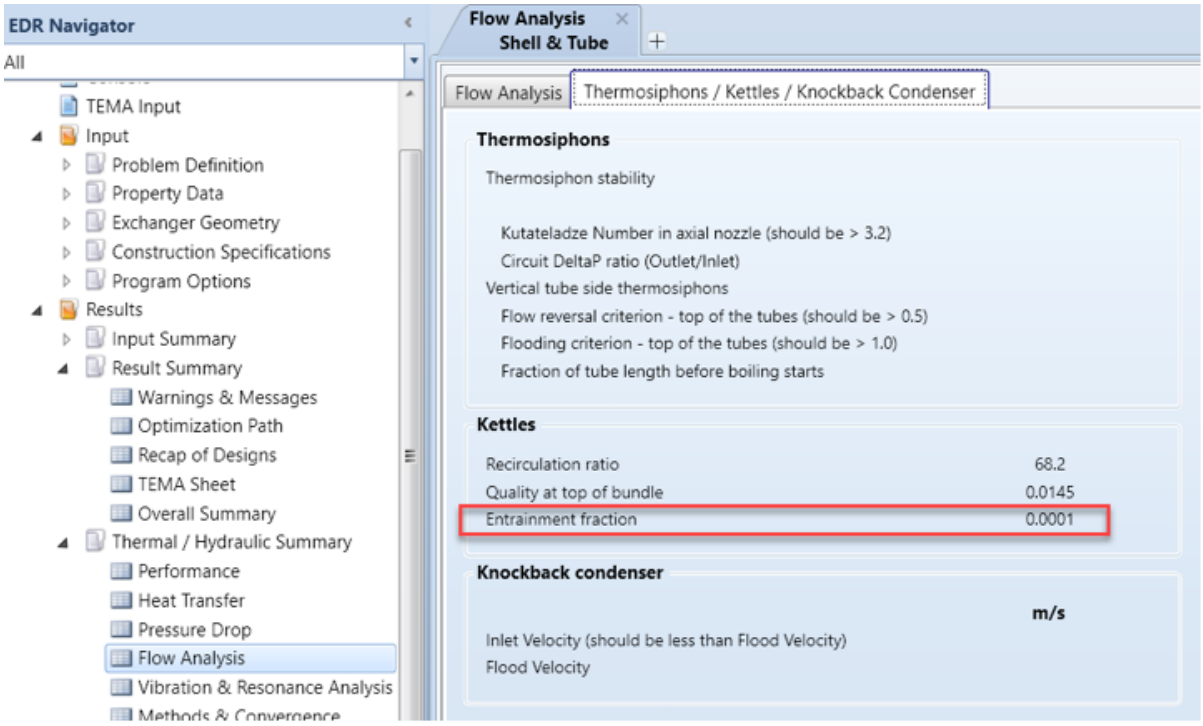
For example, a triangular 30º layout orientation with shell side nozzles located on the side (right or left from the horizontal view) will looks as shown below:



Added Entrainment Calculations for X-Shell Flooded Evaporators

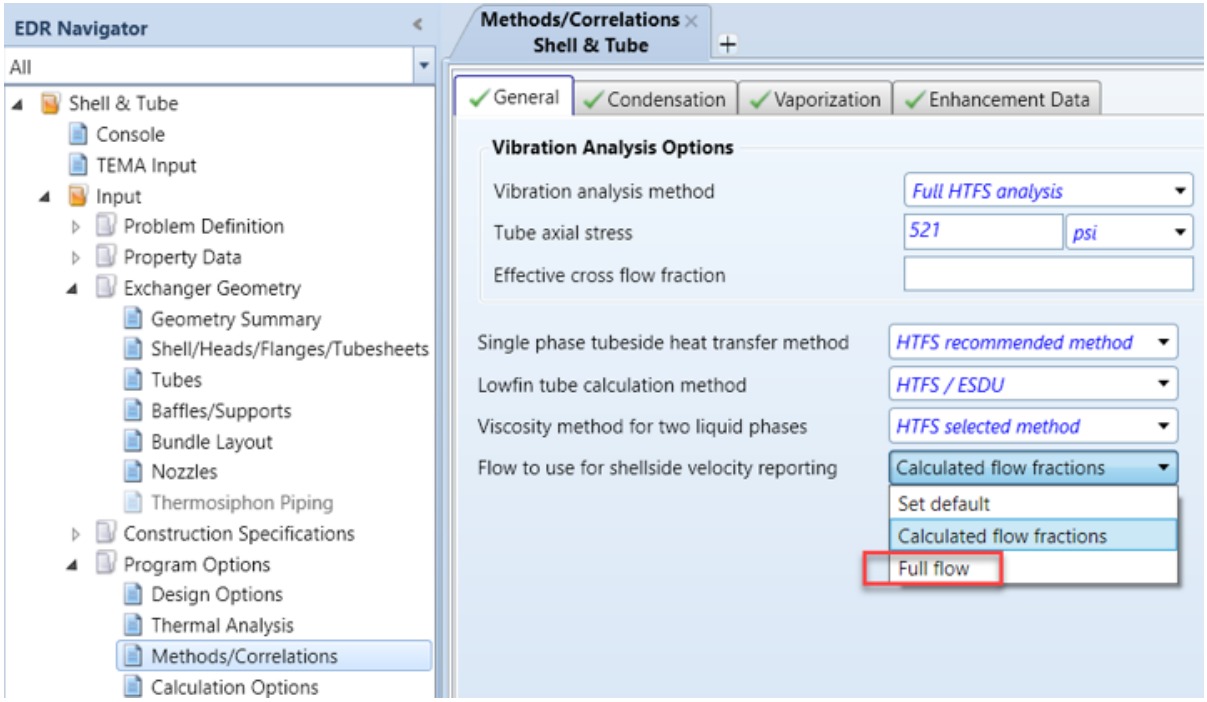
Now the program will calculate the entrainment ration for X-shell flooded evaporators.

Typical output will look like this:



Added the Option to Report Shell Side Velocities Based on Full Flow

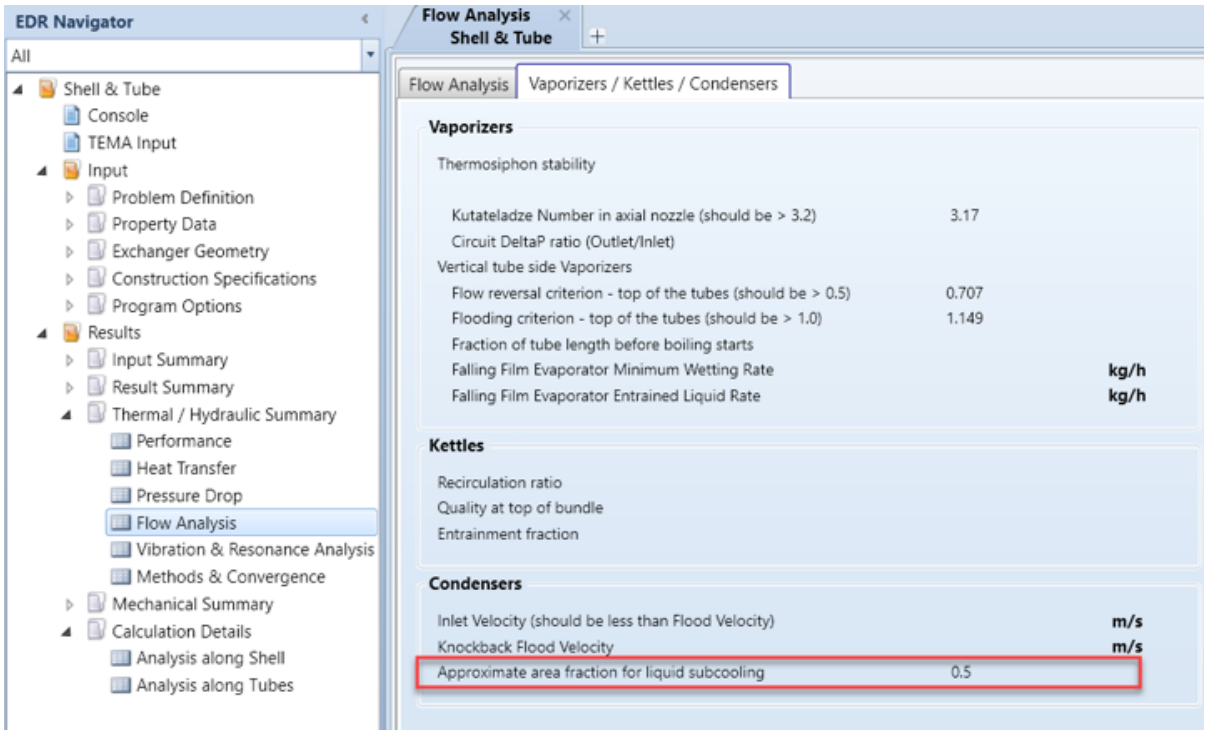
This option will enable the designer to look at mid-space cross flow and window velocities under full shell side flow. This option will allow the designer to study extreme cases and to compare velocity results with other sources.



Added Liquid-Only Area Fraction for Vaporizers and Liquid-Only Area Fraction for Subcooling the Condensate

The program will calculate and display the liquid-only area fraction for vaporizers and liquid-only area fraction for subcooling the Condensate.

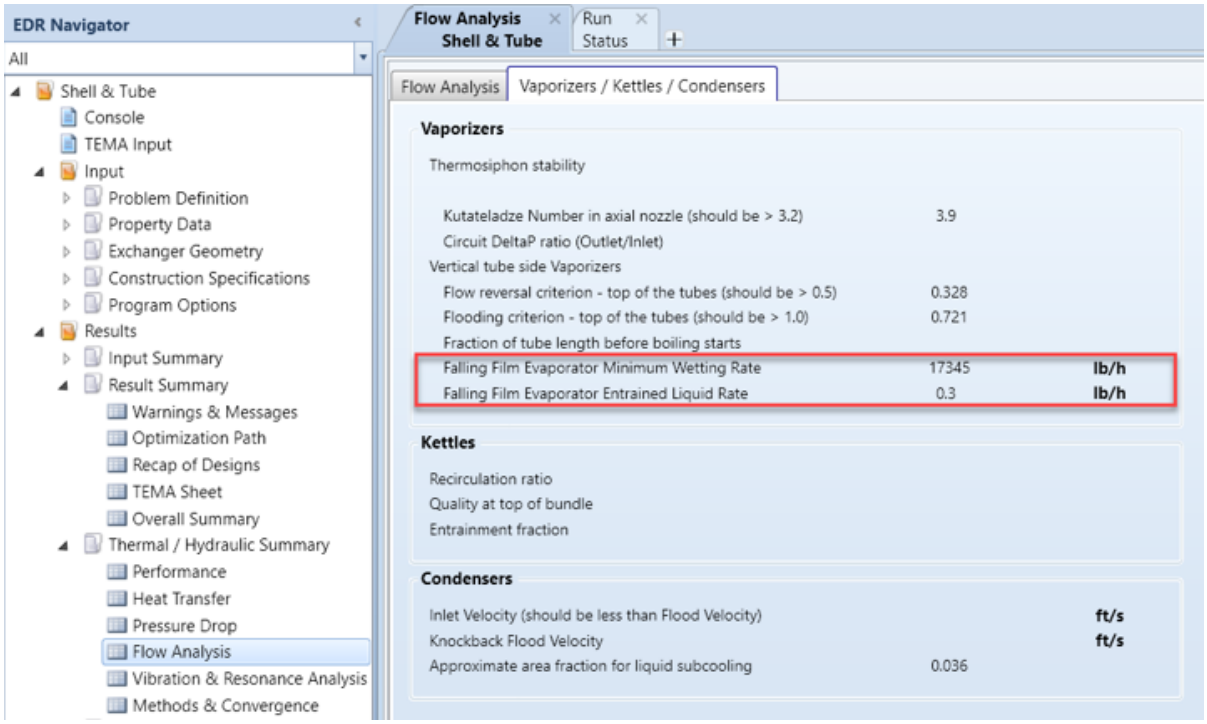
Typical output looks like this:



Added Falling Film Evaporator Entrained Liquid Mass Flow Rate and the Minimum Flowrate for Full Wetted Surface

The program will calculate and display falling film evaporator entrained liquid mass flow rate and the minimum flowrate for full wetted surface.

Typical output looks like this:



Compatibility Notes for V12

This section describes the differences that you might encounter between Aspen Shell and Tube Exchanger V12 and Aspen Shell and Tube Exchanger V11.1.

Coexistence

Aspen Shell & Tube Exchanger V12 can coexist with versions V11.1 and earlier.

64-bit EDR

Aspen Shell and Tube Exchanger V12 is 64-bit and must be used with 64-bit Aspen Plus and Aspen Properties. Aspen Shell and Tube Exchanger V12 can use either Aspen Properties V11 or V12, depending on which version is registered. Aspen Shell and Tube Exchanger V12 will automatically use the registered 64-bit of Aspen Properties if an earlier 32-bit version of Aspen Properties is registered.

Aspen Shell and Tube Exchanger V12 can only import from Aspen Plus V11 and V12. If you try to import from a 32-bit version of Aspen Plus you will get an error that EDR is unable to create the Aspen Plus data extraction component. Because of differences in architectures, Aspen Shell and Tube Exchanger V12 can import from any version of Aspen HYSYS, including 32-bit versions (V8.8, V9.0, V10).

Aspen Shell and Tube Exchanger V12 integrates *only* with Aspen Plus and Aspen HYSYS V12. This means *only* Aspen Shell and Tube Exchanger V12 models can be integrated in Aspen Plus and Aspen HYSYS V12 flowsheets.

CALGAVIN hiTRAN Wire Matrix

Aspen Shell and Tube Exchanger V12 is not compatible with the hiTRAN Wire Matrix tube inserts calculation library. Please use EDR V10 or V10.1 until this is resolved.

What's Fixed in V12

ID	Issue Description	Issue Resolution
509513	The program was not changing the tube pitch to accommodate clearances for strength welded tube-to-tubesheet joints that requires a larger shell diameter	This issue has been fixed in V12.
462802	Calculation of OTL for fixed tubesheets in Thermal - Adjustment in mechanical. TEMA table 4.3 was incorrect in thermal.	This issue has been fixed in V12.
466341	Correct tubeside outlet nozzle pressure drop for X-shells with > 2 tube passes.	This issue has been fixed in V12.
463064	Inputted vapor belt diametrical clearance not taken into account by program.	This issue has been fixed in V12.
446518	Correct nozzle offset.	This issue has been fixed in V12.
446056	Modify kettle calculations to prevent freeze for impossible kettles. Add error message when a kettle calculation fails to converge and has no heat load.	This issue has been fixed in V12.

ID	Issue Description	Issue Resolution
442731	Correct problem with setting the tubeside flow entry location from nozzle orientation for K-shells with multiple passes.	This issue has been fixed in V12.
442699	Add error message for negative baffle region lengths.	This issue has been fixed in V12.
438502	U-Bend diameter - incorrect results because of an attempt to take the square root of a negative number	This issue has been fixed in V12.
433234	Only output design status for design cases.	This issue has been fixed in V12.
429872	Thermosiphon piping element inputs should always be enabled if the 'Pipework loss calculation' input is set as 'From pipework'.	This issue has been fixed in V12.
430661	Correct the text of Operation Warnings 1354 and 1355.	This issue has been fixed in V12.
428345	Correct index for nozzle offset distance.	This issue has been fixed in V12.
423637	Remove input checking call for unused variable 'Impingement plate distance from shell ID'	This issue has been fixed in V12.
423137	Correct labels for Recap of Designs for some velocity variables	This issue has been fixed in V12.
403425	Modify calculation of tube side dryout coefficient in Standard Method to be consistent with the Advanced Method.	This issue has been fixed in V12.
398455	Prevent user from using any tube inserts for falling film evaporators.	This issue has been fixed in V12.
358624	Improved Using 'Match Tube Count' option. Now program will find layouts much closer to the desired number of tubes.	This issue has been fixed in V12.
351759	Prevent crash when designing an exchanger that is calculated to have too many vibration spans. Also checks unbaffled exchangers to see if the velocity is excessive and stops the design search if so.	This issue has been fixed in V12.
293982	Heat transfer coefficient questions - grid resolutions - dry-out performance - Improve Message 1530.	This issue has been fixed in V12.

Aspen Shell & Tube Mechanical

Product Description

Aspen Shell & Tube Mechanical (formerly Aspen Teams®) is a comprehensive set of tools for the complete mechanical design or rating of shell & tube heat exchangers and basic pressure vessels.

When used with Aspen Shell & Tube Exchanger (formerly Tasc+) or Hetran, Aspen Shell & Tube Mechanical provides bi-directional data transfer, eliminating the need for data re-entry and

ensuring consistency between thermal and mechanical designs. This enables engineers to both optimize and efficiently validate the thermal and mechanical designs of shell and tube heat exchangers.

When used as a stand-alone program in design mode, Aspen Shell & Tube Mechanical can optimize the design of most components including flanges, tubesheets, expansion joints, supports, shell, and nozzle reinforcement. They conform to TEMA standards and several international codes including, ASME Section VIII Div.1 and Div.2 Part 4, EN 13445, AD Merkblätter, and CODAP.

When 'ASME' is mentioned, is referring to BPV Section VIII Division 1 or 2 codes.

New Features and Enhancements V12

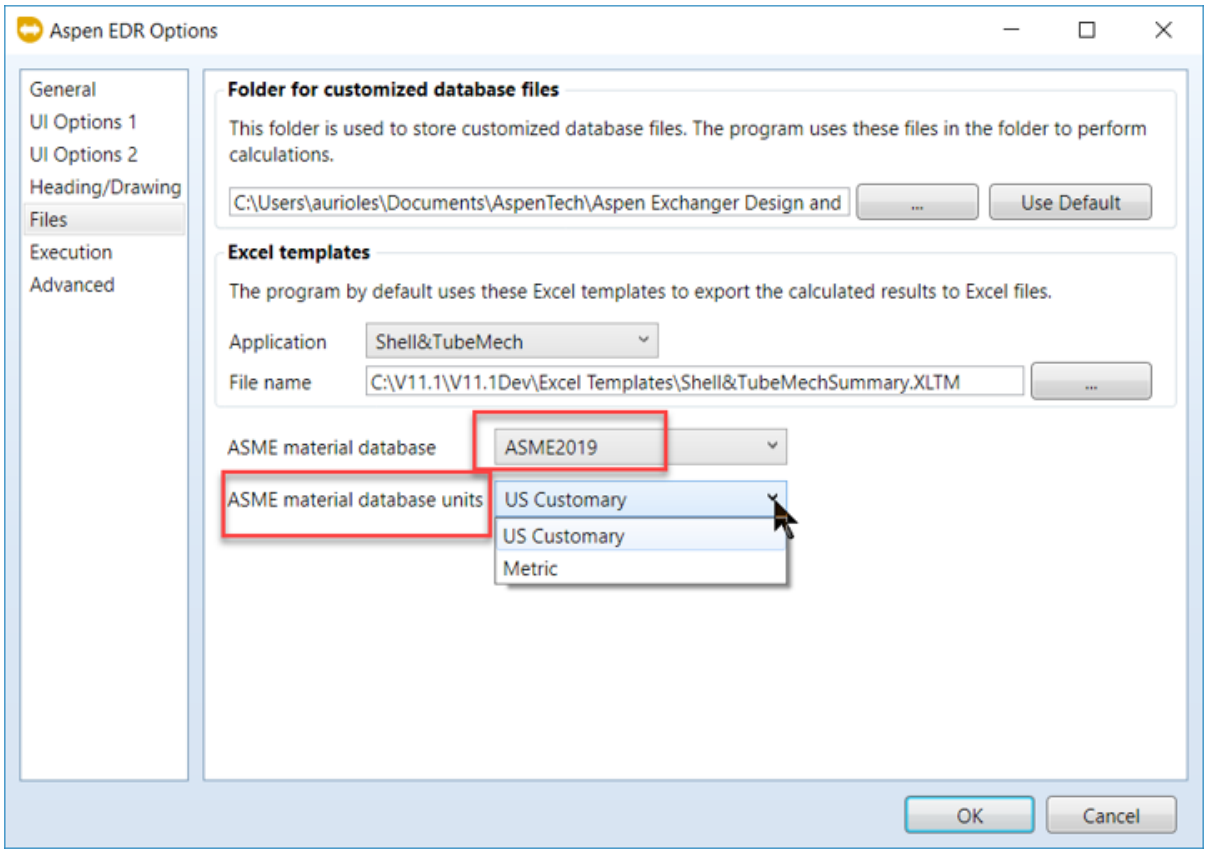
The following new features and enhancements were added in release V12:

- Updated the 2019 US Customary and Metric material stress tables. New Materials added and removed are shown in the Annex at the end of this document.
- 2019 ASME BPVC Edition:
  - Formal Recognition of Other Rules and VIII-2 Part 4 when Rules are not Available in VIII-1 (New Appendix 46)
  - Added new Proximity Rules for Nozzles located near Integral Tubesheets
  - Added new Formulas for Tube-to-Tubesheet Joints Interfacial Pressure
  - Added new Formulas for Maximum Tube Axial Loads
  - Added new ANSI nozzle external loads equivalent pressure
  - Implemented clad Tubesheets Allowable Stress in Calculations of Welded Tube-to-Tubesheet Joints
  - Provided alternative of Design Pressure instead of Operating Pressure for Operating Load Cases
  - Implemented new allowable Tubesheet Shear Stress calculation
  - Revised whether to apply rigidity Rules for Split Loose Flanges and Appendix 1-6 Flanges
- Added information on static head to the Cylinders and Covers detail calculations
- Added indication that program is using CS material made to fine grain practice and normalized
- Added warning to stiffen tubesheets during hydro test when large unperforated areas exist to avoid tube buckling in 'W' and 'P' type units
- Improved 3D Solid Model for axial nozzles on heads
- Improved how the yield strength is calculated when the yield is not available in the ASME Code
- Separated the application of paragraph UCS-68(c) for MDMT reduction between the shell and tube side

Updated the 2019 US Customary and Metric Material Stress Tables

The 2019 edition of Section II, Part D, US Customary and Metric tables have been updated.

You can select US Customary or Metric tables under File > Options > Files:



The default option will continue to be US Customary stress tables.

Since these tables have rounded numbers for their respective units, calculation results will always be different using US Customary versus Metric tables for the same geometry and design specifications.

For example, material SA-516 Grade 70 at 100 ºC will have the following allowable stress ***S*** for the 2 ASME table sets and for 3 EDR calculation units:

Material	Calculation Units	Stress Table	
		Us Customary, ***S***, Psi	Metric, ***S***, MPa
SA-516-70	US Customary-**Psi**	**20000** (table)	20015
	Metric-**MPa**	137.9	**138** (table)
	Metric-**Kgf/mm²**	14.06	14.07

Formal Recognition of Other Rules and VIII-2 Part 4 When Rules not Available in VIII-1 (New Appendix 46)

This change (see revised U-2(g) and UG-16(a)) allows VIII-1 designers to use other rules when not available in VIII-1. VIII-2 Part 4 (Design-by-Rule) can be used directly via Appendix 46 in VIII-1 designed vessels. For example, in some situations, a nozzle reinforcing pad can be avoided if rules from VIII-2 Part 4 are used instead of VIII-1 rules. A typical example is a nozzle whose ratio of nozzle radius to vessel radius exceeds 0.7. When the VIII-2 option is selected, the program will use VIII-2 section 4.5 via Appendix 46. Typical partial output shown here:

4.5.5.1 STEP 10 Determine the maximum allowable internal working pressure at the nozzle intersection

$$P_{max1} = \frac{S_{allow}}{\left(2\frac{A_p}{A_T}\right) - \frac{R_{xs}}{t_{eff}}} \qquad P_{max1} = 0.74 \text{ N/mm}^2 \qquad (4.5.59)$$

$$P_{max2} = S(t/R_{xs}) \qquad P_{max2} = 2.338 \text{ N/mm}^2 \qquad (4.5.60)$$

$$P_{max} = \min[\ P_{max1}\ ,\ P_{max2}\ ] \qquad P_{max} = 0.74 \text{ N/mm}^2 \qquad (4.5.61)$$

$$A_P = \frac{f_N + f_S + f_Y}{P} \qquad A_P = 155630.4 \text{ mm}^2 \qquad (4.5.62)$$

$$P \leq P_{max}$$

$$0.689 \text{ N/mm}^2 \leq 0.74 \text{ N/mm}^2$$

New Proximity Rules for Nozzles Near Integral Tubesheets

Paragraph UHX-4(h) states the new rules for large nozzles near integral tubesheets. This is an important rule because it will prevent large openings from potentially distorting an adjacent tubesheet.

If a nozzle is too close, the program will issue a warning:

		Description
⚠	Warning 966	NOZZLE 3: Opening too close to tubesheet. Opening size may distort tubesheet stiffness. Opening distance: 5.125 in. Opening should not be closer than: 5.5228 in.
⚠	Warning 966	NOZZLE 4: Opening too close to tubesheet. Opening size may distort tubesheet stiffness. Opening distance: 5 in. Opening should not be closer than: 5.5228 in.

The tubesheet output will contain a section showing the calculation results:

UHX-4(*h*) Minimum opening distance to an integral tubesheet to avoid tubesheet distortion

	Front Channel	Shell	Rear Channel
Shell cylinder inside diameter, D	30.125	30.125	30.125
Shell cylinder thickness, t	0.3125	0.5	0.5
Minimum opening distance = $1.8 * \sqrt{D * t}$	5.5228	6.9859	6.9859

	Tubesheet			
Units: in	Front		Rear	
Fitting inside diameter	0.0	12.375	12.375	0.0
30% of shell inside diameter	0.0	9.0375	9.0375	0.0
Minimum opening distance	0.0	5.5228	5.5228	0.0
Actual opening edge distance from adjacent tubesheet	0.0	5.125	5.0	0.0

Nozzles adjacent to integral tubesheets whose diameter are > 30% of the shell inside diameter should not be closer than 1.8*SQRT(d*t) to the adjacent tubesheet.

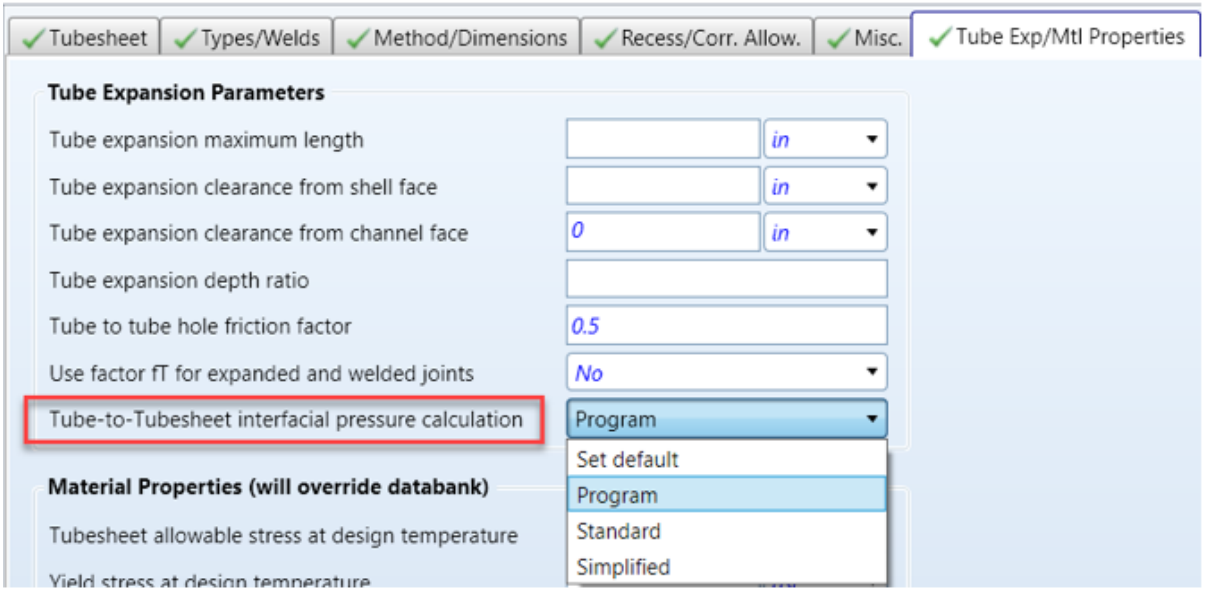
New Formulas for Tube-to-Tubesheet Joints Interfacial Pressure

The 2019 ASME edition contains a more sophisticated method to calculate the interfacial pressures in tube-to-tubesheet joints.

It is still non-mandatory (Appendix A) in ASME BPVC VIII Division 1.

The old method is called '**Simplified**' and the new method '**Standard**' (default).

Selecting one of these methods can be accessed here:



With the new 'standard' method, a typical result example looks like this:

Tube expanding pressure:

$$P_e = S_{tu}\frac{t+\frac{d_o}{2}\left(\frac{S_y}{S_{y.t}}\right)}{t+\frac{d_o}{2}}\left(1.945-1.384\frac{d_i}{d_o}\right) \qquad P_e = 164.69\ \text{N/mm}^2$$

Tube to tube hole interfacial pressure:

$$P_o = P_e\left[1-\left(\frac{d_i}{d_o}\right)^2\right]-\frac{2}{\sqrt{3}}S_{tu}\left[\ln\frac{d_o}{d_i}\right] \qquad P_o = 11.45\ \text{N/mm}^2$$

$$P_t = \frac{\frac{R_m}{d_o}E_{tT}(\alpha_t d_o(T-T_a)-\alpha_s d_o(T-T_a))}{\left(\frac{d_o}{t}^2-R_m\right)+R_m\left(2.9\frac{E_{tT}}{E_{sT}}-0.3\right)} \qquad P_t = 2.61\ \text{N/mm}^2$$

For joint types i, j, k: $P_o + P_t \leq 0.58\,\sigma_M$

$14.06\ \text{N/mm}^2 \leq$ -

New Formulas for Maximum Tube Axial Loads

The new formulas to calculate the maximum tube axial loads of tube-to-tubesheet joints now take into consideration both the joint expanded portion and the joint welded portion as applicable. A new factor for the overall efficiency of welded and expanded joints, ***f_{re}***, has been introduced.

Typical partial output looks like this:

Cross-sectional area	A_t =	0.1739 in^2	Tube allowable stress	S_a =	17176 psi
Max stress, $S_t = A_t S_a$	S_t =	2987 psi	$f_{re} = MAX[f_e f_r f_y f_t, f_r(b)]$		
Tubesheet yield stress	S_{tt} =	37954 psi	Tube yield stress	S_{tu} =	32700 psi
$f_e = (ltx/d_o\ or\ 1)$	f_e =	1	Min. Yield Stress,	$\min[S_{tt}, S_{tu}]$ =	32700 psi
$f_t = (P_o + P_t)/P_o$	f_t =	1	$f_y = S_{tt}/S_{tu}$	f_y =	1.03
f_t used	f_t =	1	$f_y = used\ (0 < f_y \leq 1)$	f_y =	1

Updated ANSI Nozzle External Loads Equivalent Pressure

The program calculates the equivalent external pressure on any external loads entered for nozzles (forces and moments) acting on ANSI nozzle flanges. The external method analysis selected must be WRC-107.

If the option for API 660 design is selected, the program will use the predefined loads in API 660 **Table 2**.

Typical output is shown below:

Component Nozzle Flange 1

UG-44(b) External Loads (forces and bending moments) on Nozzle Flanges

External Moment	*ME* = 35000 lbf*in
External Tensile Axial Force	*FE* = 3500 lbf
Gasket Reaction Diameter	*G* = 8.0 in
Moment Factor	*FM* = 0.5

Equivalent Pressure, *Pe = 16*ME/(Pi*G**3)+4*FE/(Pi*G**2)* = 417.78 psi

*** Design Temperature ***

Flange pressure rating	*PR* = 655 psi
Flange MAWP	*PD* = 564.72 psi

Compliance Check: *16ME + 4*FE*G <= Pi*G**3*((PR-PD) + FM*PR)*
672000 <= 672000

*** Ambient Temperature ***

Flange pressure rating	*PR* = 740 psi
Flange MAWP	*PD* = 692.22 psi

Compliance Check: *16ME + 4*FE*G <= Pi*G**3*((PR-PD) + FM*PR)*
672000 <= 672000

Clad Tubesheets Allowable Stress in Calculations of Welded Tube-to-Tubesheet Joints

The 2019 ASME Code is emphasizing that when clad tubesheets are used, the allowable stress to be used in welded tube-to-tubesheet joint calculations is the clad material allowable stress. Typical partial output example below:

Tubesheet material	SA-516 K02700 Grd 70 Plate				
Tubesheet clad material	SA-240 S31603 Grd 316L Plate				
Tubes material	SA-249 S31603 Grd TP316L Wld. tube(G5)				
Tubesheet allowable stress	S_t =	10900 psi	Tubes allowable stress	S_a =	14706 psi
Weld allowable stress	S_w =	10900 psi	Tube outer diameter	d_o =	0.75 in
Tubes yield stress	S_{yt} =	16400 psi	Tube thickness	t =	0.083 in
Tubesheet design temp.	=	500 °F	Tubes design temperature	=	500 °F
Appendix A weld size	a =	0.1162 in			
Fillet weld leg	a_f =	0.125 in	Groove weld leg	a_g =	0.0 in
Minimum length a_c	a_{cmin} =	0.1588 in	Total length $a_c = a_f + a_g$	=	0.125 in

Fillet weld strength,	$F_f = 0.55\pi a_f \left(d_o + 0.67a_f\right) S_w$	F_f =	1963 lbf
Groove weld strength,	$F_g = 0.85\pi a_g \left(d_o + 0.67a_g\right) S_w$	F_g =	0 lbf

Design Pressure Instead of Operating Pressure for Operating Load Cases

An option is now provided to use the design pressures throughout tubesheet calculations, including for the operating conditions. This option is more conservative since the design pressure will always be larger than the operating pressures.

A typical partial output is shown below (Steady State, design pressure = 35.15 kg/cm^2).

Operating Load Cases

Load Case	Tubesheet Temperature °C	****** Shell ****** Pressure kg/cm^2	Shell Temperature °C	****** Tubes ****** Pressure kg/cm^2	Tubes Temperature °C	Axial Expansion mm
Ambient	21.1	0	21.1	0	21.1	-0
Loss of SS flow	38.3	4.218	36.7	5.625	40	0.658
Loss of TS flow	36.7	5.625	36.7	4.218	36.7	0.348
Steady State	38.3	35.15	36.7	35.15	40	0.658

Allowable Tubesheet Shear Stress

For those materials with a higher yield basis than 2/3 to determine ***S***, the allowable tubesheet shear stress, will now have a consistent percent of yield. This is denoted by calculating the maximum allowable tubesheet shear stress with this formula:

$\tau_a = MIN(0.8S, 0.533S_y)$

A typical partial output example is shown below:

UHX-12.5.9 Step 9. For each loading case, calculate the average shear stress in the tubesheet at the outer edge of the perforated region.

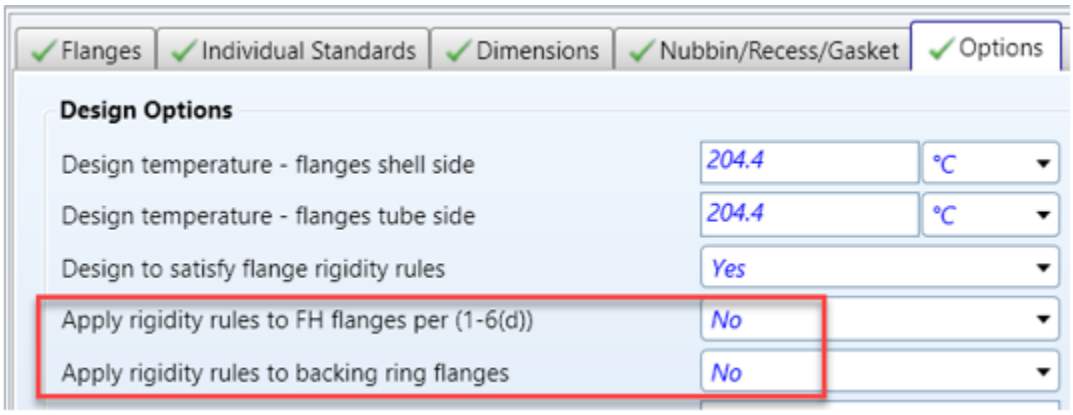
$$\tau = \left(\frac{1}{4\mu}\right)\left(\frac{Diam}{h}\right)\left|P_s - P_t\right|$$

Tubesheet Allowable Stress, S	S =	71.71 N/mm^2	Tubesheet Yield Stress, S_y	S_y =	106.87 N/mm^2
Allowable τ_a	τ_a =	$MIN(0.8S, 0.533S_y)$		τ_a =	56.96 N/mm^2

Rigidity Rules for Split Loose Flanges and Appendix 1-6 Flanges

With this change, the Code clarifies that the rigidity rules do not apply to flanges designed per appendix 1-6 and split loose flanges.

The program input default is now 'No' as shown below:



Naturally not using the Rigidity rules will result in different calculated flange thicknesses in comparison with results using the flange Rigidity rules. Below is a typical example of the added thickness for a backing ring flange when the final thickness complies with the Rigidity rules.

Code thickness	144 mm
TEMA thickness	146.15 mm
corrosion allowance on thickness not included above	-
Actual thickness	171 mm

ASME Section VIII Div.1 2017, Appendix 2, 2-14 Flange Rigidity

Component: Backing Flange

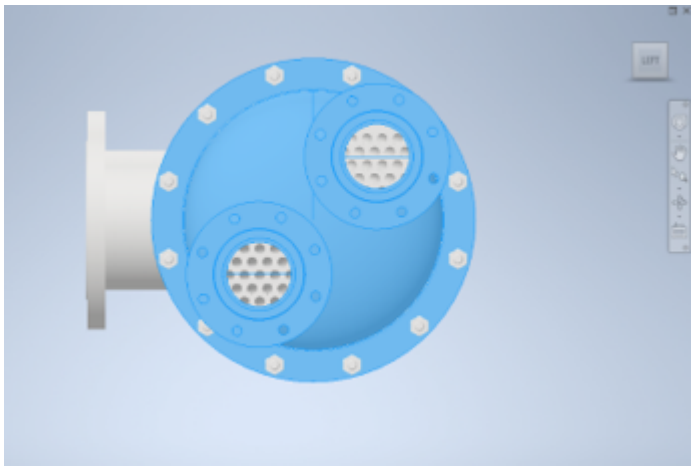
Factor KL	KL =	0.20	Mod of Elasticity	E =	190987 N/mm^2
Factor K	K =	1.08	Corroded thickness	t_a =	171 mm
Split factor	Sp =	2.00	Number of split rings	=	1
Min thickness for Rigidity	t_{min} =	171 mm	New thickness	t_n =	171 mm
Moment	M_o =	66393 N*m			

Rigidity index, $J = \frac{109.4 S_p * M_o}{E * t_a^3 * ln(K) * KL}$ J = 0.99

Therefore, expect floating head flanges and split loose flanges (backing rings) to be thinner.

Improved 3D Solid Model for Axial Nozzles on Heads

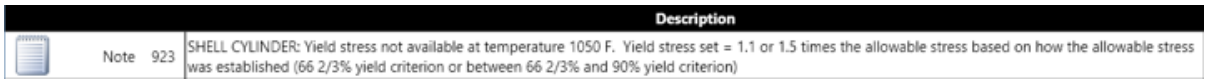
The following view shows how axial nozzles are rendered with V12:



Improved how the yield strength is calculated when the yield is not available in the ASME Code

Then the yield stress is not available in the ASME material Code books, the program will set the yield stress at 1.1 or 1.5 times the allowable stress based on how the allowable stress was established (66 2/3% yield criterion or between 66 2/3% and 90% yield criterion).

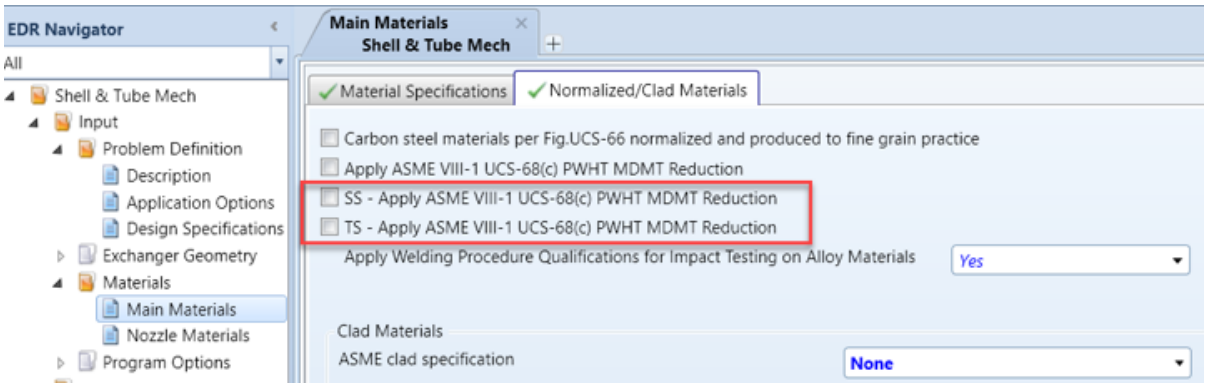
A typical message applying this new rule looks like this:



Separated the application of paragraph UCS-68(c) for MDMT reduction between the shell and tube side

Now you can select the application of ASME VIII-1 paragraph UCS-68(c) for either the shell side or the tube side.

The new input option is shown below:



Compatibility Notes for V12

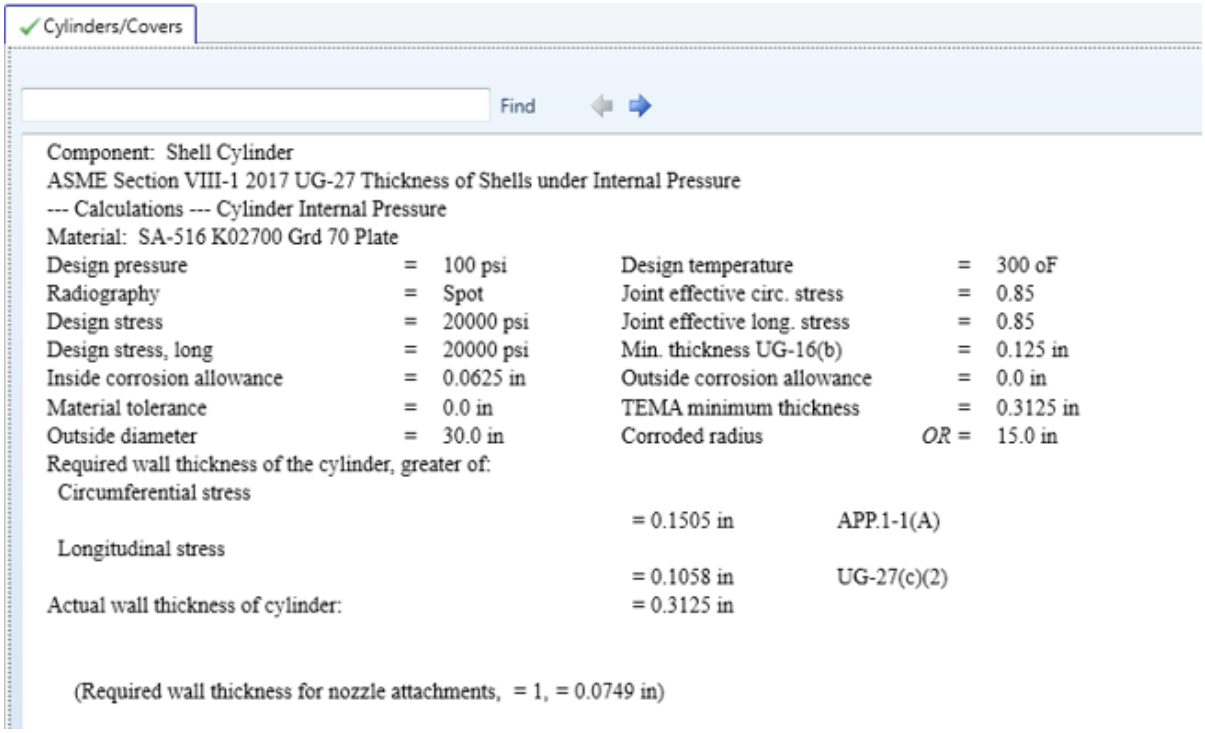
Coexistence

- Aspen Shell & Tube Mechanical V12 can coexist with versions V11.1 and earlier

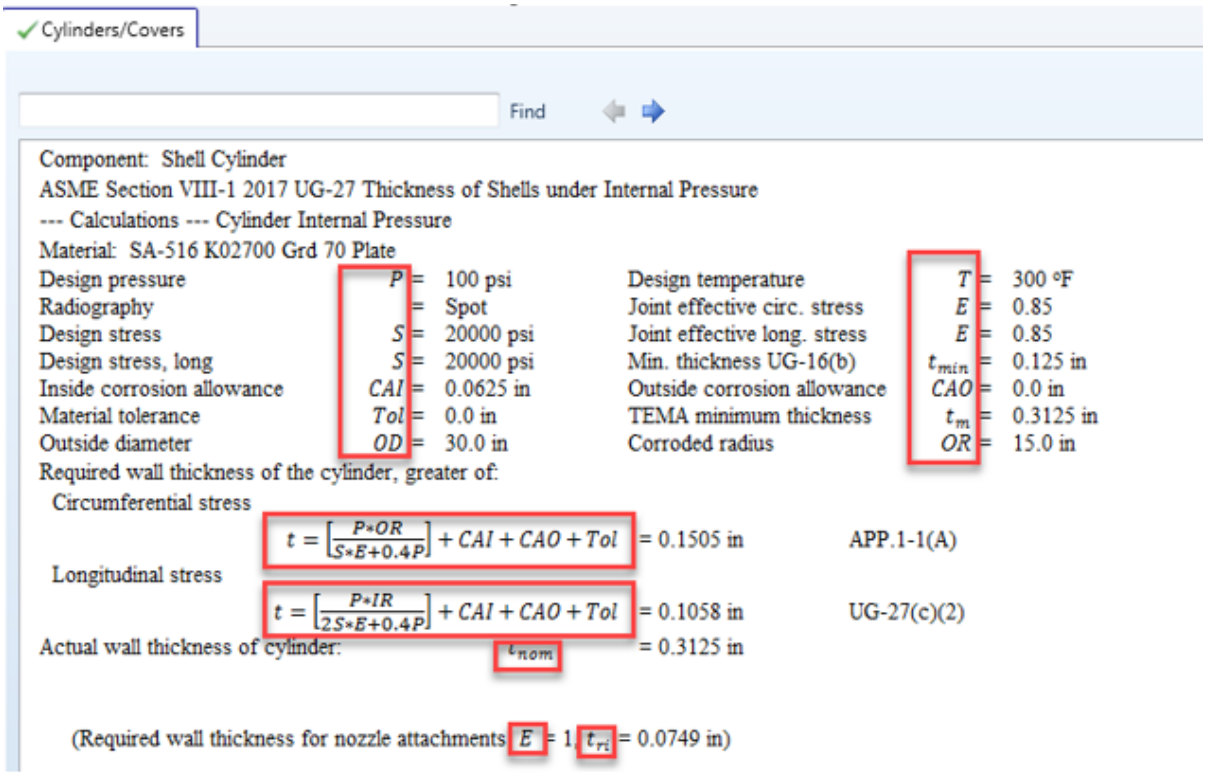
- Aspen Shell & Tube Mechanical V12 requires a 64-bit version of the TEMA F and F EJ Line Element FEA program

Rich Text Code Calculations Report

Aspen Shell and Tube Mechanical V12 is 64-bit and requires 64-bit Microsoft Mathematics be installed. On systems where this is not installed, the rich text Code Calculations report will be missing parts:



This is how the section above should look with 64-bit Microsoft Mathematics installed. The missing parts are highlighted.



What's Fixed in V12

The following is a selective set of issues resolved in Aspen Shell and Tube Mechanical in V12:

ID	Issue Description	Issue Resolution
547521	Shell cylinder Joint Efficiency Depends on several factors, seamless pipe or plate, circumferential butt joint or not, etc. Several cases found of incorrect JEs	This issue has been fixed in V12.
538842	TEMA selected angled backing ring flange thickness was not complying with clearance per TEMA RCB-5.1.4.1 (Style "A")	This issue has been fixed in V12.
534122	Bellows Expansion Joint: Tangent length not set to Zero; allowable meridional stresses incorrect; incorrect factor Km	This issue has been fixed in V12.
534006	MDMT calculation result error by ASME UCS-66 - Added SA-765 Grade III (-150 F MDMT)	This issue has been fixed in V12.
528169	Front shell flange calculation of hub small thickness as a cylinder was incorrect	This issue has been fixed in V12.
523580	CEU unit was showing the Backing Ring flange calculation results but there was no backing ring flange with this geometry	This issue has been fixed in V12.
515900	Incorrect shell cylinder joint efficiency for a U-tube exchanger with a welded flat shell cover	This issue has been fixed in V12.

ID	Issue Description	Issue Resolution
515134	Program was missing required heat treatment because it was not following UCS-79 - (-d) The reduction by cold forming from the nominal thickness	This issue has been fixed in V12.
511194	Allowable stress data not determined correctly for SA-240 S32205 Plate at 600F under ASME standard	This issue has been fixed in V12.
509519	Program was not calculating correctly the rear head floating head flange when the User enters full face gasket design	This issue has been fixed in V12.
509714	Program not warning the User when Note (7) of Table A-2 from ASME Appendix A is violated	This issue has been fixed in V12.
506547	Extended to type (1a) - lap joint flanges with a hub per ASME Fig. 2-4(1) or (1a)	This issue has been fixed in V12.
504812	Incorrect formulas being used for short cylinders attached to cones for front heads and rear heads for reinforcement calculations	This issue has been fixed in V12.
503593	Cylinder length under a ring flange not long enough when the User wants to use very short cylinder	This issue has been fixed in V12.
497154	The program was selecting the wrong MDMT curve for forging material SA-105. It should be A not B when the material is not normalized	This issue has been fixed in V12.
496114	Self-reinforced nozzles not showing the correct reinforcing thickness and nozzle weld reinforcing area.	This issue has been fixed in V12.
490705	Incorrect Nozzle ID in Reinforcement Calculations for Hillside Nozzles Located on an Elliptical Head	This issue has been fixed in V12.
489693	Nozzle on formed head designed per VIII-2. Program calculating one stress as twice what it should be	This issue has been fixed in V12.
487024	Form U-5 Tubes design temperature incorrect. No warning when an operating temperature is lower than design.	This issue has been fixed in V12.
485490	Mechanical layout does not maintain 30 deg tube pitch based on flow direction	This issue has been fixed in V12.
484572	Customer gets the PCC-1 Flange calculation results even though he selects 'No'	This issue has been fixed in V12.

ID	Issue Description	Issue Resolution
477863	Minimum channel length in accordance with UHX-12.5.10 (U-tubes). Issue a warning if inputted and too short. Consider using Simply Supported Method if too short	This issue has been fixed in V12.
480581	Incorrect external nozzle loads using API 660 Table 2 because program uses incorrect nominal nozzle diameter	This issue has been fixed in V12.
479715	U-tube exchanger per UHX-12.1(a) - show weld selection per UW-13.2	This issue has been fixed in V12.
477484	Inputted shell side gasket factors 'm' and 'y' not being used in the calculation of a 'C' type front head heat exchanger	This issue has been fixed in V12.
476981	In a U-tube exchanger, Shell Cover designed with tube side design pressure and temperature instead of shell side	This issue has been fixed in V12.
473511	Rear head pass partition calculations not reported for a multipass AET unit	This issue has been fixed in V12.
473076	Nozzle weld type Fig UW-16.1(h) showing weld tc for internal projection when there is none	This issue has been fixed in V12.
091688	Added sealing strips to bill of materials	This issue has been fixed in V12.
469138	Error message issued of an invalid material when all materials are valid	This issue has been fixed in V12.
469088	Program was not calculating portions of the saddle stresses when the inputted gusset number is > 4	This issue has been fixed in V12.
467016	Manhole blind flange weight off because of unit conversion problem between N and Kgf	This issue has been fixed in V12.
466583	Some MDMT results are shown in deg F when running in SI or metric units	This issue has been fixed in V12.
457569	Input for nozzle elevation above vessel wall not being considered for EP calculation	This issue has been fixed in V12.
463409	ASME UHX-4(b) warning for ANSI flanges with partition plates	This issue has been fixed in V12.
460841	Program accepted an impossible flange geometry - not enough room for body flange bolt wrenches	This issue has been fixed in V12.
459331	Incorrect gasket ID for the rear shell flange and shell cover flange in the PCC-1 calculation when the User enters the gasket OD and width	This issue has been fixed in V12.

ID	Issue Description	Issue Resolution
469049	Correctly draw pass partition plates in front end views of mechanical diagram for Quadrant layouts.	This issue has been fixed in V12.
459084	Wrong nozzle thickness calculation when nozzles are on weld cap heads	This issue has been fixed in V12.
458380	No message provided when the nozzle flange MAWP, according to VIII-1 UG-44(b), is less than the design pressure	This issue has been fixed in V12.
455600	Use values from API 660 Table 3 for Corrugated, Grooved, and Spiral Wound Gaskets.	This issue has been fixed in V12.
453013	External Nozzle Loads calculation performed even though User selected 'None'	This issue has been fixed in V12.
452969	Incorrect TEMA Deflection Calculation in SI Units	This issue has been fixed in V12.
452354	Don't show the stiffening rings as having been placed near a cone / cylinder junction unless required for reinforcement per Appendix 1-5/1-8.	This issue has been fixed in V12.
451304	LWN nozzle weld not being calculated when nozzle is on a flat head	This issue has been fixed in V12.
447726	Incorrect warnings being issued for channel cones and nozzle on channels	This issue has been fixed in V12.
441605	2" nominal LWN should have been 3.06" nozzle neck OD	This issue has been fixed in V12.
440449	Small cylinders not correctly included in the Bill of Materials for a BKM exchanger - Tubesheet weld size information not shown for a NEN exchanger	This issue has been fixed in V12.
440172	Incorrect gasket recess diameter on the floating head of a 'S' type exchanger	This issue has been fixed in V12.
432442	Inspection Opening flagged by Program as having insufficient thickness when in fact by Code rules it is OK	This issue has been fixed in V12.
428894	The shell side body flange on a BEU exchanger was using an incorrect dimension for the hub thickness 'g0'	This issue has been fixed in V12.
424378	Identify if the size/thickness limits are for the tube/pipe OD or wall thickness.	This issue has been fixed in V12.
422915	The Minimum Design Metal Temperature was not being calculated for finned tubes	This issue has been fixed in V12.
420534	Lifting lugs calculations were not showing reinforcing pad section	This issue has been fixed in V12.

ID	Issue Description	Issue Resolution
415624	Tube required thickness was not being calculated correctly for very small diameter tubes and relatively thin	This issue has been fixed in V12.
415204	Average results of longitudinal, radial and tangential stresses were being rounded which could have led to acceptance of an overstressed flange designs	This issue has been fixed in V12.
414940	Program was not determining that a shell needed to be fully X-rayed per ASME Code rules.	This issue has been fixed in V12.
408970	Incorrect weld joint efficiency for shell when an F&F EJ is present with a circumferential butt weld joint	This issue has been fixed in V12.
401833	Inputted nozzle dome weld sizes were being ignored by the program	This issue has been fixed in V12.
399371	Inputted tube side corrosion allowance was being ignored for the rear head cover made of alloy in a floating head exchanger	This issue has been fixed in V12.
396577	Correct problem with TE rtf file.	This issue has been fixed in V12.
396527	Using US and Metric units, nearly identical files were showing different messages due to tiny differences based on rounding of values	This issue has been fixed in V12.
395481	Updated the pass partition thickness sections for clearances for CS/Low alloys and Alloys and for TEMA R (confined joints) and TEMA C/B/no TEMA (no confined joints). Updated layout calculations for rotated square for cleaning lanes and for no cleaning lanes.	This issue has been fixed in V12.
394143	Correct problem in RTF panel MA 114 - can't have equation in the grid when the next cell has a ~.	This issue has been fixed in V12.
387883	In the cone calculation the program was not using the correct formulas for the minimum cylinder length attached to the cone at the small and large sections	This issue has been fixed in V12.
386584	Component design - checking for reinforce area based on given limit - program ignores inputted limit	This issue has been fixed in V12.
368563	In the Hydro Test Calculations - the program was not using 20 deg C as the temperature for the body flange calculations	This issue has been fixed in V12.
86881	Corrosion allowance not being used in the cone external pressure calculations per appendix 1-8.	This issue has been fixed in V12.

Annex

Materials added in the 2019 ASME materials database:

8030	"SA-553 K61365 Grd III Plate(<= 2)"	8104	"SB-466 C70600 Cls O60 Smls. tube(G5)"
8032	"SA-213 S38815 Smls. tube(G5)"	8105	"SB-467 C70600 Cls WO61 Wld. pipe(> 4 1/2)(G5)"
8033	"SA-213 S38815 Smls. tube"	8106	"SB-151 C70600 Cls O60 Bar(All)(G5)"
8034	"SA-240 S38815 Plate(G5)"	8107	"SB-151 C70600 Cls O60 Rod(All)(G5)"
8035	"SA-240 S38815 Plate"	8108	"SB-171 C70600 Cls M20 Plate(<= 5)(G5)"
8036	"SA-249 S38815 Wld. tube(G5)"	8110	"SB-171 C70600 Cls M20 Sheet(<= 5)(G5)"
8037	"SA-249 S38815 Wld. tube"	8112	"SB-171 C70600 Cls O25 Plate(<= 5)(G5)"
8038	"SA-312 S38815 Wld. pipe(G5)"	8114	"SB-171 C70600 Cls O25 Sheet(<= 5)(G5)"
8039	"SA-312 S38815 Wld. pipe"	8116	"SB-111 C70600 Cls O61 Smls. cond. tube(G5)"
8040	"SA-403 S38815 Smls. fittings(G5)"	8118	"SB-359 C70600 Cls O61 Finned tube(G5)"
8041	"SA-403 S38815 Wld. fittings(G5)"	8119	"SB-395 C70600 Cls O61 Smls. U-bend tube(G5)"
8042	"SA-403 S38815 Smls. fittings"	8120	"SB-467 C70600 Cls WO61 Wld. pipe(<= 4 1/2)(G5)"
8043	"SA-403 S38815 Wld. fittings"	8121	"SB-543 C70600 Cls WO61 Wld. tube(G5)"
8044	"SA-479 S38815 Bar(G5)"	8122	"SB-956 C70600 Cls WO61 Finned wld. tube(G5)"
8045	"SA-479 S38815 Bar"	8123	"SB-466 C70620 Cls O60 Smls. pipe"
8046	"SA-240 S32003 Plate(> 3/16)"	8124	"SB-466 C70620 Cls O60 Smls. tube"
8047	"SA-790 S32003 Wld. pipe"	8125	"SB-467 C70620 Cls WO61 Wld. pipe(> 4 1/2)"
8048	"SA-240 S32003 Sheet(<= 3/16)"	8126	"SB-151 C70620 Cls O60 Bar(All)"
8049	"SA-789 S32003 Smls. tube"	8127	"SB-151 C70620 Cls O60 Rod(All)"
8050	"SA-789 S32003 Wld. tube"	8128	"SB-171 C70620 Cls M20 Plate(<= 5)"
8051	"SA-213 S31254 Smls. tube(t > 0.187)(G5)"	8130	"SB-171 C70620 Cls M20 Sheet(<= 5)"
8052	"SA-213 S31254 Smls. tube(t > 0.187)"	8132	"SB-171 C70620 Cls O25 Plate(<= 5)"
8053	"SA-213 S31254 Smls. tube(t <= 0.187)(G5)"	8134	"SB-171 C70620 Cls O25 Sheet(<= 5)"
8054	"SA-213 S31254 Smls. tube(t <= 0.187)"	8135	"SB-171 C70620 Cls O25 Plate(<= 5)"
8055	"SA-213 S31266 Smls. tube(G5)"	8136	"SB-111 C70620 Cls O61 Smls. cond. tube"
8056	"SA-249 S31266 Wld. tube(G5)"	8138	"SB-359 C70620 Cls O61 Finned tube"
8057	"SA-312 S31266 Smls. pipe(G5)"	8139	"SB-395 C70620 Cls O61 Smls. U-bend tube"
8058	"SA-312 S31266 Wld. pipe(G5)"	8140	"SB-467 C70620 Cls WO61 Wld. pipe(<= 4 1/2)"
8059	"SA-403 S31266 Smls. fittings(G5)"	8141	"SB-543 C70620 Cls WO61 Wld. tube"

8060	"SA-403 S31266 Wld. fittings(G5)"	8142	"SB-956 C70620 Cls WO61 Finned wld. tube"
8061	"SA-479 S31266 Bar, shapes(G5)"	8143	"SB-467 C70620 Cls WM50 Wld. pipe(<= 4 1/2)"
8062	"SA-813 S31266 Wld. pipe(G5)"	8144	"SB-111 C70620 Cls H55 Smls. tube"
8063	"SB/EN 1706 AC-42000-S Cls T6 Castings"	8145	"SB-466 C70620 Cls H55 Smls. pipe"
8064	"SB-187 C10200 Cls O60 Rod(All)(G5)"	8146	"SB-466 C70620 Cls H55 Smls. tube"
8065	"SB-75 C10200 Cls O60 Smls. tube(All)(G5)"	8147	"SB-543 C70620 Cls WC55 Wld. tube"
8066	"SB-42 C10200 Cls O61 Smls. pipe(All)(G5)"	8148	"SB-956 C70620 Cls WC55 Finned wld. tube"
8067	"SB-152 C10200 Cls O25 Plate(G5)"	8149	"SB-467 C70620 Cls Wld. fr. cold rld. strip Wld. pipe(<= 4 1/2)"
8068	"SB-152 C10200 Cls O25 Sheet(G5)"	8150	"SB-467 C71500 Cls WO61 Wld. pipe(> 4 1/2)(G5)"
8069	"SB-152 C10200 Cls O25 Strip(G5)"	8151	"SB-171 C71500 Cls M20 Plate(2.5 < t <= 5)(G5)"
8070	"SB-152 C10400 Cls O25 Plate(G5)"	8152	"SB-171 C71500 Cls M20 Sheet(2.5 < t <= 5)(G5)"
8071	"SB-152 C10400 Cls O25 Sheet(G5)"	8153	"SB-171 C71500 Cls O25 Plate(2.5 < t <= 5)(G5)"
8072	"SB-152 C10400 Cls O25 Strip(G5)"	8154	"SB-171 C71500 Cls O25 Sheet(2.5 < t <= 5)(G5)"
8073	"SB-152 C10500 Cls O25 Plate(G5)"	8155	"SB-171 C71500 Cls M20 Plate(<= 2.5)(G5)"
8074	"SB-152 C10500 Cls O25 Sheet(G5)"	8156	"SB-171 C71500 Cls M20 Sheet(<= 2.5)(G5)"
8075	"SB-152 C10500 Cls O25 Strip(G5)"	8157	"SB-171 C71500 Cls O25 Plate(<= 2.5)(G5)"
8076	"SB-152 C10700 Cls O25 Plate(G5)"	8158	"SB-171 C71500 Cls O25 Sheet(<= 2.5)(G5)"
8077	"SB-152 C10700 Cls O25 Sheet(G5)"	8159	"SB-467 C71500 Cls WO61 Wld. pipe(<= 4 1/2)(G5)"
8078	"SB-152 C10700 Cls O25 Strip(G5)"	8160	"SB-466 C71500 Cls O60 Smls. pipe(G5)"
8079	"SB-187 C11000 Cls O60 Bar(All)(G5)"	8161	"SB-466 C71500 Cls O60 Smls. tube(G5)"
8080	"SB-187 C11000 Cls O60 Rod(All)(G5)"	8162	"SB-111 C71500 Cls O61 Smls. cond. tube(G5)"
8081	"SB-152 C11000 Cls O25 Plate(G5)"	8163	"SB-359 C71500 Cls O61 Finned tube(G5)"
8082	"SB-152 C11000 Cls O25 Sheet(G5)"	8164	"SB-395 C71500 Cls O61 Smls. U-bend tube(G5)"
8083	"SB-152 C11000 Cls O25 Strip(G5)"	8165	"SB-543 C71500 Cls WO61 Wld. cond. tube(G5)"
8084	"SB-152 C11000 Cls O25 Bar(G5)"	8166	"SB-956 C71500 Cls WO61 Finned wld. cond. tube(G5)"
8085	"SB-75 C12000 Cls O50 Smls. tube(All)(G5)"	8167	"SB-467 C71520 Cls WO61 Wld. pipe(> 4 1/2)"
8086	"SB-75 C12000 Cls O60 Smls. tube(All)(G5)"	8168	"SB-171 C71520 Cls M20 Plate(2.5 < t <= 5)"
8087	"SB-42 C12000 Cls O61 Smls. pipe(All)(G5)"	8169	"SB-171 C71520 Cls M20 Sheet(2.5 < t <= 5)"
8088	"SB-75 C12200 Cls O50 Smls. tube(All)(G5)"	8170	"SB-171 C71520 Cls O25 Plate(2.5 < t <= 5)"
8089	"SB-75 C12200 Cls O60 Smls. tube(All)(G5)"	8171	"SB-171 C71520 Cls O25 Sheet(2.5 < t <= 5)"

8090	"SB-42 C12200 Cls O61 Smls. pipe(All)(G5)"	8172	"SB-171 C71520 Cls M20 Plate(<= 2.5)"
8091	"SB-359 C12200 Cls O61 Finned tube(G5)"	8173	"SB-171 C71520 Cls M20 Sheet(<= 2.5)"
8092	"SB-543 C12200 Cls WO61 Wld. cond. tube(G5)"	8174	"SB-171 C71520 Cls O25 Plate(<= 2.5)"
8093	"SB-152 C12200 Cls O25 Plate(G5)"	8175	"SB-171 C71520 Cls O25 Sheet(<= 2.5)"
8094	"SB-152 C12200 Cls O25 Sheet(G5)"	8176	"SB-467 C71520 Cls WO61 Wld. pipe(<= 4 1/2)"
8095	"SB-152 C12200 Cls O25 Strip(G5)"	8177	"SB-466 C71520 Cls O60 Smls. pipe"
8096	"SB-152 C12300 Cls O25 Plate(G5)"	8178	"SB-466 C71520 Cls O60 Smls. tube"
8097	"SB-152 C12300 Cls O25 Sheet(G5)"	8179	"SB-111 C71520 Cls O61 Smls. cond. tube"
8098	"SB-152 C12300 Cls O25 Strip(G5)"	8180	"SB-359 C71520 Cls O61 Finned tube"
8099	"SB-152 C12300 Cls O25 Bar(G5)"	8181	"SB-395 C71520 Cls O61 Smls. U-bend tube"
8100	"SB-152 C14200 Cls O25 Plate(G5)"	8182	"SB-543 C71520 Cls WO61 Wld. cond. tube"
8101	"SB-152 C14200 Cls O25 Sheet(G5)"	8183	"SB-956 C71520 Cls WO61 Finned wld. cond. tube"
8102	"SB-152 C14200 Cls O25 Strip(G5)"	8184	"SB-111 C71520 Cls HR50 Smls. cond. tube"
8103	"SB-466 C70600 Cls O60 Smls. pipe(G5)"	8185	"SB-395 C71520 Cls HR50 Smls. U-bend tube"
		8186	"SB-150 C63000 Cls M20 Bar(> 4)"

Materials removed in the 2019 ASME materials database:

6683	SB-150 C63000 Cls HR50 Bar(1 < t <= 2)
6685	SB-150 C63000 Cls HR50 Bar(1/2 < t <= 1)

Aspen HTFS Research Network

Product Description

AspenTech HTFS Research Network provides access to source information on the models and correlations used in the Aspen EDR software products. It is an extensive archive that was developed from the 1970s onwards. It derives from proprietary research conducted with guidance from many industry experts. This body of documents is now available directly from the product.

The Aspen HTFS Research Network includes:

- Research Reports (>1200)
- Design Reports (≈50 extensive multi part documents)
- Handbook (>470 concise multi-page documents)

New Features and Enhancements in V12

There are no new features listed for this release.

Compatibility Notes for V12

There are no compatibility notes listed for this release.

Energy and Flare Analysis

Aspen Energy Analyzer

Product Description

Aspen Energy Analyzer® addresses a major aspect of conceptual engineering – Heat Exchanger Networks. Aspen Energy Analyzer calculates targets for energy and capital investment and enables the development of better heat integration projects – saving operating, capital and design cost, and reducing energy-related emissions. It provides tools for performing process optimization and provides both graphical and algorithmic methods.

New Features and Enhancements in V12

There are no new features for Aspen Energy Analyzer for this release.

Compatibility Notes for V12

There are no new Compatibility Notes listed for this release.

Aspen Flare System Analyzer

Product Description

Aspen Flare System Analyzer™ (previously named Aspen FLARENET) enables the engineer to perform steady-state design, rating or de-bottlenecking of single or multiple flare and vent systems. The program can calculate minimum sizes for new flare systems or evaluate alternatives to remove bottlenecks in existing relief networks. Aspen Flare System Analyzer can also be used to identify potentially dangerous relief scenarios during design phase or current operational scenarios. The program can be used to demonstrate regulatory compliance of the flare and vent systems in relation to over pressure and noise regulations.

Aspen Flare System Analyzer has an intuitive graphical Process Flowsheet environment that presents a clear and precise representation of the network. A typical model of the flare or vent system may include several hundred interconnected elements including relief valves, control valves, piping, connectors (including expansions, contractions, standard/sweep tees and orifice plates) separators and flare tips. Aspen Flare System Analyzer ensures that model development is made as simple and efficient as possible.

New Features and Enhancements in V12

There are no new features for Aspen Flare System Analyzer for this release.

Compatibility Notes for V12

This section describes the differences that you might encounter between Aspen Flare System Analyzer V12 and Aspen Flare System Analyzer V11.

Heat Capacity Results

In Aspen Flare System Analyzer V11, the heat capacity results were incorrect. The heat transfer calculations were fixed in V12. Heat capacity results are now consistent with Aspen HYSYS. This update does not affect flash calculations, which work through enthalpy.

AIV Sound Power Level Calculations

In V11, when the **Energy Institute Guidelines** 2e **(2008)** option was selected as the **Screening Method**, different results were observed for **AIV Sound Power Levels** calculations compared to the other screening methods.

In V12, Aspen Flare System Analyzer more closely aligns with the Energy Institute method, and the **AIV Sound Power Level** values are very similar for all screening methods.

What's Fixed in V12

Aspen Flare System Analyzer V12 includes software fixes that further improve the product.

ID	Issue Description	Issue Resolution
389477	In some cases, the downstream pressure was higher than upstream pressure in a Tee due to a negative calculated K value.	V12 includes a lower bound of zero for the K value.
402872	When modifying pre-existing fittings on the Inlet Piping tab of the Control Valve Editor or Relief Valve Editor, the previously specified information did not appear.	Previously specified information is now preserved.
407093	On the Inputs | Pipes data sheet (accessed via the navigation pane), clicking within a cell and then using the vertical or horizontal scroll bar caused Aspen Flare System Analyzer to fail.	This issue is fixed in V12.
444774	In V11, the piping network was unable to solve when more than one inlet pipe was specified. Additionally, when the rated flow and mass flow for the valves are specified as 0, convergence was prevented.	This issue is fixed in V12.
412063	In rare instances, scenario names did not display correctly on the KO Drums results form.	This issue is fixed in V12.

ID	Issue Description	Issue Resolution
455799	When importing pipe data from Excel, in some cases, inlet pipe segments were not imported correctly.	This issue is fixed in V12.
458639	When the Energy Institute Guidelines 2e (2008) option was selected as the Screening Method, different results were observed for AIV Sound Power Levels calculations compared to the other screening methods.	In V12, AFSA more closely aligns with the Energy Institute method, and the AIV Sound Power Level values are very similar for all screening methods.
460225	After changing the number format used for AFSA for international use, users were prevented from specifying curve data greater than 999 kg/h.	In V12, users can specify values above and below 1000 kg/h.
460562	The user interface did not provide guidance when components were not recommended for the selected Equation of State.	In AFSA V12, the Error Messages window includes warning messages to notify users when certain components are not recommended for the selected Equation of State.
471065	In some cases, a warning message stated that the orifice size was greater than the connected pipes in situations where this was not true.	This issue is fixed in V12.
492862	Using a comma (",") rather than a period (".") as the decimal point separator caused problems when importing to and from Microsoft Excel. Changing the regional settings was required for the import/export process to work successfully.	Using a comma as the decimal point separator is supported in V12.
541449	Importing safety data from HYSYS that included non-sizing scenarios on multi-valve systems was unsuccessful.	This issue is fixed in V12.

Economic Evaluation

Product Description

Aspen Capital Cost Estimator® is the state-of-the-art, fully integrated design, estimating and scheduling system designed to help you evaluate the capital cost of process plants and mills worldwide—quickly, accurately and early in the project life cycle.

Using as little information as your list of sized equipment and a general arrangement of your project, Aspen Capital Cost Estimator develops a complete, detailed engineering, procurement and construction estimate and critical path method (CPM) schedule. Because Aspen Capital Cost Estimator automatically performs mechanical designs for equipment and bulks, using self-contained international design, estimating, and scheduling procedures, you have the accurate, detailed answers you need at the 3-5% stage of engineering.

With Aspen Capital Cost Estimator, you profit from early information. You can evaluate projects during the preliminary design phase, evaluate projects during the design and construction phases, and evaluate process/project design alternatives. You can evaluate scope changes, bid tabs, vendor quotes, change orders, as well as offer new services with current resources, making use of time saved by Aspen Capital Cost Estimator.

The following sections list and describe all of the new features, enhancements, and software fixes included in this release of Aspen Economic Evaluation V12:

- Aspen Process Economic Analyzer.
- Aspen In-Plant Cost Estimator.
- Aspen Capital Cost Estimator.
- Icarus Evaluation Engine.
- Icarus Reporter
- What's Fixed in Supporting Products.

New Features and Enhancements in V12

The following new features and enhancements were added in release V12:

Icarus Evaluation Engine

The following V12 new features and enhancements are included for the Icarus Evaluation Engine.

Pricing Updates in V12

- 2019 Pricing Update Summary
- 2019 Pricing Update for Japan location

2019 Cost Basis Update - Pricing Changes

The pricing basis for Aspen Economic Evaluation V12 is still First Quarter 2019. The table below summarizes an approximation of material pricing changes from the **V11.1 EP1-3** version of Aspen Economic Evaluation (i.e. 2019 pricing basis) **to V12 due to defect corrections and model refinements**. **Included in the V12 release is an update to the Japanese costing basis**. For your convenience, the pricing changes from 2018 to 2019 (V11.1 release) are included below.

These results were obtained by running a general benchmark project containing a representative mix of equipment found in a gas processing plant. In addition to pricing changes, model enhancements and defect corrections have affected overall percentage differences. Note: this may include quantity or design differences as various models and methods have been updated or fine-tuned based on client feedback and defect resolution (see information provided in this document regarding defect corrections which may cause pricing and/or installation scope changes in the V12 What's Fixed section of the Economic Evaluation release notes for further information). *Your results will differ based on the overall mix of equipment, bulk items, and specified materials of construction contained in your project.*

Category		Material % Change from V12 (2019 Basis) vs. V11.1 EP1-3 (2019 Basis)				
		US	UK	JP	EU	ME
Equipment		0.1%	0.1%	6.8%	0.1%	0.1%
Piping		1.0%	1.2%	3.3%	1.1%	0.7%
Civil		0.0%	0.0%	2.8%	0.0%	0.0%
Steel		0.0%	0.0%	2.1%	0.0%	0.0%
Instrumentation (see note 1)	Control Valves	0.0%	0.0%	2.8%	0.0%	0.0%
	Instruments	0.0%	0.0%	2.1%	0.0%	0.0%
	Overall	0.0%	0.0%	2.2%	0.0%	0.0%
Electrical		-1.6%	-0.4%	0.0%	2.4%	-1.3%
Insulation		0.0%	0.0%	-1.6%	0.0%	0.0%
Paint		0.0%	0.0%	-0.6%	0.0%	0.0%
Construction Labor - % represents avg wage rate change		0.0%	0.0%	3.6%	0.0%	0.0%
Engineering Labor - % represents avg wage rate change		0.0%	0.0%	2.0%	0.0%	0.0%

Notes:

[1] Starting with the V8.7.1/V8.8 release, a change was made to have control valve pricing be consistent with bulk valve pricing (see V8.7.1/V8.8 release notes for further information on this change). Due to this change, we have split the Instrumentation pricing changes as depicted in the table.

- Specifically, the following items will affect pricing for each country:

  218175 For shell and tube heat exchangers and reboilers, the number of shells should be taken into consideration when calculating saddle weight/cost

  471787 Fatal error caused by Custom Piping Spec

  476010 1 Electrical push buttons no CV length

  489113 ACCE queries about heat exchanger sizing

  509244 error is because the engine is not able to estimate a cable for the compressor driver because of the max. HV wire size

  524411 Epoxy amounts high on items like compressors

  530573 Instrument Unions and couplings multiplying.

  545746 1% of welds in shops with many fittings not giving pipe

In general, the following system pricing changes were observed with the **2019 pricing updates**:

- Based on fabricator data, the following plate pricing changes have been observed:
  - A515 & A285C: ~ 17% increase
  - A516: ~ 16% increase
  - A202A/B: ~17% increase
  - A203A-E: ~0.8% decrease
- Based on vendor data, the following seamless tube pricing changes have been observed:
  - A179: ~ 37% increase
  - A199C: ~38% increase
  - A199D-F: ~39% increase
  - A209A/B: ~38% increase
  - A213A-C: ~38% increase
  - A213D-F: ~39% increase
- Based on vendor data, the following tube pricing change has been observed for welded CS tubes:
  - A214: ~ 36% increase
- Based on vendor data, stainless steel plate pricing has shown the following changes:
  - SS304: ~0.8% decrease
  - SS316: ~0.7% decrease
  - SS316Ti: ~0.7% decrease
  - SS317: ~0.8% decrease
  - SS321: ~0.6% decrease
  - SS347: ~0.5% decrease
  - SS410: ~0.8% increase
  - SS430: ~0.4% increase
  - SS6MO: ~8% increase
  - Duplex (S2205): ~0.6% decrease
- Based on vendor data, pricing changes for stainless steel welded tubing is as follows:
  - 304W: ~ 23% decrease
  - 316W: ~ 38% decrease
  - 321W: ~ 38% decrease
  - 2205W: ~32% decrease
- Based on vendor data, pricing changes for stainless steel seamless tubing is as follows:
  - 304S: ~ 37% increase
  - 316S: ~ 25% increase
  - 321S: ~ 25% increase
  - 2205S: ~25% increase
- Titanium plate and tube pricing have decreased app. 4%.
- Based on vendor data, the following increases were observed for Non-Ferrous materials:
  - Hastelloy ~ 7% plate, ~ 4% tube
  - Inconel (I600) ~ 7% plate, ~ 4% tube
  - I800 ~ 8% plate ~ 4% tube
  - C20 ~ 8% plate ~ 4% tube
  - I825 ~ 7% plate ~ 4% tube
  - Monel ~ 6% plate ~ 3% tube
  - Nickel (NI200/201) ~ 6% plate, ~ 3% tube
- The following decreases have been observed for Copper and Aluminum pricing:

  - Copper ~ 6% sheet, ~4% tube, ~ 6% wire
  - Aluminum ~ 7% plate & sheet, ~ 7% tubes
- The following Rebar pricing changes have been made for each location basis:
  - US Basis: ~ 5% increase
  - UK Basis: ~ 3% increase
  - EU Basis: ~ 4% increase
  - JP Basis: ~ 2% increase
  - ME Basis: ~ 9% decrease
- Ready Mix Type "B" Concrete pricing was updated in each location based on spot pricing received:
  - US Basis: ~ 0.3% increase
  - UK Basis: ~ 2% increase
  - EU Basis: ~ 4% increase
  - JP Basis: ~ 8% increase
  - ME Basis: ~ 3% increase
- Pricing for structural steel shapes and beams have been updated accordingly:

Approximate Structural Steel Pricing Changes					
Type	**US**	**UK**	**JP**	**EU**	**ME**
Ladders, Handrails, Grating (avg.)	1.9%	3.0%	2,1%	3.9%	0.0%
Stairways (avg.)	1.4%	3.0%	2,1%	3.9%	0.0%
Platforms (avg.)	0.4%	3.0%	2,1%	3.9%	0.0%
Steel Members (avg.)	1.7%	3.0%	2,1%	3.9%	-4.3%

Pricing Updates in V11.1

- 2019 Pricing Update Summary

2019 Cost Basis Update - Pricing Changes

The pricing basis for this release has been updated to the First Quarter 2019. The table below summarizes an approximation of material pricing changes from the V11.0 EP1-4 version of Aspen Economic Evaluation (i.e. 2018 pricing basis). These results were obtained by running a general benchmark project containing a representative mix of equipment found in a gas processing plant. In addition to pricing changes, model enhancements and defect corrections have affected overall percentage differences. Note: this may include quantity or design differences as various models and methods have been updated or fine-tuned based on client feedback and defect resolution (see information provided in this document regarding defect corrections which may cause pricing and/or installation scope changes in the V11.1 What's Fixed section of Economic Evaluation release notes for further information). *Your results <u>will</u> differ based on the overall mix of equipment, bulk items, and specified materials of construction contained in your project.*

Category	**Material % Change from V11.1 (2019 Basis) vs. V11.0 EP1-4 (2018 Basis)**					
		US	**UK**	**JP**	**EU**	**ME**
Equipment		9.6%	9.7%	*	8.7%	10.2%
Piping		4.6%	5.1%	*	2.9%	1.8%
Civil		2.4%	3.1%	*	5.7%	2.5%

Steel		4.4%	3.0%	*	3.9%	-0.5%
Instrumentation (see note 1)	Control Valves	5.1%	4.7%	*	3.6%	2.2%
	Instruments	0.8%	2.7%	*	2.5%	0.3%
	Overall	2.8%	3.4%	*	3.1%	1.2%
Electrical		4.6%	2.1%	*	3.3%	0.2%
Insulation		1.0%	2.5%	*	1.5%	1.6%
Paint		4.8%	2.1%	*	-0.1%	2.7%
Construction Labor - % represents avg wage rate change		1.5%	2.3%	*	1.0%	6.1%
Engineering Labor - % represents avg wage rate change		2.0%	1.3%	*	1.2%	0%

Notes:

* Data was not available to perform a complete pricing update for the Japan country base. However, there may be slight pricing changes in the Japan basis due to model corrections and general system enhancements. These are documented elsewhere in the V11.1 What's New content.

[1] Starting with the V8.7.1/V8.8 release, a change was made to have control valve pricing be consistent with bulk valve pricing (see V8.7.1/V8.8 release notes for further information on this change). Due to this change, we have split the Instrumentation pricing changes as depicted in the table.

- Specifically, the following items will affect pricing for each country base (detailed descriptions and impact of these changes are documented elsewhere in this document):
  - Unit handrail man-hour for horizontal or for stairs are not same (403671)
  - Pipe material affecting insulation (447893)
  - Air Cooler VFD Issue (454933)
  - Equipment Rental CHANGE action for All Contractors (471219)
  - Number of shifts (471275)
  - DTW TOWER weight changes (473134)
  - Different PIPE INSULATION results compared with V11.0 (454952)
  - Got Profit for SAN FLOOR compared with V11.0 (445360)
  - Enter Steel Platform area, got different results compared with system calculated item (460119)
- Electrical wire pricing for each country basis is affected by the Copper pricing specification. The Copper pricing has been updated in the V11.1 release (see copper wire pricing change below).

In general, the following system pricing changes were observed:

- Based on fabricator data, the following plate pricing changes have been observed:
  - A515 & A285C: ~ 17% increase
  - A516: ~ 16% increase
  - A202A/B: ~17% increase
  - A203A-E: ~0.8% decrease
- Based on vendor data, the following seamless tube pricing changes have been observed:
  - A179: ~ 37% increase
  - A199C: ~38% increase

  - A199D-F: ~39% increase
  - A209A/B: ~38% increase
  - A213A-C: ~38% increase
  - A213D-F: ~39% increase
- Based on vendor data, the following tube pricing change has been observed for welded CS tubes:
  - A214: ~ 36% increase
- Based on vendor data, stainless steel plate pricing has shown the following changes:
  - SS304: ~0.8% decrease
  - SS316: ~0.7% decrease
  - SS316Ti: ~0.7% decrease
  - SS317: ~0.8% decrease
  - SS321: ~0.6% decrease
  - SS347: ~0.5% decrease
  - SS410: ~0.8% increase
  - SS430: ~0.4% increase
  - SS6MO: ~8% increase
  - Duplex (S2205): ~0.6% decrease
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- Based on vendor data, the following increases were observed for Non-Ferrous materials:
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  - Inconel (I600) ~ 7% plate, ~ 4% tube
  - I800 ~ 8% plate ~ 4% tube
  - C20 ~ 8% plate ~ 4% tube
  - I825 ~ 7% plate ~ 4% tube
  - Monel ~ 6% plate ~ 3% tube
  - Nickel (NI200/201) ~ 6% plate, ~ 3% tube
- The following decreases have been observed for Copper and Aluminum pricing:
  - Copper ~ 6% sheet, ~4% tube, ~ 6% wire
  - Aluminum ~ 7% plate & sheet, ~ 7% tubes
- The following Rebar pricing changes have been made for each location basis:
  - US Basis: ~ 5% increase
  - UK Basis: ~ 3% increase
  - EU Basis: ~ 4% increase
  - JP Basis: ~ NA
  - ME Basis: ~ 9% decrease
- Ready Mix Type "B" Concrete pricing was updated in each location based on spot pricing received:

- US Basis: ~ 0.3% increase
- UK Basis: ~ 2% increase
- EU Basis: ~ 4% increase
- JP Basis: ~ NA
- ME Basis: ~ 3% increase

- Pricing for structural steel shapes and beams have been updated accordingly:

Approximate Structural Steel Pricing Changes					
Type	**US**	**UK**	**JP**	**EU**	**ME**
Ladders, Handrails, Grating (avg.)	1.9%	3.0%	NA	3.9%	0.0%
Stairways (avg.)	1.4%	3.0%	NA	3.9%	0.0%
Platforms (avg.)	0.4%	3.0%	NA	3.9%	0.0%
Steel Members (avg.)	1.7%	3.0%	NA	3.9%	-4.3%

What's New: All Aspen Economic Evaluation Programs

The following V12 new features and enhancements are shared by all Aspen Economic Evaluation Programs.

64-Bit Economic Evaluation

Economic Evaluation is now a 64-bit product. All third-party tools used in conjunction with Economic Evaluation must also be 64-bit.

New Steel MTO Component

A new steel plant bulk component that allows users to enter steel material takeoff data has been added in V12. The new component is called "Steel material takeoff (MTO)" and has been added to the components tree under plant bulks, steel.

New Project Evaluation Workflow

In V11.1 (or earlier), when you evaluate the project the Icarus Evaluation Engine creates delimited ASCII files for the various tables for the results database. When you invoke Interactive Reports, the Reporter loads these tables into a SQL Server database which enables the creation of various types of reports like Standard report, Excel reports etc.

In V12 this workflow is a single step. In the **Preferences** dialog an additional "**Reporting**" tab has been created for reporting related options. The tab will allow you to:

- Specify the [SQL] server\instance name to be used by reporter. The default is localdb.
- Specify the report generation options after project evaluation:
  - Check box to indicate if evaluation results should be displayed. The default state is "checked". This is applicable for ACCE (CCP report) and APEA (Investment analysis reports) only.
  - Check box to indicate if the reporter UI should be launched after project evaluation. The default state is "checked".
  - Check box to indicate if "remembered" reporter reports should be run. This will run reports saved by using the "Remember selections" feature in the reporter UI. This is applicable for Excel reports only. Default is "unchecked".
- Specify item report selections. (these have been moved from the 'General' tab to the new tab. The default item report type is 'Capital Cost Item Report'.

MCC Plant Bulk Component Enhancement

The MCC Plant Bulk now accounts for the cost of many more items such as feeder breakers, circuit breakers, and accessories. The occupied spaces in the LV-MCC is now also reported.

The following components have been added to the existing MCC plant bulk:

- Incoming cable termination device
- Terminal device current rating
- Combination Starter Devices
- Feeder Circuit Breakers
- Accessories:
  - Pilot lights
  - Push buttons
  - Space heaters
  - Selector switches
  - Future spaces

The **Voltage range** and **Starter 1 power** input fields are mandatory in the new MCC plant bulk component form.

For previous projects up to V11.1, in the GUI, the "Voltage range" and "Driver power" were two mandatory fields. With the new form, the data on these two fields will be transferred to the field of "Voltage range" and "Starter 1 power" respectively.

Detailed Electrical & Insulation Description in Detailed Unit Rate (DURE) File

Electric power wire/cable- LV, MV and HV including ground/earth wire, control wire/cable, and lighting wire/cable can be installed in tray or pull in conduit. This is true for estimation in plant bulk, installation bulk and volumetric modelling. In previous versions the line item description printed a general description "INSTALL CABLE IN TRAY" and/or "PULL WIRE IN CONDUIT" wherever appropriate.

This enhancement modifies that line item description for power, control and lighting wire/cable with associated voltage level and wire/cable size inside the tray or conduit. This enhancement is not applicable for instrumentation cable which has different sizing than those cables mentioned above and currently the estimation report provides the necessary details in the line item description for the instrumentation cable. This enhancement addresses both IP and Metric system wire/cable size and voltage level.

For the CV wire/cable, the Man-Hours differ based on the material and it is important to know the number of conductors in the multi-core CV cable. This enhancement also addresses this for CV cable by printing the number of conductors in addition to voltage level and wire/cable size. For the single wire (W-C, W-NC, W-TR), the number of conductors is not printed. Only for multi-core, multi-conductor CV cable, this enhancement will take effect.

Previously, the insulation labor line items do not have material and thickness in them. In order to allow users to account for the insulation size, material, and thickness, the detailed description has been to the insulation labor line items of the following components.

- Pipe insulation: Plant bulk and installation bulk pipe
- Equipment insulation (volumetric model)
- Insulation installation bulk items (Options → Insulation)
- Insulation plant bulk items
- Duct insulation

Additionally, for pipe insulation, the pipe diameter has been added to the line item (similar to the line item for insulation material cost).

The insulation labor line items will have the insulation material.

The detailed description will be turned on only when you have "**Create detailed labor line items**" set to "**Y**" in the **Design basis → Piping Specs → General** form.

Remote SQL Servers Now Supported

Reporter now supports the use of SQL Server Instances running on remote servers. If you are planning on using the ACCE Insights feature (new in V12 – see below for details), you must use a Remote SQL Server.

Access eLearning Content Through Economic Evaluation

You will now be able to access Economic Evaluation eLearning and other technical content through the Aspen Knowledge Center. Click **Help | Aspen Knowledge** through the UI on any Economic Evaluation product to launch the Aspen Knowledge Center.

What's New: ACCE only

The following V12 new features and enhancements are unique to Aspen Capital Cost Estimator.

ACCE Insights

ACCE Insights is an integration between Aspen Capital Cost Estimator and Aspen Enterprise Insights. Aspen Enterprise Insights is a platform for collaboratively sharing enterprise data and managing enterprise workflows. ACCE Insights allows you to easily visualize and share Estimation metrics, charts and milestones. Metrics viewable with ACCE Insights include all major metrics in your ACCE project, including direct costs, indirect costs, major account summary, etc. Viewing the metrics in the tables and charts created by ACCE Insights gives you greater visualization of the cost data. With the chronology chart created using the milestones feature it is easy to view the progress and trajectory of your project.

Some of the benefits of using ACCE Insights include:

- Collaborative environment. ACCE Insights can easily be viewed by management, engineers, estimators, etc.
- Real-time results allow for informed decision making.
- Visualization, analysis, and benchmarking capabilities reduce the expertise required for interpreting results.

Milestones

You will now be able to create milestones in ACCE and view the milestones in ACCE Insights. A milestone represents any point of significance in your project, which you want to save and use later for comparison with the future status of your project. In ACCE, you will be able to create and edit milestones. In ACCE Insights, you will be able to see chronology charts for the various milestones you have created in ACCE.

Risk Analysis Enhancements

The Risk Analysis feature allowed you to conduct cost risk analysis using Monte Carlo simulation and estimate contingency for your estimates. You could specify the uncertainty for material costs, labor hours, wage rates and indirect costs, however, in previous versions you could not specify uncertainty for the quantities (i.e. scope) of the estimate.

In V12, you can now develop risk analysis with quantities and unit costs. Both the "cost risk analysis" (i.e. V11/V11.1 risk analysis) and "quantity risk analysis" are available in V12.

In **Preferences | General** under the **Risk Analysis** option, you will be able to select the desired risk analysis method. "Cost and quantity risk analysis" or "Cost risk analysis" may be selected. The default is set to "Cost risk analysis".

- Cost Risk Analysis input file: CostRiskReport.xlsm
- Cost and Quantity Risk Analysis input file: QtyRiskReport.xlsm

The quantity risk analysis input file contains "items' quantities and unit material cost" that the cost based file doesn't have.

Risk analysis input files from older versions in the Project will be renamed to CostRiskReport.xlsm, and you will be able to use them if "Cost risk analysis" is selected in **Preferences**. You will have to create a risk analysis input file if you want to use the "Cost and quantity risk analysis" option.

"N" Option Enhancements

The "N" option in ACCE allows you to suppress the default bulks estimated for project components by the volumetric model and the default area level bulks estimated by ACCE while maintaining the capabilities of having multiple contractors, consets etc. The "N" option also suppresses the systems (power distribution, process control etc.) estimation in ACCE.

In V12, you can now toggle the "N" option at the area level.

A new field called "Suppress default eqp/area bulks" has been added to the "Area Title Info" form. This new field will also be available on the "AREAS" worksheet when the project data is exported to Excel via Spreadsheet Import/Export. This field will allow you to toggle the "N" option on and off. The table below shows the different combinations of different project and area level inputs and expected behaviors.

Value at Project Level	Value at Area Level	Expected Behavior
<blank>	<blank>	N option is not used.
<blank>	N	N option is used for the area.
N	<blank>	N option is used across the project.
N	N	N option is used across the project.
M	<blank>	M option is used across the project.
M	N	M option is used across the project. The area level input is ignored.

In prior versions when N option was selected for the project, all area level bulks were suppressed. So even when you would manually specify installation bulks for an item within the area, the corresponding area level bulks are not estimated. E.g. If you specify installation bulk piping, the corresponding pipe testing at area level was not estimated. This has been modified so that when installation bulks are specified while using the N option, the corresponding area level bulks will now be estimated. The area level bulks to be estimated when N option is enabled are given in the following table along with the conditions/inputs under which these area level bulks are estimated.

Area Level Bulk	Estimated When:
Pipe testing (Manhours and labor cost).	Any piping is estimated in the area due to specified installation or plant bulk pipe items.
Electrical tracing power items (Material cost, manhours and labor cost).	Any equipment or piping in the area has electrical tracing specified.
Instrument testing (Manhours and labor cost).	Any instrumentation is estimated as a result of specified instrumentation bulks.
Instrument runs, trays, junction boxes (Material cost, manhours and labor cost).	Any instrumentation is estimated as a result of specified instrumentation bulks.
Local panel instrumentation items (Material cost, manhours and labor cost).	Any local panel instrumentation is estimated as a result of specified instrumentation bulks.
Electrical testing (Manhours and labor cost).	Any electrical items are estimated in the area as a result of user specified input.

These bulks can be reviewed as a summary in the area bulks report in the CCP report (Area bulks report is at the end of equipment list for each area and before the area data sheet).

What's New: ACCE and AICE Only

The following V12 new features and enhancements are unique to Aspen Capital Cost Estimator and Aspen In-Plant Cost Estimator.

Primavera P6 Professional 18.8 and OpenJDK Support

ACCE and AICE now support Primavera P6 Professional R18.8. OpenJDK or Java SE Development kit may be used with Primavera P6 Professional R18.8.

- Java SE Development Kit: 64 bit jdk8u181 is supported.
- OpenJDK: OpenJDK-8.0.222.10 (jdk8u222-b10) is supported.

Compatibility Notes for V12

There are no compatibility notes listed for this release.

Retired Features

Old Reporter Sunset

Old Reporter has been removed from all Economic Evaluation products. Only New Reporter will be displayed when Reporter is launched from any Economic Evaluation product.

HYSIM No Longer Supported in APEA

HYSIM is no longer supported in APEA.

What's Fixed in V12

Aspen Economic Evaluation V12 includes a number of software fixes that further improve the product. Selected defect fixes contained in Aspen Economic Evaluation are listed below. This list is a subset of all the corrections included in Aspen Economic Evaluation V12 and includes fixes made to the Evaluation Engine, Reporter and System Framework.

If you are interested in a particular defect that you do not see listed here or want to see a more comprehensive list, contact your Support representative.

ID	Issue Description	Issue Resolution
218175	For shell and tube heat exchangers and reboilers, the number of shells should be taken into consideration when calculating saddle weight/cost	This issue has been fixed in Aspen Economic Evaluation V12.
316238	Got PD error when set SIS for Chinese template in APEA	This issue has been fixed in Aspen Economic Evaluation V12.
403132	Excel import, export: MSCorlib out of memory exception	This issue has been fixed in Aspen Economic Evaluation V12.
412235	Newly Created Raw Material/Product Specifications Cannot be Modified or Deleted	This issue has been fixed in Aspen Economic Evaluation V12.
418249	ACCE : Import Spreadsheet error	This issue has been fixed in Aspen Economic Evaluation V12.
421059	Spare equipment (pump, compressor, etc.) should not consume utility.	This issue has been fixed in Aspen Economic Evaluation V12.
421464	EE V11.0: Description issues for Ratio of Recycle to (Ovhdliqprod+Reflux) Flowrates & Ratio of SC Trim Duty to Overall Duty & SC Trim Splitter Flow Split Ratio	This issue has been fixed in Aspen Economic Evaluation V12.
437251	Aspen HYSYS Activated Economic Analyzer - The overhead condenser does not work as an aircooler	This issue has been fixed in Aspen Economic Evaluation V12.
449046	Error when trying to export spreadsheet	This issue has been fixed in Aspen Economic Evaluation V12.

ID	Issue Description	Issue Resolution
449440	Missing On/Off Ball Valves	This issue has been fixed in Aspen Economic Evaluation V12.
449998	EE V11.1: Load multiple contractors project into AICE, Contract Definition issue	This issue has been fixed in Aspen Economic Evaluation V12.
452254	Warehouse spares incorrect in escalation	This issue has been fixed in Aspen Economic Evaluation V12.
453061	Indirect costs in UCL are not getting associated with the correct contractor when the "Icarus/user COA option" was set to "I".	This issue has been fixed in Aspen Economic Evaluation V12.
456284	EE V11.1: Got exception when Primavera Project Name is XXX1	This issue has been fixed in Aspen Economic Evaluation V12.
458742	EE V11.0: Question about Driver item for MOTOR/VFD Driver type Air cooler	This issue has been fixed in Aspen Economic Evaluation V12.
463822	EE v11.1: Define Output (Reports) Units of Measure Customization once, delete it, evaluate got error	This issue has been fixed in Aspen Economic Evaluation V12.
465143	EE V11.1: Wrong behavior after copy & paste file in User P&ID Libraries	This issue has been fixed in Aspen Economic Evaluation V12.
467086	APEA V11 - the software crashes during the Sizing Expert when the area of an Air Blower is too small	This issue has been fixed in Aspen Economic Evaluation V12.
471787	Fatal error caused by Custom Piping Spec	This issue has been fixed in Aspen Economic Evaluation V12.
472235	EE V11.1: Loading issue of Project Direct Cost - Graphical Relationships report	This issue has been fixed in Aspen Economic Evaluation V12.
472277	Fwd: APEA Heat Exchanger Design Temperature calculation V10	This issue has been fixed in Aspen Economic Evaluation V12.
474747	EE V11.1: Run Decision Analyzer twice, got Incomplete Installation dialog	This issue has been fixed in Aspen Economic Evaluation V12.
476010*	1 Electrical push buttons no CV length	This issue has been fixed in Aspen Economic Evaluation V12.
476388	Program is stuck in a loop when designing LNG tank when large seismic horizontal acceleration is specified	This issue has been fixed in Aspen Economic Evaluation V12.
476910	Pipe connection type in incorrect in design datasheet when lined pipe material is specified	This issue has been fixed in Aspen Economic Evaluation V12.
480563	Remove Yard Piping component from the piping component palette	This issue has been fixed in Aspen Economic Evaluation V12.
480605	Area Specs Copy Paste Causing Crash	This issue has been fixed in Aspen Economic Evaluation V12.
480755	EE V11.1: Aspen Icarus Classic Schedule Analysis Layout issue for P6	This issue has been fixed in Aspen Economic Evaluation V12.
484015	Open Steel Reporting error	This issue has been fixed in Aspen Economic Evaluation V12.
484447*	EE V12.0: Clear All Saved Trends doesn't work	This issue has been fixed in Aspen Economic Evaluation V12.
485515*	ACCE V11 COA Allocation causing Report Issue	This issue has been fixed in Aspen Economic Evaluation V12.
486724*	Foreman gets no wage rate when "Foreman wage percent of craft rate" is used with New Reporter	This issue has been fixed in Aspen Economic Evaluation V12.
489113	ACCE queries about heat exchanger sizing	This issue has been fixed in Aspen Economic Evaluation V12.
490527	In-Plant miscalculates Install wire in tray (Equals Total wire).	This issue has been fixed in Aspen Economic Evaluation V12.

ID	Issue Description	Issue Resolution
494527*	Reporting Differences on Equipment Rentals	This issue has been fixed in Aspen Economic Evaluation V12.
502983*	When a simulation is improperad into APEA, there is a character limit of 108 on the stream names	This issue has been fixed in Aspen Economic Evaluation V12.
506365	Risk Analysis - failed message running errors	This issue has been fixed in Aspen Economic Evaluation V12.
506563*	Aspen Economics Reporter Unable to connect to database server	This issue has been fixed in Aspen Economic Evaluation V12.
509244	error is because the engine is not able to estimate a cable for the compressor driver because of the max. HV wire size	This issue has been fixed in Aspen Economic Evaluation V12.
513317	Adding electrical ith no electrical	This issue has been fixed in Aspen Economic Evaluation V12.
517382*	Reporting Error	This issue has been fixed in Aspen Economic Evaluation V12.
520370	metric project with while reporting in IP, has correct units but values appear to be metric for conduit	This issue has been fixed in Aspen Economic Evaluation V12.
524411	Epoxy amounts high on items like compressors	This issue has been fixed in Aspen Economic Evaluation V12.
526988	EE V11.0: Direct Cost Metrics by Report Group issue with the attached project	This issue has been fixed in Aspen Economic Evaluation V12.
526992	EE V11.0: Messed data L1 - Account Basis with the attached project	This issue has been fixed in Aspen Economic Evaluation V12.
527501	EE V11.0: incorrect IPA Detail Cost for metric unit	This issue has been fixed in Aspen Economic Evaluation V12.
530573*	Instrument Unions and couplings multiplying.	This issue has been fixed in Aspen Economic Evaluation V12.
534879*	Largest bore doesn't convert from MM to IN diameter	This issue has been fixed in Aspen Economic Evaluation V12.
538387*	ACCE V11.0 & V11.1: Excel VSTO registration message when launch excel interactive reports	This issue has been fixed in Aspen Economic Evaluation V12.
545746	1% of welds in shops with many fittings not giving pipe	This issue has been fixed in Aspen Economic Evaluation V12.

* This has also been fixed in a V11.0 or V11.1 Emergency Patch.

Aspen Basic Engineering

Product Description

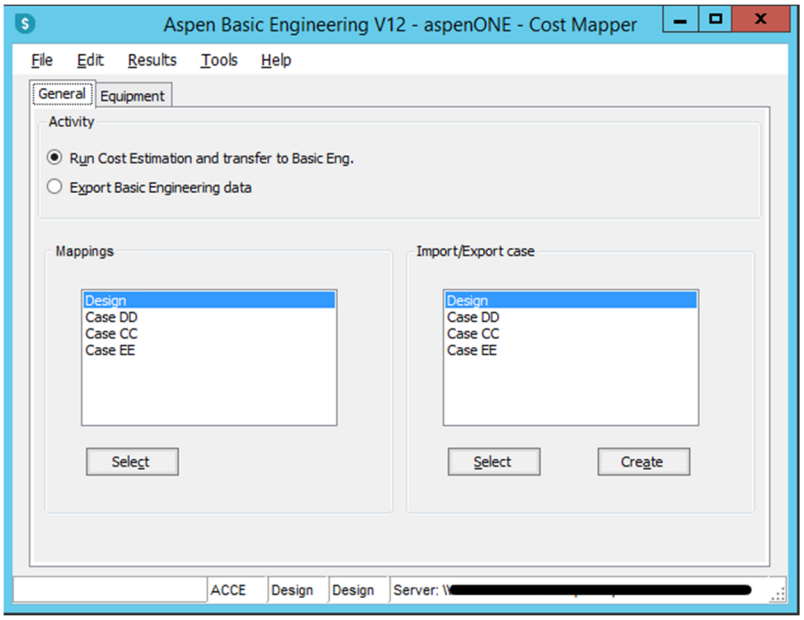
Aspen Basic Engineering provides integration of front-end engineering work processes, and management of process data and knowledge throughout the engineering lifecycle.

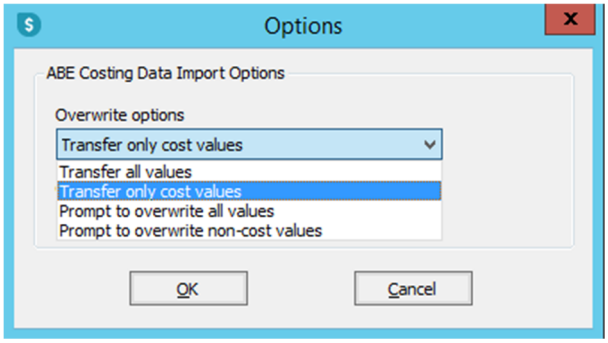
New Features and Enhancements in V12

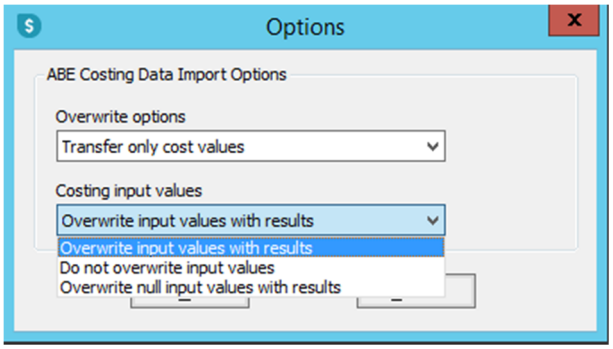
The following are new for V12:

Updated Cost Mapper UI

The cost mapper has had a modern UI refresh.

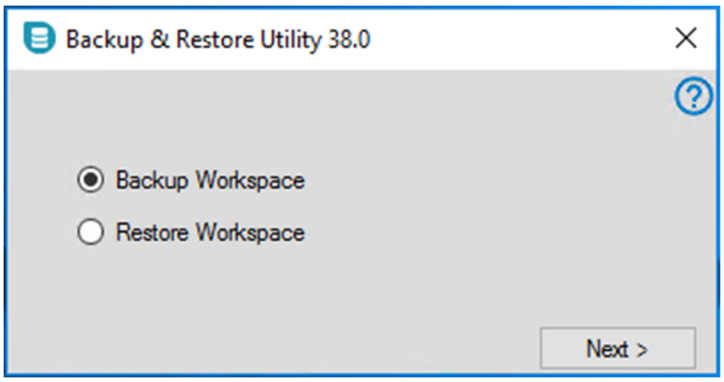






Backup and Restore Tool

ABE now has an improved Backup and Restore utility, **ABEBackup.exe**. You can use it to Backup and Restore workspaces created in V12. This new tool also has help, accessible via the icon.



Improved HMB Calculations

Material and Heat Balance calculations performed on Aspen Plus columns modeled as implicit objects in ABE now have increased accuracy.

Workspace Selection UI in Simulators

The workspace selection user interface in both Aspen Plus and Aspen HYSYS has been improved. Now you can choose to automatically connect to a workspace you have previously connected to or select the option to prompt you to choose a workspace. The connected workspace name is also displayed in the Datasheet ribbon in both Simulators.

Molecular Weight Data Transfer from Simulators

Molecular weight data is now transferred from both Aspen Plus and Aspen HYSYS.

Direct Web Access to Explorer Disabled

Note: In V12, direct access to any ABE functionality directly via a web browser is disabled. The Web enabled Explorer, Simulation Mapper and Datasheet Editor are still available from within the Process Modeling applications Aspen Plus and Aspen HYSYS.

Compatibility Notes for V12

There are no compatibility notes for this release.

What's Fixed in V12

Aspen Basic Engineering Version V12 includes a significant number of software fixes that further improve the product. The section below contains a selected subset of all defect fixes.

If you are interested in a particular defect that you do not see listed here or want to see a more comprehensive list, contact your Support representative.

ID	Issue Description	Issue Resolution
359464	H5 Equipment List: Filter/Sort doesn't work properly	This issue has been fixed in V12.
401349	XLDSE: Double-clicking to active Note field and using Ctrl+V to paste causes disconnect from database	This issue has been fixed in V12.
404409	Column data from HYSYS is not getting transferred to ABE through Mapper tool	This issue has been fixed in V12.
407640	Selecting a classview for an object in ABE Explorer causes ABE to fail	This issue has been fixed in V12.
411636	ABE V10: HYSYS import issue	This issue has been fixed in V12.
415683	H5 Datasheet Editor: Issue with company logos on datasheets	This issue has been fixed in V12.
419639	ABE V9: Issue with Global Unit Set on Continuous List	This issue has been fixed in V12.
424393	Route in core model composite VendorTrayDataBySection has changed from V8.8	This issue has been fixed in V12.
438735	ABE Migration tool help not available	This issue has been fixed in V12.
439147	ABE Interface display/crop issue	This issue has been fixed in V12.
453231	HTML5 templates and logos are always copied to the web service location	This issue has been fixed in V12.
458895	Unexpected behavior for AirCoolers and Heaters in ABE	This issue has been fixed in V12.
461394	ABE V11: Legacy PDS Revision field alignment issue	This issue has been fixed in V12.
468831	Submitted/checked/issued drawings have incorrect line widths	This issue has been fixed in V12.
471309	ABE V11: Issues with Legacy Editor	This issue has been fixed in V12.
491847	ABE V11: Datasheet and StandardModel migration issue	This issue has been fixed in V12.
494864	Data displayed in the wrong location when datasheet is exported from the web	This issue has been fixed in V12.
497997	XLDSE: Engineering Standards button grayed out	This issue has been fixed in V12.
498913	How to set up document header to repeat on multiple pages?	This issue has been fixed in V12.
499265	ABE V11: Validate Fields error in Datasheet Definer	This issue has been fixed in V12.
499292	ABE V11 CP1: "New Sheet Connector" does not update with PFD name change	This issue has been fixed in V12.
501493	ABE V11 CP1: Issue with datasheet compilation after CP1 and EP5	This issue has been fixed in V12.
508866	ABE V11 CP1: Issue in datasheet after EP07 (merged cells with text)	This issue has been fixed in V12.
509707	Drawing Editor does not open properly PFDs on a particular server	This issue has been fixed in V12.
520664	Standard liquid Volumetric Flow Rate for liquid is not transferred (for the mixture and vapor, liquid-1, liquid-2 and liquid phases) from Aspen Plus to ABE	This issue has been fixed in V12.

ID	Issue Description	Issue Resolution
522106	ABE V10: Data are missing or partially mapped using simulation importer	This issue has been fixed in V12.
527181	ABE V9: Sim Import Issues	This issue has been fixed in V12.
536451	Import of xml file from Aveva PID causes forcible disconnection of applications from server without completing import	This issue has been fixed in V12.
537374	Issues with printing custom datasheets	This issue has been fixed in V12.
539389	Company logo printing issue	This issue has been fixed in V12.
476862	ABE V11: Major problems in Datasheet Definer - Issues with Replace option	This issue has been fixed in V12.
480101	XLDSE: logo misalignment issue	This issue has been fixed in V12.
480640	In Datasheet Definer, Set Object on a cell works only once	This issue has been fixed in V12.
488107	ABE: Unable access to Server	This issue has been fixed in V12.
283357	Excel Datasheet Editor does not display attribute formatting	This issue has been fixed in V12.
315187	Inserting Descriptive Text into a field that already shows a value is not displayed	This issue has been fixed in V12.
472878	ABE V11: How to set wildcard for summary sheets with vector attributes?	This issue has been fixed in V12.
489481	When changing a numerical value in a continuous list to substitution text, this modification will not be effective in the equipment datasheet	This issue has been fixed in V12.

Process Development

The Process Development collection of applications applies to any business that is doing scale-up from the lab to the pilot plant to manufacturing scale for batch processes.

The aspenONE Process Development applications support batch process development in two major areas. The first is in managing information associated with batch processes as companies scale their processes from the lab into pilot environments and finally into the plant. This is primarily associated with Aspen Batch Process Developer. This information-centric activity is supported by the second element of our process development suite: modeling and simulation tools. These tools enable our customers to build kinetic models of reactions from laboratory data, explore the solubility characteristics of their new compounds, conduct detailed studies of dynamic distillation, separation and chromatography operations, and run a number of other simulations and studies.

Aspen Batch Process Developer

Product Description

Aspen Batch Process Developer is a process modeling and simulation system for the batch process industries. While it has been specifically designed for the simulation of pharmaceutical, biotech and agricultural chemical processes, it can also be used to simulate other complex, recipe-based batch processes.

New Features and Enhancements in V12

There are no New Features or Enhancements listed for this release.

Compatibility Notes for V12

There are no compatibility notes for this release.

What's Fixed in V12

There are no fixed issues listed for this release.

Aspen Solubility Modeler

Production Description

Aspen Solubility Modeler allows easy calculation of drug solubility in many common solvents and comparison of different solvents by regressing solubility data for various drugs with selected solvents using the new NRTL-SAC property method in Aspen Properties.

The new version of the NRTL-SAC model supersedes the existing NRTLSAC and ENRTLSAC models, which require that pure components be defined as oligomers, making them difficult to use. In

addition, both NRTLSAC and ENRTLSAC require an Aspen Polymers license. The new NRTL-SAC property method does not require an Aspen Polymers license. In addition, a new databank NRTL-SAC containing pure NRTL-SAC parameters for over 130 common solvents is available. The new model in this release supports nonelectrolyte systems only. For more details, please see *Aspen Properties Help.*

Aspen Solubility Modeler consists of two Microsoft Excel spreadsheets and an Aspen Properties file configured to allow you to quickly and easily calculate the solubility information you need using the power of the Aspen Properties engine. The two Excel spreadsheets are:

- Regression.xls for regressing model parameters.
- Calculation.xls for performing solubility calculations.

The regression spreadsheet can be used to determine the NRTL-SAC parameters for a drug through regression of experimental data. The Calculation spreadsheet can be used to predict its solubility based on these parameters.

Both Aspen Properties and Aspen Solubility Modeler (both in the Process Development module) must be installed in order to use Aspen Solubility Modeler. While it is running, it uses an Aspen Properties license.

Before you use Aspen Solubility Modeler, you should configure Excel as described in the section **Configuring Excel for Aspen Solubility Modeler** in the help.

New Features and Enhancements in V12

There are no new features or enhancements listed for this release.

Compatibility Notes for V12

There are no compatibility notes listed for this release.

What's Fixed in V12

There are no fixed issues listed for this release.

Aspen Operator Training (AOT)

Product Description

Aspen Operator Training (AOT) provides an end-user environment for plant operators and training instructors where operators can be trained using a process model as a virtual plant without affecting actual plant operations. AOT can connect the process model to the various process control systems, letting you develop and customize the connectivity and appearance of the instructor and operator stations to mimic the actual DCS system interface.

Aspen Operator Training includes the following capabilities:

- Interfaces with information from different data sources, such as various distributed control systems (DCS) and process simulators.
- Provides an editor environment where the displays of operator and instructor stations can be designed, and the system connectivity can be configured.
- Displays process data (including values, trends, and alarms).
- Runs in a distributed environment.

New Features and Enhancements

The following new features and enhancements were added in Aspen Operator Training V12.

New Aspen Operator Training Example Case: HYSYS_COLUMN_AOT

Aspen Operator Training V12 includes a new example project, **HYSYS_COLUMN_AOT.aot**, which is based on a HYSYS Dynamics column. This project analyzes typical malfunction behavior in **CRUDE DISTILLATION UNIT - DYNAMIC MODEL DDH.hsc**, as well as the processes needed to stabilize the Crude Distillation column. For details, refer to the *Operator Training for Crude Distillation Unit Malfunctions Tutorial*. The following scenarios are modeled in this tutorial:

- Performance deterioration of a feed pump
- Performance deterioration of a reflux pump
- Performance deterioration of a pumparound cooler
- Performance deterioration of a furnace

Compatibility Notes

There are no compatibility notes listed for this release.

What's Fixed in V12

Aspen Operator Training V12 includes the following software fixes that further improve the product.

ID	Issue Description	Issue Resolution
424380	In some cases, using the **SIMIT** connection type to connect to a SIMIT server was unsuccessful.	The SIMIT connection was streamlined in V12.
436412	When the path of the simulation case associated with Aspen Operator Training contained an unsupported character (such as "&"), Aspen Operator Training was unable to run.	In Aspen Operator Training V12, the unsupported character is automatically replaced when you save the case.
471039	In some cases, projects with a **SIMIT** connection type had the following issues: The **SIMIT File Path** field and the **Close SIMIT Project** check box did not appear. If the SIMIT project was not already loaded, when attempting to load it within Aspen Operator Training, SIMIT failed. The **SIMIT** connection type behaved similarly to the **OPC Client** connection type.	This issue is fixed in V12.
479603	In some cases, running an Aspen Operator Training project with a trend chart open resulted in a memory leak.	In V12, the chart component was fixed, resolving this issue.
504346	The Pulse button was not sufficiently responsive.	This issue is fixed in V12.
504894	In some cases, changes to the SP controller mode in Aspen Operator Training were not reflected in the associated Aspen Dynamics file.	This issue is fixed in V12.
523810	When connecting two streams using a Synchronization project, unnecessary pop-up messages appeared.	This issue is fixed in V12.

Aspen OnLine

Product Description

Aspen OnLine enables the use of models in plant operations for a wide range of real-time process monitoring, soft sensor, operator advisory and real-time optimization (RTO) applications. Models are executed using conditioned on-line plant measurements. Model predictions are published to the historian to populate operator displays, tracked for trend analysis, or used to update controller settings.

Aspen OnLine is compatible with Aspen Plus EO or Aspen Custom Modeler simulation cases.

New Features and Enhancements for V12

Aspen OnLine V12 contains the following new features:

- A new option allows tags with **Suspect** quality to be treated as Good. By default, they are treated as Bad. You can set this option on the **Project Configuration | Specifications** sheet.
- A new option within the **Load Model Once** feature allows the model to be unloaded and reloaded if an error occurs during model execution. This is intended for cases where you have intermittent connection issues.
- New options in the **Tags | Data Validation** sheet let you override bad tag values earlier, so that you can, for instance, override bad values before they are used in a formula tag.
- Aspen OnLine can now use models saved as Aspen Plus compound files (*.apwz) or Aspen HYSYS compound files (*.hscz).
- You can now specify for each tag whether it should be scaled automatically or manually on plots, and the limits for manual scaling.
- You can now specify an ADSA data source for tags in addition to the CIM-IO device. The ADSA data source can be used to retrieve historical data at startup to allow the immediately calculation of averages and steady state, and as a backup if the CIM-IO connection fails.
- You can now have multiple EO and/or RTO models within a project, and you can schedule runs of EO models. When you load projects with EO/RTO models from previous versions in Aspen OnLine V12, the **Schedule** form, previously disabled for projects with EO models, is enabled, set to **Use project-wide run sequence** and **As often as possible** to reproduce the behavior of previous versions running EO models whenever steady-state was reached.
- You can now specify **Files to copy** filters on the **Models | Specifications | Specifications** sheet. This can be one or multiple filename filters, with * wildcards, separated by semicolons. This specifies the default files to copy for Offline-to-Online as well as what files are exported with the project.

Compatibility Notes for V12

Using a network folder as the Offline folder of a project is no longer supported. No part of the project may now reside on a network folder.

Some changes have been made to the structure of the **Online** and **Hist** folders of a project:

- Each online model now resides in a subfolder named for the model. (You can specify which files are copied on the **Models | Specifications | Specifications** sheet, or the **Offline-to-Online Dialog Box**.)
- Case history folders now show the timestamp to millisecond precision along with the model name. (Files are still copied to these folders from the model's online folder. Use the **History Options** dialog box accessible from the **Specifications** form to specify which files are copied.)
- Since there can be more than one Aspen Plus EO model in a project, we can have multiple **hist_**<*model name*>**.dat** files corresponding to those models.

Avoid using very long model file and project names. These names are used as part of a SQL database name which is limited to 128 characters. The database name does not include the path of the project folder, as it did in V11, so the restriction is generally eased compared to V11, though longer project names were possible in V10 and earlier.

Aspen Version Comparison Assistant (AVCA)

Product Description

Aspen Version Comparison Assistant helps you decide whether or not to upgrade an existing AspenTech product to a newer version. It demonstrates how the changes in a newer version affect your current models if you choose to upgrade.

Aspen Version Comparison Assistant lets you:

- Validate and adopt new versions of AspenTech software (Aspen Plus, HYSYS, EDR, and Aspen Flare System Analyzer) quickly and easily.
- Reduce the time you spend testing your own models against new versions of AspenTech software.
- View relevant upward compatibility documentation and select whether each difference is acceptable. Reports can be printed and exported to Excel.
- Compare results of an Aspen Plus, HYSYS, EDR, or Aspen Flare System Analyzer case to another model while remaining within the simulator.

New Features and Enhancements in V12

There are no New Features or Enhancements listed for this release.

Compatibility Notes for V12

There are no compatibility notes listed for this release.

Aspen Simulation Workbook

Product Description

Aspen Simulation Workbook (ASW) is a tool for interfacing AspenTech's process simulation models with Microsoft Excel worksheets. Aspen Simulation Workbook also has tools to link model variables to plant data tags imported using third-party applications. These capabilities allow modeling experts to link models and plant data and publish the resulting models as Excel worksheets for use by casual model users.

New Features and Enhancements in V12

There are no New Features or Enhancements listed for this release.

Compatibility Notes for V12

There are no compatibility notes listed for this release.

Aspen Open Object Model Framework

Product Description

Aspen Open Object Model Framework (OOMF) is an AspenTech corporate component that is used for configuration, solution and investigation of large-scale numerical problems. It is embedded within several AspenTech products such as Aspen Plus, Aspen HYSYS, Aspen HYSYS Petroleum Refining, Aspen HYSYS Upstream, Aspen Operations Reconciliation and Accounting, Aspen PIMS, and Aspen MBO.

When OOMF is embedded within a product, users of the product interact with OOMF via that product's graphical user interface. OOMF is also available to internal AspenTech developers and services professionals as a DOS executable. These internal users interact with OOMF using the OOMF script language to create and manipulate simulation data. The OOMF script language has any of the features of an advanced programming language, such as mathematical and string functions, if-then-else logic, and for-do loops. Products that embed OOMF also extend the capabilities of the equation-based scripting language by providing application-specific commands.

New Features and Enhancements in V12

There are no New Features or Enhancements listed for this release.

Compatibility Notes for V12

There are no compatibility notes listed for this release.

Known Issues in V12

The Known Issues section provides information about issues in the V12 Aspen Engineering products.

Aspen Multi-Case V12

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
Aspen Multi-Case does not support entering values using a comma as the decimal separator.	You must set the language to English for your web browser before using Aspen Multi-Case. You can specify values using a period as the decimal separator.
In some instances, when attempting to run a very large number of cases, Aspen Multi-Case may experience issues.	Running a very large number of cases is often accidental. As a result, when you click the Run icon, a dialog box appears, asking if you are sure that you want to run the scenario. The dialog box lists the number of cases and the number of cores selected for the run to prevent errors.

Process Modeling (Aspen Plus)

Aspen Plus V12

Coexistence Issues	Workaround/Comment
No known issues	

Installation Issues	Workaround/Comment
No known issues	

General Usability Issues	Workaround/Comment
After performing Offline-to-Online for an Aspen Plus equation-oriented model from within Plant Data and publishing the model to Aspen OnLine, you will see errors saying you need to perform offline-to-online.	This aspect of the seamless transition from Plant Data to Aspen OnLine does not work for Aspen Plus EO models. You will have to perform offline-to-online within Aspen OnLine.
Within the Safety Analysis environment, performing the following steps may cause Aspen Plus to fail: 1. Select the **Scenarios** tab for a PRD. 2. Select the **PRD Data** tab and add a new PRD. 3. Return to the **Scenarios** tab.	After adding a new PRD on the **PRD Data** tab, close the PRD form.
For files created in an earlier version of Aspen Plus, if the **Set Pressure Increase** value on the **PRD Rating** tab is empty for a spare PRD, changing the **Number of Vessels** for a fire scenario may cause Aspen Plus to fail.	N/A

OLI Interface V12

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
No known issues	

Aspen Properties V12

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
No known issues	

Aspen Custom Modeler V12

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
No known issues	

Aspen Model Runner V12

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
No known issues	

Aspen Plus Dynamics V12

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
No known issues	

Aspen Adsorption V12

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
No known issues	

Aspen Chromatography V12

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
No known issues	

Aspen Utilities Planner V12

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
When only Aspen Utilities Planner and Aspen Properties have been installed, cases fail to open in Excel.	Install Aspen Custom Modeler products together with Aspen Utilities Planner.

General Usability Issues	Workaround or Comment
No known issues	

Aspen HYSYS V12

Coexistence Issues	Workaround/Comment
No known issues.	

Installation Issues	Workaround/Comment
No known issues.	

General Usability Issues	Workaround/Comment
When using Datasheets, the Heat of Vaporization Mass Basis data (Thermodynamics properties) is not transferred correctly from Aspen HYSYS to Aspen Basic Engineering.	Save/close/reopen files created in older versions when using HYSYS V12.
Within an EO Sub-Flowsheet, changing the name of an Alias and then clicking **Validate** or **Solve** causes HYSYS to fail.	In order to prevent this issue from occurring, if you rename an Alias, click **Reset Equation Oriented** and then select the **Rebuild the equation oriented system** option prior to solving or validating the Equation Oriented case.
Within the Safety Analysis environment, performing the following steps may cause HYSYS to fail: 1. Select the **Scenarios** tab for a PRD. 2. Select the **PRD Data** tab and add a new PRD. 3. Return to the **Scenarios** tab.	After adding a new PRD on the **PRD Data** tab, close the PRD form.
For files created in an earlier version of HYSYS, if the **Set Pressure Increase** value on the **PRD Rating** tab is empty for a spare PRD, changing the **Number of Vessels** for a fire scenario may cause HYSYS to fail.	N/A
When using Oil Manager, if you provide a name for an oil blend that ends with German characters, HYSYS may fail.	N/A

Aspen HYSYS Dynamics V12

Coexistence Issues	Workaround or Comment
No known issues.	

Installation Issues	Workaround or Comment
No known issues.	

General Usability Issues	Workaround or Comment
No known issues.	

Aspen HYSYS Upstream V12

Coexistence Issues	Workaround or Comment
No known issues.	

Installation Issues	Workaround or Comment
No known issues.	

General Usability Issues	Workaround or Comment
No known issues.	

Aspen HYSYS Petroleum Refining V12

Coexistence Issues	Workaround or Comment
No known issues.	

Installation Issues	Workaround or Comment
No known issues.	

General Usability Issues	Workaround or Comment
The **Undo** command does not work for the following forms: • The Stream Cutter view (with **Refining Reactor Transition** type | **Reformer/NHT/CGHT** or **Refining Reactor Transition** type | **Hydrocracker** selected) • The **Feed Data** tab and the **Reactor Section** tab of the Hydrocracker property view	N/A

General Usability Issues	Workaround or Comment
• The **Feed Data** tab and the **Operation** tab of the Hydrocracker Calibration property view	
The **Convert to Refining Assay** functionality does not support multiple conversions of the same Oil Manager assay.	Do not use the **Convert to Refining Assay** button to convert the same Oil Manager assay to a HYSYS Petroleum Refining assay multiple times.

Aspen HYSYS Thermodynamics COM Interface V12

Coexistence Issues	Workaround or Comment
No known issues.	

Installation Issues	Workaround or Comment
No known issues.	

General Usability Issues	Workaround or Comment
No known issues.	

Exchanger Design and Rating

Exchanger Design and Rating Products V12

This section contains a summary of known issues or limitations that apply to the family of Exchanger Design and Rating products in the release. These known issues include issues related to the Aspen Plus integration.

Workarounds are suggested where possible.

All Exchanger Design and Rating Products V12

General Usability Issues	Workaround or Comment
Newer versions of Office 2016 (such as 16.0.13001.20384) are treated as a different version with Access Database Engine 2016, and Office does not support different version components on the same machine. This results in an error when trying to use functions associated with Excel.	Repair Office with Control Panel on any machines encountering this issue.

Aspen Air Cooled Exchanger V12

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
No known issues	

Aspen Fired Heater V12

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
No known issues	

Aspen Shell & Tube Exchanger V12

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
No known issues	

Aspen Shell & Tube Mechanical V12

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
No known issues	

Aspen Plate Exchanger V12

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
No known issues	

Aspen HTFS Research Network V12

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
No known issues	

Aspen Plate Fin Exchanger V12

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
No known issues	

Aspen Plus/EDR Integration

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
No known issues	

Economic Evaluation V12 Product Family

The following section describes known issues that can apply to the Economic Evaluation V12 Product Family.

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
Newer versions of Office 2016 (such as 16.0.13001.20384) are treated as a different version with Access Database Engine 2016, and Office does not support different version components on the same machine. This results in an error when trying to use functions associated with Excel.	Repair Office with Control Panel on any machines encountering this issue.
Excel related functions do not work after updating Excel.	If you have not launched Excel after updating, Excel related functions in Economic Evaluation will not work. Launch Excel and dismiss the Privacy option dialog. Excel related functions in Economic Evaluation should now work again.
The Database Name of the database that is created for storing the results of a project cannot be more than 128 characters.	The format of the Database Name is: EEV120_ ComputerName_UserName_ProjectName_ Scenario Name. Shorten the Project Name and/or the Scenario Name, until the Database Name is 128 characters or less.
Exception when exporting project data to spreadsheet in certain scenarios: In V12, we have deprecated and removed the "Above grade or buried yard pipe" plant bulk models (BPIPYARD PIPE, BCIVYARD PIPE). These components can no longer be added to the project. Past projects containing these components will continue to work and the yard pipe components from past project can still be evaluated. If a project contains yard pipe components without a user tag number and if you try to export the	The workaround for this is to add a user tag number to the yard pipe components or remove the yard pipe component and replace it with the "Above grade or buried pipe" (BPIPPIPE) component.

data from this project to spreadsheet an exception occurs during the export and the export fails.	

Aspen Process Economic Analyzer V12

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
No known issues	

Aspen In-Plant Cost Estimator V12

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
No known issues	

Aspen Capital Cost Estimator V12

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
No known issues	

Icarus Evaluation Engine V12

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
No known issues	

Aspen Basic Engineering V12

Coexistence Issues	Workaround or Comment
No known issues.	

Installation Issues	Workaround or Comment
When machines with ABE Enterprise Server and Microsoft Office 2016 installed, attempting to use the **Export to Excel** functionality from the Activated Datasheet Editor does not work properly.	Perform the following steps: **1** Launch **Component Services** by running **comexp.msc**. If Office is 32-bit, then run **comexp.msc -32**. **2** Select the **Identity** tab. Make sure **The interactive user is selected**. **3** Expand **Component Services | My Computer | DCOM Config | Microsoft Excel Application**. Click **OK** on any dialog boxes that appear. **4** Select the Microsoft Excel Application. Right-click and select **Properties**. **5** Select the **Identity** tab and make sure **The interactive user** is selected. **6** Select the **Security** tab. Click **Edit...** for **Launch and Activation Permissions** and **Access Permissions**. For **Launch and Activation Permissions**, make sure **Customize** is selected. For **Access Permissions**, make sure **Customize** is selected. Make sure that **ZyqadAdministrators** and **network service** is listed with full permissions.
V12 Simulation Importer: Simulation Importer fails when importing an Aspen Plus example file.	Clear the **Import Diagram** check box and retry.
For the ABE Enterprise Server, the activated clients (Explorer and Datasheet Editor) do not recognize that users in the **ZyqadAdministrators** group have certain privileges.	Users should be added directly to workspaces via the ABE Administrator because there are limitations if they are added via a group.
On machines with the ABE Enterprise Server and Microsoft Office 2013 installed, the Export to Excel functionality does not work properly.	On the **Identity** tab of the **Microsoft Excel Application Properties** dialog box, select the **The interactive user** radio button.

General Usability Issues	Workaround or Comment
Newer versions of Office 2016 (such as 16.0.13001.20384) are treated as a different version with Access Database Engine 2016, and Office does not support different version components on the same machine. This results in an error when trying to use functions associated with Excel.	Repair Office with Control Panel on any machines encountering this issue.
The Datasheet Definer fails to launch on Windows 8.1 Machines with Office 2013 installed.	Install the recent Office 2013 Service Pack.
In the Excel Datasheet Editor, you cannot paste multiple fields between two datasheets of the same type.	It is possible to copy/paste values by performing the following steps: **1** Launch one instance of a datasheet. **2** Launch a new instance by clicking **Open Document | By Type**.
If you create a workspace when the **Open Workspace** dialog is open, the new workspace is not listed when you click **Browse**.	Do not create workspaces when the **Open Workspace** dialog is open.
Office 2016 and Access Database Engine 2016 can cause issues with functions related to Excel in ABE.	Repair Office in the Control Panel on the machines with problem.
In the Drawing Editor, Symbol and Label images created in the Graphic Definer can display incorrectly if the symbol file wasn't closed before it was compiled.	Close the symbol and label files after you are done editing and compiling. Do not have multiple files opened at once.
When ASW is enabled on machine, an error can pop up when you launch the XLDSE from the ABE Explorer	**1** Close the error. **2** Open Excel. **3** Click **File | Options | Add-ins**. **4** Select **Excel Add-ins** from the drop-down menu next to **Manage**, then click **Go**. **5** Uncheck the Aspen Simulation Workbook, then click **OK**. **6** Relaunch the XLSDE from the Explorer.
For the Drawing Editor, when exporting ABE PDF or PID documents to AutoCad, the prototype file selected in the **AutoCad Export Options** dialog box has no effect on the output files.	Exported AutoCad files must be cleaned up manually after export.
In the Datasheet Definer, Triangles are not supported as check box/radio button shapes. Only the circle fill is supported.	N/A
For the Activated Datasheets Explorer, if the **by Document** view is selected, when you filter by **Document Name** and **Sort A to Z**, select all datasheets, and click **Apply**, the **All Documents** table will not list all the datasheets.	Change the **View** to **by Equipment**, and then switch back to **by Document**. All reports will appear in the **All Documents** table.
If you try to import a package containing column objects that was generated in V10 or an earlier	Perform the following steps: **1** Using Notepad, open the package (.zpkg).

General Usability Issues	Workaround or Comment
release into ABE V12, an error message regarding the **MaterialFlowPhase** class may appear.	**2** Search for all **LiquidDraw** attributes. **3** Modify the class from **MaterialFlowPhase** to **MaterialPort** for each of the **LiquidDraw** attributes. **4** Save the file. Make sure to retain the original extension (.**zpkg**). **5** Import the package. A warning message may appear. All information is transferred, except for the attributes that appear on the warning message.
In the ABE Excel Datasheet Editor, when replacing an image using the **Edit Sketch Field** window, the new image appears overlaid on top of the previous image.	Remove the previous image before adding a new image.
When editing a Sketch Field in a datasheet, the **Insert Object (Embed OLE document)** functionality is not supported.	To view a sketch, upload a preview image.
V12 ABE licensing: An error message is not shown on the H5 Explorer (Enterprise Server) when the SLM_AspenZyqad key is commented out in the license file.	If the web clients in HYSYS/Aspen Plus do not load, try to log in from a desktop application to see if a license error pops up. Contact your ABE administrator if this occurs.

Energy and Flare Analysis

Aspen Energy Analyzer V12

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
No known issues	

Aspen Flare System Analyzer V12

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
Exporting Aspen Flare System Analyzer cases in .mdb format using a machine with a 64-bit version of Microsoft Excel installed does not work.	Either: • Use a 32-bit version of Microsoft Excel. -or- Export Aspen Flare System Analyzer cases in .xml or .xls/.xlsx format instead.

Process Development

Aspen Batch Process Developer V12

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
No known issues	

Aspen Adsorption V12

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
No known issues	

Aspen Operator Training V12

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
No known issues	

Aspen Online V12

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
After performing Offline-to-Online for an Aspen Plus equation-oriented model from within Plant Data and publishing the model to Aspen OnLine, you will see errors saying you need to perform offline-to-online.	This aspect of the seamless transition from Plant Data to Aspen OnLine does not work for Aspen Plus EO models. You will have to perform offline-to-online within Aspen OnLine.

Aspen Version Comparison Assistant (AVCA)

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround/Comment
No known issues	

Aspen Simulation Workbook

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround/Comment
In Russian and Chinese versions, when you first use the Table Wizard in a new ASW workbook or after reopening a workbook, some parts of the wizard are not translated.	Close and reopen the wizard and it should all become translated.

Aspen Open Object Model Framework

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
Encrypted OOMF script files fail to run properly if the file contains the backslash (\) character used for line continuation.	Remove the backslashes and combine the lines before encrypting the file.