Aspen Engineering Suite

Release Notes V11

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Aspen Technology, Inc.
20 Crosby Drive
Bedford, MA 01730
USA
Phone: (1) 781-221-6400
Toll Free: (1) (888) 996-7100
URL: https://www.aspentech.com

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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 V11 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

Documentation is now available directly from the applications. This ensures that you can always find the most current version of the document that you are looking for.

You can find Documentation in the following ways:

- Installation Guides and Release Notes - click the corresponding link on the first page of the Installation Browser.
- To access context-sensitive help:
  - Click the Help button on an application dialog box.
  - Press F1.
  - Click the application Help menu and select Help.
- To access additional documents in PDF format:
  - Click the Online Documentation link on the product's Start page or Start tab, or select Documentation from the product's Help menu. This opens the Online Documentation Center from which you can view and/or download the product-specific documents.
  - Logon to the AspenTech Customer Support site and browse the Documentation page.
  - Download all of the available documentation from the Customer website by downloading a .zip file that contains the documentation.

Note: The aspenONE Documentation DVD is no longer included in the DVD package. If you want a DVD that contains all PDF documents, you may request one from AspenTech Support.

What’s New in V11

The What’s New section provides information about new features and functionality in the V11 Aspen Engineering products.

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 V11

Aspen Plus V11 includes new features in the following areas:

- Batch flowsheet enhancements
- BatchOp enhancements
- BatchSep enhancements
- Column Analysis enhancements
- Safety Analysis enhancements
- Reactor modeling enhancements
- Other engineering enhancements
- Physical property enhancements
- Workflow and usability enhancements

Batch Flowsheet Enhancements

A visual representation of a batch operating schedule is available. In the **Unit Procedures** object manager, the **Configure** sheet of each unit procedure, and the **Configure** sheet of each operation within a unit procedure, there is a diagram showing a visual representation of the batch schedule, based on input specifications. You can click this diagram to jump to the form for each operation, and tooltips display summaries of the operations. A similar diagram, based on the results and updated live during the run is the **Unit Procedure Operating Schedule**, available by clicking **Operating Schedule** in the Batch tab of the ribbon.

In the **Results Summary | Streams** form for batch hierarchies (and at the top level if it is set to batch) there is a **Batch** sheet which reports cumulative mass, mole, and energy for the streams in the batch flowsheet. BatchOp has a similar sheet in its **Stream Results** form reporting on its feed and product streams, as does the **Results** form for each stream in a batch flowsheet. These cumulative flow results will also appear in the report file.

Controllers in batch flowsheets now have built-in strip chart plots in the plot gallery on the **Home** tab of the ribbon. These include all controller models (set point, process variables, and controller outputs are plotted as appropriate to each model). You can now access the variables of the PID controller in unit procedures as well. In the PID controller, the **Gain** is now reported in the results.

Sensitivity blocks are now supported in batch flowsheets. RadFrac is also supported as a continuous unit operation, but please see Creating a Batch Flowsheet in the help for guidelines on using it effectively, as well on for limitations in the variables accessible in unit procedures and strip charts.

The Dryer block now has a Batch mode which allows it to be used in batch flowsheets. In this mode you specify the drying time directly, rather than the residence time in the dryer determining the drying time. Only convective dryers can be modeled in this mode, and certain other options are not available.

BatchOp Enhancements

You can now specify classification for solids leaving the tank in condensed phase draw streams. You can choose to have all solids remain in the tank or preferentially remove fine or coarse solids, specifying the separation sharpness and offset of fines. If there are two liquid phases, you can also choose which liquid phase to draw from.

BatchOp now also offers the ability to model filtration and deliquoring of solids, using the general filtration model and the Nicolaou or Schubert deliquoring model, as used in the Filter block.

You can now choose to have the tank start empty, and not connect a batch charge stream to the block.

In the **BatchOp | Results | Balance** sheet, cumulative mass and energy balance results are shown including the initial and final contents of the pot. Component-based balance results are also displayed. These results also appear in the report file.

In the **BatchOp | Profiles | Overall** sheet, when Vessel results are displayed, the vapor mass fraction has been supplemented with the phase fractions for all phases on mass and mole basis. Cumulative draw mass is also displayed.

In the **BatchOp | Results | Crystallization** and **BatchOp | Profiles | Crystallization** sheets, new results available include D10 and D90 (particle sizes larger than 10% and 90% of the particle mass), magma density, nucleation rate and growth rates (for substreams with single salts precipitating), and super-saturation of each solute. There are also new strip chart plots in the plot gallery for magma density and super-saturation, and all the new results are available in the custom strip charts.

In the **BatchOp | Profiles | Composition** sheet, a greater variety of profiles is now available. You can choose combinations of vessel or vent profiles, on mole or mass basis, and as composition or accumulated amount. For vessel profiles, you can choose which substream to show, and for vessel profiles of the MIXED substream, you can choose to show results for a specific phase.

BatchSep Enhancements

The pot-only configuration is supported. You can select Pot or Batch distillation column under Configuration on the Setup | Configuration sheet.

Vendor trays and vendor packing are now supported. This feature has been updated (compared to previous versions of standalone Aspen Batch Modeler) to use the tray and packing types and input method from Column Analysis in RadFrac. Only rating calculations are supported, and these features from RadFrac Column Analysis are not supported: hydraulic plots, user subroutines, active area under downcomer, swept-back weirs, downcomer balancing, export to vendor, Montz packing, MD trays, generic or custom trays. When specifying vendor packing, setting the section packed height does not update the input for HETP, though the value will be reflected in the results.

Multiple batches are now supported. On the Operating Steps form, the Multiple Batches sheet lets you configure the run to consist of multiple batches. On the Initial Conditions form, the Receiver Recycle sheet lets you specify which distillate receivers and side draw receivers are recycled into the initial charge for subsequent batches, and the Distillate Receivers and Side Draw Receivers sheets lets you specify that any material remaining in the receivers at the end of one batch cycle is used for the initial condition of the next batch. The Final Conditions form lets you specify that the final column contents remain in place and are recycled to the next batch.

BatchSep now has a custom strip chart available in the plot gallery. This lets you select any combination of BatchSep variables to plot over time.

The Aspen Batch Modeler (ABM) to BatchSep converter is now delivered with Aspen Plus, and updated to support the features listed above in Aspen Batch Modeler files from older versions. To use the converter:

1. In the **GUI\Xeq** folder of the Aspen Plus installation, run ConvBspfToBkp.exe.
2. Under **Aspen Batch Modeler File**, click **Browse** and select an Aspen Batch Modeler file. The converter can convert ABM files that use the column or pot-only configuration. ABM files using fitting cases or experiments are not supported.
3. Under **Aspen Plus File Directory**, click **Browse** and select the location where the converter should write the Aspen Plus file.
4. The **Aspen Plus File Name** defaults to the ABM file name with the .bkp extension, but you can change it.
5. Click **Convert**, and the message window at the bottom will alert you to any issues with the conversion.
6. If the conversion is successful, the messages will end with **Conversion finished**. Then you can click **Open converted file in Aspen Plus V11**, or import the file into another Aspen Plus file from within Aspen Plus.

Column Analysis Enhancements

RadFrac with Column Analysis now supports trays with lattice downcomers. This modern style of tray allows greater liquid load than conventional trays, 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 trays are only supported for sieve trays in rating calculations. The sizing mode is not supported, nor are valve or bubble cap trays.

RadFrac with Column Analysis also supports custom trays for rating calculations only. You can use custom trays to model innovative or unusual tray designs not covered by the specific tray types available in Column Analysis. For these trays, you specify key parameters such as the fraction of active area, fraction of hole area, fraction of downcomer area, and the diameter. Aspen Plus

calculates the results as for other trays; only average or total downcomer properties are available since details about individual downcomers are not specified.

In RadFrac with the Interactive Sizing mode of Column Analysis you can choose to use equal bubbling area rather than equal flow path length to design columns with 3 or more tray passes.

Column Analysis now includes 3 sizes of Montz structured packings, and two sizes of Raschig Super-Ring Plus random packing. In addition, the latest version of the packing database includes updated data for Raschig Super-Pack, Tri-Packs, and Jaeger-Ring.

Reactor Modeling Enhancements

RCSTR now supports crystallization reactions. You can enable either or both of chemical reactions and crystallization reactions on the **RCSTR | Setup | Kinetics** sheet. You can also choose to run RCSTR without reactions. In this case, it merely mixes inlets and assigns phases to designated outlet streams. It has the same set of crystallization results as BatchOp available based on the steady-state values.

Crystallization reactions have been enhanced to allow the consideration of diffusion limitations and Gibbs free energy of crystal formation.

In RStoic and RYield blocks, you can now use separate outlet streams to hold the vapor and liquid products, in addition to the existing option to have a separate water decant stream. All streams are connected to the same **Products** port on the flowsheet; use the **Setup | Streams** sheet to define which phases go into each outlet stream.

Safety Analysis Enhancements

Preparing Documentation using ABE Datasheets

Starting in V11, within the Safety Analysis environment, you can use Aspen Basic Engineering (ABE) Datasheets to prepare documentation of the design basis for any PSVs, rupture disks, and storage tanks. The Safety Analysis environment provides standardized relief systems calculations and data consistency across the final report deliverables, making it faster and easier to complete a pressure relief analysis.

ABE Datasheets offers a light-weight, single-user experience to create datasheets quickly and easily. The technology also offers a server-based, multi-user experience so that companies can have a centralized repository of their relief systems design documentation.

A number of Safety datasheet templates are available for selection. When creating datasheets, you can use the filters to view only Safety-related items.

Improved Accuracy for Line Sizing Calculations Based on Aspen HYSYS Hydraulics

Starting in V11, Safety Analysis environment line sizing calculations use Aspen HYSYS Hydraulics, the same rigorous technology available in Aspen HYSYS. This technology supports both single phase and multi-phase pressure drop calculations for high and low velocity flows.

- You can switch between the **Design** and **Rating** methods. Both methods use Aspen HYSYS Hydraulics calculations, which are performed using the property package associated with the sizing case's **Selected Stream**.
- You can use the new **Edit Pipes & Fittings** view to describe the line in detail on a fitting-by-fitting basis. The initial configuration consists of three items, in the following order:
    1) Pipe to represent the inlet flange to the PSV
    2) PSV (choke diameter)
    3) Pipe to represent the outlet flange from the PSV

- You can click **Configure** to access the **Calculation Settings** view, which lets you configure settings for individual line sizing calculations. These calculation settings are based on Aspen Hydraulics piping selections.

When you open an Aspen Plus case containing relief valve line sizing calculations performed prior to V11, you can either upgrade to the current line sizing methods or continue to use the legacy line sizing calculation methods.

We recommend that you upgrade to the current line sizing methods to take advantage of the more accurate Aspen Hydraulics calculations.

New Non-Capacity-Certified Liquid Orifice Sizing Option

Aspen Plus V11 offers a Non-Capacity-Certified Liquid orifice sizing option. This method is used for liquid relief through a valve not requiring capacity certification. This option is recommended for valves built for older API standards or valves that are not certified for liquid relief but may encounter scenarios in which they must pass an all-liquid stream.

Ability to Choose Rigorous Two-Phase Method for Control Valve Scenarios

In Aspen Plus V11, Control Valve Failure scenarios include a new Handle multi-phase flow rigorously check box. When this check box is selected, the control valve uses a rigorous calculation method to obtain more accurate flow rates and pressure drop for both vapor and liquid flow.

Restricted Lift for Relief Valves

In Aspen Plus V11, you can opt to model restricted lift relief valves. You can select the Restricted Lift Valve check box on the PRD Data tab to transform your PSV into a restricted-lift PSV in accordance with API 526, allowing you to reduce the rated flow into the disposal system in order to meet the pressure loss criteria on the outlet line. You can specify the fraction lift (relative to the full lift).

Cubical Expansion Coefficient Calculated for Thermal Expansion Scenarios

For Thermal Expansion scenarios, Aspen Plus can now calculate the cubical expansion coefficient. When you select the API 521 6e (2014) Equation (4) option, the cubical expansion coefficient is calculated based on the thermodynamic properties of the selected stream.

Ability to Select Preferred Version of API 526 for Relief Valve Selection

On the General Setup tab of the Preferences Manager, you can now choose between API 526 7e (2017) and API 526 5e (2002) as the preferred edition of the API 526 standard for relief valve selection. For new PSVs, API 526 7e (2017) is the default selection.

Ability to Edit Wetted Area Exponent for Fire Scenarios

Supercritical, Wetted (API), and Semi-Dynamic Flash Fire scenarios now allow you to edit the wetted area exponent for fire calculations involving partial confinement.

Usability Enhancements

- A new **Safety Messages List** panel allows you to view all Safety-related errors, warnings, and messages for your current case. This view is automatically updated when you add or edit PRDs.
- The summary table on the **Scenarios** tab was simplified and improved.
- The Reference Stream behavior was improved.

- You can now select a valve from the **Selected Orifice** drop-down list even when the orifice has not yet been calculated. After selecting an orifice, if you want to clear your selection, you can now select the **<empty>** option.

Other Engineering Enhancements

Aspen Plus is now a 64-bit program and requires a 64-bit version of Windows. Large simulations which exceeded the memory limitations of 32-bit programs can now run, provided sufficient memory is available on the computer.

Compr now reports results for head at surge and stonewall.

Resizing Options Available for Quoted Equipment in Activated Economics

The **Quoted equipment** tab of the **Economic Equipment Data Summary** grid features a new **Allow Resize** drop-down list.

- **Yes | Allow Resizing** is the default selection. When **Yes** is selected, the quoted item details are changed after the evaluation is updated based on changes in the simulation. In some cases, data may be removed.
- When **No | No Resizing** is selected, the quoted item details remain unchanged from one evaluation to the next and is not impacted by changes in the simulation. Keep in mind that if simulation conditions change, the quoted item details may no longer be accurate.

Physical Property Enhancements

A new method, the density marching method (Venkatarathnam, 2014) is available for use in computing P-T Envelope analysis. This method uses density rather than pressure or temperature as the independent variable, which removes computational difficulties the standard method encounters around the critical point. The new method also supports vapor-liquid-liquid systems.

The PPR78 method, implementing the Predictive Peng-Robinson equation-of-state model, is now available. It combines the 1978 Peng-Robinson model with classical Van der Waals mixing rules involving a temperature-dependent binary interaction parameter predicted by PPR78 from the chemical structures of molecules within the mixture.

A new option on the **Setup | Calculation Options | Flash Convergence** sheet lets you use the RefProp flash algorithm instead of the ones built into Aspen Plus when using one of the RefProp methods (RefProp, GERG2008, or IAPWS-95). By default, the Aspen flash algorithm selected for **Flash convergence algorithm** on that sheet is used with these methods. It is faster, but in some cases this may lead to incorrect phase behavior.

Binary analysis includes new types Txx, Txxy, and Pxxy which compute liquid-liquid equilibrium in addition to or instead of vapor-liquid equilibrium. With the new types you can generate Txy and Pxy plots which include the liquid-liquid behavior as well as the vapor-liquid behavior.

Within the Aspen Properties Database Manager, you can now export data to Excel from the grids of compounds in the **Find Compounds** dialog box and the **Selected Compounds** form.

New property set properties are now available for variations on heat capacity ratio CPCV:

- CPCP-R and CPCP-RMX provide the heat capacity ratio CP/(CP-R) for pure components and mixtures, respectively.
- CPCVIG and CPCVIGMX provide the ideal gas heat capacity ratio CP/CV for pure components and mixtures, respectively.

There is also the new property set property SC, Schmidt number, which is the ratio of kinetic viscosity to diffusivity.

The PURE37 databank has been added with the latest data from DIPPR. This release does not include any new components or parameters, but it includes updated data for many parameters. See compatibility notes.

The NIST database is based on version 10.12 of NIST's data. The NIST TDE engine has been updated to version 10.2.

The NIST-TRC databank now has PC-SAFT parameters for 1042 compounds. These parameters were not previously available in NIST-TRC. The compounds include aromatic and nonaromatic hydrocarbons up to C19 and many compounds containing oxygen, nitrogen, sulfur, and halogen atoms.

A new ACIDGAS databank is available with components likely to occur in acid gas processing and parameters for suitable property methods.

Modified Rackett liquid molar volume is now available as a pure component model VL0MRK you can use in conjunction with the mixture model to ensure consistency.

The REFPROP model from NIST has been updated to version 10.1. This version includes 25 new fluids:

Alias	Name	CAS Number
C16H34	N-HEXADECANE	544-76-3
C22H46	N-DOCOSANE	629-97-0
C6F14	PERFLUORO-N-HEXANE	355-42-0
C6H5CL	CHLOROBENZENE	108-90-7
CL2	CHLORINE	7782-50-5
C2H4O-2	ETHYLENE-OXIDE	75-21-8
C2HF3	TRIFLUOROETHYLENE	359-11-5
C3H2F4-N2	C3H2F4-N2	29118-25-0
C3H3F3	3,3,3-TRIFLUOROPROPENE	677-21-4
C2H4CL2-2	1,2-DICHLOROETHANE	107-06-2
C2H3CL	VINYL-CHLORIDE	75-01-4
C4H2F6	C4H2F6	692-49-9
C4H6-4	1,3-BUTADIENE	106-99-0
C4H6-1	1-BUTYNE	107-00-6
C5H10-2	1-PENTENE	109-67-1
C6H14-4	2,2-DIMETHYL-BUTANE	75-83-2
C6H14-5	2,3-DIMETHYL-BUTANE	79-29-8
C6H14-3	3-METHYL-PENTANE	96-14-0
C2H2	ACETYLENE	74-86-2
C4H6	CYCLOBUTENE	822-35-5
C3H4-1	PROPADIENE	463-49-0
C3H6O-4	PROPYLENE-OXIDE	75-56-9
C2H6O2	ETHYLENE-GLYCOL	107-21-1
C2H7NO	MONOETHANOLAMINE	141-43-5
C4H11NO2-1	DIETHANOLAMINE	111-42-2

Workflow and Usability Enhancements

You can now hide components with zero flow in the stream summary. To do so, when the stream summary is displayed, click **Select Properties** in the ribbon, then click the **Scope** tab of the **Edit Stream Summary Template** dialog box, then check the box **Hide Components with zero flow**.

You can now save the results plots from Plant Data by entering a name for the plot and clicking **Save**. They appear under the **Results plots** folder.

The **Molecular Structure** form has several workflow enhancements. The **Structure** sheet is now integrated into the left side of the **Functional Groups** sheet, allowing you to reference this picture when specifying functional groups. Also, when selecting functional groups:

- You can filter the list of groups by type.
- In the list beside each group number is a text description of the group.

- To the right is a large image of the structure the selected group represents.

The table of functional groups has been enhanced to show these images and descriptions in each row.

When copying property parameters to input from the **Retrieve Parameter Results** dialog box, starting in V11 they are now tagged as source USER-*databankname*, allowing you to distinguish them from data you entered. New options in this dialog box and in **Clean Property Parameters** allow you to overwrite or remove this data without affecting data you entered.

OOMF now provides ENCRYPT and DECRYPT commands. You can encrypt EBS script files with a password and distribute them without those files being able to be read or modified. Encrypted files can be invoked without the password.

Compatibility Notes for V11

This section describes the differences that you might encounter between Aspen Plus V11 and Aspen Plus V10. In most cases, previous Aspen Plus input files and backup files are completely compatible with Aspen Plus V11.

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 NISTV110.

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 V11 and earlier versions are:

Fortran Compiler

Aspen Plus V11 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.

Because Aspen Plus is now a 64-bit program, compiled user models must be rebuilt as 64-bit. Starting in V11, integer variables in user model interfaces are now 64-bit integers. Integer variables used to store Hollerith strings are 64-bit but use only 32 of those bits to hold four bytes per declared variable. If you have declared variables for user models as INTEGER*4 or LOGICAL*4, you must change these declarations to INTEGER or REAL for your code to work in V11. REAL*8 or DOUBLE PRECISION variables are still 64-bit. In addition, we now use the default calling convention, not the CVF calling convention. See Chapter 1 of *Aspen Plus User Models* for more details.

Power Law Reactions

A change was made to the form completeness behavior in power law reactions in reaction sets of type general. The **Driving Force** sheet is now incomplete if no data has been entered. This matches the behavior of similar reactions in the legacy power law reaction set. When nothing was specified on the Driving Force sheet, the reactions were defaulting to zero order, which is usually incorrect. If you really do need a zero-order reaction, you can enter 0 for the exponent on any reactant to make the sheet complete.

Reversible Reactions

When entering reversible reactions in a General reaction set, if you specify **Compute reverse rate using microscopic reversibility** on the **Kinetic** sheet then you must specify an equilibrium constant for this reaction on the **Equilibrium** sheet.

- If you specify **Compute Keq from built-in expression** on that sheet you can choose the **Keq basis** for that equilibrium constant. In order for Aspen Plus to calculate the reverse reaction rate correctly from the equilibrium constant, this **Keq basis** must match the **[Ci] basis** specified on the **Kinetic** sheet.
- If you specify **Compute Keq from Gibbs energies** on that sheet, in order for Aspen Plus to calculate the reverse reaction rate correctly from the equilibrium constant, the **[Ci] basis** must be specified on the **Kinetic** sheet as **Mole gamma**.

When the **[Ci] basis** is not specified in these ways, in past versions Aspen Plus calculated an incorrect reverse rate. Now the **Kinetic** and **Equilibrium** sheets are marked incomplete when this situation occurs, so you can correct the problem.

Watson Heat of Vaporization Extrapolation

In past versions, the lower temperature limit for the Watson heat of vaporization model was not being honored. The model equation was being used at low temperatures instead of performing linear extrapolation as was documented. Now the limit is honored and linear extrapolation occurs below the lower limit.

LLE Data

When entering data for property regression, TXX, PXX, TPXX, or TPXXY data which is missing X1 or X2 is no longer permitted, and the forms containing them will be marked incomplete. Data regression requires values for both liquid phases for these data sets. If there really is a second liquid phase, estimate its composition, and perhaps use a larger standard deviation for the estimates to reflect the greater uncertainty of this data. If there is not really a second liquid phase, use a separate data set of a different type, such as TPXY, for the one-liquid-phase data. See **Entering Phase Equilibrium and Mixture Data** in the help for more information.

HYSPR Method

The HYSPR (HYSYS Peng-Robinson) property method was updated to allow it to use analytical derivatives in EO mode, making the method faster in such situations. Some issues in enthalpy calculations were also fixed, leading to possibly different results in cases using it.

RadFrac

In past versions, if you configured a column with a thermosiphon reboiler, using legacy tray rating it was possible to create a section which extended into the last tray specified for the column (which is the reboiler). This is fixed now so that such columns will be marked as having incomplete input.

In column analysis, the interactive sizing for both trays and packing sized the column based on the stage with the maximum liquid rate. In most columns, this was correct. In some columns

where there is a large change in the vapor rate over the column, this was incorrect and led to columns being designed too small. In addition, in tray columns where downcomer choke and jet flooding are both relevant, one of these flooding criteria could be violated. These issues are all now fixed, and may result in columns sized larger (but more accurately) in V11 than in past versions. If you want to keep the V10 results, change the column to Rating mode and save the file in V10 before opening it in V11.

In column analysis in V10, the overall section efficiency from the **Column Internals | Geometry | Design Parameters** sheet was not applied when calculating the section pressure drop. In V11 this issue is fixed and you will see different pressure results on the **Column Internals** forms when specifying section efficiency.

In tray columns with column analysis, in previous versions the aeration factor multiplier was incorrectly applied to both the dry pressure drop and wet pressure drop. In V11, it is applied only to the wet pressure drop. If you specified the aeration factor multiplier in a previous version, hydraulic results will be different in V11.

Data for Raschig Super-Pack, Tri-Packs, and Jaeger-Ring packings are updated. To maintain compatibility with V9 and V10, choose packing database V9.0.

Rate-Based Distillation

A change was made in version V8.8 which affects results was not previously reported. When one of the mass transfer correlations which also computes interfacial area is selected for mass transfer coefficient, that method is used for computing the interfacial area used in calculating mass transfer, because in these correlations, the mass transfer and interfacial area have been designed to work together and do so significantly better than mixing and matching the correlations. A different interfacial area correlation can be selected which will be used for calculating the interfacial area used in reaction calculations, if applicable.

BatchSep/Aspen Batch Modeler

The pressure drop and flooding correlations from Aspen Batch Modeler (ABM) have been updated with BatchSep in V11 to use ones from Column Analysis. In particular, for generic packings, the default flooding method has been changed to Wallis. This will lead to different results compared with ABM in some cases.

These features from vendor trays in ABM are not supported in BatchSep for consistency with Column Analysis: Separate weir heights for each panel, input of downcomer straight height, side edge type. Also, for off-center downcomers, distance from center must be entered rather than distance from wall. The distance from center equals half the tray diameter minus the distance to wall.

BatchSep models in *.inp files may load into user interface incompletely, in particular with stream connections, though they can still be run in the engine without such problems. To load BatchSep models from old *.inp files into the new BatchSep model, open them in the corresponding version, manually add or correct stream connections to the block (which may not load correctly), and adjust any other settings as necessary until the model is complete, and save as a .bkp file. Then open the .bkp file in the new version to update the model.

Convective Dryers

In calculations involving the vapor saturation moisture Y*, the convective dryer model now calculates this term at the average of the solid particle temperature TS and the adiabatic saturation temperature TGS. Past versions used the adiabatic saturation temperature. This better predicts drying in the initial phase where the solids temperature may be significantly different from the adiabatic saturation temperature. Results of convective dryers may change as a result.

Custom Tables

An issue that causes values of certain stream properties to not be displayed in custom tables has been fixed in V11, but those tables will still not display the values when the file is first opened in V11. Saving the file in V11 will fix the links between these variables and the custom table so that the values will be displayed.

Input Files with Reactor Activity

If you have input files from previous versions containing RPLUG, RBATCH, RCSTR, or BATCHOP blocks in which activity is defined at the block level, you will need to modify those input files to use them with V11. Only .inp files are affected; backup (.bkp) files work without issue.

Affected RPLUG, RBATCH, RCSTR, and BATCHOP blocks will contain a line such as

ACT-VAL ACT1 1.0 / ACT2 1.1 / ACT3 1.2

Where the activity names and values (everything after ACT-VAL) depend on what is defined in the block. Add a new line immediately before or after that line, containing:

SUBOBJECTS ACTIVITY = ACT1 ACT2 ACT3

Where the list after the equal sign contains all the activity names from the ACT-VAL statement.

Utility Units

In past versions, if you have electric utilities and other types of utilities in the same problem, the type of unit (energy flow or mass flow) for the first utility will be shown for all utilities in the utility results. Now this is fixed and all utilities should show the correct unit type.

Plant Data

In order to use Plant Data, the model file name and path must not exceed 92 characters in total. This is a limit imposed by the SQL database Aspen OnLine uses to store information related to the Plant Data feature, which is created with an .MDF extension in the folder with the model file. Earlier versions also had path name limits, but in updates to V10, it was possible to have paths exceeding this limit.

Parameters for PENG-ROB and RK-SOAVE

Historically, when the PENG-ROB and RK-SOAVE methods are selected, the Aspen Physical Property System has loaded parameters from the EOS-LIT databank, which contains many parameters for these methods, even if not selected, and ahead of other databanks. This loading is now controlled by the **Require Engine to use special parameters …** option in **Setup | Calculation Options** which previously only applied to electrolyte parameters for ELECNRTL and PITZER. This option is selected by default. In models where you have disabled the option, and are using PENG-ROB or RK-SOAVE, you will experience different results and possibly missing parameters if EOS-LIT is not in the databank search list. This means that you can now use parameters from a custom databank for these methods, by disabling this option and specifying your custom databank ahead of (or instead of) EOS-LIT in the databank search order.

Calculating Molecular Weight from Formula

The option in **Setup | Calculation Options | Calculations** to **Calculate component molecular weight from atomic formula** now also applies when the molecular weight (MW) and/or formula (ATOMNO/NOATOM) is data you have specified as part of the simulation, rather than taken from databanks. This may cause minor changes in some simulations highly sensitive to molecular weights, such as in some reactors, with non-databank components. The option should be turned off whenever using components representing isotopes whose molecular weights intentionally differ from the norm (as with HE-3 in the pure component databanks supplied with Aspen Plus). As

always, if only the molecular weight or only the formula is available, Aspen Plus uses the available data.

PURE37 Databank Changes

The PURE37 databank includes the latest changes from DIPPR, which more than is usually the case may affect results of simulations. Normal alkanes now use equation 123 for liquid thermal conductivity (KL), and many compounds including 2-methoxyethanol now use equation 124 for liquid heat capacity (CPL).

Models Using SPYRO

It is possible to use 32-bit SPYRO 6 from 64-bit Aspen Plus using a wrapper interface file which is included with Aspen Plus. However, this wrapper slightly changes the interaction with SPYRO, and some changes in configuration files are needed. For more information, see Using Spyro in the help.

Safety Analysis Changes

Line Sizing Method Changes

Aspen Plus features improved line sizing calculations. Aspen HYSYS Hydraulics, the same rigorous technology available in Aspen HYSYS, is used for the Safety Analysis environment line sizing calculations. This technology supports both single phase and multi-phase pressure drop calculations for high and low velocity flows. When you open an Aspen Plus case containing relief valve line sizing calculations performed prior to V11, you can either upgrade to the current line sizing methods or continue to use the legacy line sizing calculation methods.

If you opt to continue to use the legacy line sizing calculation methods, the line sizing will be simplified.

- The **Calculate Equivalent Length** check box is removed.
- The existing pipe fitting information and diameter change information specified in the **Equivalent Length Calculation** section in previous versions is not retained. This includes all information specified in the **Enlargement and Contraction** table.
- The **Specified Equivalent Length** value is retained.

After you switch to the **Rating** method, you cannot return to the legacy line sizing calculation methods.

We recommend that you upgrade to the current line sizing methods to take advantage of the more accurate Aspen Hydraulics calculations. Calculated results for the current line sizing methods will be closer to those seen in Aspen HYSYS Hydraulics and Aspen Flare System Analyzer.

Changes to Reference Stream Behavior

In Aspen Plus V10, in the **Scenario Reference Stream** section of the **Scenario Setup** form, the **Reference Stream** field displayed the stream to which the relieving device was connected. This was automatically selected based on where you added the relieving device. To override the stream, you could select the **Override Stream** check box next to the field and select a different stream; the fluid compositions and properties were imported.

In V11, when you add a new scenario, the **Reference Stream** field is **<empty>** by default. You must click **Select** and specify the stream that best represents the relieving fluid composition.

If you open a case created prior to V11, the previous **Reference Stream** configuration is retained.

Default Versions of API Version used in Calculations

On the **General Setup** tab of the Preferences Manager, **API 526 7e (2017)** is now the default **PSV Flange & Rating Source** for cases created in Aspen Plus V11. When opening a case created in a previous version, **API 526 5e (2002)**, which was previously the only available option, is selected by default. If you change this selection in the Preferences Manager, existing valves will be updated.

Custom Orifice Updates

Any custom orifices that you created prior to V11 will now let you specify the flange size and rating. If your custom orifices did not have unique names, the names will be modified by appending asterisks.

Handle Multi-Phase Flows Rigorously Check Box

In Aspen Plus V10, the "rigorous" Fisher two-phase method was not available for control valve calculations using the ANSI/ISA coefficients. Instead, those calculations are forced to use a "simplified" method that assumes all-vapor behavior beginning at 10% vapor and scales linearly from all-liquid to all-vapor between 0% and 10%.

In Aspen Plus V11, Control Valve Failure scenarios include a new **Handle multi-phase flow rigorously** check box. When this check box is selected, the control valve uses a rigorous calculation method to obtain more accurate flow rates and pressure drop for both vapor and liquid flow. This check box does not apply to the **PSV Plus** method.

When loading a case from a previous version, the value is set according to how the calculation was performed in the original version:

- Rigorous calculations are applied for the **Universal Gas Sizing** and **Vendor-Specific** methods.
- Simplified calculations are applied for the **ISA** method.

Updated Relieving Phase - Method Names

In V11, the following **Relieving Phase - Methods** names were updated:

- **Liquid** was renamed to **Capacity-Certified Liquid**.
- **Mixed (A)** and **Mixed (B)** were combined and renamed to **Omega (Sat. or 2-Phase)**.
- **Mixed (C)** was renamed to **Omega (Subcooled)**.

Changes to Choke Flow Check for Control Valve Failure Scenarios

In previous versions of Aspen Plus, for Control Valve Failure Scenarios using the **Universal Gas Sizing** or **Vendor-Specific** calculation method, an incorrect check for choke flow was performed. In Aspen Plus V11, this incorrect check is no longer performed, leading to a more accurate **Required Relieving Flow**. The impact of this change lessens when a larger **C1** value is specified.

Changes to Backpressure Limits for Conventional Valves

In previous versions of Aspen Plus, **Conventional** valves applied a total backpressure limit of 10% by default. In V11, for **Conventional** valves, the design limit for backpressure is that the maximum built-up backpressure must be lesser than or equal to the scenario overpressure.

Restricted Lift for Relief Valves

In Aspen Plus V11, you can opt to model restricted lift relief valves using the **Restricted Lift Valve** check box on the **PRD Data** tab. When opening cases created in a previous version, this check box will be cleared.

Wetted Area Exponent for Fire Scenarios

Starting in V11, **Supercritical**, **Wetted (API)**, and **Semi-Dynamic Flash** Fire scenarios now allow you to edit the wetted area exponent for fire calculations involving partial confinement. When opening cases created in a previous version, the default exponent, 0.82, is applied.

Changes to Default Kd for Direct Integration Method

When using the **Direct Integration** method for orifice calculations, in previous versions, the default **Kd** value was always 0.85. In Aspen Plus V11, the default **Kd** is now selected based on the fluid phase at relieving conditions.

Retired Features

Standalone Aspen Batch Modeler (ABM) is no longer delivered. A converter for ABM files to use them with BatchSep is now delivered with Aspen Plus; see the What's New for details on using it. BatchSep in Aspen Plus has been enhanced to support the pot-only configuration; however, in this mode, it requires a dummy distillate stream, which will remain unused. The converter will add this stream when required. ABM files using fitting cases or experiments are no longer supported.

In Aspen Plus V11, the Documentation Builder in the Safety Analysis environment is no longer available. Instead, it is replaced with the Datasheets feature, which lets you use Aspen Basic Engineering (ABE) Datasheets to prepare documentation of the design basis for any PSVs, rupture disks, and storage tanks. The Safety Analysis environment provides standardized relief systems calculations and data consistency across the final report deliverables, making it faster and easier to complete a pressure relief analysis. ABE Datasheets offers a light-weight, single-user experience to create datasheets quickly and easily. The technology also offers a server-based, multi-user experience so that companies can have a centralized repository of their relief systems design documentation.

The property models NRTLSAC and ENRTL-SAC have been removed. You should migrate any simulations using them to NRTL-SAC, which supersedes both models.

This is the last version to include the pure component databanks PURE20, PURE22, and PURE24. These databanks correspond to Aspen Plus V7.2 and earlier versions. Because most users have updated their simulations to more recent databank versions, these databanks are being dropped to reduce the size of the delivered database. If you think you will still need them, see Maintaining Access to Retired Databanks in the Aspen Properties Enterprise Database help for instructions on preserving a copy of these databanks.

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 V11

Aspen OLI interface includes new features and enhancements in the following areas:

64 Bit Version

The Aspen OLI Interface now supports 64-bit installation in Aspen Plus.

Compatibility Notes for V11

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 V11

Aspen Properties V11 includes new features and enhancements in the following areas:

64 Bit Version

Aspen Properties is now a fully 64-bit program. Aspen Properties Excel Add-in supports both 32-bit and 64-bit versions of Excel.

Aspen Properties Excel Calculator

A new conversion function MoleFlowtoMoleFraction is available. This is useful for ensuring mole fractions are normalized before using them in mixture property calculations.

Molecular Structure Form

The Molecular Structure form has several workflow enhancements. The Structure sheet is now integrated into the left side of the Functional Groups sheet, allowing you to reference this picture when specifying functional groups. Also, when selecting functional groups:

- You can filter the list of groups by type.
- In the list beside each group number is a text description of the group.
- To the right is a large image of the structure that the selected group represents.

The table of groups has been enhanced to show these images and descriptions in each row.

Property Analysis

A new method, the density marching method (Venkatarathnam, 2014) is available for use in computing P-T envelope analysis. This method uses density rather than pressure or temperature as the independent variable, which removes computational difficulties that the standard method encounters around the critical point. The new method also supports vapor-liquid-liquid systems.

Binary analysis includes new types Txx, Txxy, and Pxxy which compute liquid-liquid equilibrium in addition to or instead of vapor-liquid equilibrium. With the new types you can generate Txy and Pxy plots which include the liquid-liquid behavior as well as the vapor-liquid behavior.

Aspen Properties Database Manager

Within the database manager, you can now export data to Excel from the grids of compounds in the Find Compounds dialog box and the Selected Compounds form.

Property Sets

New property set properties are now available for variations on heat capacity ratio CPCV:

- CPCP-R and CPCP-RMX provide the heat capacity ratio CP/(CP-R) for pure components and mixtures, respectively.
- CPCVIG and CPCVIGMX provide the ideal gas heat capacity ratio CP/CV for pure components and mixtures, respectively.

There is also the new property set property SC, Schmidt number, which is the ratio of kinetic viscosity to diffusivity.

Databanks

The PURE37 databank has been added with the latest data from DIPPR. This release does not include any new components or parameters, but it includes updated data for many parameters. See compatibility notes.

The NIST database is based on version 10.12 of NIST's data. The NIST TDE engine has been updated to version 10.2.

The NIST-TRC databank now has PC-SAFT parameters for 1042 compounds. These parameters were not previously available in NIST-TRC. The compounds include aromatic and nonaromatic hydrocarbons up to C19 and many compounds containing oxygen, nitrogen, sulfur, and halogen atoms.

A new ACIDGAS databank is available with components likely to occur in acid gas processing and parameters for suitable property methods.

When copying property parameters to input from the Retrieve Parameter Results dialog box, starting in V11 they are now tagged as source USER-databankname, allowing you to distinguish them from data you entered. New options in this dialog box and in Clean Property Parameters allow you to overwrite or remove this data without affecting data you entered.

Property Models

The PPR78 method, implementing the Predictive Peng-Robinson equation-of-state model, is now available. It combines the 1978 Peng-Robinson model with classical Van der Waals mixing rules involving a temperature-dependent binary interaction parameter predicted by PPR78 from the chemical structures of molecules within the mixture.

The Modified Rackett liquid molar volume is now available as a pure component model VL0MRK you can use in conjunction with the mixture model to ensure consistency.

The REFPROP model from NIST has been updated to version 10.1. This version includes 25 new fluids:

Alias	Name	CAS Number
C16H34	N-HEXADECANE	544-76-3
C22H46	N-DOCOSANE	629-97-0
C6F14	PERFLUORO-N-HEXANE	355-42-0
C6H5CL	CHLOROBENZENE	108-90-7
CL2	CHLORINE	7782-50-5
C2H4O-2	ETHYLENE-OXIDE	75-21-8
C2HF3	TRIFLUOROETHYLENE	359-11-5
C3H2F4-N2	C3H2F4-N2	29118-25-0
C3H3F3	3,3,3-TRIFLUOROPROPENE	677-21-4
C2H4CL2-2	1,2-DICHLOROETHANE	107-06-2
C2H3CL	VINYL-CHLORIDE	75-01-4
C4H2F6	C4H2F6	692-49-9
C4H6-4	1,3-BUTADIENE	106-99-0
C4H6-1	1-BUTYNE	107-00-6
C5H10-2	1-PENTENE	109-67-1
C6H14-4	2,2-DIMETHYL-BUTANE	75-83-2
C6H14-5	2,3-DIMETHYL-BUTANE	79-29-8
C6H14-3	3-METHYL-PENTANE	96-14-0
C2H2	ACETYLENE	74-86-2
C4H6	CYCLOBUTENE	822-35-5
C3H4-1	PROPADIENE	463-49-0
C3H6O-4	PROPYLENE-OXIDE	75-56-9
C2H6O2	ETHYLENE-GLYCOL	107-21-1
C2H7NO	MONOETHANOLAMINE	141-43-5
C4H11NO2-1	DIETHANOLAMINE	111-42-2

A new option on the Setup | Calculation Options | Flash Convergence sheet lets you use the RefProp flash algorithm instead of the ones built into Aspen Plus when using one of the RefProp methods (RefProp, GERG2008, or IAPWS-95). By default, the Aspen flash algorithm selected for Flash convergence algorithm on that sheet is used with these methods. It is faster, but in some cases this may lead to incorrect phase behavior.

Compatibility Notes for V11

This section describes the differences that you might encounter between Aspen Properties V11 and Aspen Properties V10. In most cases, previous Aspen Properties input files and backup files are completely compatible with Aspen Properties V11. 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 NISTV110.

Fortran Compiler

Aspen Properties V11 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.

Because Aspen Properties is now a 64-bit program, compiled user models must be rebuilt as 64-bit. Starting in V11, integer variables in user model interfaces are now 64-bit integers. Integer variables used to store Hollerith strings are 64-bit but use only 32 of those bits to hold four bytes per declared variable. If you have declared variables for user models as INTEGER*4 or LOGICAL*4, you must change these declarations to INTEGER or REAL for your code to work in V11. Real variables are still 64-bit (REAL*8); if you use DOUBLE PRECISION declarations for these variables in your code, ensure that compiler options are creating these variables as 64-bit, not 128-bit. See Chapter 1 of Aspen Plus User Models for more details.

Watson Heat of Vaporization Extrapolation

In past versions, the lower temperature limit for the Watson heat of vaporization model was not being honored. The model equation was being used at low temperatures instead of performing linear extrapolation as was documented. Now the limit is honored and linear extrapolation occurs below the lower limit.

LLE Data

When entering data for property regression, TXX, PXX, TPXX, or TPXXY data which is missing X1 or X2 is no longer permitted. and the forms containing them will be marked incomplete. Data regression requires values for both liquid phases for these data sets. If there really is a second liquid phase, estimate its composition, and perhaps use a larger standard deviation for the estimates to reflect the greater uncertainty of this data. If there is not really a second liquid phase, use a separate data set of a different type, such as TPXY, for the one-liquid-phase data. See Entering Phase Equilibrium and Mixture Data for more information.

HYSPR Method

The HYSPR (HYSYS Peng-Robinson) property method was updated to allow it to use analytical derivatives in EO mode, making the method faster in such situations. Some issues in enthalpy calculations were also fixed, leading to possibly different results in cases using it.

Parameters for PENG-ROB and RK-SOAVE

Historically, when the PENG-ROB and RK-SOAVE methods are selected, the Aspen Physical Property System has loaded parameters from the EOS-LIT databank, which contains many binary and pure parameters for these methods, even if not selected, and ahead of other databanks. This

loading is now controlled by the Require Engine to use special parameters ... option in Setup | Calculation Options which previously only applied to electrolyte parameters for ELECNRTL and PITZER. This option is selected by default. In models where you have disabled the option, and are using PENG-ROB or RK-SOAVE, you will experience different results and possibly missing parameters if EOS-LIT is not in the databank search list. This means that you can now use parameters from a custom databank for these methods, by disabling this option and specifying your custom databank ahead of (or instead of) EOS-LIT in the databank search order.

PURE37 Databank Changes

The PURE37 databank includes the latest changes from DIPPR, which more than is usually the case may affect results of calculations. Normal alkanes now use equation 123 for liquid thermal conductivity (KL), and many compounds including 2-methoxyethanol now use equation 124 for liquid heat capacity (CPL).

Aspen Properties Excel Calculator

In past versions of Aspen Properties Excel Calculator, if you entered the name of a property manually, and it did not exactly match one of the defined property names, it is possible that the calculator returned a value for a property other than the one intended. Now it enforces better rules for matching property names: The property name must exactly match one of the names produced by the Properties command within the add-in, except that case is ignored. An incorrect property name will lead to an Excel error in the cell. It is (and has always been) recommended that you enter property names using the Properties command to insert the name in a cell and reference the cell in the function.

Calculating Molecular Weight from Formula

The option in Setup | Calculation Options | Calculations to Calculate component molecular weight from atomic formula now also applies when the molecular weight (MW) and/or formula (ATOMNO/NOATOM) is data you have specified as part of the simulation, rather than taken from databanks. This may cause minor changes in some simulations highly sensitive to molecular weights with non-databank components. The option should be turned off whenever using components representing isotopes whose molecular weights intentionally differ from the norm (as with HE-3 in the pure component databanks supplied with Aspen Plus). As always, if only the molecular weight or only the formula is available, Aspen Properties uses the available data.

Retired Features

The property models NRTLSAC and ENRTL-SAC have been removed. You should migrate any simulations using them to NRTL-SAC, which supersedes both models.

This is the last version to include the pure component databanks PURE20, PURE22, and PURE24. These databanks correspond to Aspen Plus V7.2 and earlier versions. Because most users have updated their simulations to more recent databank versions, these databanks are being dropped to reduce the size of the delivered database. If you think you will still need them, see Maintaining Access to Retired Databanks in the Aspen Properties Enterprise Database help for instructions on preserving a copy of these 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 V11

Two new property procedures are available. pSolFrac calculates solid fraction given a composition (fractions on any basis) and pSolSplt calculates the normalized solid and moisture compositions as well as the solid fraction.

You can now easily copy variable values from steady-state experiments and from time 0 of dynamic experiments to the corresponding model variables. For details, see Copying Estimation input to the Simulation Model.

You can now plot the convergence history of optimization runs. To do so, from the Optimization dialog box click Convergence History.

Compatibility Notes for V11

ACM V11 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 V11 for use with PIMS V11, which is a 32-bit product. Export the model from ACM V10 to use it with PIMS V11. For models that need to be compiled, only Visual Studio 2017 and Intel Fortran 2017 Professional Edition or higher, 64-bit are supported.

What's Fixed in V11

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 V11

Two new property procedures are available. pSolFrac calculates solid fraction given a composition (fractions on any basis) and pSolSplt calculates the normalized solid and moisture compositions as well as the solid fraction.

You can now easily copy variable values from steady-state experiments and from time 0 of dynamic experiments to the corresponding model variables. For details, see Copying Estimation input to the Simulation Model.

You can now plot the convergence history of optimization runs. To do so, from the Optimization dialog box click Convergence History.

Compatibility Notes for V11

Aspen Custom Modeler V11 can be installed and used at the same time as V10 and other previous versions of Aspen Custom Modeler. However, please note the following compatibility issues when upgrading your existing simulations to version V11.

- ACM Language (.acmf) files generated using previous versions of Aspen Custom Modeler are compatible with version V11. You may see some warning messages when loading .acmf files created with previous versions. This is a result of some solver options that have become obsolete or have been renamed. Saving the file in ACM V11 eliminates these warnings.
- ACM Library (.acml) files generated from previous releases of Aspen Custom Modeler cannot be loaded in version V11. Load the source .acmf version of these files into Aspen Custom Modeler V11 and regenerate the library file.
- Aspen Plus .appdf files created with earlier versions of Aspen Plus are not compatible with Aspen Custom Modeler V11. If you try to load a physical properties file (.appdf) that was generated using an earlier version of Aspen Plus, the following error message appears:
  SAIPIN-F-Error loading Aspen your .appdf File.
  See the Aspen Properties error messages first, or it may be due to an incompatible PDF file version. You should exit the application and reload your input file once you have rectified the problem. After you receive this error, exit Aspen Custom Modeler before loading any further simulations. To continue, you must regenerate the .appdf file using Aspen Plus V11.
- ACM V11 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 V11 for use with PIMS V11, which is a 32-bit product. Export the model from ACM V10 to use it with PIMS V11. For models that need to be compiled, only Visual Studio 2017 and Intel Fortran 2017 Professional Edition or higher, 64-bit are supported.
- CISolid components from Aspen Plus are now recognized as solids. In previous versions, ACM used a method based on volatility to determine which components were solids. This resulted in very wrong enthalpy and other wrong properties when this check did not work correctly.
- The Paste Link feature to use OLE links is no longer supported. It did not work well, nor consistently across different versions of products such as Microsoft Excel. To make links between Excel and Aspen Custom Modeler, use Aspen Simulation Workbook.
- Some changes were made in the first derivative calculations in finite difference methods FFD1, FFD2, CFD2, and CFD4 in V9.
  - FFD1 now uses FFD1 at Sbound/Node 4.
  - FFD2 now uses FFD2 at Sbound/Node 4.
  - When the second derivative is not defined, CFD2 uses CFD2 at Sbound/Node 4.
  - When the second derivative is not defined, if the two sections have the same node spacing, CFD4 uses CFD4 at Section1/Node 4, Sbound/Node 5, and Section 2/Node 6. If they have different spacing, CFD2 is used at these locations.

The changes to the FFD methods ensure that they are really the reverse of BFD1 and BFD2, respectively. The changes to the CFD methods ensure that they are really symmetric.

- Some corrections were made to the behavior of automatic control tuning with PIDincr in V9 for the ideal, series, and parallel algorithms.
  - The parameters generated by Ziegler-Nichols apply to the series algorithm. These are now converted correctly when you use another algorithm. In previous versions, these parameters were interpreted as being for the ideal algorithm, and an incorrect conversion was performed if you were using parallel for open-loop mode.
  - The parameters generated by the other methods apply to the ideal algorithm, and were previously being interpreted correctly for that algorithm and converted correctly if you were using the parallel algorithm in open-loop mode. Now they are also converted correctly if you are using series.
  - No conversion was being performed on the parameters in closed-loop mode. This conversion is now performed (with the updates above).

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.

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 V11

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

Compatibility Notes for V11

There are no Compatibility Notes listed for this release.

What's Fixed in V11

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 V11

Gas dynamic adsorption models now have an option in the kinetic model of the gas layer to estimate the molecular diffusivities using properties from Aspen Properties.

Compatibility Notes for V11

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 V11

There are no new features or enhancments for this release.

Compatibility Notes for V11

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 V11

Aspen Utilites Planner now uses SQL databases rather than Microsoft Access databases to configure the optimization. Microsoft Access databases from earlier versions must be converted to use them with Aspen Utilities Planner V11. A converter is included. For more information, see Converting Microsoft Access Databases in the help.

In the Boiler model, there is a new specification IncludeBDinEFF which lets you indicate whether the energy of the blowdown stream should be included as useful energy in calculating the boiler efficiency or ignored.

Compatibility Notes for V11

There are no Compatibility Notes listed for this release.

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 V11

New features and enhancements were added in the following areas in HYSYS V11:

- General HYSYS Improvements
- HYSYS Properties Improvements
- Safety Improvements
- Equation-Oriented Modeling Improvements
- HYSYS Midstream Improvements
- HYSYS Upstream Improvements

General HYSYS Improvements

64-bit Aspen HYSYS

Aspen HYSYS is now a 64-bit application and requires a 64-bit operating system. This change offers the following benefits:

- Reduced memory limitations for very large, complex flowsheets or sub-flowsheets (for example, Equation Oriented sub-flowsheets)
- Performance improvements and greater stability
- Support for 64-bit Microsoft Office
- Fewer compatibility issues and improved consistency with common operating systems
- Can be installed on 64-bit operating systems without encountering RAM limitations
- Meets common company guidelines and protocols

Variable Manager

Aspen HYSYS V11 features a new Variable Manager, which serves as a variable repository for all the variables that are being used in case studies, data tables, and strip charts. The Variable

Manager offers similar capabilities as the Databook from HYSYS V7.3. The Variable Manager view lets you view, add, or delete variables that can be later used in case studies, data tables, and strip charts. Variables added directly to the case studies, data tables, or strip charts are also visible in the Variable Manager. To open the Variable Manager, on the **Home** ribbon tab, in the **Analysis** group, click **Variable Manager**.

Line Sizing Manager

Aspen HYSYS V10 and earlier releases included a Pipe Sizing Utility, which let you quickly perform either a design or rating calculation based on a stream without having to add a pipe operation to the flowsheet. In V11, this utility was replaced with the new Line Sizing Manager. To access the Line Sizing Manager, from the **Home** ribbon | **Analysis** group, click **Equipment Design** | **Line Sizing**.

The Line Sizing Manager lets you perform line sizing calculations for multiple streams and process lines. You can design and evaluate piping based on criteria that checks certain flow parameters, such as maximum pressure gradient or a maximum velocity. The Line Sizing Manager can calculate the minimum pipe size (diameter) that satisfies all of your specified criteria or check that the installed pipe (diameter) satisfies the necessary criteria.

The Line Sizing Manager offers the following advantages:

- Permits multiple stream connections. You can size many lines within the same Line Sizing Utility.
- Includes a single summary view that displays all of the lines in a system.
- Lets you size the pipe based on multiple criteria: Pressure Gradient, Velocity, and Rho V2.

When you open a case containing Pipe Sizing Utilities in HYSYS V11, the Pipe Sizing Utilities are automatically converted to Line Sizing Manager objects.

Column Analysis Improvements

For the Interactive Sizing mode in Column Analysis, you can now choose to use equal bubbling area rather than equal flow path length to design columns with 3 or more tray passes.

For tray columns, the sizing algorithm was updated to handle scenarios in which the stage with the maximum downcomer velocity is different from the stage with the maximum jet flood. When Column Analysis is used to size a tray column, the following algorithm is used to size each section:

1. Size the section based on the stage with the largest liquid flow rate and the design parameters specified. This is the correct size for most columns.
2. Perform a rating calculation based on this size. Calculate the percent jet flooding and percent downcomer choke flood for each stage.
3. Determine the stage with the maximum percent jet flood. If this violates the design limit, re-size the column based on this stage. The downcomer area and number of passes from the first calculation are kept.

The sizing algorithm for packed column was also improved in HYSYS V11. For packed columns, a diameter is now calculated separately for each stage based on the selected sizing criterion (% Approach to Maximum Capacity (L/V) or Design Capacity Factor), and the largest diameter in the section is chosen to be the section diameter. Then the approach to capacity for each stage is re-calculated based on this column diameter.

Additional Column Solver Options

The **Advanced Solving Options** view (accessed from the **Parameters** tab | **Solver** page of the Column view) contains two new groups:

- The **Inner-Loop Jacobian Step Size** group allows you to improve convergence in some cases (for example, when the vapor flow is expected to be very low for all stages) by keeping the step size proportional to the inner-loop iteration variables.

- The **Temperature Tolerance for Column Flowsheet Calculations** group allows you to resolve minor temperature inconsistencies by relaxing the temperature inconsistency check tolerance slightly.

EDR Integration Improvements

The following improvements were made to the LNG Exchanger in HYSYS V11:

- A new **Transfer UA to Simple Model** button on the **EDR PlateFin** tab of the LNG Exchanger lets you transfer the EDR calculated pressure drops to a **Simple Weighted** model and set up the UA specifications for each of the pass UAs and the overall UA.
- Starting in V11, if you switch from the **EDR - PlateFin** model to another model, HYSYS stores the stream mapping and geometry information. If you later switch back to the **EDR - PlateFin** model, your previous stream mapping and geometry information will be restored.
- When the PlateFin geometry is imported from an EDR file to the LNG, the EDR streams are automatically mapped to the LNG passes if the EDR stream names match the LNG pass names in HYSYS.
- When the **EDR - PlateFin** model is selected, if the temperature of one of the HYSYS streams disagrees with the corresponding temperature calculated in EDR by a margin of more than 1 °C, a warning message appears.

You can now run the Find Process Fouling and Natural Convection simulation modes within the Rigorous Air Cooler in HYSYS. On the **Rigorous Air Cooler** tab | **Application** page, you can select the **Find Process Fouling** option or the **Natural Convection** option from the **Calculation Mode** drop-down list.

In HYSYS V11, you can now model steam injection in the firebox for the rigorous EDR Fired Heater model. Select the injected steam material stream from the **Steam Injection** drop-down list on the **Design** tab | **Connections** page. On the **EDR FiredHeater** tab | **Streams** page, you can specify the steam injection location in firebox.

Data Table Usability Improvements

HYSYS V11 features the following improvements to data tables and strip charts:

- You can easily rearrange the order of variables within a data table.
- In the first column of the data table, you can specify a number to change the order of the variable.
- Exporting control variables from the Control Manager to strip charts and data tables was improved. For Split Range Controllers, Ratio Controllers, and PID Controllers, you can now use the Control Manager to select multiple variables at the same time and send them to data tables or strip charts.

Improved Handling of HYSYS Columns in Activated Economics

The process for handling HYSYS columns in Activated Economics was improved in V11. In previous versions, mappings were only created for equipment defined in the column sub-flowsheet.

In V11, on the **Map Preview** view, you can choose from three different configurations for the condenser:

- **Condenser - Standard**: This is the default configuration. Condensers are mapped to three Economic Evaluation components: a TEMA Exchanger for the condenser, a Horizontal Drum for the overhead accumulator, and a centrifugal pump for the reflux pump.
- **Condenser - w/Ovhd Pump**: Condensers are mapped to a condenser exchanger and overhead drum, without a pump. Gravity is fed back to the column.
- **Condenser - wo/Pumps**: Condensers are mapped to a condenser exchanger, overhead drum, and a pump for both the reflux and product flow.

If additional condensers are added to the subflowsheet, the default **Condenser - Standard** mappings will apply. All other unit operations contained in the sub-flowsheet are mapped to Economic Evaluation components (for example, tray sections are mapped to Economic Evaluation multi-diameter column(s), the reboiler is mapped to an Economic Evaluation reboiler, and pumps are mapped to Economic Evaluation centrifugal pumps). If no condenser or reboiler is present in the sub-flowsheet, no Economic Evaluation components are created.

Resizing Options Available for Quoted Equipment in Activated Economics

The **Quoted equipment** tab of the **Economic Equipment Data Summary** grid features a new **Allow Resize** drop-down list.

- **Yes | Allow Resizing** is the default selection. When **Yes** is selected, the quoted item details are changed after the evaluation is updated based on changes in the simulation. In some cases, data may be removed.
- When **No | No Resizing** is selected, the quoted item details remain unchanged from one evaluation to the next and is not impacted by changes in the simulation. Keep in mind that if simulation conditions change, the quoted item details may no longer be accurate.

Plant Data Enhancements

- You can now save the results plots from Plant Data by entering a name for the plot and clicking **Save**. They appear under the **Results Plots** folder.
- For HYSYS models containing at least one HYSYS Petroleum Refining "flowsheet reactor" (FCC, Catalytic Reformer, or Hydrocracker), you can select the reactor model from the **Run** drop-down list on the **Variables** form. Plant Data will perform calibration for this reactor by entering the Calibration environment for the reactor, using values from the **DSForPlantDataRuns** HYSYS Refining dataset to update relevant variables for the reactor, and perform a calibration run. If the DSForPlantDataRuns dataset does not exist, the program will create one by cloning the current dataset. After the calibration run is performed and tuning factors are saved, the results are reflected in the Plant Data output tags.
- Plant Data supports the selection of variables from EO Sub-Flowsheets.
  - You should only select EO variables from the top-level EO Sub-Flowsheet.
  - We recommend that you select SM variables from the main flowsheet rather than the EO Sub-Flowsheet. Do not attempt to select both SM variables and EO variables from within the EO Sub-Flowsheet in the same case.

  After selecting SM and/or EO variables from an EO Sub-Flowsheet for Plant Data, you can select a top-level EO Sub-Flowsheet from the **Run** drop-down list. Plant Data runs the selected EO Sub-Flowsheet and will send input values to all selected input variables and retrieve results from all output variables.

Activated Datasheets Improvements

The **Datasheets** functionality (available through the **Datasheets** ribbon tab) features substantial improvements in HYSYS V11.

- Usability was enhanced significantly. Icons were updated to be more intuitive, and the workflow is now quicker and easier.
- General performance and speed were improved.
- The mapping and data transfer processes were simplified. Mapping is now performed automatically performed. To create datasheets, confirm the mapping and transfer the simulation data to the workspace.
- EDR PlateFin Heat Exchangers now appear as objects on the **Mapper** form.
- You can now map to multiple inlet and outlet streams for Separators and Columns.

General HYSYS Enhancements

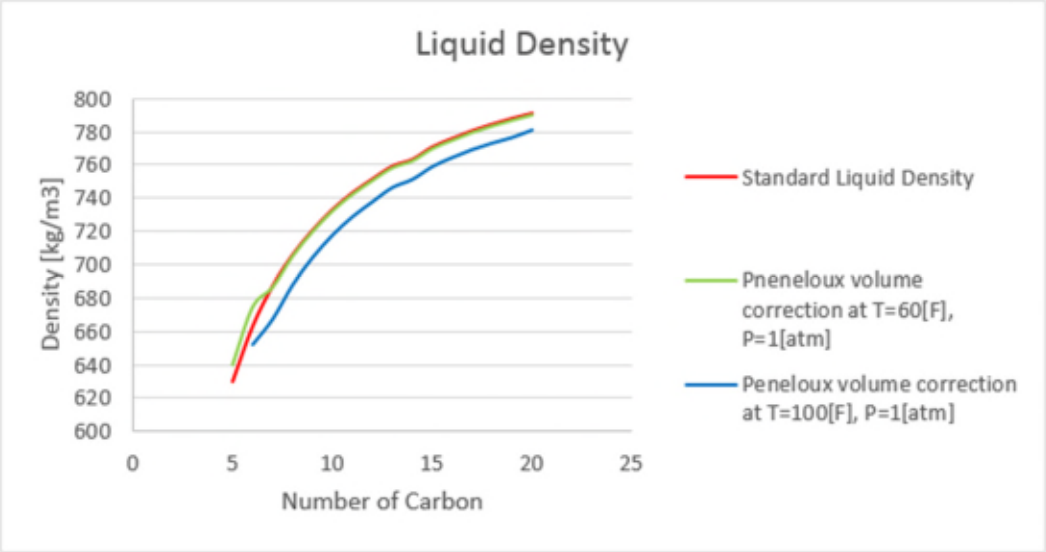
- The **Monitor** tab | **Tables** page of the Recycle now lists the **Error** and **Tolerance** of each variable when the **Raw Data** radio button is selected. These columns appear in both **Nested** and **Simultaneous** modes and provide you with additional information to help you determine which variables do not converge.
- The **Pipe Profile View** of the Pipe Segment now includes a **Total dP** column, eliminating the need to manually calculate the total pressure drop across the fittings.
- When modeling liquid choking for the Valve, you can now choose between using the true critical pressure or pseudo critical pressure. Radio button selection is available on the **Rating** tab | **Flow Limits** page and the **Dynamics** tab | **Flow Limits** page of the Valve property view. The **True critical pressure** option is only used when the **Peng-Robinson** property package is selected.
- OOMF now provides ENCRYPT and DECRYPT commands. You can encrypt EBS script files with a password and distribute them without those files being able to be read or modified. Encrypted files can be invoked without the password.

HYSYS Properties Improvements

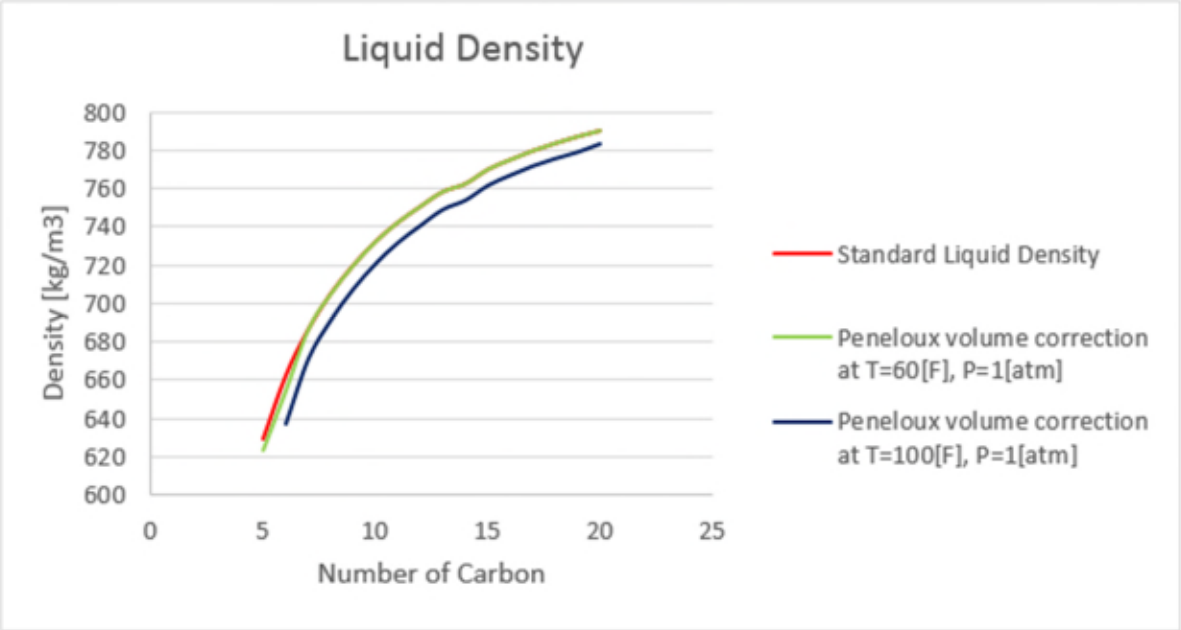
Peneloux Volume Translation Method Available for Peng-Robinson and SRK Packages

In Aspen HYSYS V11, the **Peneloux** volume translation method is now available for HYSYS **Peng-Robinson** and **SRK** property packages when the **Density** is set to **Use EOS Density**.

The calculated results of the liquid mass density of components C5~C20 using the **Peng-Robinson** property package with the **Peneloux** volume correction are shown in the following figure.



The calculated results of the liquid mass density of components C5~C20 using the **SRK** property package with the **Peneloux** volume correction are shown in the following figure.



Improvements to GCEOS Property Package

The **GCEOS** property package features the following improvements in HYSYS V11:

- A new mixing rule, **Fij = Aij + Bij*Trj +Cij*Trj^2; alphai=sum(xj*Fij)**, is now available. This mixing rule is a function of reduced temperature and compositions. The following equations are used when this mixing rule is selected.

$$a = \sum_{x_i} \sum_{x_j} \cdot \sqrt{a_i \cdot a_j}$$

$$a_i = a_{c_i} \cdot \alpha_i$$

$$a_{c_i} = \Omega_a \frac{R^2 T_{c_i}^2}{P_{c_i}}$$

$$\alpha_i = \sum_{x_k} \left[A_{i_k} + B_{i_k} T_{r_k} + C_{i_k} T_{r_k}^2 \right]$$

- Calculated values for **Omega a** and **Omega b** are now reported on the **Set Up** tab. The following equations are used:

$$\Omega_a = \frac{u\xi[3+(u-1)\xi]+[3+(u-w)\xi^2]}{[3+(u-1)\xi]^2}$$

$$\Omega_b = \frac{\xi}{3+(u-1)\xi}$$

Improvements to Aspen Properties Packages in HYSYS

- The Aspen Properties **HYSYS Peng Robinson** property package features improved performance in HYSYS V11. 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.

- When associating an Aspen Properties fluid package with Oil Manager, results are more accurate in HYSYS V11.

Aspen Properties PPR78 Property Package Now Available in HYSYS

The Aspen Properties **PPR78** property package is available for selection in HYSYS V11. This package is based on the Predictive Peng-Robinson equation of state. It combines the model proposed by Peng and Robinson in 1978 with classical Van der Waals mixing rules involving a temperature-dependent binary interaction parameter $k_{ij}(T)$. These k_{ij} coefficients are predicted by PPR78 from the chemical structures of molecules within the mixture.

New Flash Methods Available for Aspen Properties Packages

Starting in HYSYS V11, you can select the HYSYS flash method for suitable Aspen Properties property packages. A new HYSYS **Flash with** Aspen Properties option is available in the **Flash Method** group on the **Phase Handling** tab of the **Fluid Package** view. HYSYS Flash is not suitable for all Aspen Properties packages (for example, the **Electrolyte NRTL** package). If you select this method for an unsuitable property package, an error message appears. When you select this option, the parameters available for selection on the **Phase Handling** tab are identical to those on the **Stab Test** tab.

Additionally, a new **RefProp Flash** option allows you to use the RefProp flash algorithm for **GERG2008**, **IAPWS-95**, and **RefProp** property packages. If the flash algorithm fails when the **RefProp** flash method is selected, the default **Aspen Flash** method is automatically used instead. The **Aspen Flash method** is faster; however, in some cases, it may lead to incorrect phase behavior.

Aspen Properties Physical Properties Enhancements

The NIST database is based on version 10.12 of NIST's data. The NIST TDE engine has been updated to version 10.2.

The PURE37 databank has been added with the latest data from DIPPR. This release does not include any new components or parameters; however, it includes updated data for many parameters.

The REFPROP model from NIST has been updated to version 10.1. This version includes 25 new fluids:

Alias	Name	CAS Number
C16H34	N-HEXADECANE	544-76-3
C22H46	N-DOCOSANE	629-97-0
C6F14	PERFLUORO-N-HEXANE	355-42-0
C6H5CL	CHLOROBENZENE	108-90-7
CL2	CHLORINE	7782-50-5
C2H4O-2	ETHYLENE-OXIDE	75-21-8
C2HF3	TRIFLUOROETHYLENE	359-11-5
C3H2F4-N2	C3H2F4-N2	29118-25-0
C3H3F3	3,3,3-TRIFLUOROPROPENE	677-21-4
C2H4CL2-2	1,2-DICHLOROETHANE	107-06-2
C2H3CL	VINYL-CHLORIDE	75-01-4
C4H2F6	C4H2F6	692-49-9
C4H6-4	1,3-BUTADIENE	106-99-0
C4H6-1	1-BUTYNE	107-00-6

Alias	Name	CAS Number
C5H10-2	1-PENTENE	109-67-1
C6H14-4	2,2-DIMETHYL-BUTANE	75-83-2
C6H14-5	2,3-DIMETHYL-BUTANE	79-29-8
C6H14-3	3-METHYL-PENTANE	96-14-0
C2H2	ACETYLENE	74-86-2
C4H6	CYCLOBUTENE	822-35-5
C3H4-1	PROPADIENE	463-49-0
C3H6O-4	PROPYLENE-OXIDE	75-56-9
C2H6O2	ETHYLENE-GLYCOL	107-21-1
C2H7NO	MONOETHANOLAMINE	141-43-5
C4H11NO2-1	DIETHANOLAMINE	111-42-2

HYSYS Properties Enhancements

New **Latent Heat** and **Mass Latent Heat** correlations are now available under the **Standard** correlation type on the Correlation Manager. These correlations can be used to calculate latent heat for partially vaporized mixtures. These properties are calculated for the stream rather than the phase.

Improvements to Methods Assistant

The Property Package Selection Assistant (launched by clicking **Methods Assistant** on the **Home** ribbon tab | **Navigate** group in the Properties environment) features improved recommendations in HYSYS V11. The purpose of the assistant is to help you select the most appropriate property packages for use with Aspen HYSYS. The assistant will ask you questions and will suggest suitable property packages based on your responses.

Safety Improvements

Preparing Documentation using ABE Datasheets

Starting in V11, within the Safety Analysis environment, you can use ABE Datasheets to prepare documentation of the design basis for any PSVs, rupture disks, and storage tanks. The Safety Analysis environment provides standardized relief systems calculations and data consistency across the final report deliverables, making it faster and easier to complete a pressure relief analysis.

ABE Datasheets offers a light-weight, single-user experience to create datasheets quickly and easily. The technology also offers a server-based, multi-user experience so that companies can have a centralized repository of their relief systems design documentation. To get started, from the Safety Analysis environment, on the **Home** ribbon tab, click **Datasheets**. The **Datasheets** button is only available when Aspen Basic Engineering is installed on your machine.

A number of Safety datasheet templates are available for selection. When creating datasheets, you can use the filters to view only Safety-related items.

Template Name	Equipment Class	Description
AZ Rupture Disk	BurstingDisc	Summarizes key mechanical and process details relevant for the rupture disk design.

Template Name	Equipment Class	Description
Safety ANSI ISA Control Valve Failure Relief Load Report	ControlValveFailure	Calculation summary report that provides key inputs and results for the control valve failure scenario using the ANSI/ISA valve sizing equation to determine the relief load.
Safety PSV+ Control Valve Failure Relief Load Report	ControlValveFailure	Calculation summary report that provides key inputs and results for the control valve failure scenario using the PSV+ valve sizing equation to determine the relief load.
Safety Universal Gas Control Valve Failure Relief Load Report	ControlValveFailure	Calculation summary report that provides key inputs and results for the control valve failure scenario using the Universal Gas valve sizing equation to determine the relief load.
Safety Vendor-Specific Control Valve Failure Relief Load Report	ControlValveFailure	Calculation summary report that provides key inputs and results for the control valve failure scenario using vendor-specific valve sizing equations to determine the relief load.
Safety Fan Failure Relief Load Report	FanFailure	Calculation summary report that provides key inputs and results for the fan failure scenario.
Safety Semi-Dynamic Fire Relief Load Report	Fire	Calculation summary report that provides key inputs and results for a pool fire scenario, assuming the relief load was calculated using the semi-dynamic fire methodology.
Safety Supercritical Fire Relief Load Report	Fire	Calculation summary report that provides key inputs and results for a pool fire scenario, assuming the relief load was calculated using the supercritical fire methodology.
Safety Unwetted Fire Relief Load Report	Fire	Calculation summary report that provides key inputs and results for a pool fire scenario, assuming the relief load was calculated using the API 521 Unwetted fire methodology.
Safety Wetted Fire Relief Load Report	Fire	Calculation summary report that provides key inputs and results for a pool fire scenario, assuming the relief load was calculated using the API 521 Wetted fire methodology.
Safety Homogeneous Line Sizing Calculation Report	LineRating	Line sizing calculation summary for the legacy homogeneous line sizing method (not recommended).

Template Name	Equipment Class	Description
Safety Liquid Line Sizing Calculation Report	LineRating	Line sizing calculation summary for the legacy liquid line sizing method (not recommended).
Safety Rigorous Line Sizing Calculation Report	LineRating	Line sizing calculation summary for the rigorous line sizing method (recommended).
Safety Vapor Line Sizing Calculation Report	LineRating	Line sizing calculation summary for the legacy vapor line sizing method (not recommended).
Safety Storage Tank Venting Requirement Report	LowPressureTank	Calculation summary report that provides key inputs and results for the relief system design on a low pressure storage tank, assuming the inbreathing, outbreathing, and fire relief rates were calculated using API 2000.
Safety Reflux Failure Relief Load Report	RefluxFailure	Calculation summary report that provides key inputs and results for the relief load calculation for a reflux failure scenario.
Safety HDI Orifice Sizing Calculation Report	ReliefCase	Calculation summary report that provides key inputs and results for the HEM orifice sizing calculation.
Safety Liquid Orifice Sizing Calculation Report	ReliefCase	Calculation summary report that provides key inputs and results for the liquid orifice sizing calculation.
Safety Omega Non-Cooled Orifice Sizing Calculation Report	ReliefCase	Calculation summary report that provides key inputs and results for the omega non-cooled orifice sizing calculation.
Safety Omega Subcooled Orifice Sizing Calculation Report	ReliefCase	Calculation summary that provides key inputs and results for the omega sub-cooled orifice sizing calculation.
Safety Non-Certified Liquid Orifice Sizing Calculation Report	ReliefCase	Calculation summary report that provides key inputs and results for the non-certified liquid orifice sizing calculation.
Safety Steam Orifice Sizing Calculation Report	ReliefCase	Calculation summary report that provides key inputs and results for the steam orifice sizing calculation.
Safety Vapor Orifice Sizing Calculation Report	ReliefCase	Calculation summary report that provides key inputs and results for the vapor orifice sizing calculation.
Safety General Relief Load Report	ReliefLoadCalculation	Calculation summary report that provides key inputs and results for general overpressure scenarios.

Template Name	Equipment Class	Description
AZ Continuous List Relief Valves	ReliefValve	List of all relief valves in the workspace along with key design parameters.
AZ Safety Pressure Valve	ReliefValve	Summarizes key mechanical and process details relevant for the relief valve design.
Safety Thermal Expansion Relief Load Calculation Summary	ThermalExpansion	Calculation summary report that provides key inputs and results for the thermal expansion relief load calculation.
Safety Exchanger Tube Rupture Relief Load Report	TubeRupture	Calculation summary report that provides key inputs and results for the tube rupture relief load calculation.

Improved Accuracy for Line Sizing Calculations Based on Aspen HYSYS Hydraulics

Starting in V11, Safety Analysis environment line sizing calculations use Aspen HYSYS Hydraulics, the same rigorous technology available in Aspen HYSYS. This technology supports both single phase and multi-phase pressure drop calculations for high and low velocity flows.

- You can switch between the **Design** and **Rating** methods. Both methods use Aspen HYSYS Hydraulics calculations, which are performed using the property package associated with the sizing case's **Selected Stream**.
- You can use the new **Edit Pipes & Fittings** view to describe the line in detail on a fitting-by-fitting basis. The initial configuration consists of three items, in the following order:

  1) Pipe to represent the inlet flange to the PSV

  2) PSV (choke diameter)

  3) Pipe to represent the outlet flange from the PSV
- You can click **Configure** to access the **Calculation Settings** view, which lets you configure settings for individual line sizing calculations. These calculation settings are based on Aspen Hydraulics piping selections.

When you open an Aspen HYSYS case containing relief valve line sizing calculations performed prior to V11, you can either upgrade to the current line sizing methods or continue to use the legacy line sizing calculation methods.

We recommend that you upgrade to the current line sizing methods to take advantage of the more accurate Aspen Hydraulics calculations.

New Non-Capacity-Certified Liquid Orifice Sizing Option

Aspen HYSYS V11 offers a **Non-Capacity-Certified Liquid** orifice sizing option. This method is used for liquid relief through a valve not requiring capacity certification. This option is recommended for valves built for older API standards or valves that are not certified for liquid relief but may encounter scenarios in which they must pass an all-liquid stream.

Ability to Choose Rigorous Two-Phase Method for Control Valve Scenarios

In Aspen HYSYS V11, Control Valve Failure scenarios include a new **Handle multi-phase flow rigorously** check box. When this check box is selected, the control valve uses a rigorous

calculation method to obtain more accurate flow rates and pressure drop for both vapor and liquid flow.

Restricted Lift for Relief Valves

In Aspen HYSYS V11, you can opt to model restricted lift relief valves. You can select the **Restricted Lift Valve** check box on the **PRD Data** tab to transform your PSV into a restricted-lift PSV in accordance with API 526, allowing you to reduce the rated flow into the disposal system in order to meet the pressure loss criteria on the outlet line. You can specify the fraction lift (relative to the full lift).

Cubical Expansion Coefficient Calculated for Thermal Expansion Scenarios

For Thermal Expansion scenarios, Aspen HYSYS can now calculate the cubical expansion coefficient. When you select the **API 521 6e (2014) Equation (4)** option, the cubical expansion coefficient is calculated based on the thermodynamic properties of the selected stream.

Ability to Select Preferred Version of API 526 for Relief Valve Selection

On the **General Setup** tab of the **Preferences Manager**, you can now choose between **API 526 7e (2017)** and **API 526 5e (2002)** as the preferred edition of the API 526 standard for relief valve selection. For new PSVs, **API 526 7e (2017)** is the default selection.

Ability to Edit Wetted Area Exponent for Fire Scenarios

Supercritical, Wetted (API), and Semi-Dynamic Flash Fire scenarios now allow you to edit the wetted area exponent for fire calculations involving partial confinement.

Usability Enhancements

- A new Safety **Messages List** panel allows you to view all Safety-related errors, warnings, and messages for your current case. This view is automatically updated when you add or edit PRDs.
- The summary table on the **Scenarios** tab was simplified and improved.
- The Reference Stream behavior was improved.
- You can now select a valve from the **Selected Orifice** drop-down list even when the orifice has not yet been calculated. After selecting an orifice, if you want to clear your selection, you can now select the **<empty>** option.

Emissions Manager

A new Emissions Manager tool is available in Aspen HYSYS V11. To access the Emissions Manager, on the **Home** ribbon tab, in the **Safety** group, click **Emissions**.

Using the Emissions Manager, you can:

- Define which components (for example, H2S) should be tracked for emissions reported. This is helpful for complying with various regulatory standards.
- Create custom component groupings (for example, VOC) for easy emissions reporting.
- View emissions summaries for multiple streams across your simulation.
- View the flow rates of selected speciated components and the total emissions of various component groups without combustion and after combustion.
- Adjust the simulation-wide emissions settings.

BLOWDOWN Technology Enhancements

A new **Max Mach Number** field is available on the **Design** tab | **Geometry** page of the Pipe for pipes that model pressure drop. When you specify a value, the **Upstream Mach Number** and **Downstream Mach Number** values on the **Results** tab | **Table** page are always evaluated against this value. If either of these values exceed the user-specified **Max Mach Number**, a warning message appears.

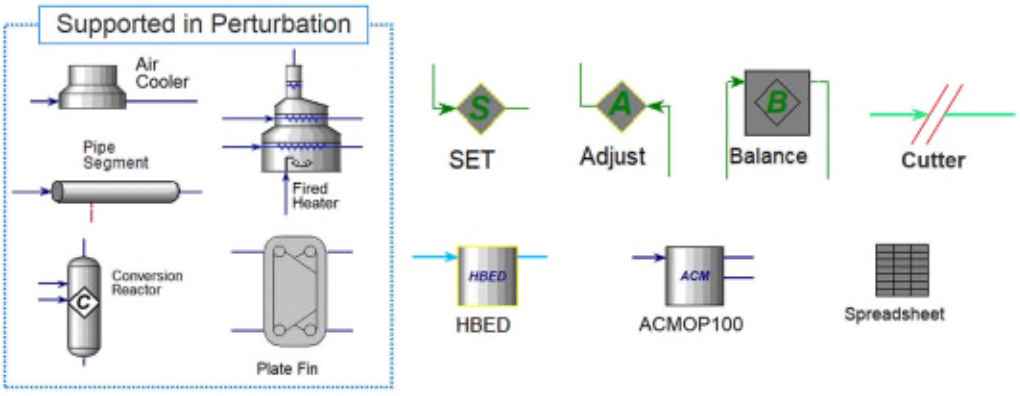
Two additional BLOWDOWN templates are available in HYSYS V11:

- **Bottom BLOWDOWN Template – BottomBlowdown.blo** lets you design and rate blowdown valves in a liquid-filled system. This template lets you analyze the dynamic depressurization of a single vessel and its associated piping for liquid-side depressurization. In this template, you will specify the system topology, the system inventories, and the system geometries in order to size or rate a blowdown orifice for routine or emergency depressurization.
- **Single Vessel BLOWDOWN Template with Knockout Drum – SingleVessel_KODrum.blo** lets you more rigorously analyze performance of the disposal system for two-phase or liquid discharge into the disposal system.

Equation-Oriented Modeling Improvements

Support for Additional HYSYS Unit Operations Unit Operations / Functionalities in EO

In Aspen HYSYS V11, the following additional unit operations and functionalities are supported in the EO Sub-Flowsheet:



- Hydroprocessor Beds (HBEDs)
- ACM (Aspen Custom Modeler) exported custom models
- Pipes
- Conversion Reactors
- Spreadsheet operations
- Balance operations are converted to appropriate EO connections within EO Sub-Flowsheets.
- Adjusts are converted to appropriate EO specifications within EO Sub-Flowsheets.
- Sets are converted to appropriate EO connections within EO Sub-Flowsheets.
- Stream Cutters
- Column internal streams are now supported in EO.
- The LNG Exchanger is now mapped to a rigorous EO model. HYSYS provides its own set of variables and equations for the EO model for the LNG Exchanger. For Simple End Point and Simple Weighted models, overall UA and overall LMTD specifications are supported. The EDR -

PlateFin method and EDR - CoilWound method are now available for the EO Solution Method via the Perturbation Layer.

- The Air Cooler is now available for the EO Solution Method via the Perturbation Layer. This applies to both the Air Cooler Simple Design model and the Rigorous (EDR) Air Cooler model.
- The Fired Heater is now available for the EO Solution Method via the Perturbation Layer. This applies to both the Simple Fired Heater model and the EDR Fired Heater model.

Support for Stream Properties as part of EO Solution

Properties (including Refining properties) are supported for streams as part of the EO solution. You can create an optional EO block for the Material Stream. This block is connected in EO in the same manner as feed blocks. This supports the calculation of additional properties for the stream (for example, to support logical operations, calibration workflow, model tuning workflows, and so on). This block is automatically created for feed streams.

To configure the Material Stream to create an optional EO block, on the **Equation Oriented** tab | **Configure** page, select the **Create Equation Oriented block and connections for stream?** check box. For feed streams, this check box is automatically selected and cannot be cleared. For product and intermediate streams, this is an optional selection. The check box is selected by default if the Material Stream is referenced by a Spreadsheet, Set, or Adjust containing a property that is mapped in EO. Otherwise, it is cleared by default. After selecting this check box, you can select any desired properties to add to the EO solution.

Equation Oriented Enhancements

In Aspen HYSYS V11:

- You can assign different Aspen Properties fluid packages for individual unit operations and streams in the EO Sub-Flowsheet.
- Improvements to the Aspen Properties HYSYS Peng Robinson property package result in consistent results between the **Sequential Modular** and **Equation Oriented** modes.
- You can now select any variable from the associated worksheet or unit operation form and drag and drop it or copy and paste it directly to EO forms, such as the **EO Inputs** form or the **EO Specification Group** form.
- You can add EO sub-flowsheet variables to case studies as Independent and Dependent Variables. When selecting EO sub-flowsheet variables as Independent Variables, make sure that the flowsheet mode is set to Equation Oriented.
- The fields in the **Flash options** group on the **Additional Equation Oriented Options** view were improved to simplify the process of specifying information regarding phases in EO.

Improved Integration with ASW

Integration between Aspen Simulation Workbook (ASW) and the EO Sub-Flowsheet was improved in Aspen HYSYS V11. EO-related variables are available in Aspen Simulation Workbook (ASW), including attributes from Objectives, EO Inputs, Specification Groups, and so on. Your HYSYS simulation can be controlled from ASW. Within ASW, you can switch from EO to Steady State (SM) and you can change the EO simulation mode.

EO Sensitivities View

Aspen HYSYS V11 features a new EO Sensitivities view, which can be accessed from the **Equation Oriented** ribbon tab | **Analysis & Reports** group. Equation-oriented sensitivity enables you to compute the sensitivity between a set of independent and dependent variables. The resulting sensitivity is the derivative or gain between the variables. This can be very useful for analyzing flowsheet behavior or in control system design. The Jacobian provides the sensitivity around the current solved point, preventing the need to use case studies.

EO Simulation Summary

Aspen HYSYS V11 includes a Simulation Summary. Using the Simulation Summary, you can easily view the problem size, degrees of freedom, synchronization status, and all EO errors and warnings for the current EO sub-flowsheet and all sub-flowsheets within the EO hierarchy.

Additional Options for Resetting Equation Oriented Simulations

The new **Reset Equation Oriented** dialog box offers recovery options for resetting EO simulations. The following options are available:

- Rebuilding the equation-oriented system
- Rebuilding the equation-oriented system and reinitialize with the current results
- Restoring from the previous solution
- Updating the equation-oriented simulation from an external file

HYSYS Midstream Improvements

Ability to Model Caustic Wash Process

Aspen HYSYS V11 features a new **Acid Gas – Caustic Wash** property package, which can be used to model the caustic wash process. The **Acid Gas – Caustic Wash** property package was developed with the Peng-Robinson equation of state for the vapor phase and the electrolyte non-random two-liquid (eNRTL) activity coefficient model for electrolyte thermodynamics (Song and Chen, 2009). The property package contains the eNRTL model parameters identified from regression of the available VLE data. The package also rigorously accounts for the chemistries of the caustic wash process.

During the caustic wash process, impurities such as H2S and light mercaptans are removed from light hydrocarbon feeds. This property package functions similarly to the other Acid Gas property packages. The primary difference is that caustic NaOH, rather than an amine or physical solvent, is used to remove acid gas from the feedstock.

The caustic wash system can be used for both liquid and vapor hydrocarbons. You can use the Absorber and Liquid-Liquid Extractor columns to simulate this process.

Several useful examples of the caustic wash process are provided in the **Aspen HYSYS** | **Samples** | **Acid Gas Cleaning** folder:

- **Acid Gas Cleaning Caustic Scrubber With Single Recirculating Loop.hsc**
- **Acid Gas Cleaning Caustic Scrubber With Dual Recirculation Loops.hsc**
- **Acid Gas Cleaning Caustic Wash With Selective Absorption Of H2S From Sour Gas.hsc**
- **Acid Gas Cleaning Caustic Wash Removal Of Sulphur Compounds From Liquid Hydrocarbons.hsc**

These can serve as templates for all supported processes.

Improved Model for Sour Water Stripping

Aspen HYSYS V11 features a new **Sour Water** property package, which models the removal of H2S, NH3, and other contaminants from water. Sour water strippers are commonly used in refineries and other operations where a stream of water is produced containing ammonia and hydrogen sulfide. In most cases, the sour water also contains carbon dioxide and a number of trace impurities. The primary purpose of the stripper is to remove the ammonia and hydrogen sulfide, typically to levels below 50 ppmw NH3 and 10 ppmw H2S, so that the water can be reused or disposed of as normal wastewater.

The sour water stripping process uses an external heat source to shift chemical equilibria. This can be performed using a reboiler in the stripping column, external steam, or another stripping vapor,

such as hot hydrocarbon vapor. The calculated results for the stripping column appear on the **Performance** tab | **Sour Water** page.

Aspen HYSYS supports the modeling of caustic injection scenarios and two-column sour water stripping.

Rigorous rate-based distillation calculations are available.

Several useful examples of the sour water stripping process are provided in the **Aspen HYSYS** | **Samples** | **Sour Water Stripping** folder:

- **Sour Water Stripping.hsc**
- **Sour Water Stripping Two Column.hsc**
- **Sour Water Stripping with Caustic.hsc**
- **Sour Water Stripping With Phenol.hsc**

These can serve as templates for all supported processes.

Methanol Supported for Acid Gas - Physical Solvents Property Package

You can now use the **Acid Gas – Physical Solvents** property package to model acid gas removal using Methanol. The results for the physical solvent Methanol were validated using literature and data. The **Aspen HYSYS** | **Samples** | **Acid Gas Cleaning** folder includes a new example case, **Acid Gas Cleaning using Methanol at Low Temperature.hsc**.

Improved Convergence and Performance for Acid Gas - Chemical Solvents Property Package

HYSYS V11 features improved performance and easier column convergence for the **Acid Gas - Chemical Solvents** property package for the following blends:

- MDEA + PZ blends
- Sulfolane + MDEA + PZ blends

These improvements are especially striking for columns using the **Advanced Modeling** calculation mode. This update eliminates the need to specify the temperature profile for convergence.

Additional Component Pairs Supported for CPA Property Package

In HYSYS V11, additional component pairs are supported for the **CPA** property package. The CPA property package now supports the following major component pairs for glycols, methanol, water, acid gases, hydrocarbons, and aromatics. These are important pairs in dehydration and acid gas cleaning.

	CH4																	
C2	Databank	C2																
C3	Databank	Databank	C3															
NC4	Databank	Databank	Databank	NC4														
IC4	Databank	Databank	Databank	Databank	IC4													
EG	Databank	Databank	Databank	Databank	Databank	EG												
DEG	Databank	Databank	Databank	Databank	Databank	Estimated	DEG											
TEG	Databank	Databank	Databank	Databank	Databank	Estimated	Estimated	TEG										
H2O	Databank	Databank	Databank	Databank	Databank	Databank	Databank	Databank	H2O									
C6H6	Databank	Databank	Databank	Databank	Estimated	Databank	Databank	Databank	Databank	C6H6								
TOL	Databank	Databank	Databank	Estimated	Estimated	Databank	Databank	Databank	Databank	Estimated	TOL							
ETBZ	Databank	Estimated	Estimated	Estimated	Estimated	Databank	Databank	Databank	Databank	Estimated	Estimated	ETBZ						
OXYL	Databank	Estimated	Estimated	Estimated	Estimated	Databank	Databank	Databank	Databank	Estimated	Estimated	Estimated	OXYL					
MXYL	Databank	Estimated	Estimated	Estimated	Estimated	Databank	Databank	Databank	Databank	Estimated	Estimated	Estimated	Estimated	MXYL				
PXYL	Databank	Estimated	Estimated	Estimated	Estimated	Databank	Databank	Databank	Databank	Estimated	Estimated	Estimated	Estimated	Estimated	PXYL			
N2	Databank	Databank	Databank	Databank	Databank	Databank	Databank	Databank	Databank	Databank	Estimated	Estimated	Estimated	Estimated	Estimated	N2		
CO2	Databank	Databank	Databank	Databank	Databank	Databank	Databank	Databank	Databank	Databank	Databank	Estimated	Estimated	Estimated	Estimated	Databank	CO2	
H2S	Databank	Databank	Databank	Databank	Databank	Databank	Databank	Databank	Databank	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated	Databank	Databank	H2S
MEOH	Databank	Databank	Databank	Databank	Databank	Databank	Databank	Databank	Databank	Databank	Databank	Databank	Databank	Databank	Databank	Databank	Databank	Databank

Validation of Acid Gas Convergence Parameters

The convergence parameters for the following were validated based on data from Amine Experts in HYSYS V11:

- Prediction for CO2 pickup for cases modeling the selective absorption of H2S from sour gas by using MDEA
- Temperatures profiles for Regenerators
- Heat duties for both H_2S Regenerators and mixed H_2S-CO_2 Regenerators
- No changes were made to the thermal models, database parameters, or reaction sets as the result of validation.

Compatibility Notes for HYSYS V11

This section describes the differences that you might encounter between HYSYS V11 and HYSYS V10. In most cases, previous HYSYS input files and backup files are completely compatible with HYSYS V11.

The most important areas where you might encounter differences between HYSYS V11 and earlier versions are as follows:

- General HYSYS
- HYSYS Properties
- Unit Operations
- Safety Analysis
- Plant Data
- Retired Features

General HYSYS

Pipe Sizing Utility Replaced by Improved Line Sizing Manager

HYSYS V10 and earlier releases included a Pipe Sizing Utility, which let you quickly perform either a design or rating calculation based on a stream without having to add a pipe operation to the flowsheet. However:

- The Pipe Sizing Utility only permitted a single stream connection. As a result, if you wanted to size 100 pipes (for example), this required the creation of many individual Pipe Sizing Utilities.
- The Pipe Sizing Utility did not include a single summary view to display all of the pipes in a system.

- The Pipe Sizing Utility only provided a single sizing criteria (pressure gradient). It did not support the ability to size the pipe based on other (or multiple) criteria, such as a maximum velocity.

When you open a case containing Pipe Sizing Utilities in HYSYS V11, the Pipe Sizing Utilities are automatically converted to Line Sizing Manager objects. The table below shows how your previous specifications are mapped to the new Line Sizing Manager.

Depending on the Schedule and Pipe and Nominal Diameter, the Actual Diameter may differ slightly in V11.

Applicable To:	Pre-V11 Pipe Sizing Utility		Converted Result in New Line Sizing Manager	
	Parameter	**Specification**	**Parameter**	**Specification**
Both Calculation Types	Name	<Any value>	Pipe Tag/Name	<Same value>
	Stream	<Any stream>	Stream Name	<Same stream>
	Flow Correlation	Gregory Aziz Mandhane	Flow Correlation	Gregory Aziz Mandhane
	N/A	N/A	Pipe Material	Carbon Steel
	N/A	N/A	Roughness	Default Value
	N/A	N/A	Force Single Phase check box	Cleared
	N/A	N/A	Use Detailed Fittings check box	Cleared
Max. Diameter Calculation Type	Calculation Type	Max. Diameter	Calculation Type	Design
	Pressure Drop	<Any value>	Criteria Pressure Gradient	<Same value>
	N/A	N/A	Velocity	<empty>
	N/A	N/A	Rho V^2	<empty>
	N/A	N/A	Sizing Criteria	**Criteria Pressure Gradient** value
	Schedule	<Any value>	Schedule	<Same value>
	Successful calculation		Pipe Inside Diameter	<Calculated result>
	Successful calculation		Pipe Nominal Diameter	<Calculated result>
Pressure Drop Calculation Type	Calculation Type	Pressure Drop	Calculation Type	Rating
	Schedule	<Any value>	Schedule	Actual
	Pipe Inside Diameter	<Any value>	Pipe Inside Diameter	<Same value>
	Successful calculation		Pressure Gradient	<Calculated result>

HYSYS Properties

Improved Kinetics for MDEA + PZ Blends and Sulfolane + MDEA + PZ Blends

In earlier versions, for **Acid Gas - Chemical Solvents** packages containing MDEA + PZ blends or Sulfolane + MDEA + PZ blends, converging columns using the **Advanced Modeling** calculation mode was sometimes difficult.

In order to improve convergence, the kinetics for these blends were simplified and removed, and unnecessary reactions were removed. When you open a case created in a previous version in HYSYS V11, the updated reaction parameters are applied. The only exception is if you previously manually updated these parameters.

The table below shows the differences in reaction parameters between HYSYS V10 and HYSYS V11.

Reaction Set	Reaction No.	A, kmol/m3.s		E, kJ/kmol	
		V10	**V11**	**V10**	**V11**
Set -1 (Absorber)	Rxn-8	4.7730e+15	1.75e+10	3.36e+4	1.15e+3
	Rxn-9	9.1736e+28	5.48e+23	9.15e+4	6.03e+4
	Rxn-10	1.2650e+14	0	3.36e+4	3.36e+4
	Rxn-11	2.2570e+26	0	7.53e+4	7.53e+4
Set-2 (Stripper)	Rxn-35	1.75e+10	1.75e+10	1.34e+4	1.15e+3
	Rxn-36	3.40e+23	5.48e+23	5.93e+4	6.03e+4
	Rxn-37	1.04e+14	0	3.37e+4	3.37e+4
	Rxn-38	7.65e+24	0	6.56e+4	6.56e+4
	Rxn-44	3.18e+20	1.83e+23	6.94e+4	8.77e+4

The reaction parameters for Rxn-8, Rxn-9, Rxn-35, and Rxn-36 were updated to be consistent with the literature (Bishnoi, S.; Rochelle, G. T. "Absorption of Carbon Dioxide into Aqueous Piperazine: Reaction Kinetics, Solubility and Mass Transfer." *Chem. Eng. Sci*. 2000, 55, 5531-5543.).

The **Forward Reaction** parameter **A** was set to 0 for Rxn-10, Rxn-11, Rxn-37, and Rxn-38.

The reaction parameters of Rxn-44 were updated so that the rate constants are more consistent with the chemical equilibrium constants at high temperatures.

CPA Binary Interaction Parameters

In HYSYS V11, additional component pairs are supported for the **CPA** property package. When opening a case created in a previous version, in order to take advantage of this improvement, you must click **Reset Params** on the **Binary Coeffs** tab of the fluid package to apply the most recent binary interaction parameters. Keep in mind that this will reset any existing user-defined parameters.

Improved Results for Aspen Properties Fluid Packages Associated with Oil Manager

When associating an Aspen Properties fluid package with Oil Manager, results are more accurate in HYSYS V11.

If you open a case created in an earlier version, when the Aspen Properties HYSYS **Peng Robinson** package is selected, to obtain similar results to the HYSYS **Peng-Robinson** package, follow the steps described in the "Optimal Settings for the Aspen Properties HYSYS Peng Robinson Package" topic in the *Aspen HYSYS V11 Help*.

Improvements to Aspen Properties HYSYS Peng-Robinson Property Package

The HYSPR property method for the Aspen Properties **HYSYS Peng-Robinson** property package was updated to allow it to use analytical derivatives in EO mode, making the method faster in such situations. Some issues in enthalpy calculations were also fixed, leading to possibly different results in cases using this package.

Improvements to GCEOS Property Package

Due to improvements to the **GCEOS** property package in HYSYS V11, stream properties (such as density) may be different than in previous releases.

Changes to Acid Gas Property Package Parameters

Updates were made to the storage of underlying property parameters for the **Acid Gas - Chemical Solvents** and **Acid Gas - Liquid Treating** property packages. As a result, inconsistencies between solvents for different solvent systems have been resolved. To take advantage of this improvement, click **Upgrade Parameters** on the **Set Up** tab for the fluid package. For new simulations, the latest parameters are used automatically.

PURE37 Databank Changes

The PURE37 databank includes the latest changes from DIPPR, which may affect results of simulations more than is usually the case. Normal alkanes now use equation 123 for liquid thermal conductivity (KL), and many compounds, including 2-methoxyethanol, now use equation 124 for liquid heat capacity (CPL).

Unit Operations

Improved Results for Generic and Horizontal Vessel Correlations for Separators

For the Separator, 3-Phase Separator, and Tank, in previous versions, if you specified carryover using the **Generic** or **Horizontal Vessel** correlation (available on the **Rating** tab | **C.Over Setup** page), the correlation results were incorrect. In V11, these results are now calculated on the correct basis. You must manually force HYSYS to recalculate in order to view the accurate results.

Changes to Reported Viscosity for Streams without Two Liquid Phases

In HYSYS V10, for streams without two liquid phases, the same value was reported for both **Kinematic Viscosity** and **Dynamic Viscosity**. This was exclusively a display issue and did not impact calculations. This display issue was resolved in HYSYS V11.

Changes to Reported Actual Liquid Flow for Streams with No Liquid Phase

In HYSYS V10, the actual liquid flow was incorrectly reported as a value in instances where there was no liquid phase, rather than being reported as zero. This was a display issue only and did not impact calculations. In HYSYS V11, this display issue was fixed, and the actual liquid flow is correctly reported as zero in these instances.

Fixes to Enthalpy Estimate Used in Heat Exchanger Calculations

When applying temperature and enthalpy specifications for the Heat Exchanger in previous versions, HYSYS estimated the outlet conditions from the heat curve rather than performing a rigorous flash calculation. The Heat Exchanger used this incorrect estimate in the energy balance, resulting in an incorrect hot side outlet enthalpy/temperature. This issue was resolved in V11, which can lead to minor differences in results for the Heat Exchanger.

Improvements to LNG Exchanger Equal Enthalpy Calculations

In HYSYS V10, the LNG Exchanger used equal enthalpy approximations in calculations. In V11, the actual equal enthalpy intervals are used instead, which may lead to differences in results.

Changes to Energy Balance for Simple Fired Heater

In HYSYS V10, for the simple Fired Heater model, in some cases, the energy balance was not maintained for moist air due to an improper handling of the energy with the excess air specification. This issue was fixed in HYSYS V11, which may lead to differences in results.

Improvements to Compressor Interpolation

In previous versions, interpolation was performed incorrectly in certain instances for Compressors that had performance curves with three or fewer data points, leading to inaccurate results. Since the interpolation is now performed correctly, V11 features improved results.

Updates to Tulsa Unified Model

The **Tulsa Unified Model** was updated to the latest version in HYSYS V11. As a result, you may notice improvements in Pipe Segment results.

Improved Sizing Algorithm in Column Analysis

In previous versions of Column Analysis, the **Interactive Sizing** for both trays and packing sized the column based on the stage with the maximum liquid rate. In most columns, this was correct. In some columns with a large change in the vapor rate over the column, this was incorrect and led to columns being designed too small. In addition, in tray columns where downcomer choke and jet flooding were both relevant, one of these flooding criteria could be violated. These issues are now fixed and may result in columns sized larger (but more accurately) in V11 than in past versions. If you want to retain the V10 results, change the column to **Rating** mode and save the file in V10 before opening it in V11.

Changes to Application of Aeration Factor Multiplier

In tray columns using Column Analysis, in previous versions, the **Aeration Factor Multiplier** was incorrectly applied to both the dry pressure drop and wet pressure drop. In V11, it is applied only to the wet pressure drop. If you specified the **Aeration Factor Multiplier** in a previous version, hydraulic results will be different in V11.

Updated Section Pressure Drop Results for Column Analysis

In Column Analysis in V10, the overall section efficiency from the **Geometry** tab | **Design Parameters** page of the **Tray Geometry** form was not applied when calculating the section pressure drop. In V11, this issue is fixed; you will see different pressure drop results on the Column Internals forms when specifying section efficiency.

Changes to Packing Dimension for RASCHIGPAK Packing Type in Column Analysis

If you selected a **Packing Dimension** of **P90Y** for a **RASCHIGPAK** packing type in previous versions when using Column Analysis, when you open the case in V11, the **Packing Dimension** will appear as **P90X**. This change will not impact your results.

Composite Curves in EO

The **Design** tab | **Parameters** page of the LNG Exchanger now includes an **Include Composite Curves in EO** check box. By default, this check box is selected, indicating that composite curves are included in the calculations in Equation Oriented mode. If you want to use the simplified heat balance model from V10 instead, clear this check box.

Safety Analysis

Line Sizing Method Changes

Aspen HYSYS features improved line sizing calculations. Aspen HYSYS Hydraulics, the same rigorous technology available in Aspen HYSYS, is used for the Safety Analysis environment line sizing calculations. This technology supports both single phase and multi-phase pressure drop calculations for high and low velocity flows. When you open an Aspen HYSYS case containing relief valve line sizing calculations performed prior to V11, you can either upgrade to the current line sizing methods or continue to use the legacy line sizing calculation methods.

If you opt to continue to use the legacy line sizing calculation methods, the line sizing will be simplified.

- The **Calculate Equivalent Length** check box is removed.
- The existing pipe fitting information and diameter change information specified in the **Equivalent Length Calculation** section in previous versions is not retained. This includes all information specified in the **Enlargement and Contraction** table.
- The **Specified Equivalent Length** value is retained.

After you switch to the **Rating** method, you cannot return to the legacy line sizing calculation methods.

We recommend that you upgrade to the current line sizing methods to take advantage of the more accurate Aspen Hydraulics calculations. Calculated results for the current line sizing methods will be closer to those seen in Aspen HYSYS Hydraulics and Aspen Flare System Analyzer.

Changes to Reference Stream Behavior

In Aspen HYSYS V10, in the **Scenario Reference Stream** section of the **Scenario Setup** form, the **Reference Stream** field displayed the stream to which the relieving device was connected. This was automatically selected based on where you added the relieving device. To override the stream, you could select the **Override Stream** check box next to the field and select a different stream; the fluid compositions and properties were imported.

In V11, when you add a new scenario, the **Reference Stream** field is **<empty>** by default. You must click **Select** and specify the stream that best represents the relieving fluid composition.

If you open a case created prior to V11, the previous **Reference Stream** configuration is retained.

Default Versions of API Version used in Calculations

On the **General Setup** tab of the Preferences Manager, **API 526 7e (2017)** is now the default **PSV Flange & Rating Source** for cases created in Aspen HYSYS V11. When opening a case created in a previous version, **API 526 5e (2002)**, which was previously the only available

option, is selected by default. If you change this selection in the Preferences Manager, existing valves will be updated.

Custom Orifice Updates

Any custom orifices that you created prior to V11 will now let you specify the flange size and rating. If your custom orifices did not have unique names, the names will be modified by appending asterisks.

Handle Multi-Phase Flows Rigorously Check Box

In Aspen HYSYS V10, the "rigorous" Fisher two-phase method was not available for control valve calculations using the ANSI/ISA coefficients. Instead, those calculations are forced to use a "simplified" method that assumes all-vapor behavior beginning at 10% vapor and scales linearly from all-liquid to all-vapor between 0% and 10%.

In Aspen HYSYS V11, Control Valve Failure scenarios include a new **Handle multi-phase flow rigorously** check box. When this check box is selected, the control valve uses a rigorous calculation method to obtain more accurate flow rates and pressure drop for both vapor and liquid flow. This check box does not apply to the **PSV Plus** method.

When loading a case from a previous version, the value is set according to how the calculation was performed in the original version:

- Rigorous calculations are applied for the **Universal Gas Sizing** and **Vendor-Specific** methods.
- Simplified calculations are applied for the **ISA** method.

Updated Relieving Phase - Method Names

In V11, the following **Relieving Phase - Methods** names were updated:

- **Liquid** was renamed to **Capacity-Certified Liquid**.
- **Mixed (A)** and **Mixed (B)** were combined and renamed to **Omega (Sat. or 2-Phase)**.
- **Mixed (C)** was renamed to **Omega (Subcooled)**.

Changes to Choke Flow Check for Control Valve Failure Scenarios

In previous versions of Aspen HYSYS, for Control Valve Failure Scenarios using the **Universal Gas Sizing** or **Vendor-Specific** calculation method, an incorrect check for choke flow was performed. In Aspen HYSYS V11, this incorrect check is no longer performed, leading to a more accurate **Required Relieving Flow**. The impact of this change lessens when a larger **C1** value is specified.

Changes to Backpressure Limits for Conventional Valves

In previous versions of Aspen HYSYS, **Conventional** valves applied a total backpressure limit of 10% by default. In V11, for **Conventional** valves, the design limit for backpressure is that the maximum built-up backpressure must be lesser than or equal to the scenario overpressure.

Restricted Lift for Relief Valves

In Aspen HYSYS V11, you can opt to model restricted lift relief valves using the **Restricted Lift Valve** check box on the **PRD Data** tab. When opening cases created in a previous version, this check box will be cleared.

Wetted Area Exponent for Fire Scenarios

Starting in V11, **Supercritical**, **Wetted (API)**, and **Semi-Dynamic Flash** Fire scenarios now allow you to edit the wetted area exponent for fire calculations involving partial confinement. When opening cases created in a previous version, the default exponent, 0.82, is applied.

Changes to Default Kd for Direct Integration Method

When using the **Direct Integration** method for orifice calculations, in previous versions, the default **Kd** value was always 0.85. In Aspen HYSYS V11, the default **Kd** is now selected based on the fluid phase at relieving conditions.

Depressuring Utility Template Updates

When you create a Depressuring Utility in HYSYS, the Depressuring Utility sub-flowsheet is created from a pre-defined template. This template is updated for each version of HYSYS.

If you open a case from a previous version in HYSYS V11, the template used for Depressuring Utilities created in a previous version of HYSYS is not automatically updated. Instead, these utilities will continue to use the previous version of the template. In order to take advantage of any recent improvements to the template, you must re-create the Depressuring Utility manually.

Depressuring Utility Historical Data Results

In previous versions of HYSYS, for the Depressuring Utility, when the following conditions were met:

- **Fire Stefan Boltzmann** was selected from the **Operating Mode** drop-down list.
- **Detailed** was selected from the **Heat Transfer Model** drop-down list.
- **Continually Updated** was selected from the **U Selection** drop-down list.

  -and-
- The **C** value was specified for **Air – Outside**.

Then the **Historical Data** view displayed the default value for **Air – Outside** rather than the user-defined value.

In HYSYS V11, the **Historical Data** view displays the user-defined value for **Air – Outside**.

BLOWDOWN Results Will Be More Consistent with V9

In HYSYS V10, some BLOWDOWN Analysis results differed significantly from the results in HYSYS V9:

- In some instances, the liquid height results were higher in V10.
- In some instances, the peak flow vapor temperature was warmer than the initial starting temperature for vapor in V10.

HYSYS V11 results will be more consistent with HYSYS V9.

Plant Data

In order to use Plant Data, the model file name and path must not exceed 92 characters in total. This is a limit imposed by the SQL database Aspen OnLine uses to store information related to the Plant Data feature, which is created with an .MDF extension in the folder with the model file. Earlier versions also had path name limits, but in updates to V10, it was possible to have paths exceeding this limit.

Retired Features

Documentation Builder

In Aspen HYSYS V11, the Documentation Builder in the Safety Analysis environment is no longer available. Instead, it is replaced with the **Datasheets** feature, which lets you use Aspen Basic Engineering (ABE) Datasheets to prepare documentation of the design basis for any PSVs, rupture disks, and storage tanks. The Safety Analysis environment provides standardized relief systems calculations and data consistency across the final report deliverables, making it faster and easier

to complete a pressure relief analysis. ABE Datasheets offers a light-weight, single-user experience to create datasheets quickly and easily. The technology also offers a server-based, multi-user experience so that companies can have a centralized repository of their relief systems design documentation.

Amine Package

Starting in V8.3, HYSYS did not allow you to add an **Amine Pkg** when creating a new case. In HYSYS V11, you can no longer use the **Amine Pkg** when opening older cases. Instead, when you open an older case containing an **Amine Pkg**, it is automatically converted to an Acid Gas property package. The Acid Gas packages provide an easy to set up and accurate column solver and offer superior thermodynamics and mass transfer rate-based distillation.

Only Amine property packages that are used in the flowsheet are converted, since for an unused package, there is no unit operation with which to associate it. Depending on the unit operation, either the **Acid Gas - Chemical Solvents** package or the **Acid Gas - Liquid Treating** package may be used.

The **Acid Gas conversion report** window appears. A backup of your current case is created, ensuring that none of your data is lost in this conversion.

Note: The conversion may fail if the component list contains an amine combination not supported by the Acid Gas package, or if an amine or physical solvent is absent. A column operation may not convert successfully if it contains internals that are not supported by the Acid Gas property package (such as chimneys or sumps).

DBR Amine Package

Starting in HYSYS V11, the **DBR Amine Package** is no longer available for selection. We recommend that you use the **Acid Gas - Chemical Solvents** property package instead.

Template files that previous used the **DBR Amine Package** were updated to use either the **Acid Gas - Chemical Solvents** package or the **Acid Gas - Physical Solvents** package (for DEPG templates).

When opening cases containing a **DBR Amine Package**, you must perform one of the following tasks:

- Manually select a new property package to replace the **DBR Amine Package**.
  -or-
- Open the case in HYSYS V8.6, V8.8, V9, or V10 and convert the **DBR Amine Package** to an Acid Gas property package.

When manually selecting a new property package:

- If you want to select another COMThermo property package, you can do so directly from the Model Selection list on the **Set Up** tab of the Fluid Package.
- If you want to select a HYSYS property package:
  - For cases with a single fluid package, you can delete the previous **DBR Amine Package** and create a new HYSYS property package with the same component list.
  - For cases with multiple fluid packages with different component lists, in order to retain your compositions for any streams that used the previous property package:

    a. From the **Model Selection** list on the **Set Up** tab of the Fluid Package, replace the **DBR Amine Package** with a placeholder COMThermo property package (for example, **HysysPR**).

    b. Create a new HYSYS property package with the desired component list.

    c. Switch to the Simulation environment.

    e. Use the **Fluid Package** drop-down list on the **Worksheet** tab | **Conditions** page to switch to the new fluid package for all desired streams.

    f. Return to the Properties environment.

    g. Delete the placeholder package.

DBR PVTPro Package

The DBR PVTPro package is no longer available.

- When you add a COMThermo fluid package, in the **Model Selection** list, the **PVTProExtPkg** option is no longer available.
- On the PVT Laboratory Measurements window, in the **Selected Engine** list, the **DBR PVTPro** option is no longer available.

What's Fixed in Aspen HYSYS V11

Aspen HYSYS V11 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 HYSYS Interface / Usability

ID	Issue Description	Issue Resolution
20376	The shortcut menu option (accessed by right-clicking an active form) for printing screenshots was no longer available in HYSYS.	The **Print Window Screenshot** option is available when right-clicking an active form.
20378	When the default **File Path for Cases** was edited using the **Simulation Options** view (accessed by clicking **File** | **Options**), the default location to save case files was not updated to reflect these changes.	In HYSYS V11, the user-defined paths are used.
20382	On the **Worksheet** tab of unit operations, all streams could not be selected if the streams were located in two separate rows.	This issue was fixed in HYSYS V11.
21384	After adding buttons to the Quick Access Toolbar and then opening any unit operation, the button will no longer appear on the Quick Access Toolbar, and the option to add it again is unavailable.	This issue was fixed in HYSYS V11.
21754	Users could only modify the name of the Stream Correlation Sets File and could not modify the path. This prevented users without Administrator rights from creating a customized version of this file.	This issue was fixed in HYSYS V11.
24217	In HYSYS V10, when returning to the parent flowsheet from a sub-flowsheet, the Object Palette was sometimes sized improperly.	This issue was fixed in HYSYS V11.
21831	When registering extensions, if the extension name included non-alphanumeric characters (such as a space), if the Model Palette was open, HYSYS failed.	This issue was fixed in HYSYS V11.

ID	Issue Description	Issue Resolution
24321	When printing to Excel, the units were not labeled for a small subset of Workbook variables.	This issue was fixed in HYSYS V11.
175907	The **Object Type** drop-down list for the Variable Navigator no longer included the **Utilities** option.	The **Utilities** option was added to the **Object Type** drop-down list in HYSYS V11.
243774	After clicking **Order/Hide/Reveal** on a page of the Workbook containing Utility Objects, HYSYS failed.	This issue was fixed in HYSYS V11.
247688	When opening cases that included non-standard configuration of preference settings, HYSYS sometimes failed.	In HYSYS V11, a bound check was added to prevent this issue.
265190	The list of active documents was inaccurate when activating HYSYS cases using automation.	This issue was fixed in HYSYS V11.
268545	When clicking **File** | **Open** or **File** | **Save**, the dialog box always navigated to the default directory by default.	A new **Ignore the Default File Path for "Cases"** check box was added to the **File Options** group on the **Simulation Options** view. When this option is selected, the dialog box navigates to the most recent location specified instead.
274079	In some cases with Oil Manager assays, all stream names in the PFD appeared with **@Main** appended.	This issue was fixed in HYSYS V11.
279263	In HYSYS V10, the Spreadsheet had the following issues: • The Spreadsheet object was in focus when the user navigated to the stream/unit operation cell value that they intended to drag/drop to the Spreadsheet. • The active cell in the Spreadsheet was not clearly highlighted. • Pressing the **Esc** key did not cancel changes before they were committed.	HYSYS V11 features the following improvements: • When dragging a variable to a Spreadsheet grid that is partially overlapped, the Spreadsheet is activated. • The Spreadsheet active cell color was changed from a light yellow to a darker highlight to maintain consistency with other HYSYS forms. • Pressing the **Esc** key cancels changes.
281731	Selection of units when specifying data was inconsistent. Sorting according to letter input did not work in the same way it did in HYSYS V7.3, and the **Backspace** key did not clear the UOM filter entry.	A new **DropDown Autofill Reset Timer** option on the **Resources Options** view lets you specify the time in seconds before the "buffer" of key-strokes pressed in sequence during autofill is erased; any new key-strokes pressed result in a new autofill.

ID	Issue Description	Issue Resolution
281738	The **Define from Stream** functionality had the following issues: • When defining from stream, the first available stream was not pre-selected. • Pressing **Enter** did not commit the stream selection. The user was forced to click **OK**. • Using the keyboard to type and filter streams on the **Available Streams** window was not additive. A time-delay reset occurred.	These issues were fixed in HYSYS V11.
281759	If users selected an object on the Model Palette and then hid the palette, when re-opening the palette, the previously selected item was canceled. Users were required to select the item again.	This issue was fixed in HYSYS V11.
313336	When HYSYS values were transferred to the EDR property table, the property table sometimes reported a vapor fraction value that was slightly greater than 1.	1 is now the maximum value reported for vapor fraction.
346447	When printing a datasheet, in some cases, the results for case studies did not display properly.	This issue was fixed in HYSYS V11.
346811	When changing the logo used on reports, *.bmp files with special XML characters within the file name were not supported.	This issue was fixed in HYSYS V11.
352521	When the **Activated Dashboard** was set to **Off** in the Preferences Settings, after closing and re-opening HYSYS, the Activated dashboard continued to appear.	This issue was fixed in HYSYS V11.
357480	When exporting case studies to Excel, the Excel file only displayed four significant figures, even in cases where the preference settings were configured to provide greater accuracy.	This issue was fixed in HYSYS V11.
358081	When transferring HYSYS data to APEA, stream phase changes were not updated in APEA.	This issue was fixed in HYSYS V11.
366607	After copying a process data table, when variables contained in the process data table were deleted from the associated object, they were not removed from the process data table.	This issue was fixed in HYSYS V11.
377218	In rare instances, when opening a V7.3 HYSYS case in HYSYS V10, the automatic conversion process for Aspen Assay Management encountered issues.	This issue was fixed in HYSYS V11.

HYSYS Properties

ID	Issue Description	Issue Resolution
21078	After creating an Aspen Properties package in HYSYS by importing a .bkp file, editing the component list or reactions for the package caused HYSYS to experience issues.	HYSYS prevents you from editing the component list or reactions for packages imported in this manner.
21801	The predictions for helium properties provided by the **RefProp** property package were inaccurate.	The **RefProp** property package features improved property calculations for Helium.
21887	The HYSYS flash method was not available for Aspen Properties property packages.	In HYSYS V11, you can select the HYSYS flash method for suitable Aspen Properties property packages. A new **HYSYS Flash with Aspen Properties** option is available in the **Flash Method** group on the **Phase Handlin**g tab of the **Fluid Package** view. HYSYS Flash is not suitable for all Aspen Properties packages (for example, the **Electrolyte NRTL** package).
45411	When using an **Aspen Properties** property package, if: • An assay was attached to a stream that was active in flowsheet calculations. -and- • The column used the column pump around return temperature or pump around delta T specifications rather than the pump around duty specification. Then the column internal results (such as reflux rate) would be incorrect.	This issue was fixed in HYSYS V11.
104638	When attempting to use Oil Manager hypothetical components with a petroleum assay, the Property Table could not be calculated.	This issue was fixed in HYSYS V11.
154360	Latent Heat and Mass Latent Heat were not reported as stream properties.	The **Latent Heat** correlation and the **Mass Latent Heat** correlation are now available under the **Standard** correlation type on the Correlation Manager.
155048	When attempting to open a HYSYS case from a previous version that contained the **Amine Pkg** and convert it to the **Acid Gas – Chemical Solvents** package, if amine approach calculations were turned on, HYSYS experienced issues.	Amine approach calculations are automatically turned off by HYSYS when the conversion is performed.

ID	Issue Description	Issue Resolution
224141	Issues occurred when attempting to install an oil blend in Oil Manager before specifying the stream to which to attach the blend.	This issue was fixed in HYSYS V11.
239571	The **IAPWS-IF97** property package encountered issues in high temperature regions.	This issue was fixed in HYSYS V11.
244552	The component R1233ZD (CAS Number: 102687-65-02 Alias: C3H2CLF3-N1) was not supported for the **RefProp** package within HYSYS.	This component is supported the **RefProp** package within HYSYS V11.
311784	When associating an Acid Gas fluid package with Oil Manager, attempting to enter the Simulation environment caused HYSYS to experience issues.	Shifting to the Oil environment is no longer allowed when the Acid Gas package is the associated fluid package for Oil Manager.
359123	The Hydrate Formation Analysis always re-solved upon reloading, regardless of version. This resulted in delays when opening files, since some utilities could take several minutes to solve.	This issue was fixed in HYSYS V11.
387998	Adding components with the characters "(" or ")" to fluid packages using Aspen Properties infrastructure caused HYSYS to fail.	This issue was fixed in HYSYS V11.

HYSYS Unit Operations

ID	Issue Description	Issue Resolution
20393	The Spreadsheet only displayed four significant figures for certain variable types, even in cases where the preference settings were configured to provide greater accuracy.	This issue was fixed in HYSYS V11.
21499	The Recycle did not offer an easy method of monitoring convergence.	The **Monitor** tab | **Tables** page of the Recycle now lists the **Error** and **Tolerance** of each variable when the **Raw Data** radio button is selected. These columns appear in both **Nested** and **Simultaneous** modes and provide you with additional information to help you determine which variables do not converge.
21690	The NORSOK model for corrosion on the pipe segement calculated the same CO2 mole fraction along the pipe.	The CO2 corrosion calculations in the pipe segment and in Aspen Hydraulics will use the CO2 vapor fraction at the intermediate points to calculate the partial pressure, rather than using the vapor fraction at the inlet for all points.

ID	Issue Description	Issue Resolution
21757	The **Profile** tab of the Pipe Segment did not report pressure drops across fittings.	The **Pipe Profile View of** the Pipe Segment now includes a **Total dP** column, eliminating the need to manually calculate the total pressure drop across the fittings.
21761	When setting the outlet stream conditions, the Air Cooler performs a PH flash at the enthalpy calculated by EDR to calculate an outlet temperature, and when the outlet stream eventually flashes to calculate the rest of its properties, it performs a TP flash using the temperature calculated from the original PH flash. In V11, slight differences between the results of the two flashes caused a consistency error in HYSYS.	This issue was fixed in HYSYS V11.
92102	In some cases, when attempting to view, plot, or specify details for Centrifugal Compressor surge curves, HYSYS experienced issues because the surge curve attempted to access the temperature of a feed stream that did not exist.	This issue was fixed in HYSYS V11.
101981	For the Separator, 3-Phase Separator, and Tank, in previous versions, if you specified carryover using the **Generic** or **Horizontal Vessel** correlation (available on the **Rating** tab | **C.Over Setup** page), the correlation results were incorrect.	In V11, these results are now calculated on the correct basis. You must manually force HYSYS to recalculate in order to view the accurate results.
113182	In cases where the **Use sizing methods to calculate Delta P** check box was selected on the **Design** tab | **Parameters** page of the Valve and the outlet conditions were specified, after the inlet conditions were calculated, the phase conditions of the outlet were overwritten by the conditions of the inlet. Only the phase-specific conditions reported on the outlet stream's **Worksheet** tab | **Conditions** page in the **Vapour Phase**, **Liquid Phase**, and **Aqueous Phase** columns were affected, and the overall phase conditions of the outlet were correct despite the defect.	This issue was fixed in HYSYS V11.
139299	When opening cases created in previous versions, pipe segments within the case were not automatically updated to reflect improvements to the Tulsa pressure drop correlations.	When you open up a case in V11 that was saved using the previous version of the Tulsa model, the pipe will automatically re-solve using the updated model.

ID	Issue Description	Issue Resolution
155060	In instances where the Adjusted object for an Adjust operation was deleted and that Adjust operation was managed by the Simultaneous Adjust Manager, HYSYS sometimes failed when the Simultaneous Adjust solver ran.	This issue was fixed in HYSYS V11.
159223	Issues occurred in resetting the current pump head when switching from Dynamics mode to Steady State.	In HYSYS V11, the interpolation of the Pump curve was improved, resulting in more consistent behavior.
224966	When upgrading parameters for the **Acid Gas – Chemical Solvents** property package, the Efficiency was not calculated for MDEAmine or Piperazine.	This issue was fixed in HYSYS V11.
225563	When plotting the equal enthalpy curve for the Compressor, not all combined streams were considered in the calculations.	This issue was fixed in HYSYS V11.
227928	For the Pipe Segment, the Radial Temperature Profile was incorrectly calculated by adding the delta T of each layer starting from the ambient temperature to the fluid temperature.	The Radial Temperature Profile is now calculated starting at the fluid temperature and subtracting the delta T of each layer.
249504	When changing the stage numbering to **Bottom to Top** for Side Strippers, the side stripper numbering still appeared as **Top to Bottom**.	This issue was fixed in HYSYS V11.
259815	For Column Analysis Hydraulic Plots, the **Liquid** tab on the **Liquid** view displayed an operating point that differed from the reported flow if you chose to number from bottom to top.	This issue was fixed in HYSYS V11.
265865	When using **Find Fouling** mode for a Rigorous Shell&Tube Heat Exchanger, fouling resistance variables could not be used with the Plant Data feature. The following error message appeared: **Unable to retrieve variable information from the clipboard. The selected variables are likely not supported by Cxs.**	These variables are now exposed to Cxs and can be accessed by the Plant Data feature.
271601	In some instances, the Compressor status mistakenly appeared as **Curves are Incomplete**.	This issue was fixed in HYSYS V11.

ID	Issue Description	Issue Resolution
228721	The Simulation and Safety Analysis environments provided different results for the Valve flow rate. The Safety Analysis environment used the true critical pressure of the liquid (if available) to calculate the limiting pressure ratio for the control valve calculation, whereas the Simulation environment used the pseudocritical pressure.	When modeling liquid choking for the Valve, you can now choose between using the true critical pressure or pseudo critical pressure. Radio button selection is available on the **Rating** tab | **Flow Limits** page and the **Dynamics** tab | **Flow Limit**s page of the Valve property view. The **True critical** pressure option is only used when the **Peng-Robinson** property package is selected.
233744	For Column Analysis, the **Constant V/L** line did not appear on the Hydraulics Plots in cases where it did not intercept with other curves.	The **Constant V/L** line now appears, even if it does not intercept with other curves.
238945	In some instances, the Rigorous Plate Exchanger appeared to have solved within the HYSYS flowsheet; however, when accessing the EDR Browser, an error message appeared.	A check is performed to ensure that the EDR execution completed without errors before setting the data in HYSYS V11.
263954	In some cases, for the simple Fired Heater model, the energy balance was not maintained for moist air due to an improper handling of the energy with the excess air specification.	This issue was fixed in HYSYS V11.
264736	In some instances, the Heat Exchanger failed to solve when the molar flow was set to zero.	This issue was fixed in HYSYS V11.
274845	For Electrolyte NRTL rate-based columns, the performance report did not display both vapor and liquid temperature.	This issue was fixed in HYSYS V11.

ID	Issue Description	Issue Resolution
283719	Minor temperature inconsistences caused column convergence issues.	The **Advanced Solving Options** view (accessed from the **Parameters** tab | **Solver** page of the **Column** view) contains two new groups: • The **Inner-Loop Jacobian Step Size** group allows you to improve convergence in some cases (for example, when the vapor flow is expected to be very low for all stages) by keeping the step size proportional to the inner-loop iteration variables. • The **Temperature Tolerance for Column Flowsheet Calculations** group allows you to resolve minor temperature inconsistencies by relaxing the temperature inconsistency check tolerance slightly.
290524	In Steady State, a temperature cross occurred for the Air Cooler in situations where such behavior would not be expected.	This issue was fixed in HYSYS V11.
305772	The **Duty** value displayed on the **Performance** tab of the LNG Exchanger does not reflect the significant figures specification in the Preference Settings.	This issue was fixed in HYSYS V11.
307909	For streams without two liquid phases, the same value was reported for both **Kinematic Viscosity** and **Dynamic Viscosity**. This was exclusively a display issue and did not impact calculations.	This display issue was resolved.
311788	When using a very low value for a column flow specification, the target specification value was mistakenly scaled by the total feed flow.	This issue was fixed in HYSYS V11.
316284	In some cases, when loading a case containing a Heat Exchanger where the shell side was not defined, HYSYS experienced issues.	This issue was fixed in HYSYS V11.
351997	In some situations, when using a HYSYS data table to create an ASW table, unit were not transferred correctly.	Units are now transferred correctly.
362156	CAPE-OPEN unit operations written in .NET only worked when they were compiled using the same version of .NET as the HYSYS CAPE-OPEN extension.	This issue was fixed in HYSYS V11.

ID	Issue Description	Issue Resolution
366830	In rare instances, adding a Column Temp Spec caused HYSYS to fail.	This issue was fixed in HYSYS V11.
381587	For the liquid phase, light liquid flow values, heavy liquid flow values, and mixed liquid flow values are reported; mixed liquid flow should be the sum of light liquid flow and heavy liquid flow. However, in V10, the mixed liquid flow value was incorrectly on the Heat Exchanger because the values were not updated based on the associated stream values.	The Heat Exchanger values are updated when the stream information changes.
382055	When the **Live Updates** check box was selected on the **Perfomance** tab | **Plots** page of the Column view and the **Logarithmic Axis** check box was selected on the **Axes** tab of the **Graph Control** view, HYSYS experienced issues.	This issue was fixed in HYSYS V11.
387868	When specifying the **Temperature** for the Gibbs Reactor, HYSYS sometimes calculated the **Duty** with errors.	This issue was fixed in HYSYS V11.

BLOWDOWN Technology / Depressuring Utility

ID	Issue Description	Issue Resolution
20399	In HYSYS V10, when using the **Pipeline Pressurization** BLOWDOWN template, if the initial inventory flash calculated all liquid, the BLOWDOWN Analysis was unable to run. The model at the orifice used HEM for gas or two-phase flow and used a flashing flow algorithm for liquid.	In HYSYS V11, HEM is always used, so this issue is fixed.
24307	For the Depressuring Utility, if you specified a **Feed Molar Flow Rate** value, this value would not be saved when saving the HYSYS case.	This issue was fixed in HYSYS V11.

ID	Issue Description	Issue Resolution
116147	For the Depressuring Utility, when the following conditions were met: • **Fire Stefan Boltzmann** was selected from the **Operating Mode** drop-down list. • **Detailed** was selected from the **Heat Transfer Model** drop-down list. • **Continually Updated** was selected from the **U Selection** drop-down list. • The **C** value was specified for **Air – Outside**. Then the **Historical Data** view displayed the default value for **Air – Outside** rather than the user-defined value.	This issue was fixed in HYSYS V11.
116176	For BLOWDOWN, when using an API Fire (**Apply to liquid**) heat flux method on a Vessel or Pipe without pressure drop, if nine or more vessels/pipes without pressure drop existed upstream of the unit operation (including branching), the fire was mistakenly applied to the subsequent unit operation instead of the selected unit operation.	This issue was fixed in HYSYS V11.
119563	On the **Results Summary** tab | **Major Findings** page of the BLOWDOWN Analysis, for pipes in the discharge system with insulation layers inside of the metal wall, minimum temperatures of the innermost insulation layer were used to report the **Min Wall Temp** instead of the metal temperatures. As a result, incorrect warning messages appeared, stating that the minimum wall temperature was below the minimum design temperature.	This issue was fixed in HYSYS V11.
154546	In HYSYS V10, some BLOWDOWN Analysis results differed significantly from the results in HYSYS V9: • In some instances, the liquid height results were higher in V10. • In some instances, the peak flow vapor temperature was warmer than the initial starting temperature for vapor in V10.	HYSYS V11 results will be more consistent with HYSYS V9.

ID	Issue Description	Issue Resolution
230237	The maximum number of timesteps permitted for a BLOWDOWN Analysis was 8,000.	The maximum number of timesteps permitted for a BLOWDOWN Analysis was increased to 50,000.
271914	When you used the custom plot tool in a BLOWDOWN Analysis and added a unitless parameter to the second axis, HYSYS experienced issues after saving and reloading the case.	This issue was fixed in HYSYS V11.
350245	When the Depressuring Utility had an **Adiabatic** operating mode and used the **Simple** heat transfer model, regardless of the U value specification, HYSYS defaulted to 51kJ/h/m^2K.	This issue was fixed in HYSYS V11.

Sulsim (Sulfur Recovery)

ID	Issue Description	Issue Resolution
155389, 226635	Within the SRU Sub-Flowsheet, in some instances, issues with flash calculations for streams at high temperatures containing primarily liquid sulfur with small amounts of other components prevented the Mixer from solving.	This issue was fixed in HYSYS V11.
21720	Issues occurred with the re-calculation of the Sx distribution at constant enthalpy for higher temperature streams that were predominantly S_Liquid.	This issue was fixed in HYSYS V11.
226634	The Heat Exchanger in the SRU Sub-Flowsheet did not recognize that the constant composition/molar flow assumption could be made if there was no elemental sulfur in the stream.	The Heat Exchanger in the SRU Sub-Flowsheet now accounts for the possibility that composition and molar flow change from inlet to outlet as the elemental sulfur species are redistributed.
259105	HYSYS V10 did not allow you to specify an empty value for the H2S/SO2 approach to equilibrium. Because this value could be specified as empty, attempting to import the value from a spreadsheet resulted in a consistency error.	HYSYS V11 lets you specify an empty value for the H2S/SO2 approach to equilibrium, allowing the value to be imported from a spreadsheet without a consistency error.
365648	When **Use specified outlet to solve block?** was set as **Yes** on the **OutletSpecs** tab | **Specification** page of the Catalytic Converter, a material balance error occurred. Results on the **Results** page were inaccurate.	This issue was fixed in HYSYS V11.

Safety Analysis Environment

ID	Issue Description	Issue Resolution
20385	In supersonic or sonic conditions, the line sizing check was not performed properly.	Safety Analysis environment line sizing calculations now use Aspen HYSYS Hydraulics, the same rigorous technology available in Aspen HYSYS.
227651, 228268	In the Safety Analysis environment, in some cases, the required relief load was underestimated for **Exchanger Tube Rupture** scenarios using a mixed relieving method. This occurred when no liquid existed at the upstream conditions; due to an error in the mixed phase calculations, HYSYS only used half of the vapor flow rate, even when the flow was effectively all vapor.	This issue was fixed in HYSYS V11.
229297	The Safety Analysis environment calculated a low flow rate for liquid **Control Valve Failure** scenarios when an aqueous phase was present.	This issue was fixed in HYSYS V11.
266284	In the Safety Analysis environment, for the **Semi-Dynamic Flash** calculation method, when the **Enthalpy** radio button was selected on the **Stepwise Flash Data** dialog box, in some cases, the enthalpy change on each step would jump and no longer be consistent with the specified enthalpy step.	This issue was fixed in HYSYS V11.
267341	Wetted Fire calculations for horizontal vessels with 2:1 ellipsoidal heads included an error regarding the calculations of the wetted area of the head in cases in which the liquid level was below the vessel center line. As a result, the calculated wetted area was not a conservative value.	This issue was fixed in HYSYS V11.
282001	If the name of a PSV included a period character (.), double-clicking the PSV did not open it. Instead, the PSV could be opened by selecting it in the navigation pane.	HYSYS does not allow you to create PSVs with a period character (.) in the name.
302843	In HYSYS V10 and earlier versions, for conventional valves, a warning was provided regarding the backpressure limit if the total backpressure exceeded 10% of the gauge set pressure. This was incorrect.	In HYSYS V11, the warning message instead only appears when the builtup backpressure exeeds 10% of the gauge set pressure.

Equation Oriented Modeling

ID	Issue Description	Issue Resolution
367907	In some instances, switching an Equation Oriented Sub-Flowsheet back to **Sequential Modular** mode resulted in a consistency error for the Measurement block, even in instances where the SM inputs were not changed.	This issue was fixed in HYSYS V11.
393032	Specified stream **Std Ideal Volume Flow** or **Liq Flow @ Std Cond** (SM) variables were not updated after an EO solve in which a measurement, or any other alternative specification, was used to set or calculate the stream flow.	This issue was fixed in HYSYS V11.

Pro/II to HYSYS Converter

ID	Issue Description	Issue Resolution
272033	Attempting to import a Pro/II case containg keywords that the Pro/II to Converter does not support caused errors to occur.	The Pro/II to HYSYS Converter now ignores the unsupported keywords, allowing you to proceed with your conversion.
278827	For cases converted from Pro/II to HYSYS, using a combination of Aspen Properties and HYSYS fluid packages caused issues with components being converted into HYSYS reactions.	This issue was fixed in HYSYS V11.

Aspen HYSYS Dynamics

New Features and Enhancements V11

The following new features and enhancements were added in HYSYS Dynamics V11:

- Performance Improvements
- Malfunction Scenarios
- Dynamics Tuning Manager
- Selector Block Enhancements
- New Dynamics Tutorial Available
- Dynamics Enhancements

Performance Improvements

HYSYS Dynamics V11 features improved performance:

- Improvements in speed
- Improved robustness for dynamic simulations (especially complex dynamic cases)

The modeling of column flooding was improved substantially in HYSYS V11. When the bottom tray in the column is almost completely flooded, the Francis Weir equation no longer applies. In HYSYS V11, numerical adjustments are made, and two flooding thresholds are used by HYSYS. These

changes result in improvements in column stability and convergence, as well as preventing large fluctuations in internal and external streams.

Malfunction Scenarios

You can now model equipment failures, malfunction, or performance deterioration quickly and easily in HYSYS Dynamics for the following unit operations:

- Air Coolers
- Heat Exchangers
- Pumps
- Relief Valves
- Valves

You can access this feature on the **Dynamics** tab | **Malfunction** page of the desired unit operation.

Dynamics Tuning Manager

The Dynamics Tuning Manager provides options for modifying your dynamic model, helping ensure uninterrupted integrator performance. The most common scenario for pressure flow solver failure is when a section of the system has zero flow. You can:

- Select a section of the PFD and set up actions that are triggered when a failure-prone scenario is encountered. For example, select a section that HYSYS will automatically ignore when it approaches low flow. This section is automatically restored when it recovers from low flow.
- Manually ignore a section of the PFD when the integrator is running.
- Modify the scaling of differential equations for the selected objects in the PFD area to relax or tighten the solution accuracy for that particular section of the flowsheet.

To use the Dynamics Tuning Manager, you can either:

- Select the desired section of the flowsheet. Right-click and select **Dynamics Tuning** | **Add Objects to Dynamics Tuning Area** | **Create New PFD Area**.
- From the **Dynamics** ribbon tab | **Modeling Options** group, click **Dynamics Tuning**.

Selector Block Enhancements

- The following enhancements were made to the Selector block in HYSYS V11:
- All PID algorithms now use the Dynamic Reset Feedback method to track the OP signal. Previously, only the HYSYS PID Velocity Form used this method, and all other PID algorithms used a static tracking form.
- You can use the new **Track OP** check box to disable or enable OP tracking for a particular input signal.
- You can use the new **Tracking Gain** field to adjust how closely the unselected input should track the selected input.

New Dynamics Tutorial Available

The Sweet Gas Refrigeration Plant tutorial has been extended to incorporate the dynamic capabilities of HYSYS into a basic steady state gas plant model. You can either continue using the case that you build during the Steady State Simulation portion of this tutorial or use the completed steady state version as the starting point (**Sweet Gas Refrigeration Plant.hsc**, located in the **HYSYS** | **Samples** directory). To get started with this tutorial, refer to the "Dynamic Simulation" topic in the *Aspen HYSYS V11 Help*.

Dynamics Enhancements

- The **Equation Summary** view now provides additional filtering and sorting capabilities.
- A new **Enabled split range curves** check box was added to the **Split Range Setup** tab of the Split Range Controller. This button lets you specify your own split range curves for the output range using the **Curve Information** table.
- An **Enable DMCplus Modifications** check box was added to the **Connections** tab of the DMCplus Controller, allowing you to configure and modify the DMCplus Controller. This check box also existed in earlier versions of HYSYS.
- A new approach to solving the pressure-flow system in the Control Valve is available as an option. Selecting the **Use Modified Pressure-Flow Eq.** check box (available on the **Dynamics** tab | **Specs** page of the Valve) can enhance the robustness of the simulation when the process conditions around the Control Valve change rapidly (for example, in pressuring or depressuring processes). It can be used as an alternative to smaller integration steps in such cases, yielding faster dynamic simulations.
- A new **Liquid Holdup Options** group was added to the **Options** tab of the Integrator, allowing you to improve the behavior of the holdup model when the liquid content approaches 100% of the holdup volume. The use of these options can be helpful in separators where almost 100% liquid will be modeled.

Compatibility Notes

This section describes the differences that you might encounter between HYSYS Dynamics V11 and HYSYS Dynamics V10. In most cases, previous HYSYS input files and backup files are completely compatible with HYSYS Dynamics V10.

Changes to Selector Blocks

In Selector blocks, the tracking of the selected OP by the unselected input signals (assuming they come from a PID, Split Range, or Ratio controller) is now performed using the Dynamic Reset Feedback method. Previously, this method was used for the **HYSYS PID Velocity Form** only, and other PID algorithms used a static version of the tracking equation. Due to this change, the output of an unselected controller connected to a Selector block can differ in V11 if its PID algorithm is not **HYSYS Velocity**, and the **Selection Mode** is **Minimum**, **Maximum**, **Median**, or **Hand Sel**. The tracking mode can be disabled temporarily if the change has an undesirable impact.

Changes to PID, Split Range, and Ratio Controllers

For PID, Split Range, and Ratio Controllers, a minor correction was made to the calculation of the integral term for the **Honeywell** and **Foxboro** algorithm types when algorithm subtype is not **Pure Integral**. The impact is expected to be minor, if any.

Improvements to the Cold Initialization of the Transfer Function

In HYSYS V10, for the Transfer Function, the value of the **Cold Init OP** was ignored, and the output always started from zero.

In HYSYS V11, the cold initialization of the Transfer Function is fixed. Note that the Cold Init OP does not apply to the Delay, Lead1, and Lead2 transfer functions.

This change could possibly affect the dynamic response in some instances. There will be no effect if **any** of the following conditions apply:

- The case has already been initialized and run in Dynamics mode.
- Only the Delay, Lead1, and/or Lead2 transfer functions are selected.
- The **Cold Init OP** value is empty or zero.

Change to Pressure-Flow Calculations for Heating Models

In previous versions, for Heaters, Coolers, Heat Exchangers, Air Coolers, and LNG Exchangers, the corresponding heat model always used the density of the physical inlet for pressure-flow calculations, even when the flow was reversed. In V11, the outlet density is selected in cases where reverse flow occurs.

Improvements to Dynamics Assistant Sizing for Valves

In previous versions, the Dynamics Assistant used a different sizing equation than the Valve. It used a simplified form of the Universal Gas Sizing method with default settings that were sometimes different from the actual valve conditions (for example, if the valve default model was ANSI/ISA rather than Universal Gas Sizing), so the results were merely estimated values. In V11, the Cv is updated with the accurate value from the valve after the valve is inserted.

Modified Weir Flow to Address Column Flooding

In previous versions of HYSYS, columns often encountered difficulties in simulating flood scenarios. This is because the Francis weir equation is an overflow equation, which is not valid when the adjacent trays effectively become one due to flooding. HYSYS V11 addresses column flooding by modifying the weir flow equation under flooding conditions and smoothing the transition between flooding and non-flooding conditions to ensure continuity. Due to these improvements, you may notice differences in results.

What's Fixed in Aspen HYSYS Dynamics V11

Aspen HYSYS Dynamics V11 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
20362	An incorrect value was reported for **Total Volume** on the **Dynamics** tab | **Holdup** page of the Air Cooler. This was exclusively a display issue and did not impact calculations.	This display issue was resolved.
21471	The **Connections** tab of the DMCplus Controller view did not contain the **Enable DMCplus Modifications** check box that existed in previous versions.	In V11, the **Enable DMCplus Modifications** check box was added, allowing you to configure and modify the DMCplus Controller.
21716	In Dynamics mode, a flash optimization algorithm for a Separator with a tube bundle (Kettle Heat Exchanger) sometimes caused incorrect results.	This issue was fixed in HYSYS V11.
21793, 65156	If you opened a case in Dynamics mode and added a new pipe object, and then attempted to save the case without returning to Steady State mode, HYSYS experienced issues.	This issue was fixed in HYSYS V11.

ID	Issue Description	Issue Resolution
24055	Disabling the heat loss calculations or changing the U value to 0 manually for a Tray Section caused perturbation and unstable behavior to occur.	This issue was fixed in HYSYS V11.
24331	In some instances, when the Pump was turned off, the RPM remained higher than expected.	This issue was fixed in HYSYS V11.
114659	The flow through Valves with a negative Delta P and the Check Valve was absolute zero, which could cause convergence issues in certain situations.	In HYSYS V11, negligible flow is permitted in this case to improve convergence.
121600	In HYSYS V10, the **Update while Integrating** option for the calculation of the heat transfer coefficient for the Pipe Segment in Dynamics mode incorrectly assumed free convection and used the Churchill and Chu correlation.	In HYSYS V11, it was corrected and now uses the Dittus-Boelter Correlation for forced convection.
21659	In HYSYS V10, the **HYSYS** | **PID Positional** algorithm used the steady state version of the tracking equation.	In HYSYS V11, the **HYSYS** | **PID Positional** algorithm now uses the same equation to track the selected output in a selector block as the equation used for the velocity algorithm PID to better track the selected output when the PID output entering the selector block has **Unselected** status. This change could possibly affect the results of an existing PID when **all** of the following conditions apply: • The **HYSYS** | **PID Positional** algorithm is selected. • The PID is connected to a selector block. • The selector block has **Unselected** status. -and- The Selector mode is set to **Minimum**, **Maximum**, **Median**, or **Hand Sel**.
21756	When using the OLGA Link, units were not always converted properly from the PID Controller.	This issue was fixed in HYSYS V11.
49522	In previous versions, for Heaters, Coolers, Heat Exchangers, Air Coolers, and LNG Exchangers, the corresponding heat model always used the density of the physical inlet for pressure-flow calculations, even when the flow was reversed.	In V11, the outlet density is selected in cases where reverse flow occurs.

ID	Issue Description	Issue Resolution
247628	When attempting to copy and paste a Heat Exchanger or Air Cooler model without attached streams, HYSYS sometimes failed.	This issue was fixed in HYSYS V11.
256417	The **Feed Nozzle efficiency** variable for Vapor, Liquid, and Aqueous phases of Vessels was not available in the Variable Navigator for the Spreadsheet.	This variable and several other Advanced Holdup variables were exposed in HYSYS V11.
259583	In Dynamics mode, on the **Rating** tab | **Curves** page of the Pump, the **Offset Values** group sometimes failed to list the **Head** and **Efficiency** values.	This issue was fixed in HYSYS V11.
268868	In Dynamics mode, a temperature cross occurred for the Heat Exchanger in situations where such behavior would not be expected.	This issue was fixed in HYSYS V11.
278753, 264781	In Dynamic mode, in some cases, the total mass flow for streams displayed incorrectly. The sum of the individual phase mass flows was correct. Inconsistencies between molar and mass flows also occurred. This issue did not impact results, since the pressure flow solver uses molar flows in calculations.	This issue was fixed in HYSYS V11.
296452	HYSYS Dynamics could not properly simulate properly tanks or other types of holdups when the liquid content reaches a certain level (for example, above 90%). When the liquid filled up the vessel almost completely, the process variables, especially holdup pressure and outlet flows, started to oscillate with high frequency without a physical explanation. Also, in some cases, instead of oscillation, the liquid content jumped to 100% in a single time step after reaching a certain percentage in the tank. When the liquid reached 100%, usually the oscillation stopped. However, in some cases, it became impossible to decrease the liquid content to below 100% again.	The **Options** tab includes a new **Liquid Holdup Options** group, allowing you to improve the robustness of the simulation when separators or other unit operations with holdup models are almost filled with liquid. When the **Adjust pressure perturbation for numerical derivatives** check box is selected, HYSYS adjusts the pressure perturbation, used for numerical differentiation during the solution process, so that the obtained derivatives remain valid with different phase conditions of the holdup. When the **Use lag filter to reduce derivative noise** check box is selected, the numerical derivatives calculated during the solution process are passed through a first-order filter so that the derivative noise is reduced. The filter starts to act when the liquid volume in the holdup has reached the specified threshold.

ID	Issue Description	Issue Resolution
296888	In previous versions of HYSYS, columns often encountered difficulties in simulating flood scenarios. This is because the Francis weir equation is an overflow equation, which is not valid when the adjacent trays effectively become one due to flooding.	HYSYS V11 addresses column flooding by modifying the weir flow equation under flooding conditions and smoothing the transition between flooding and non-flooding conditions to ensure continuity.
297426	The Surge Controller OP was prevented from returning to the normal range after the Compressor comes back to the right of the backup line.	The Surge Controller is prevented from remaining in the saturated state when flow conditions allow otherwise. However, if the surge controller is already saturated, you must change the **Mode** to **Manual** and back to **Auto** a single time to reset an internal parameter. After that, the Surge Controller will not remain saturated in similar situations due to this fix.
309017	Turning off the Compressor in Dynamics mode resulted in a significantly slower speed.	Turning off the Compressor does not negatively impact the speed of HYSYS.
309529	For the Event Scheduler, when the **Jump When selection** on the **Branching & Time Out Behavior** tab of the **Event** window was changed from **Never** to another selection, HYSYS failed.	This issue was fixed in HYSYS V11.
315829	For the MPC Controller, the **Model Step Response** data was incomplete in some cases.	This issue was fixed in HYSYS V11.
346797	In Dynamics mode, the operating point in a performance curve for the Expander did not appear correctly. This was a display issue and did not impact calculations.	This display issue was fixed in HYSYS V11.
352659	The Pump Head was always set as a dependent variable in Dynamics mode.	This issue was fixed in HYSYS V11.
377167	The Compressor performance plots displayed intermediate calculation results that did not match the strip chart results. This was a display issue that did not impact calculations.	The display issue was resolved.

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 2000 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 V11

The following new features and enhancements were added in HYSYS Upstream V11:

- New Multiphase Pump
- New Wet Gas Compressor
- Ability to Model Salt Calculations in Hydrate Formation Analysis

New Multiphase Pump

Starting in Aspen HYSYS V11, you can model the Multiphase Pump for accurate design of the subsea process. To choose this model, select the **Enable Multiphase Pump** check box on the **Design** tab | **Parameters** page of the Pump.

This pump model supports the presence of a vapor phase inside the pump (two-phase inlet) by allowing you to specify the performance at various inlet gas mass or volume fractions.

The following calculation options are available for the Multiphase Pump:

- **Use correlation**: The correlation approach models the Multiphase Pump in a quick, simplified fashion. For the **Use correlation** option, you provide performance curves for a conventional, single-phase pump, and HYSYS adjusts the specified head using a correlation.
- **Use curves**: The **Use curves** option is the preferred approach when accurate multiphase curves are available. For this option, the Multiphase Pump is simulated using multiphase performance curves provided by manufacturers or lab experimentation.

The Multiphase Pump is supported for use in Dynamics mode.

New Wet Gas Compressor

Starting in Aspen HYSYS V11, you can model the Wet Gas Compressor for accurate design of the subsea process. To choose this model, select the **Wet gas** operating mode on the **Design** tab | **Parameters** page of the Compressor.

This compressor model supports the presence of a liquid phase inside the centrifugal compressor by allowing you to specify the performance curves at various inlet gas mass or volume fractions.

The performance of the Wet Gas Compressor has been validated against experimental data from the Norwegian University of Science and Technology (NTNU). The Wet Gas Compressor is used for well pressure boosting, eliminating the need for pre-treatment on the produced gas. The field operating window is up to 5% liquid. The Wet Gas Compressor offers the following benefits:

- Enhanced extraction
- Utilization of smaller fields

- Less complex compressor systems

The following **Curve Input** options are available:

- **Single GMF/GVF**: Models the wet gas compressor with a single pair of head vs. flow and efficiency vs. flow curves. You can still add multiple curves as a function of speed, but not for different curve GMF (gas mass fraction) or GVF (gas vapor fraction) performance values.
- **Multiple GMF/GVF**: Lets you add multiple curve collections for different curve GMF (gas mass fraction) or GVF (gas vapor fraction) values. You can enter collections of Head vs. Flow vs. Efficiency for multiple speeds with different GVF / GMF values.

The Wet Gas Compressor is supported for use in Dynamics mode.

Ability to Model Salt Calculations in Hydrate Formation Analysis

A new **Hu Lee Sum Correlation** check box is available on the **Design** tab | **Connections** page of the Hydrate Formation Analysis, allowing you to account for salt concentration in your stream and its effect on inhibiting hydrate formation. This check box applies a salt formation correlation developed for single and mixed salt systems by Professor Amadeu Sum from Hydrates Energy Innovation Laboratory. This allows you to model the effect of salts as inhibitors, since salt is common in production wells.

In the new in the **Brine Solution** group, you can select the **Salt effect suppression** check box to disable the effects of salts on the simulation. When this check box is cleared, the effects of salts are modeled. When this check box is selected, you can specify the mass flow values for selected salts.

Compatibility Notes

This section describes the differences that you might encounter between HYSYS Upstream V11 and HYSYS Upstream V10. In most cases, previous HYSYS input files and backup files are completely compatible with HYSYS Upstream V10.

Profes Method used in Correlation for Inner Heat Transfer Coefficient for Hydraulics Valves

In HYSYS V11, for Hydraulics Valves, the correlation for the inner heat transfer coefficient now uses the Profes method. In previous versions, the simplified HTFS method was used. This improvement can significantly impact temperature results for two-phase systems with low liquid fractions (around 1-10%).

Retired Features

DBR PVTPro Package

The DBR PVTPro package is no longer available.

- When you add a COMThermo fluid package, in the **Model Selection** list, the **PVTProExtPkg** option is no longer available.
- On the PVT Laboratory Measurements window, in the **Selected Engine** list, the **DBR PVTPro** option is no longer available.

What's Fixed in Aspen HYSYS Upstream V11

Aspen HYSYS Upstream V11 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
23869	Within the Aspen Hydraulics Sub-Flowsheet, in Dynamics mode, editing the pipeline profile of a Complex Pipe by adding a new segment caused display issues for the grid on the **Design** tab | **Data** page.	The grid updates correctly in HYSYS V11.
228020	In cases where an Aspen Hydraulics Sub-Flowsheet no longer appeared as solved after the case was re-loaded, ignoring and un-ignoring the sub-flowsheet sometimes caused HYSYS to fail.	This issue was fixed in HYSYS V11.
249832	Pigs sometimes appeared in an incorrect reference position on the flowsheet. This was a display issue only and did not impact the pig calculations.	This issue was fixed in HYSYS V11.
259102	In rare instances, deleting an Aspen Hydraulics Sub-Flowsheet caused HYSYS to experience issues.	This issue was fixed in HYSYS V11.
291573	In some cases, Aspen Hydraulics Sub-Flowsheets that were over-specified or had inconsistent boundary conditions caused HYSYS to fail.	This issue was fixed in HYSYS V11.

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 V11

The following new features and enhancements were added in release V11:

- Streamlined Excel-Based Planning Model Update Workflow
- Molecule-Based Reactor
- Performing Prediction Runs for the Catalytic Reformer and Hydrocracker

- Managing Multiple Calibration Sets and Performing Prediction Runs for the NHT, CGHT SHU, CGHT HDS, Isom Unit, Visbreaker, Delayed Coker, and HBED
- HYPlan Utility Improvements
- PIMS Support Analysis Updates
- New FCC Configuration Available
- Torch Oil Configuration for FCC
- General Refining Enhancements
- Aspen Assay Management Improvements
  - Spiral XML Format Assays
  - Improved Characterization Results for Single Stream Assays
  - Improved Handling of Fluid Packages for Assays
  - Exporting Assays as PIMS CSV Files
  - New Index Property (BureauMinesCorrelationIndex)
  - Assay Management Enhancements

Streamlined Excel-Based Planning Model Update Workflow

Aspen HYSYS enables a new Excel-based Planning Model Update (PMU) workflow, which promotes collaboration between planners and process engineers. PMU templates were created for the Fluidized Catalytic Cracker (FCC), Catalytic Reformer, and Hydrocracker. 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
- Run case studies to examine the effect of perturbations of individual variables
- Compare input and results for various data sets
- Create LP base and shift vectors for the LP submodel update
- Track HYSYS and LP model predictions closely against plant data

These PMU templates are available through the AspenTech Support Center (**https://esupport.aspentech.com**). The templates are compatible with HYSYS V9 and later versions (V10 and V11). For further information, refer to the *Aspen HYSYS Petroleum Refining Planning Model Update (PMU) Template User's Guide*, which is also available on the Support site.

Molecule-Based Reactor

Aspen HYSYS V11 includes the new Molecule-Based Reactor. The Molecule-Based Reactor reaction network contains up to 2696 species and 5825 reactions, allowing you to track molecular details across the reactor. This reactor supports Hydrocracker and Hydrotreater kinetics.

This model uses local thermodynamics and can handle various refining chemistries. You can use the Molecule-Based Reactor to model Hydrocrackers, Hydroprocessing Beds, and Hydrotreaters.

HYSYS provides eight default feed types. The first three feed types are supported by Aspen HYSYS Petroleum Refining expertise, literature, and KMT. The remaining five feed types are based on NOISE data acquired by AspenTech.

The following example cases are available in the **Aspen HYSYS** | **Samples** | **Refining Cases** folder:

- **MBRXRBed_HCR_Example_Case.hsc**: This example case models a hydroprocessing bed and includes the following feeds:
  - **Feed1** contains an assay and does not have a molecule-based composition.
  - **MBFeed1** is a stream with a molecule-based composition.
- **Stream 2** is the outlet stream of the Molecule-Based Reactor. It later enters a Component Splitter that splits light gas and C5+ components. The liquid product of C5+ is Stream 4.

Stream 4 enters a Refining Short-Cut column, which separates the reactor effluent into typical product streams. All molecular properties can be transferred to these product streams.

- **MBRXRBed_HTR_Example_Case.hsc**: This example case models a hydrotreating bed with an HDS feed. Otherwise, the connections are the same as those in **MBRXRBed_HCR_Example_Case.hsc**.
- **MBHCR_Example_Case.hsc**: This example case models a single stage hydrocracker with two treating beds and two cracking beds. Otherwise, the connections are the same as those in **MBRXRBed_HCR_Example_Case.hsc**.
- **MBHTR_Example_Case.hsc**: This example case models a hydrotreater. This example case models a hydrotreater with two treating beds. Otherwise, the connections are the same as those in **MBRXRBed_HCR_Example_Case.hsc**.

Ability to Perform Prediction Runs for the Catalytic Reformer and Hydrocracker

Starting in HYSYS V11, you can perform prediction runs for the Catalytic Reformer and Hydrocracker, in addition to the FCC. You can view the status of the data sets and select which calibrations to run for the FCC, Catalytic Reformer, or Hydrocracker. You can choose to run multiple calibrations sequentially.

A calibration run fits the model's kinetic tuning parameters and other key operation tuning parameters to match the observed process operation, feed properties, and product yields. This is also called a tuning run.

The Catalytic Reformer and Hydrocracker use reconciliation, which will match the targets as closely as possible. However, this is rarely an exact match, since due to the more complex chemistry, there are more targets (such as yields and product qualities and temperature changes across the reactor). You must select tuning factors for inclusion, as well as which terms to include in the objective function. For any reconciliation parameters, you must specify the upper and lower bounds; for any terms included in the objective function, you must specify a weighting factor. Default weighting factors are provided.

The **Run Predictions of Calibrations** feature performs a simulation run for selected cases based on the selected calibration factor set. This feature lets you validate a calibration factor set by comparing the predicted results that appear on **Prediction Results** tab with the actual data (derived from the measurements) on the **Analysis** tab.

Ability to Manage Multiple Calibration Sets and Perform Prediction Runs for the NHT, CGHT SHU, CGHT HDS, Isom Unit, Visbreaker, Delayed Coker, and HBED

For the NHT, CGHT SHU, CGHT HDS, Isom Unit, Visbreaker, Delayed Coker, and HBED:

- The **Calibration** tab | **Data Sets** page lets you manage and run multiple data sets and view calibrated factors for each set. You can use the **Average Set Weights** dialog box to adjust the weight used for each set when calculating the values in the **Average** column for the calibration data sets. For example, if the final data set is more recent than the first two data sets, you may want to provide a heavier weight for this set.
- The **Calibration** tab | **Prediction** | **Data** page lets you perform prediction runs to assess how closely the average factor sets match your calibration data. You can perform a simulation run on selected cases. This helps you validate calibration factor set by comparing the predicted results with the actual data (which are derived from the measurements).
- You can use the **Calibration** tab | **Prediction** | **Plot** page to compare the model predictions to plant data.

HYPlan Utility Improvements

In Aspen HYSYS V11, the following improvements were made to the HYPlan Utility:

- When the .hyp file is exported, a .txt file containing a list of internal OOMF variables and their units of measure is exported as well. These .txt files are provided for reference only and are not used by PIMS.
- HYPlan models assume certain default values for constants. You can modify many of these constants on the **Constants** view. To access this view, on the **Model Generation (3/3)** page of the HYPlan Model Utility form, click **Constants**. The default standard conditions are 60 °F and 1 atm. To change the standard conditions, edit the Water Standard Density and Air Standard Density.
- The HYPlan Model Utility predictions include both weight and volume based fractions.
- All pure component products are provided as individual output (in volume and mass units).
- When using a volume basis in the HYPlan Utility, fuel gas, coke, H2S, and H2 flows are mapped to regular volumes instead of FOE values.

PIMS Support Analysis Updates

You can now add PIMS Support Analyses to your HYSYS case again. Previously, this feature had been removed. The PIMS Support Analysis user interface was updated in HYSYS V11 and now features additional pages on the **Variables** tab of the PIMS Support Analysis, allowing you to select streams for recursion, select qualities for recursed stream properties, and view and edit the recursed properties. The new **Driving Factor type** drop-down list on the **Variables** tab | **Independent Variables** page lets you specify the kind of row that PIMS will use to calculate values when it solves.

On the **Shift Vectors** tab, a new **Show Shift Vectors** radio button is available.

New FCC Configuration Available

You can now configure an FCC with two risers and two regenerators. For this configuration:

- The first riser contains two midpoints, and the second riser does not contain any midpoints.
- You can connect a feed to the reactor.

To specify this configuration, select the **Custom** check box on the FCC Configuration Wizard.

Torch Oil Configuration for FCC

In some cases, you may run hydrocracked feeds that are very easy to crack but do not form enough coke to achieve the heat balance for catalytic cracking reactions. In that case, you can add a torch oil feed directly to the regenerator. Light cycle oil and slurry oil from the main fractionator act as a recycle and mix with the catalyst from the reactor; these recycles serve as torch oil for the regenerator. This torch oil feed is burned to provide the necessary heat for the heat balance.

To add a torch oil feed directly to the regenerator for the FCC:

- On the **Feeds** page, from the **Location** drop-down list, select **Torch**.

  -or-
- On the **Select Feed Location** dialog box (which you can access by adding or editing a feed on the **Feed Data** tab | **Properties** page), select the **Torch** option.

General Refining Enhancements

- A new **Failed Property Shifts** page was added to the **Model Summary** tab of the Petroleum Shift Reactor. This page provides error messages to help you diagnose the reasons for shift failure.
- The **Prediction Results** tab on the FCC Calibration view was improved.
- For single riser FCC configurations, the **Spent Catalyst Regenerator Bypass** group on the **Riser/Reactor** page allows you to specify where the spent catalyst from the reactor is sent. Typically, all spent catalyst is sent to the regenerator; however, in some cases, a portion of the spent catalyst is split off and returned to the riser rather than entering the regenerator.

This group allows you to model this type of unit, which changes the heat balance and increases the catalyst circulation rate.

- For the FCC, when using the **Bulk Properties** property method, you can select the **Specify aromatics by ring number** check box on the **Feed Data** tab | **Properties** page to specify UV aromatics for the feed. These values are used in the calculation of the feed lumps.
- For the FCC, Catalytic Reformer, and Hydrocracker, you can now export the data from a prediction run to a CSV file by clicking **Save To CSV** on the **Prediction** or **Prediction Results** tab | **Worksheet** page.
- For the FCC, Catalytic Reformer, and Hydrocracker, you can now export the data from a calibration run to a CSV file by clicking **Save To CSV** on the **Analysis** tab | **Worksheet** page.
- For the FCC, Catalytic Reformer, and Hydrocracker, if you have performed multiple calibration runs, you can save multiple factor sets at the same time using the **Save Calibration Factor Sets** view. This viewed can be accessed by clicking **Save Calibration Factors** on the refinery reactor's ribbon tab.
- In the Calibration environment, the refinery reactor ribbon tabs (the **FCC** ribbon tab, the **Reformer** ribbon tab, and the **Hydrocracker** ribbon tab) were re-organized to improve ease of navigation.
- You can now use the **Data Set Manager** view to sort data sets in the Calibration environment.
- The Delayed Coker and Visbreaker now feature a new **Furnace Volumes** group (on the **Simulation** tab | **Tuning Parameters** page), which allows you to specify the furnace volumes in which the reactions are occurring.
- The Delayed Coker and Visbreaker now include a new **Delumping Curve** page on the **Simulation** tab. In most cases, you will not need to edit the delumping curve. However, if you want to change the results (for example, you want to smooth the property curve) without re-calibrating your model, you can edit the values on this page.
- The following additional correlations are available under the **Petroleum** correlation type within the Correlation Manager:
  - **Dist X%**
  - **X% EVAP**

Aspen Assay Management Improvements

Spiral XML Format Assays

Using the **SpiralXML** group on the **Assay Management** ribbon tab:

- You can directly import Spiral assays (in XML format) into Aspen Assay Management using the **Import** button.
- You can examine and modify the mapping of properties between Assay Management properties and those found in the Spiral XML format using the **ExportMapping** and **ReplaceMapping** buttons. The mapping allows for flexibility regarding properties in the Spiral XML format. You can adjust mappings from Spiral properties to assay properties, in case your format is slightly different. You can also customize the names of properties that you want to import.

Improved Characterization Results for Single Stream Assays

The characterization of single stream assays (especially light naphtha assays) was improved in HYSYS V11. As a result, the density curves and distillation curves are more accurate.

Improved Handling of Fluid Packages for Assays

HYSYS V11 features improved handling of fluid packages for assays.

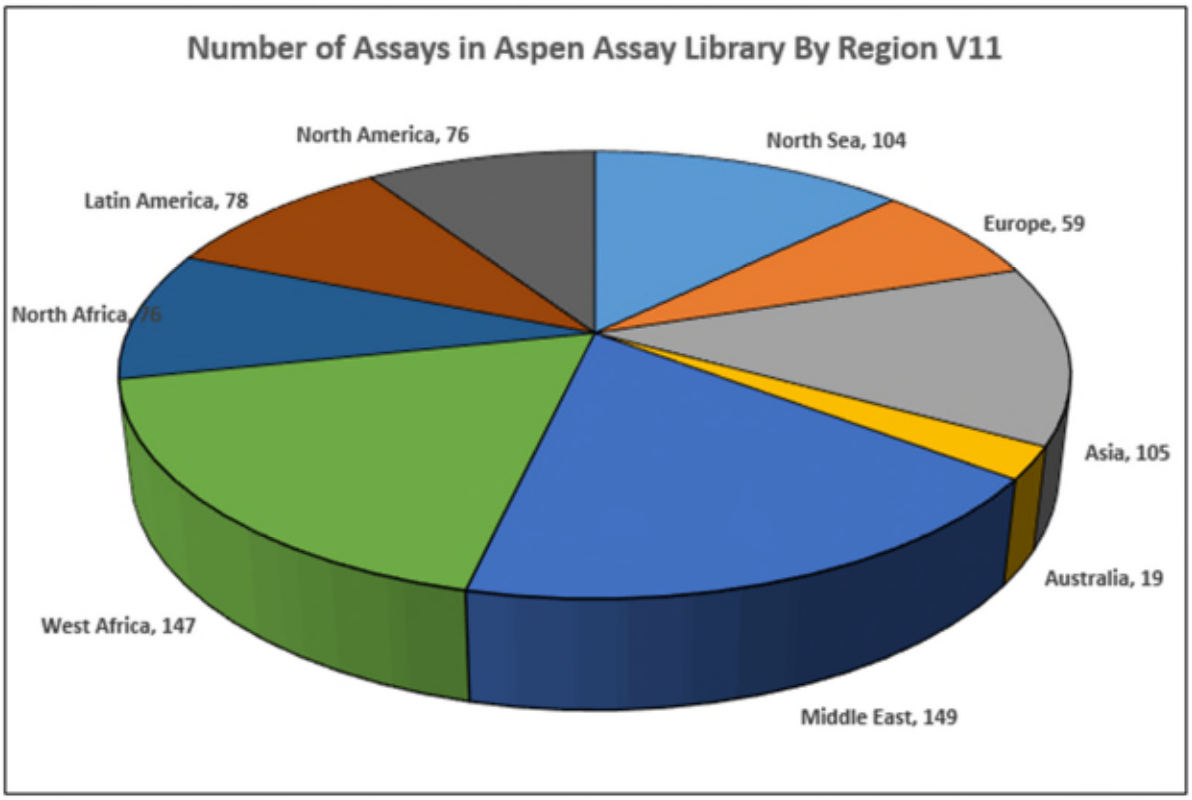
- A new **Fluid Package** drop-down list at the top of the **Petroleum Assays** form allows you to select the default fluid package for assays used in the case.
- After switching an imported assay's fluid package, you can easily switch back to the original fluid package using the drop-down list in the **Fluid Package** column. You no longer need to re-characterize the assay. The results on the **Property Table** tab are fitted based on the fluid package selection.
- When you export an assay as an .afam file and import it in a new case, the fluid package from the original case is retained.
- For assays that use Aspen Properties fluid packages, thermodynamic properties (including critical temperature and pressure and acentric factor) are now correctly re-estimated when the assay is re-characterized.

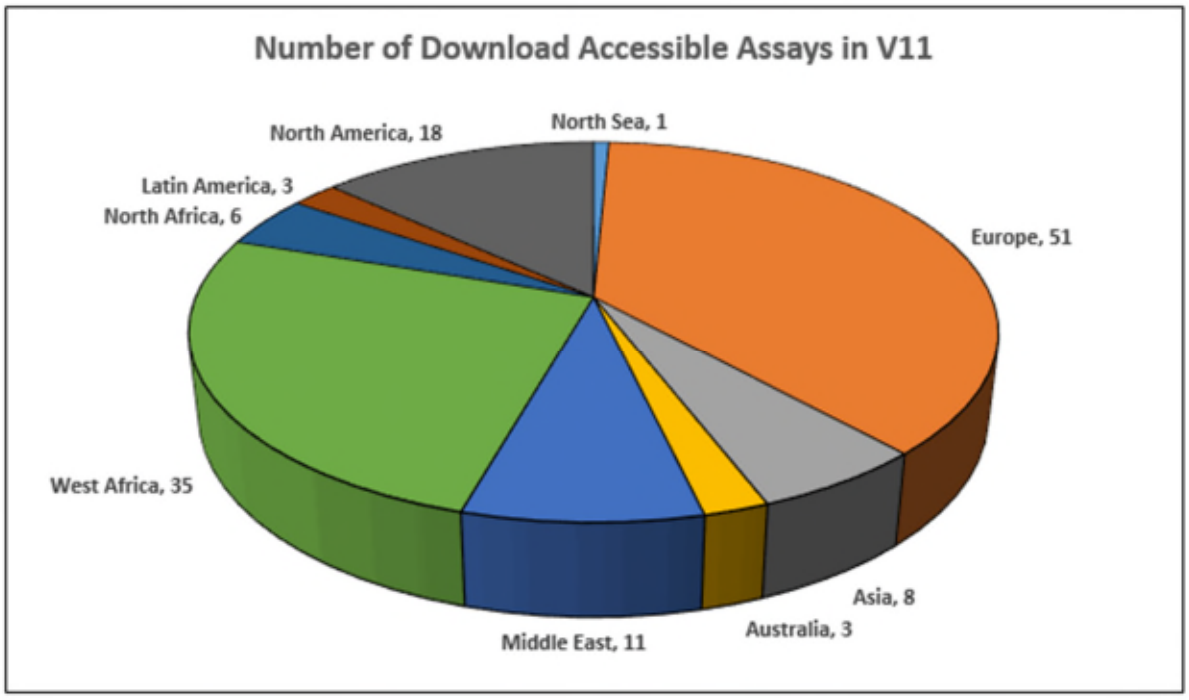
Assay Library Update

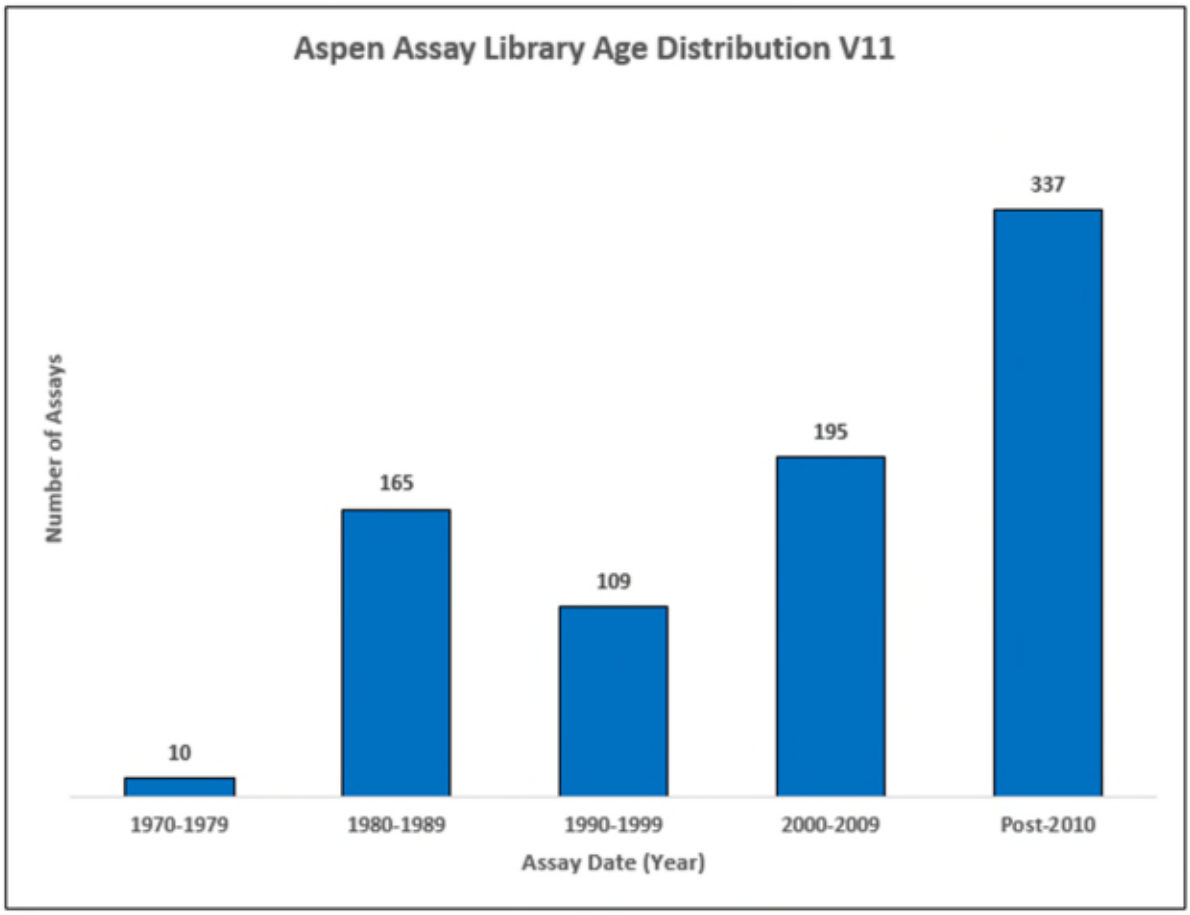
The built-in V11 library contains 813 unique assays created using lab assay data licensed from PennEnergy and legacy assay databases. The latest library update adds 49 new and updated assays. In addition, the Aspen Assay Management you to download assay data for 136 crudes from other public sources. The geographic and age distribution of Aspen's Assay Library is as follows:

Assays By Region in V11

Region	Aspen Assay Library	Download Assays
North Sea	104	1
Europe	59	51
Asia	105	8
Australia	19	3
Middle East	149	11
West Africa	147	35
North Africa	76	6
Latin America	78	3
North America	76	18
Total	813	136


Number of Assays in Aspen Assay Library By Region V11
North America, 76
North Sea, 104
Latin America, 78
Europe, 59
North Africa, 76
Asia, 105
Australia, 19
West Africa, 147
Middle East, 149


Number of Download Accessible Assays in V11
North America, 18
North Sea, 1
Latin America, 3
North Africa, 6
Europe, 51
West Africa, 35
Asia, 8
Australia, 3
Middle East, 11



Aspen Assay Library Updates to V11

Region	# of Added Assays	# of New Unique Assays
North Sea	4	2
Europe	3	2
Asia	2	1
Australia	0	0
Middle East	10	1
West Africa	10	2
North Africa	5	0
Latin America	4	0
North America	11	11
Total	49	19

New Crudes in V11

Assay Name	Region	Country
Bakken-2017	North America	United States of America
Banyu Urip-2017	Asia	Indonesia
Bnb (Brent Ninian Blend)-2017	North Sea	United Kingdom
Cascade Chinook Blend-2013	North America	United States of America
Eagle Ford Chem Grade-2017	North America	United States of America
Eagle Ford Fen Grade-2017	North America	United States of America
Eagle Ford Ingleside-2016	North America	United States of America
Eagle Ford-2016	North America	United States of America

Goliat-2016	North Sea	Norway
Kirkuk ex Kbt-2015	Middle East	Iraq
Mars-2017	North America	United States of America
Plutonio-2016	West Africa	Angola
Prinos Blend-2016	Europe	Greece
Ras Gharib-2015	Middle East	Egypt
Sangos-2016	West Africa	Angola
Southern Green Canyon-2016	North America	United States of America
Sugarloaf-2016	North America	United States of America
WTI Domestic Sweet-2016	North America	United States of America
WTI Magellano-2016	North America	United States of America

Exporting Assays as PIMS CSV Files

Starting in HYSYS V11, you can export assays in the PIMS .**csv** format. The new **Export Assays into PIMS CSV Files** wizard helps guide you through the process of selecting assays to export, mapping components, mapping properties, and selecting the file location.

New Index Property (BureauMinesCorrelationIndex)

A new Index property, **BureauMinesCorrelationIndex**, is available in HYSYS V11. The Bureau of Mines Correlation Index (BMCI) is an index used to judge the suitability of heavy feedstock for the production of olefins (often referred to as petrochemical potential). The BMCI is based only on boiling range and density.

Assay Management Enhancements

In HYSYS V11:

- You can display the distillation input points as a TBP curve for each product cut in a back-blending assay. To do so, create a Distillation plot for a back-blending assay and select the **Show back-blending input cuts** check box on the **Format** ribbon tab.
- On the **Add Assay** dialog box, the units for properties can be selected when applicable using the drop-down list next to the **Add Property/Description** column header. You can display additional assay properties and descriptions in the **Select Assay** area by clicking the column header **Add Property/Description** or right-clicking a column header and selecting **Add Property/Description** from the contextual menu.
- On the **Assays Summary** form, the units for properties can be selected when applicable using the drop-down list next to the **Add Property/Description** column header. You can display additional assay properties and descriptions by clicking the column header **Add Property/Description** or right-clicking a column header and selecting **Add Property/Description** from the contextual menu.
- On the **Conventional Results** or **Molecular Results** form, the new **Show Results Only** / **Show Results and Inputs** toggle button lets you choose between displaying only results and displaying the result value and the input value together in one cell. The black value on the top left is the result value. The gray value on the bottom right is the input value.

Compatibility Notes

This section describes the differences that you might encounter between HYSYS Petroleum Refining V11 and HYSYS Petroleum Refining V10. In most cases, previous HYSYS input files and backup files are completely compatible with HYSYS Petroleum Refining V10.

HYPlan Utility

- In previous versions of HYSYS, the units specified in the HYPlan utility were only used in plots. In HYSYS V11, the units are used when the HYPlan model is exported.

- In previous versions of HYSYS, users could specify FOE values. In HYSYS V11, you can directly specify specific gravity values instead.
- Due to changes in HYPlan tuning, you may notice minor differences between the predicted results from HYPlan models compared to those created in previous versions.

Aspen Assay Management

Improved Handling of Pre-V8.4 User Specifications for Total Percentage for Light Ends

Prior to V8.4, the **Specification** tab for macro-cut assays included an **Input** check box in the **Percentage Light End in Assay** group, which allowed you to specify the **Total Percentage** for light ends. If you opened a pre-V8.4 case with this selection in HYSYS V10, your selection was ignored.

In HYSYS V11, your specifications are taken into account when the case is restored.

Improved Characterization Results for Single Stream Assays

Due to improvements in single stream assay characterization in HYSYS V11, the density curves and distillation curves are more accurate. Results may differ from those in HYSYS V10, especially for light naphtha assays with narrow temperature ranges.

Improved Characterization Results for Assays with Aspen Properties Fluid Packages

In HYSYS V10 and earlier releases, when re-characterizing an assay with Aspen Properties fluid package, some thermodynamic properties (including critical temperature and pressure and acentric factor) were not properly re-estimated. In HYSYS V11, thermodynamic properties (including critical temperature and pressure and acentric factor) are now correctly re-estimated when the assay is re-characterized.

When you select the Aspen Properties HYSYS **Peng Robinson** package, to obtain similar results to the HYSYS **Peng-Robinson** package, you must specify the following using the **Hypotheticals Manager**:

- On the **Summary** tab of the **Hypotheticals Manager** view, specify the **Normal Boiling Pt**, **Molecular Weight**, and **Liquid Density**.
- On the **Settings** tab of the **Hypotheticals Manager** view, retain the default settings.

Fine Tuning Always Performed for Molecular Characterization

In HYSYS V10, the **Home** ribbon tab | **Molecular Characterization** group included a **Fine Tune** check box, which was available after molecular characterization was enabled. By default, the **Fine Tune** check box was cleared. Fine tuning was used to further fine tune the regressed molecular profiles, providing the best possible match to the three key assay properties, including TBP yield curve, API density and sulfur content. Molecular compositions of micro-cuts (as determined from the regressed molecular profiles) were adjusted iteratively to match the three properties one by one and cut by cut.

In HYSYS V11, fine tuning is always performed as part of the Molecular Characterization algorithm, so this check box was removed. For instances where the **Fine Tune** check box was cleared in a previous version, if you open the case in HYSYS V11, fine tuning will be applied. Your results may differ from those in previous versions.

What's Fixed in V11

Aspen HYSYS Petroleum Refining V11 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
21788	When attempting to install an oil to a Petroleum Distillation Column in HYSYS V9 or later, HYSYS failed.	Petroleum Distillation Columns no longer appear in the list of flowsheets to which an oil can be installed.
23764	When transferring factor sets to the Simulation environment after calibrating the FCC, if a calibration factor had a very small value (such as 1e-18), the factor was not updated.	This issue was fixed in HYSYS V11.
24132	Using the REFSRK component list with packages other than the REFSRK fluid package caused HYSYS to experience issues.	HYSYS prevents you from using the REFSRK component list with packages other than the REFSRK fluid package.
24229	In the FCC Calibration environment, deleting all available data sets sometimes caused HYSYS to fail.	This issue was fixed in HYSYS V11.
103064	RON and MON could not be shifted for pure components using the Assay Manipulator.	RON and MON can be shifted for pure components using the Assay Manipulator.
116173	For Hydrocrackers that only included hydrotreater beds, clicking **Push Data to Simulation** in the Calibration environment did not correctly push the results to the Simulation environment.	In HYSYS V11, the kinetic factors for the various activity classes are now properly applied, and this issue is resolved.
159214	In certain cases, when moving objects into sub-flowsheets or importing templates into sub-flowsheets, HYSYS failed.	This issue was fixed in HYSYS V11.
159216	In some instances, the **Reaction Activities** for the Alkylation Unit changed after each calibration run.	HYSYS V11 does not reset kinetic parameters immediately after a calibration run, which allows for consistent results if the calibration is re-run.
190988	For **Reformer/NHT/CGHT** feed transitions, the **Full Stream GC** and **Partial Stream GC** results were slightly inaccurate in some cases.	This issue was fixed in HYSYS V11.
259579	For the Hydrocracker, issues occurred when calibrating the cut points of the product transition.	This issue was fixed in HYSYS V11.

ID	Issue Description	Issue Resolution
260568	For sub-flowsheets using a Petroleum transition, HYSYS assumed that the internal stream was the inlet stream and that the external stream was the outlet stream.	A check is performed to ensure that these assumptions are correct in HYSYS V11.
262405	The Visbreaker failed to shift the viscosities in HYSYS V10 and used the base curves to calculate the viscosity targets.	Viscosity shifting was improved in HYSYS V11.
272512	When calculating the bottoms and distillation nitrogen for the Hydrocracker calibration target, sulfur was used instead of nitrogen.	This issue was fixed in HYSYS V11.
284596	Hydrocrackers that were created in a pre-V9 version of HYSYS did not allow you to directly add new calibration data sets. Instead, data sets could only be created by copying previous data sets and modifying them.	This issue was fixed in HYSYS V11.
290249	The Concarbon and Asphaltenes content was not maintained across the Visbreaker.	A balance equation was implemented to ensure that equal amounts of Concarbon and Asphaltenes content are entering and exiting the Visbreaker.
292774	A display issue occurred for the **Penetration Index** when the value was **<empty>.**	This issue was fixed in HYSYS V11.
294294	The Keq intercept values were not initialized properly for the Isomerization Unit, which sometimes lead to calibration failure.	This issue was fixed in HYSYS V11.
301153	In situations where the names of objective function terms for hydrogen consumption in the Hydrocracker were excessively long, only the first two terms were included in the objective function.	This issue was fixed in HYSYS V11.
305579	In some cases, if a Refining Short-Cut Column variable had been added to a Spreadsheet, deleting the Refining Short-Cut Column caused HYSYS to fail.	This issue was fixed in HYSYS V11.
307327	Deleting a Delayed Coker that was created in HYSYS V10 caused HYSYS to fail.	This issue was fixed in HYSYS V11.
387830	Due to a rounding error within the Refining Short-Cut Column, the yield fractions summed to a value slightly greater than 1.	This issue was fixed in HYSYS V11.

ID	Issue Description	Issue Resolution
388566	In situations where an FCC variable was calculated by a Spreadsheet, ignoring the Spreadsheet did not reset specifications for the FCC.	This issue was fixed in HYSYS V11.

Assay Management in HYSYS

ID	Issue Description	Issue Resolution
23860	In some instances, results for streams using backblending were unreasonable.	This issue was fixed in HYSYS V11.
24253	The Guide Point functionality did not work properly.	The Guide Point functionality was removed from the **Assay Management** ribbon tab.
106559	Changing an existing component list could lead to incorrect component compositions and properties when using Aspen Assay Management.	In HYSYS V11, additional checks are performed to ensure correct behavior when modifications are made to the component list.
287294	Petroleum assays failed to characterize when a 0% distillation point was not specified.	This issue was fixed in HYSYS V11.
389482	In some cases, the following issues occurred in Aspen Assay Management: • For hypothetical components, negative molecular weight values were sometimes reported, resulting in issues with thermal conductivity calculations. • Light end compositions were overwritten when the assay was re-characterized.	This issue was fixed in HYSYS V11.

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 V11

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

Compatibility Notes for V11

There are no compatibility notes listed for this release.

Exchanger Design and Rating

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

- New Features and Enhancements for the Exchanger Design and Rating Programs
- What's Fixed 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 V11

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 V11

Drag and drop between EDR cases

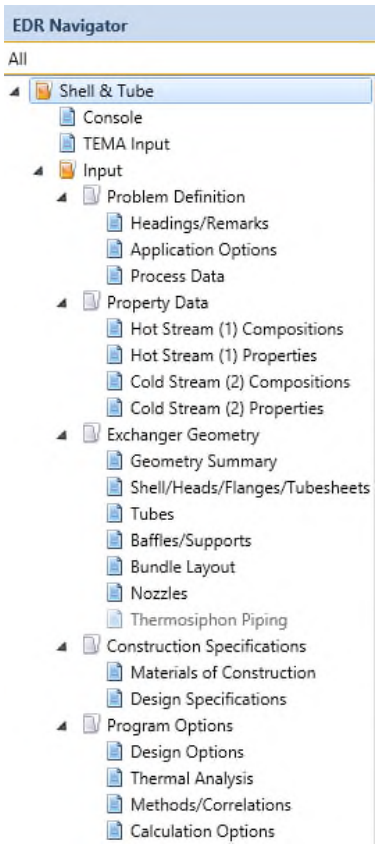
This feature allows you to drag and drop input data between EDR cases. Any input node in the EDR navigation tree can be dragged from the source EDR application and dropped anywhere in the target EDR application. Drag and drop can only be between two EDR applications of the same type (for example, between two Shell and Tube Exchangers or between two Air Cooled Exchangers).

Usage notes:

1. As stated above, drag and drop can only be between two EDR applications of the same type.
2. Only drag-and-drop of input is supported. Drag-and-drop of Results is not supported.
3. The copied data will overwrite data in the target application. You will be prompted to OK this action.
4. The drag-and-drop can be cancelled by pressing the Esc key. Alternatively, the drag-and-drop is cancelled if the drop is on the source.

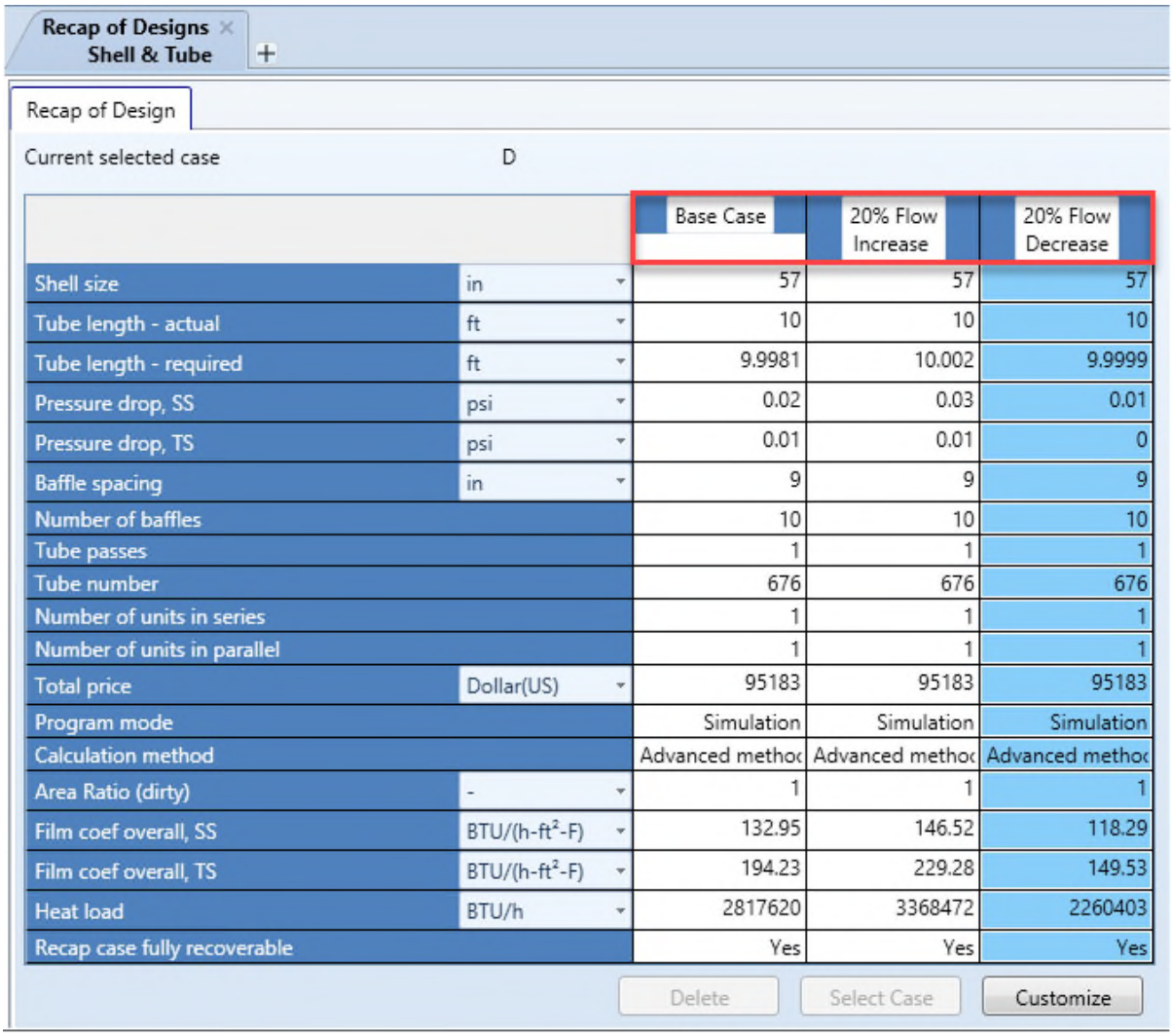
5. All copied data goes into the target application as user input. Default values in the source application will be user-input values in the target application. This may impact active input checking which can set default values for missing input.

The EDR Navigator is shown below. For example, to copy all exchanger geometry, click and drag the **Exchanger Geometry** node in the source application and drop it anywhere in the target application. To copy the entire **Shell and Tube** case, drag the Shell & Tube node and drop it anywhere in the target application.



Recap of Design Case names

You can now enter a name for each case in **Recap of Design**, allowing you to provide a description of the case.



Compatibility Notes for V11

This section describes the differences that you might encounter between Aspen EDR V11 and Aspen EDR V10.1.

Coexistence

Aspen Exchanger Design and Rating V11 can coexist with versions V10.1 and earlier

64-bit EDR

Aspen Exchanger Design and Rating V11 is 64-bit and must be used with Aspen Plus and Aspen Properties V11, which are also 64-bit. EDR V11 will automatically use Aspen Properties V11, even if an earlier 32-bit version of Aspen Properties is registered.

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

EDR V11 integrates only with Aspen Plus V11 and Aspen HYSYS V11. This means only EDR V11 models can be integrated in Aspen Plus V11 and Aspen HYSYS V11 flowsheets.

User Correlations for Platefin and CoilWound Exchangers

Aspen Exchanger Design and Rating V11 is 64-bit and any user correlation for Platefin Exchanger and CoilWound Exchanger must also be 64-bit

What's Fixed in EDR V11

ID	Issue Description	Issue Resolution
306686	SaveAsEDR not converting .bit files to .edr	This issue was fixed in EDR V11.
291588	In **Properties** the **Delete** button in **Pressure levels** is disabled and cannot be re-enabled.	This issue was fixed in EDR V11.

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 V11

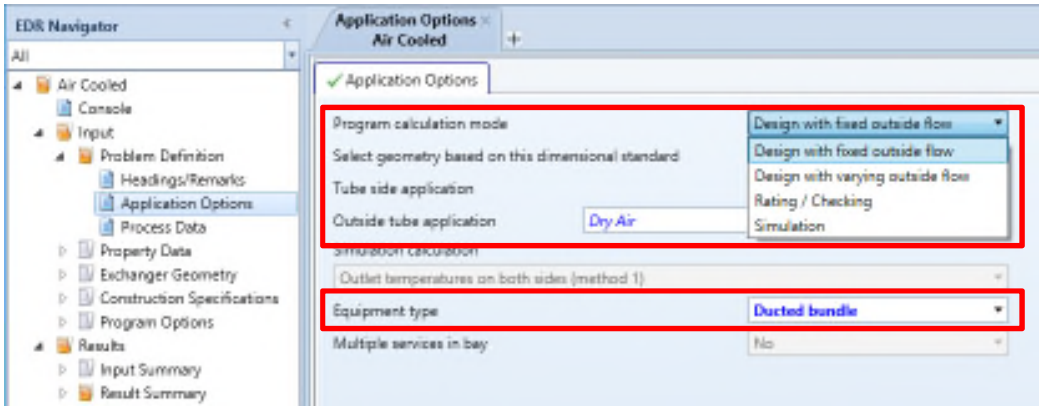
The following new features and enhancements were added in release V11:

- Design a heat recovery (ducted) bundle
- Added Notes field to the setting plan drawing
- Add Find Fouling and Natural Convection simulation modes in HYSYS

Design a ducted (heat recovery) bundle

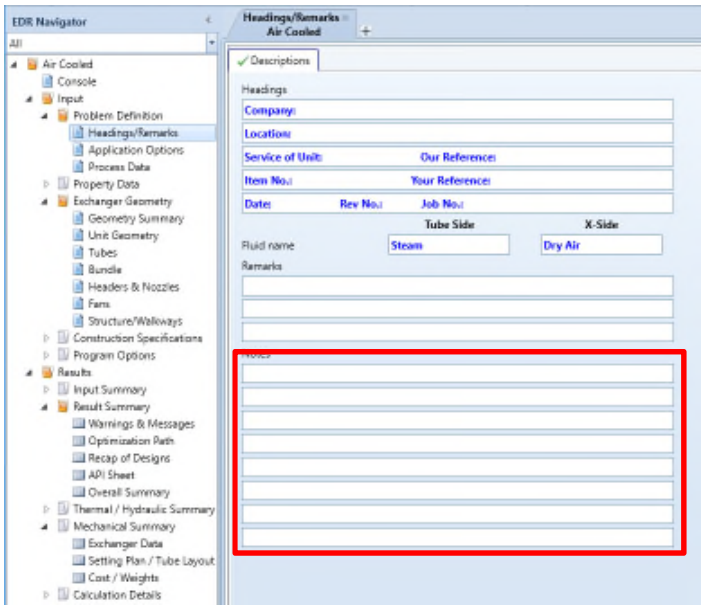
Designing a ducted (heat recovery) bundle with a fixed or varying outside flow rate is added to version V11.

Now you can select Ducted bundle for the Equipment type and Design with fixed outside flow or Design with varying outside flow for Program calculation mode in the | Input | Problem Definition | Application Options | Application Options tab:



Added Notes field to the setting plan drawing

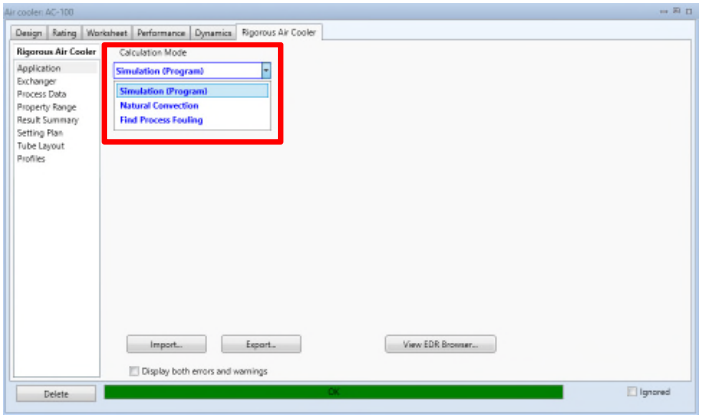
A Notes field section has been provided for comments that will appear in the setting plan drawing:



The Notes will appear here in the Setting Plan:

Add Find Fouling and Natural Convection simulation modes in HYSYS

The option to run Find process fouling and Natural convection simulation modes is added to the Rigorous Air Cooler in HYSYS. Now you can select **Find Process Fouling** or **Natural Convection** from the dropdown options of the Calculation Mode in the Rigorous Air Cooler tab | Application page.



Compatibility Notes for V11

This section describes the differences that you might encounter between Aspen Air Cooled Exchanger V11 and Aspen Air Cooled Exchanger V10.1.

Coexistence

Aspen Air Cooled Exchanger V11 can coexist with versions V10.1 and earlier.

64-bit EDR

Aspen Air Cooled Exchanger V11 is 64-bit and must be used with Aspen Plus and Aspen Properties V11, which are also 64-bit. Air Cooled Exchanger V11 will automatically use Aspen Properties V11, even if an earlier 32-bit version of Aspen Properties is registered.

Air Cooled Exchanger V11 can only import from Aspen Plus V11. 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 V11 can import from any version of Aspen HYSYS, including 32-bit versions (V8.8, V9.0, V10).

Air Cooled Exchanger V11 integrates only with Aspen Plus V11 and Aspen HYSYS V11. This means only Air Cooled Exchanger V11 models can be integrated in Aspen Plus V11 and Aspen HYSYS V11 flowsheets.

What's Fixed in V11

ID	Issue Description	Issue Resolution
385767	Estimation of total heat load for humid air where airside condensation does not occur needs improvement. This affects the airside outlet temperature.	This issue was fixed in EDR V11.
366275	A crash occurs when the unit of measure for pressure drop is unknown and displayed as blank.	This issue was fixed in EDR V11.
357445	Convergence problem	This issue was fixed in EDR V11.
299637	Issue with fouling resistance specified on the extended surface	This issue was fixed in EDR V11.
272245	Missing equations to Outside Enhancement topic in Help.	This issue was fixed in EDR V11.

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.

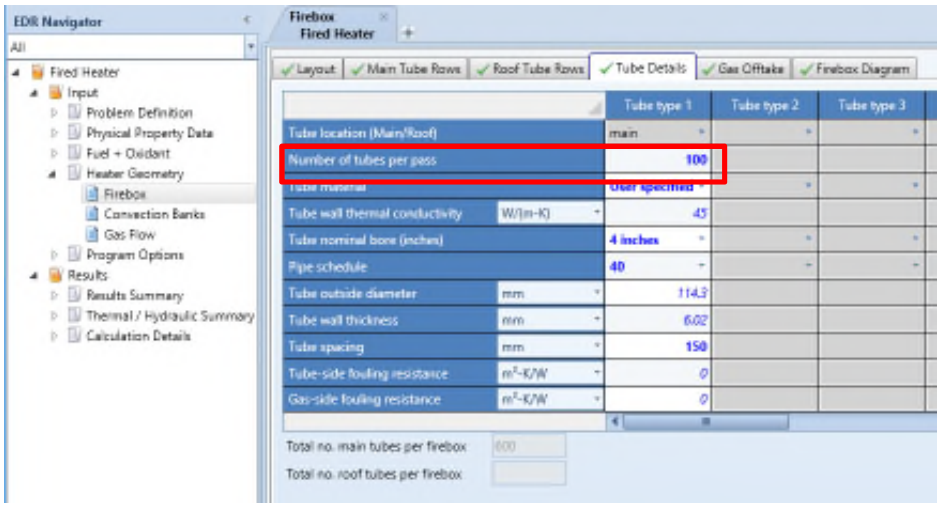
New Features and Enhancements

The following new features and enhancements are added in release V11:

- Handle more than 50 tubes in a firebox pass
- Steam injection in HYSYS rigorous fired heater simulation

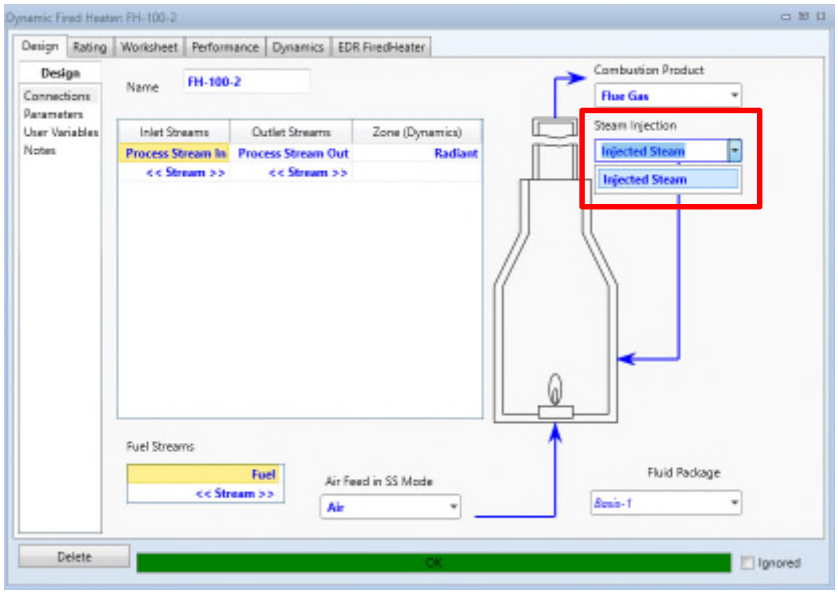
Handle more than 50 tubes in a firebox pass

Now you can specify up to 100 tubes per pass in a firebox. Prior to version V11, the maximum number of tubes per pass is 50.

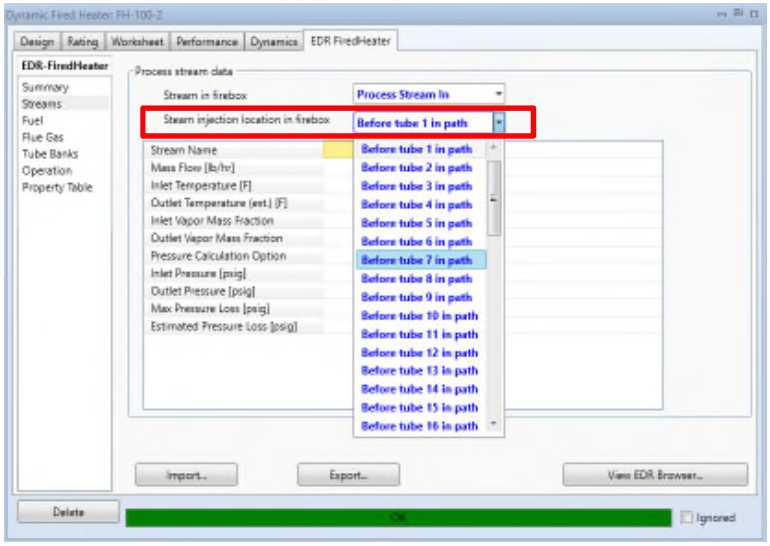


Steam injection in HYSYS rigorous fired heater simulation

The capability to run steam injection in the firebox is added to the Rigorous Fired Heater in HYSYS. First create an injected steam material stream, then select it from the material stream dropdown list of Steam Injection in Design tab | Connection page.



Next, select the steam injection location from the dropdown list of Steam injection location in firebox in EDR FiredHeater tab | Streams page.



Compatibility Notes for V11

This section describes the differences that you might encounter between Aspen Fired Heater V11 and Aspen Fired Heater V10.1.

Coexistence

Aspen Fired Heater V11 can coexist with versions V10.1 and earlier.

64-bit EDR

Aspen Fired Heater V11 is 64-bit and must be used with Aspen Plus and Aspen Properties V11, which are also 64-bit. Aspen Fired Heater V11 will automatically use Aspen Properties V11, even if an earlier 32-bit version of Aspen Properties is registered.

Aspen Fired Heater V11 can only import from Aspen Plus V11. 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 V11 can import from any version of Aspen HYSYS, including 32-bit versions (V8.8, V9.0, V10).

Aspen Fired Heater V11 integrates only with Aspen HYSYS V11. This means only Aspen Fired Heater V11 models can be integrated in Aspen HYSYS V11 flowsheets.

Stream Overview Report

The Results | Thermal / Hydraulic Summary | Stream Overview | Inlet + Outlet Properties report now reports properties only if the stream phase exists. Earlier versions reported values for both vapor and liquid phases, even if the phase does not exist at the stream temperature and pressure.

What's Fixed in V11

ID	Issue Description	Issue Resolution
274091	Problems calculating fluegas acid dew point.	This issue was fixed in EDR V11.
229289	Reporting of the number of tubes in the API sheet is incorrect.	This issue was fixed in EDR V11.

ID	Issue Description	Issue Resolution
229271	Help does not state that the effective tube length reported in the API sheet does not include the U-bend tube length.	This issue was fixed in EDR V11.

Aspen Plate Exchanger

Product Description

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

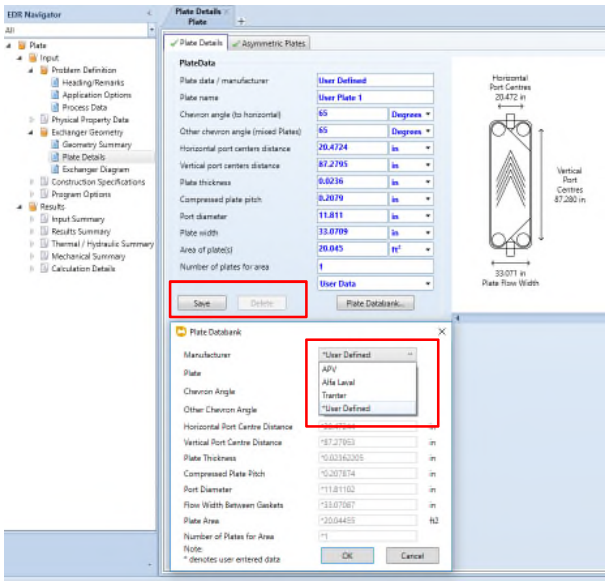
New Features and Enhancements V11

The following new features and enhancements were added in release V11:

- Save user-specified plate data in the plate databank
- Add Reynolds numbers, velocity and shear stress to the interval analysis

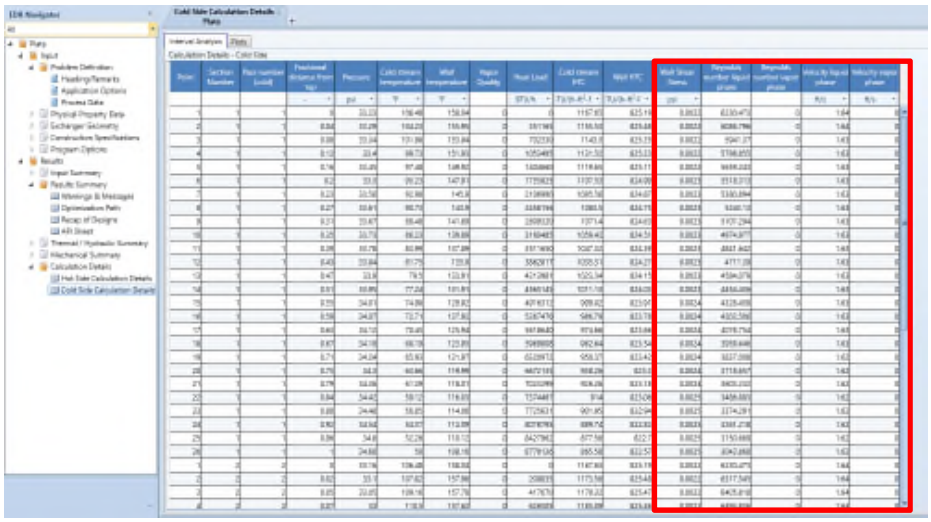
Save user-specified plate data in the plate databank

V11 adds a feature to save user-specified plate data entered in Plate Details tab into a customized database. The saved user-specified plate data can also be deleted. When you want to retrieve data from Plate DataBank, both Manufacturer data and the saved user data will be available.

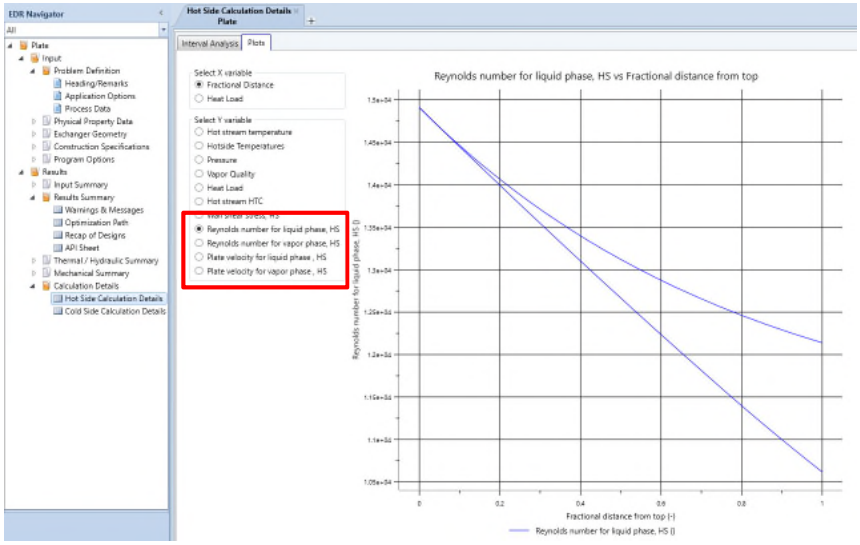


Add Reynolds numbers, velocity and shear stress to the interval analysis

Now you can review the calculated wall shear stress, Reynolds number for liquid phase and vapor phase, and velocity for liquid phase and vapor phase at each of the calculation points in | Results | Calculation Details | Hot Side (or Cold Side) Calculation Details | Interval Analysis tab:



You can also view the plot of the calculated wall shear stress, Reynolds number for liquid phase, Reynolds number for vapor phase, velocity for liquid phase, or velocity for vapor phase against fractional distance or heat load in **| Results | Calculation Details | Hot Side (or Cold Side) Calculation Details | Plot** tab:



Compatibility Notes for V11

This section describes the differences that you might encounter between Aspen Plate Exchanger V11 and Aspen Plate Exchanger V10.1.

Coexistence

Aspen Plate Exchanger V11 can coexist with versions V10.1 and earlier.

64-bit EDR

Aspen Plate Exchanger V11 is 64-bit and must be used with Aspen Plus and Aspen Properties V11, which are also 64-bit. Aspen Plate Exchanger V11 will automatically use Aspen Properties V11, even if an earlier 32-bit version of Aspen Properties is registered.

Aspen Plate Exchanger V11 can only import from Aspen Plus V11. 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 V11 integrates only with Aspen Plus and Aspen HYSYS V11. This means only Aspen Plate Exchanger V11 models can be integrated in Aspen Plus and Aspen HYSYS V11 flowsheets.

Exchanger Weight

Aspen Plate Exchanger V11 corrects the exchanger weight for cases with multiple exchangers. When the number of exchangers is one the weight is unchanged.

Exchanger Residence Volume and Residence Time

Aspen Plate Exchanger V11 corrects the exchanger residence volume for cases with multiple exchangers. The residence time changes because residence volume changed. When the number of exchangers is one the residence volume and residence time are unchanged.

Exchanger Cost

The exchanger cost has been updated in Aspen Plate Exchanger V11.

What's Fixed in V11

ID	Issue Description	Issue Resolution
290900	Tooltip for input Number of exchanger to "number of exchangers in parallel" not working.	This issue was fixed in EDR V11.
287493	Problems with the residence volume calculation for multiple exchangers.	This issue was fixed in EDR V11.
266191	EDR crash in Aspen HYSYS occurs when trying to view Plate Details in the EDR Browser.	This issue was fixed in EDR V11.
261246	Need to add operation warning 1057 when actual surface area is less than the required surface area.	This issue was fixed in EDR V11.
232615	Reporting of Overall coefficient (UA) in API sheet, line 36 is wrong.	This issue was fixed in EDR V11.

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.

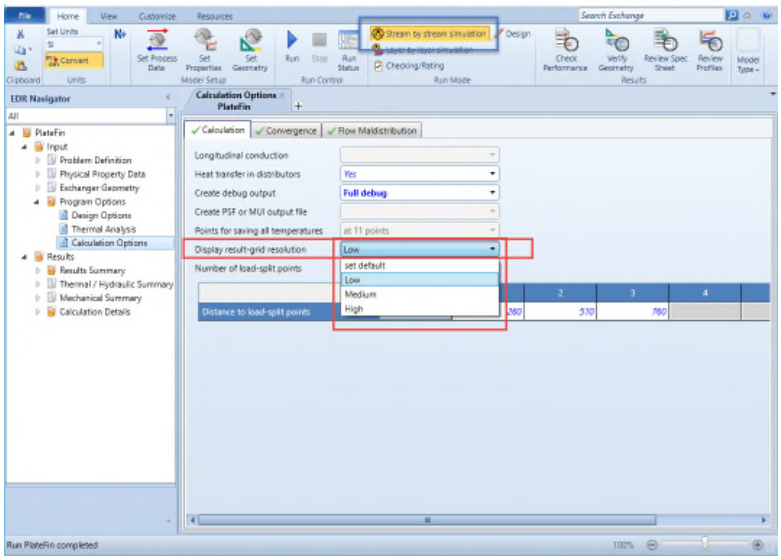
New Features and Enhancements for V11

The following new feature was added in release V11:

- Added more crossflow points in results

Added more crossflow points in results

For EDR versions prior to V11, in a crossflow PlateFin case, stream details results are only shown for three points in the crossflow direction. In V11, the **Display result-grid resolution** input has three choices for the number of display points: Low, Medium and High grid resolutions. You will observe the effect of (crossflow) grid resolution in Stream Plots and 3D stream plots in Stream Details node.



Compatibility Notes for V11

This section describes the differences that you might encounter between Aspen Plate Fin Exchanger V11 and Aspen Plate Fin Exchanger V10.1.

Coexistence

Aspen Plate Fin Exchanger V11 can coexist with versions V10.1 and earlier.

64-bit EDR

Aspen Plate Fin Exchanger V11 is 64-bit and must be used with Aspen Plus and Aspen Properties V11, which are also 64-bit. Aspen Plate Fin Exchanger V11 will automatically use Aspen Properties V11, even if an earlier 32-bit version of Aspen Properties is registered.

Aspen Plate Fin Exchanger V11 can only import from Aspen Plus V11. 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 V11 can import from any version of Aspen HYSYS, including 32-bit versions (V8.8, V9.0, V10).

Aspen Plate Fin Exchanger V11 integrates only with Aspen HYSYS V11. This means only Aspen Plate Fin Exchanger V11 models can be integrated in Aspen HYSYS V11 flowsheets.

User Correlations

Aspen Exchanger Design and Rating V11 is 64-bit and any user correlation for Platefin Exchanger must also be 64-bit. The starter Visual Studio project delivered in EDR V11 has been converted to 64-bit.

What's Fixed in V11

ID	Issue Description	Issue Resolution
359270	There is an error with the reporting of inlet/outlet distributor pressure drops when one of the streams is marked as "No flow (ignore)"	This issue was fixed in EDR V11.
305672	Problem with the full end distributor pressure drop calculation	This issue was fixed in EDR V11.
305267	Problem with the heat load calculation when the liquid heat transfer coefficient is input, and the program calculates any other coefficient (vapor or two phase).	This issue was fixed in EDR V11.
303673	Incorrect heat curve in a specific case	This issue was fixed in EDR V11.
263594	Incorrect error 1123 "no data input provided for Generic:…".	This issue was fixed in EDR V11.
258952	Problem with the reporting of zero area in Alpema sheet	This issue was fixed in EDR V11.
163269	Display of thermosiphon results is incorrect.	This issue was fixed in EDR V11.

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 V11

The following new features and enhancements were added in release V11:

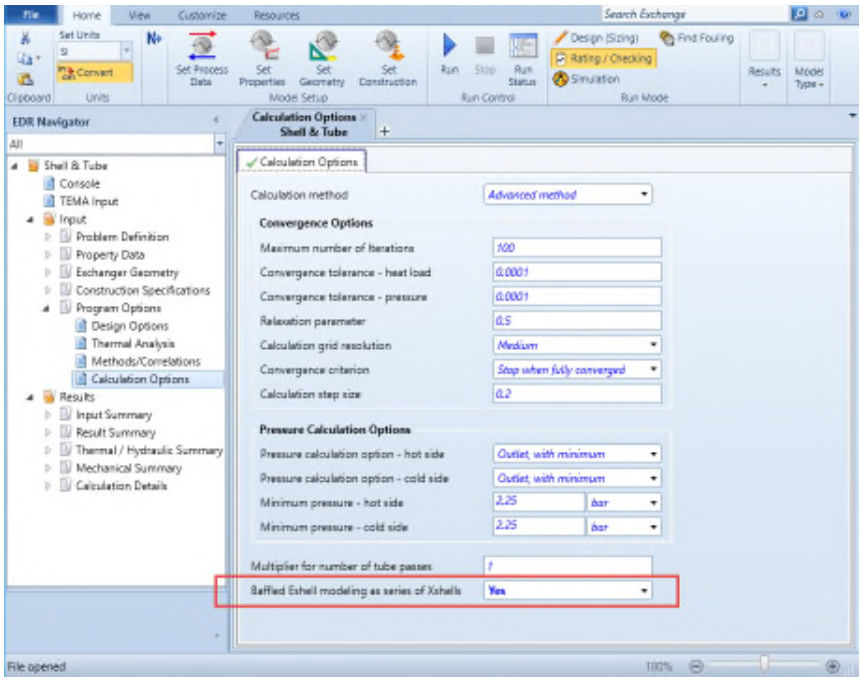
- Added Baffled E-shell modeling as series of X-shells (two-dimensional modeling)
- Added overall flow and duty multiplier
- Added TEMA sheet input page
- Added summary message information and links in the Performance report
- Modified viscosity calculation approach for a mixture of two liquid phases in condensation and Falling Film Evap (modified HTFS selected method)
- Added Read/Front head OD as input
- Added minimum design metal temperature (MDMT) to the TEMA sheet (design temperature line)
- Added heat exchanger configuration diagram in Baffle and Longitudinal Baffles pages
- Added a diagram to clarify flow fractions in the Flow Analysis report
- Added New output variables in calculation details
- Added Notes field to the tube layout and setting plan drawings
- Added TEMA RGP-RCB-4.6.1 Distributor Belts
- Added separate liquid and vapor outlet nozzle information to TEMA sheet

Added Baffled E-shell modeling as series of X-shells (two-dimensional modeling)

This feature allows you to model E, I or J-shells with a small number of baffles (e.g. one or two up to five) as a series of X-shells. It models each baffle-space using a crossflow grid, similar to that used for X-shells. This feature gives a better representation of local temperature differences between the streams. It is particularly targeted at exchangers with a single baffle, such as those with down flow condensation in the inlet end space, followed by upflow condensation in the narrower outlet endspace.

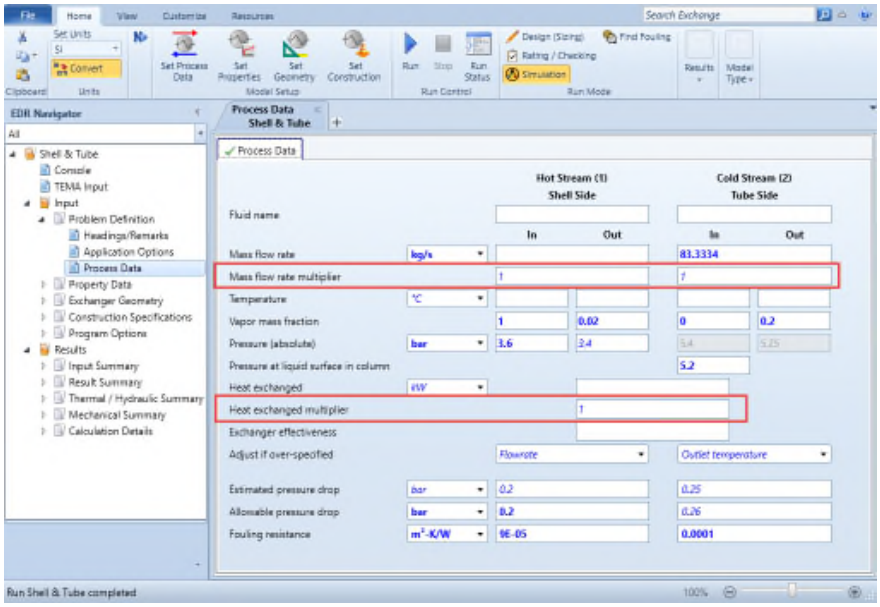
The following restrictions exist for this feature:

- Only available for E, I, or J shells
- Only for single segmental baffle type
- Exchangers with 1 or 2 baffles, or up to 5 baffles
- Not for design mode



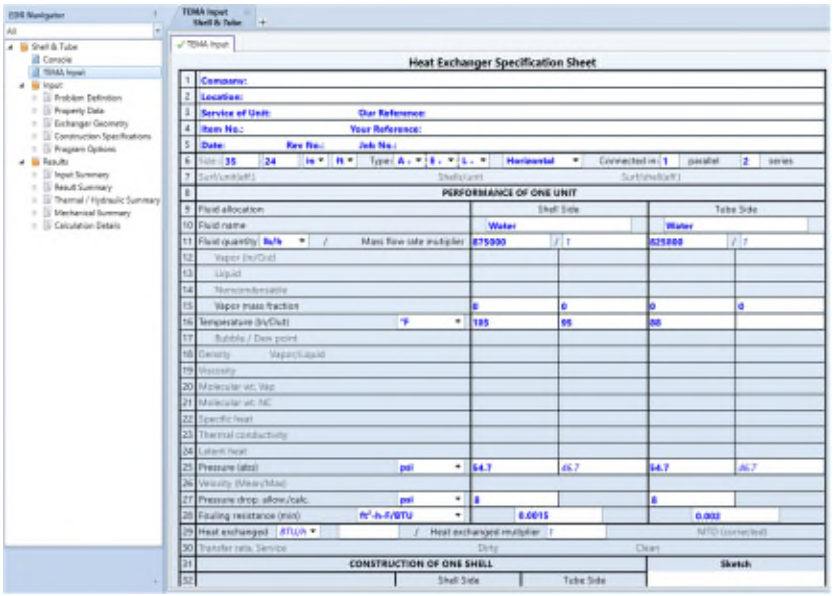
Added overall flow and duty multiplier

Mass flow rate and heat duty (heat exchanged) multipliers are added in the process data page. Overall mass flow rate considered in the heat transfer calculation is the "mass flow rate" multiplied by the "mass flow rate multiplier". A similar approach is applied for the overall heat duty (heat exchanger).



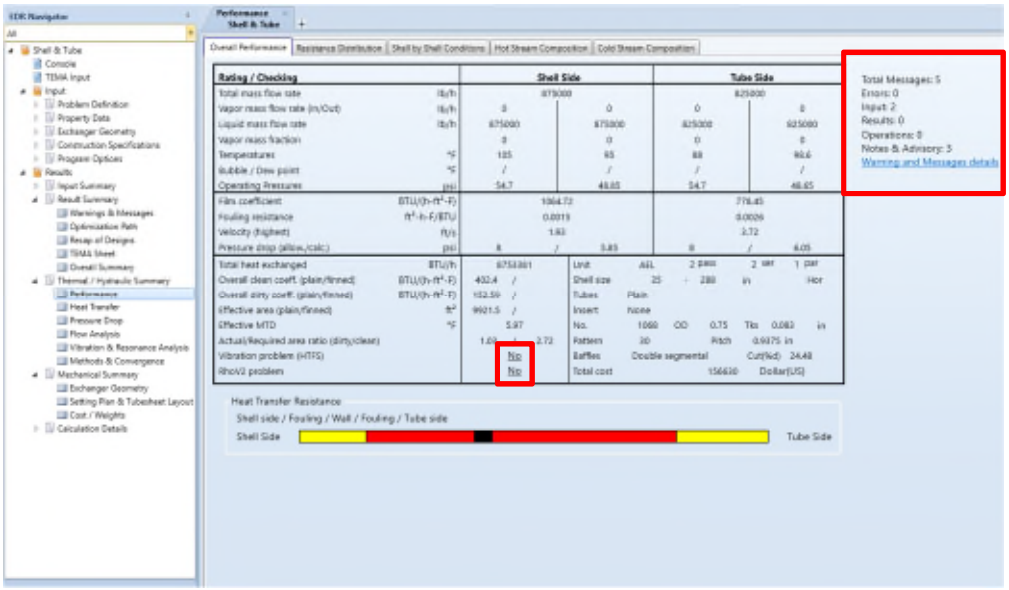
Added TEMA sheet input page

V11 provides a concise TEMA Input page. This is located under Console node in the Navigation tree. The TEMA sheet input page has the same format as the standard TEMA sheet and allows you to specify key process and geometry information on one page. Variables on this page are also present on other forms in the input section, and are synchronized.



Added summary message information and links in the Performance report

The Performance report now has a section near the top that provides a summary of warnings and messages, as well as a link to go to the warnings and messages form. Also, the **Vibration problem** and **RhoV2 problem** values now have hyperlinks to the Vibration & Resonance Analysis and Flow Analysis reports.

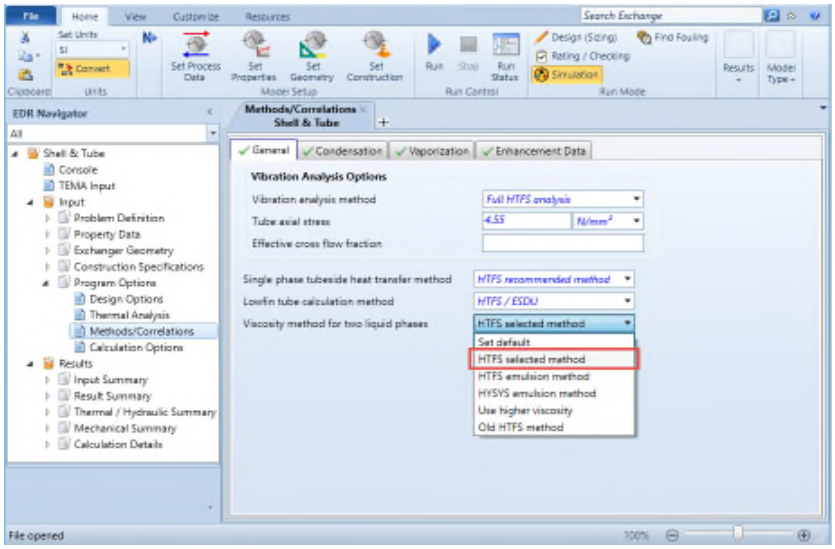


Modified viscosity calculation approach for a mixture of two liquid phases in condensation and Falling Film Evap (modified HTFS selected method)

The "HTFS selected method" uses the higher viscosity method (details below) for condensing flows, and the new HTFS emulsion method for single phase and boiling flows.

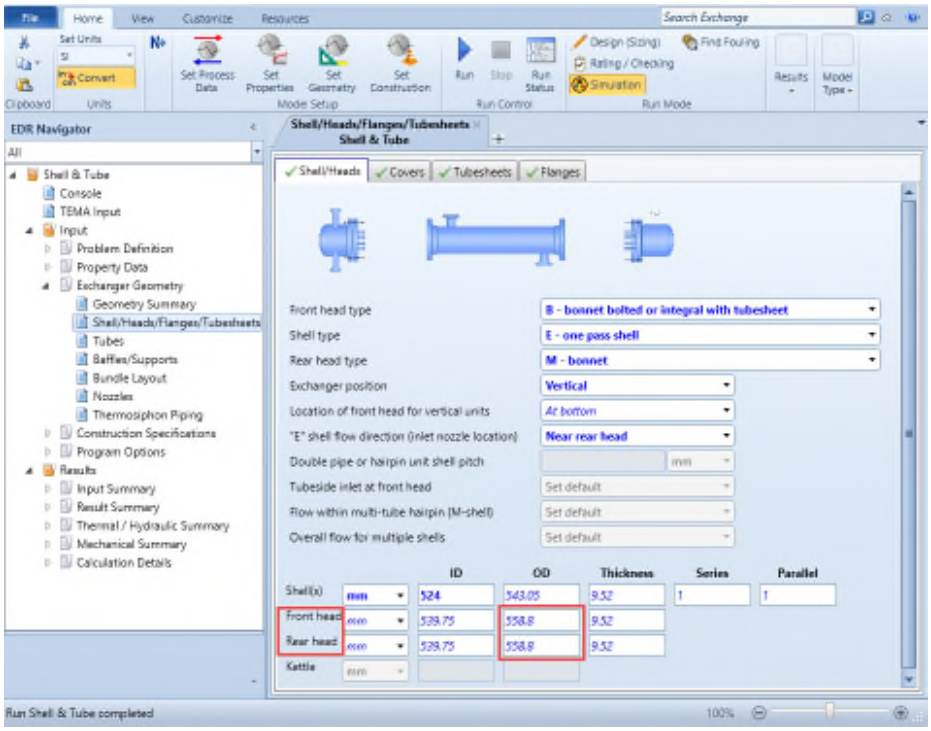
In earlier versions, for "use the higher viscosity" method, the higher viscosity was used as long as that phase constituted above 5% (by volume) of the 2-liquid mixture. Below this the viscosity was

transitioned towards that of the lower viscosity phase. This new method will almost always begin to transition at higher percentages. In some cases, this will result in significantly higher heat transfer and lower pressure drops than the earlier version predicted.



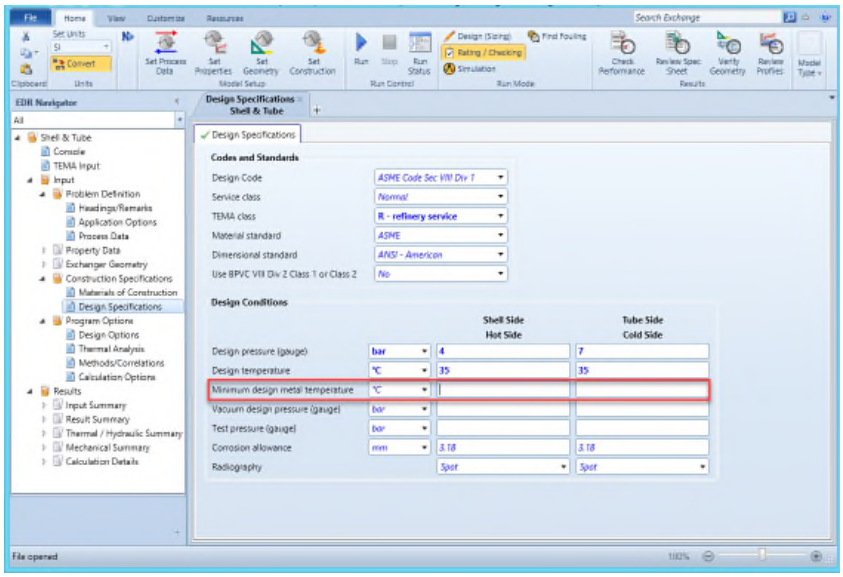
Added Read/Front head OD as input

Input controls are added for Front/Rear head OD, in Shell/Heads page. You can choose two out of three options of ID, OD, and thickness to specify the front/rear head.

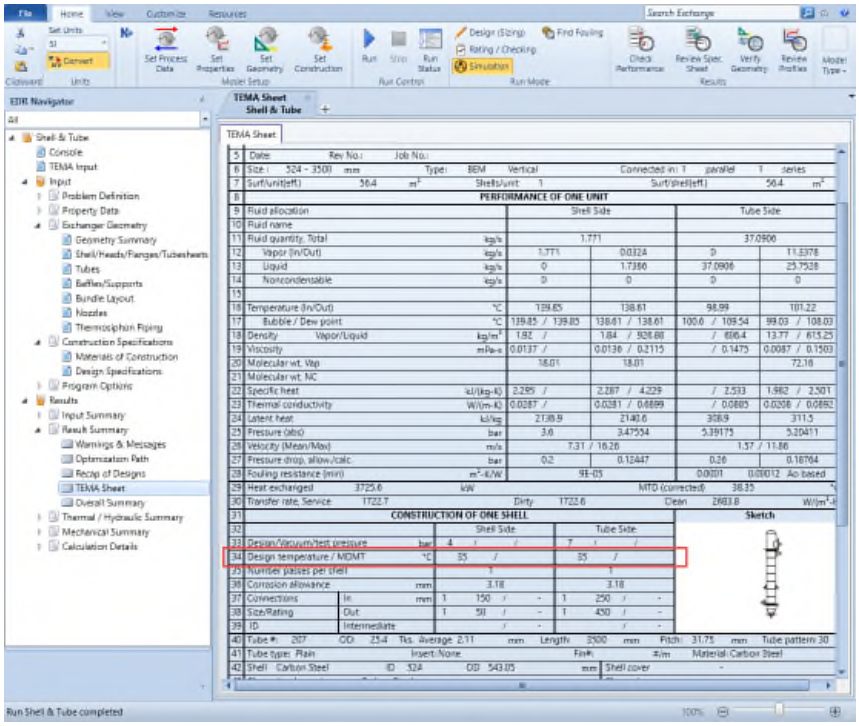


Added minimum design metal temperature (MDMT) to the TEMA sheet (design temperature line)

A new input is added for the minimum design metal temperature (MDMT) in the Design Specifications page.



After running the case, the MDMT is displayed in the TEMA sheet on line 34.



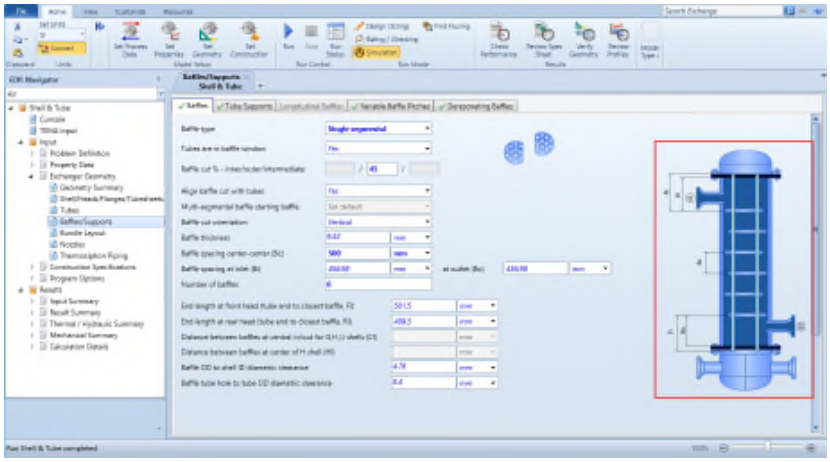
Added heat exchanger configuration diagram in Baffle and Longitudinal Baffles pages

To help visualize various distance inputs in the Baffles page, the exchanger configuration diagram is added with the following specifications:

- Exchanger orientation
- Inlet/Outlet locations
- Baffle spacing (at inlet, center-center)
- End length at front/rear head
- Distances between baffles at central in/out for G, H, I and J shells

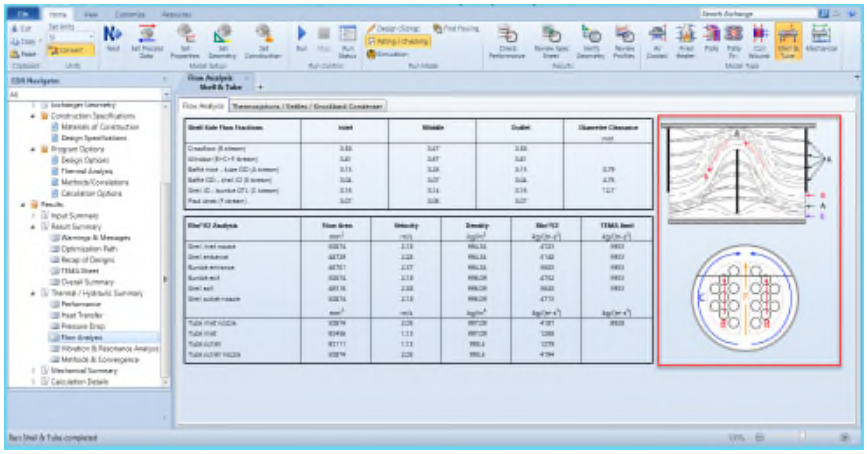
- Distance between baffles at center of H shell

For F, G, and H shells, a similar picture is shown in Longitudinal Baffles page.



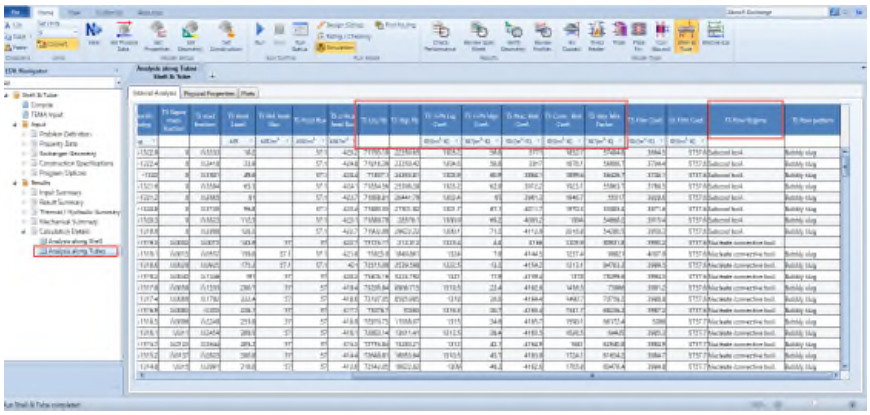
Added a diagram to clarify flow fractions in the Flow Analysis report

Diagrams are added to the Flow Analysis report to clarify flow fractions.



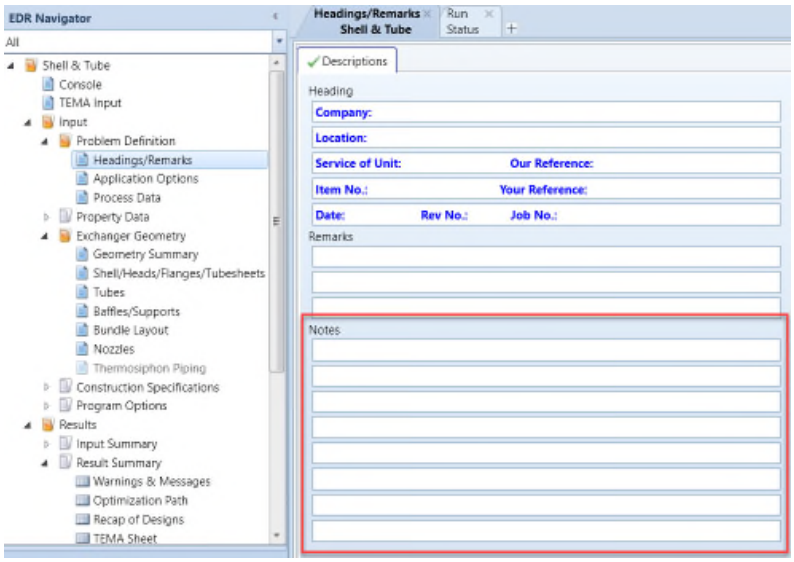
Added New output variables in calculation details

New variables are added to the "analysis along Shell/Tube" pages to facilitate the detailed understanding of heat and mass transfer within the exchanger. This option is most helpful in boiling and condensation cases for which various components of heat transfer are reported.



Added Notes field to the tube layout and setting plan drawings

A Notes field section has been provided for comments that will appear in the tube layout and setting plan drawings:



The Notes will appear here in the Setting Plan:

Design Data	Units	Shell	Channel
Design Pressure	psi	70	70
Design Temperature	°F	170	170
Full Vacuum			
Corrosion Allowance	in	0.125	0.125
Test Pressure	psi		
Number of Passes		1	2
Radiography			
PWHT			
Internal Volume	ft³	79.8341	74.3984

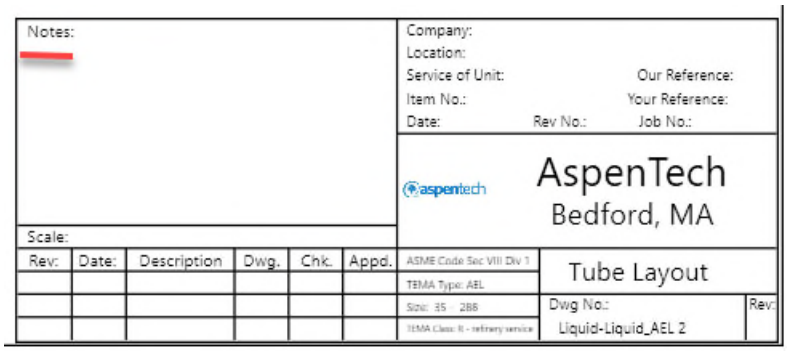
Weight Summary		
Empty	Flooded	Bundle
24144 lb	33566 lb	16625 lb

Notes:

Scale:

Rev:	Date:	Description	Dwg.	Chk.	Appd.

And here in the Tube Layout:

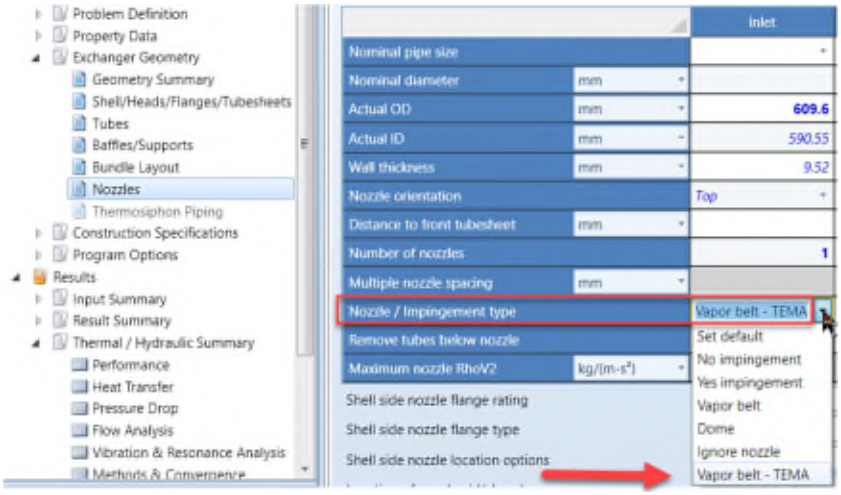


Added TEMA RGP-RCB-4.6.1 Distributor Belts

V11 has an option to select Vapor/Distributor belts in accordance to TEMA RGP-RCB-4.6.1

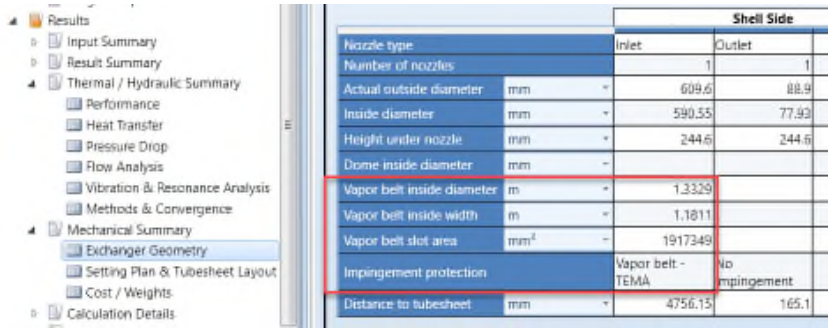
This feature provides commonalty for those designs that require compliance with TEMA guidelines.

The option in input is here:

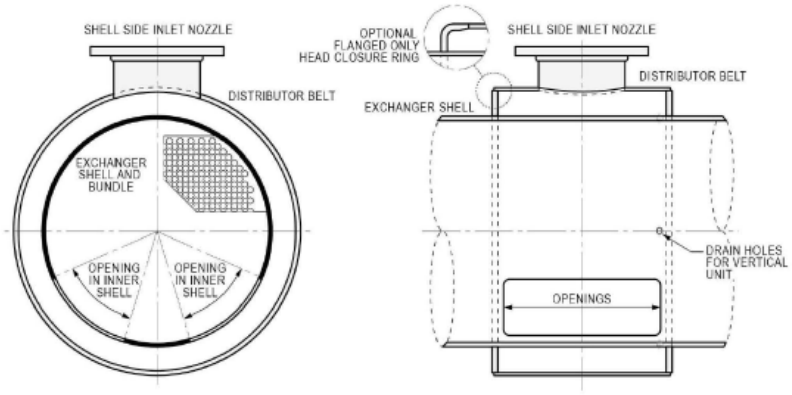


Calculations will determine the vapor/distributor diameter as well as the recommended total slot area for optimum fluid flow.

Typical output looks like this:

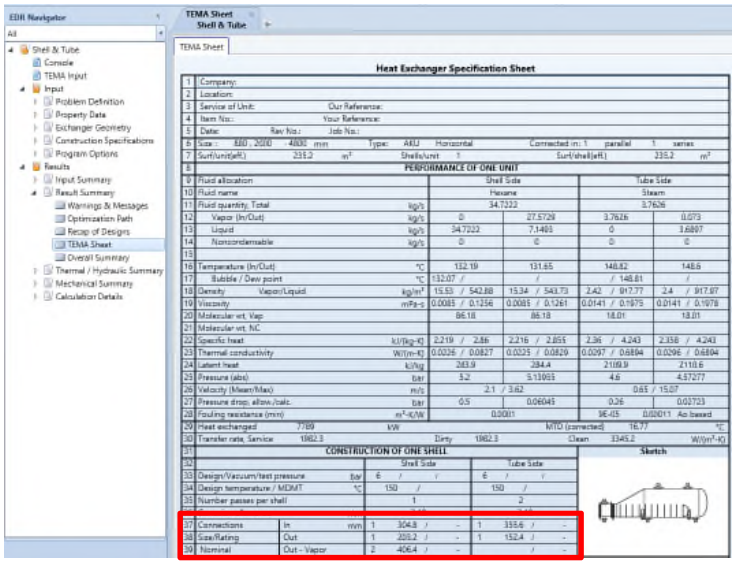


The typical vapor/distributor belt arrangement (from TEMA FIGURE RGP-RCP-4.6.1: EXAMPLE DISTRIBUTOR BELT CONFIGURATION) is shown below:



Added separate liquid and vapor outlet nozzle information to TEMA sheet

The TEMA sheet will now display the geometry information for both outlet nozzles if the exchanger has separate liquid and vapor outlet nozzles.



Compatibility Notes for V11

This section describes the differences that you might encounter between Aspen Shell and Tube Exchanger V11 and Aspen Shell and Tube Exchanger V10.1.

Coexistence

Aspen Shell and Tube Exchanger V11 can coexist with versions V10.1 and earlier.

64-bit EDR

Aspen Shell and Tube Exchanger V11 is 64-bit and must be used with Aspen Plus and Aspen Properties V11, which are also 64-bit. Aspen Shell and Tube Exchanger V11 will automatically use Aspen Properties V11, even if an earlier 32-bit version of Aspen Properties is registered.

Aspen Shell and Tube Exchanger V11 can only import from Aspen Plus V11. 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 V11 can import from any version of Aspen HYSYS, including 32-bit versions (V8.8, V9.0, V10).

Aspen Shell and Tube Exchanger V11 integrates only with Aspen Plus and Aspen HYSYS V11. This means only Aspen Shell and Tube Exchanger V11 models can be integrated in Aspen Plus and Aspen HYSYS V11 flowsheets.

CALGAVIN hiTRAN Wire Matrix

Aspen Shell and Tube Exchanger V11 is not compatible with the hiTRAN Wire Matrix tube inserts calculation library. Please use EDR V10 or V10.1 until this is resolved.

Improved Weight Calculation

Aspen Shell and Tube Exchanger V11 has improved the weight calculation, making it closer to Shell and Tube Mechanical. You will see differences in exchanger weights for U-tubes and Bonnet type front heads, due to improved volume calculations.

The weight is reported in three places:

- TEMA sheet, line 55
- Setting Plan, Weight Summary table

Results | Mechanical Summary | Cost / Weights

What's Fixed in V11

ID	Issue Description	Issue Resolution
388399	In Use Existing Layout when there are no nozzles, a crash occurs	This issue was fixed in EDR V11.
388266	Issue when importing a PSF file with a single stream that is missing process data.	This issue was fixed in EDR V11.
367068	Weir OD input is not used.	This issue was fixed in EDR V11.
356163	A results error occurs when the hot stream temperature increases or cold stream temperature decreases.	This issue was fixed in EDR V11.
351795	In a BKU when only properties at the bubble and dew points are input, a crash occurs	This issue was fixed in EDR V11.
350792	Refresh issue which caused the wrong heat load to be reported in Shell by Shell conditions.	This issue was fixed in EDR V11.
350066	Crash occurs when two impingement plates are saved to a single nozzle and also the cause of saving two impingement plates (which should not be possible).	This issue was fixed in EDR V11.
347101	Designs with overlapping tube passes should not be allowed.	This issue was fixed in EDR V11.
309676	Rho-V-Sq Indicators are inconsistent in Optimization Path, Overall Summary, and Performance results.	This issue was fixed in EDR V11.

ID	Issue Description	Issue Resolution
309036	Flux ratio display in results is incorrect.	This issue was fixed in EDR V11.
307449	Methods/Correlations | Condensation tab is disabled when inside the simulators.	This issue was fixed in EDR V11.
304672	Operational Warning 1355 about flow reversal in thermosiphons is incorrect.	This issue was fixed in EDR V11.
304690	An uncommon issue occurs when the number of shells in series and parallel is entered in the Exchanger Geometry rather than Design Options.	This issue was fixed in EDR V11.
304234	The calculation of the pure component molar volume (seen in Properties | Component Properties tab) is incorrect.	This issue was fixed in EDR V11.
301886	The EDR warning for baffle cut greater than 15% using Triple Segmental Baffle needs updating.	This issue was fixed in EDR V11.
287023	Units of Measure on Drawings when using global unit sets Hysys SI, Hysys Field, and Hysys EuroSI are incorrect.	This issue was fixed in EDR V11.
274316	Bundle Entrance velocity when using VaporBelt is incorrect.	This issue was fixed in EDR V11.
274068	EDR information in HYSYS datasheet is incorrect.	This issue was fixed in EDR V11.
264123	Handling of inconsistencies between PV and PT flashes in Aspen Properties, which caused the wrong dew point to be used, resulting in incorrect results needs to be improved.	This issue was fixed in EDR V11.
259117	Property error 1802 that occurs in some cases using Aspen Properties.	This issue was fixed in EDR V11.
217989	Add inlet velocity and flood velocity to knockback reflux condenser report.	This issue was fixed in EDR V11.
217989	Problem with the full end distributor pressure drop calculation.	This issue was fixed in EDR V11.
176477	Fix 6-pass BFU tube layout.	This issue was fixed in EDR V11.
162033	Fix crash when the EDR file contains multiple cases and one of the cases is a CoilWound Exchanger case.	This issue was fixed in EDR V11.
155147	Fix scrollbar when importing from HYSYS.	This issue was fixed in EDR V11.
21716	Fix tube side nozzles on the setting plan for an 8-pass U-tube.	This issue was fixed in EDR V11.
21316	Fix properties error when a temperature is very close to the bubble / dew point.	This issue was fixed in EDR V11.

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 V11

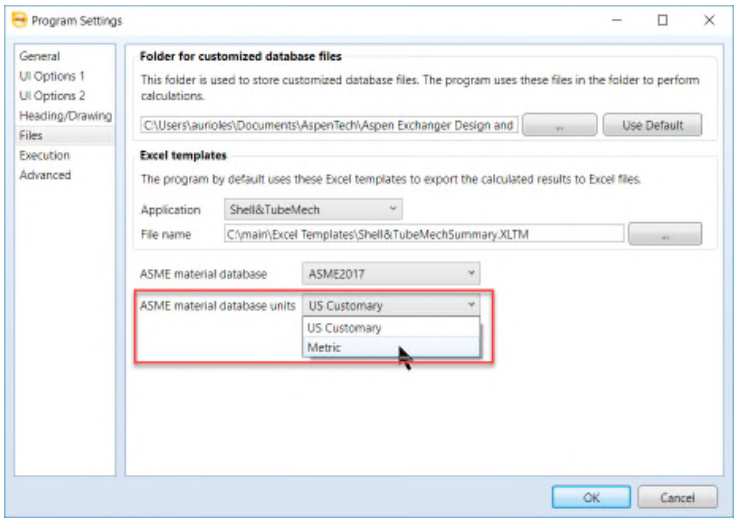
The following new features and enhancements were added in release V11:

- Added the 2017 Metric material stress tables
- Added Aspen Materials to provide materials outside of the typical material databases
    - Improved the design of Graphite exchangers
- Improved on assembly bolt stress calculations per PCC-1
- Added new formulas to the calculations of tube-to-tubesheet joints
    - New inputs for handling factor fT limits and selection of methods
- Added User-specified Additional Costs for Final Assembly Details
- Improved clad material processing
- Improved hydrostatic test calculations
- Added input for the tubesheet-to-cylinder weld leg dimension
- Improved processing of materials depending on thickness or diameter
- Improved optimization of bellows expansion joints
- Added the Equivalent Pressure on Nozzle Rating calculations (ASME Code Interpretation BPV VIII-1-16-85 / Code Case 2901) - 2019 UG-44 Change
- Added automatic API 660 external nozzle loads per table 2
- Added inputs for buckling distance for cover stiffening rings
- Added Notes field for display on the Thermal Setting Plan and Tubesheet Layout
- Added Labor Data output to Excel and Word export

Added 2017 Metric material stress tables

The 2017 edition of Section II, Part D, Metric tables have added to version V11.

Now the User can select US Customary or Metric tables under File > Options > Files:



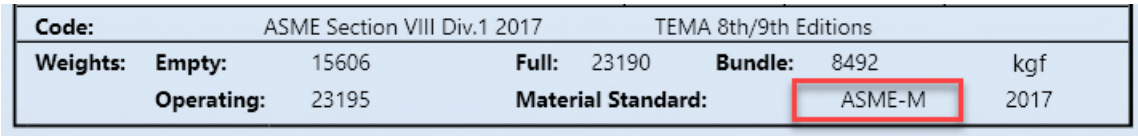
The default option will continue to be US Customary stress tables.

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 sets and for 3 calculation units:

Material	Calculation Units	Stress Table	
		Us Customary, ***S***, Psi	Metric, ***S***, MPa
SA-516-70	US Customary-Psi	20000	137.895
	Metric-MPa	19628	138
	Metric-Kgf/mm^2	14.061	14.072

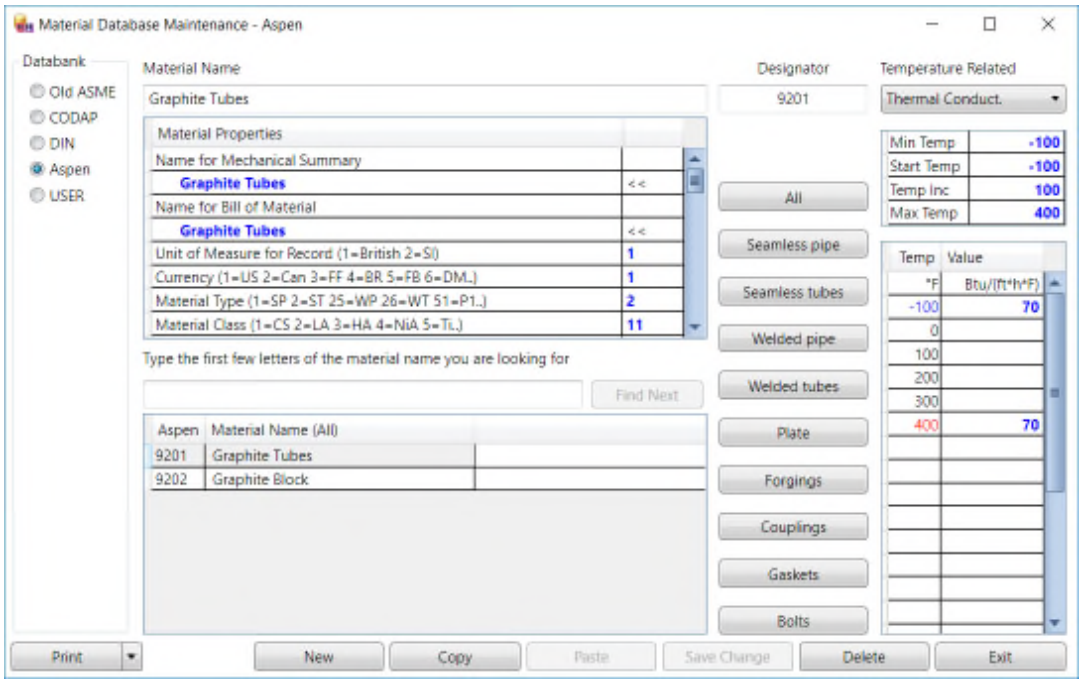
In the Results section, the Summary of Design Specifications will show which Section II, Part D stress table is being used:



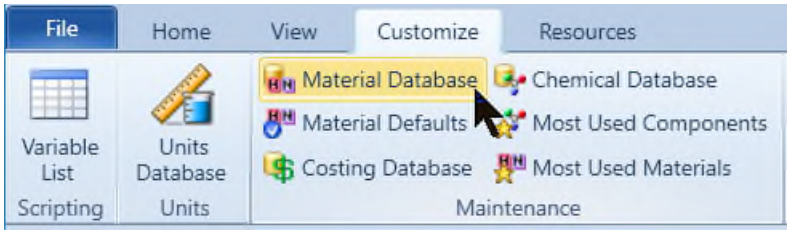
Added Aspen Materials to provide materials outside of the typical material databases

Another material database has been added to provide material specifications not available in the traditional material databases. The ID numbers will be between 9200 and 9400.

Two materials have been added: Graphite Tubes and Graphite Block. These options will improve the thermal and mechanical design of graphite exchangers.



You can access this material information from Customize > Material Database



Note that this database is not User-changeable. For User-specified materials, continue using the User database.

Improved on assembly bolt stress calculations per PCC-1

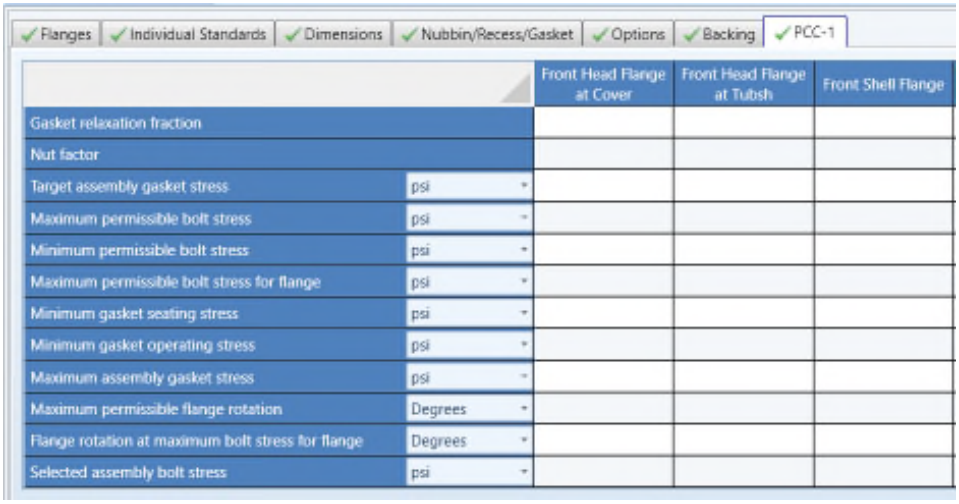
The calculations for the flange torque requirements using Appendix O per standard PCC-1, *Guidelines for Pressure Boundary Bolted Flange Joint Assembly* have been significantly improved. It uses the joint component approach to determine if the selected bolt stress is acceptable based on default or user input limits.

These calculations will only be done if the option to comply with API 660 is selected.

If user values are not input, the program will determine values based on ambient temperature, gasket material, and gasket geometry for all inputs aside from the flange rotations. If flange rotations are not input by the user, Step 8 will not be performed.

You can input your own assembly bolt stress to be checked.

Example Input:

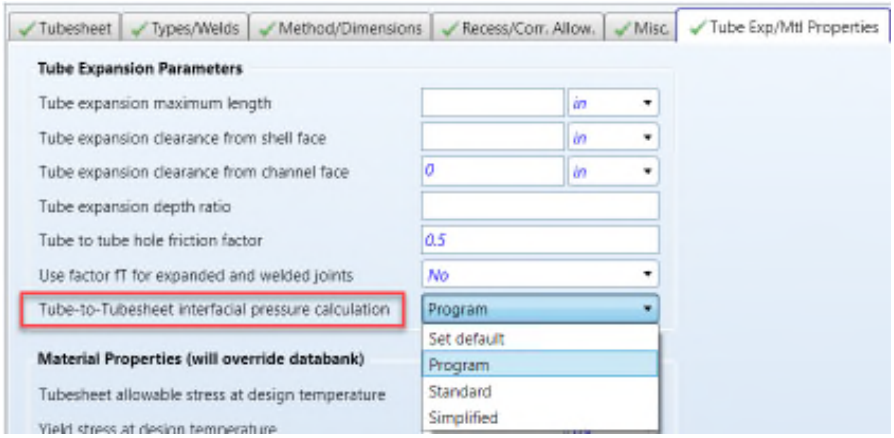


Added new formulas to the calculations of tube-to-tubesheet joints

A more sophisticated method is now being used to calculate the interfacial pressures in tube-to-tubesheet joints.

The old method has now been 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:

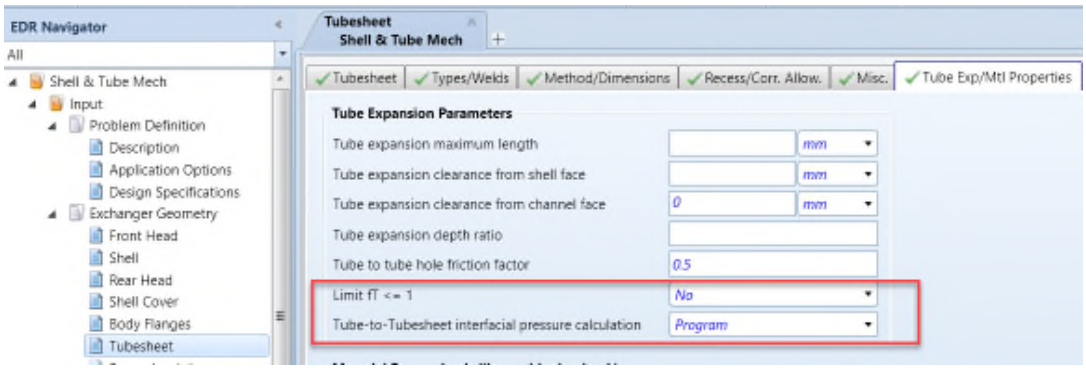
$$P_o = P_e\left[1-\left(\frac{d_i}{d_o}\right)^2\right]-\frac{2}{\sqrt{3}}S_{tu}\left[\ln\frac{d_o}{d_i}\right] \qquad P_o = 11.45\ \text{N/mm}^2$$

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

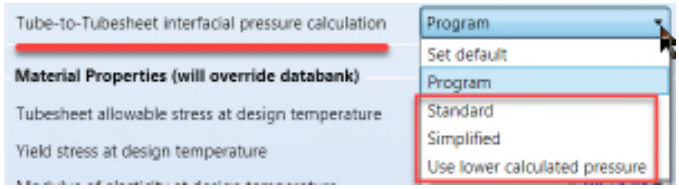
For joint types i, j, k: $P_o + P_t \leq 0.58\,\sigma_M$

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

The following two inputs have been added:

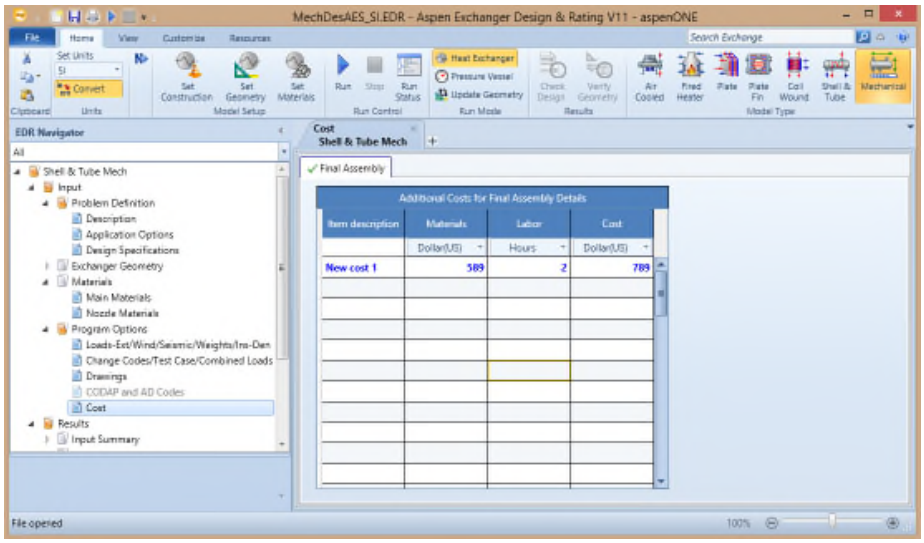


The tube-to-tubesheet interfacial pressure calculation input has these options:

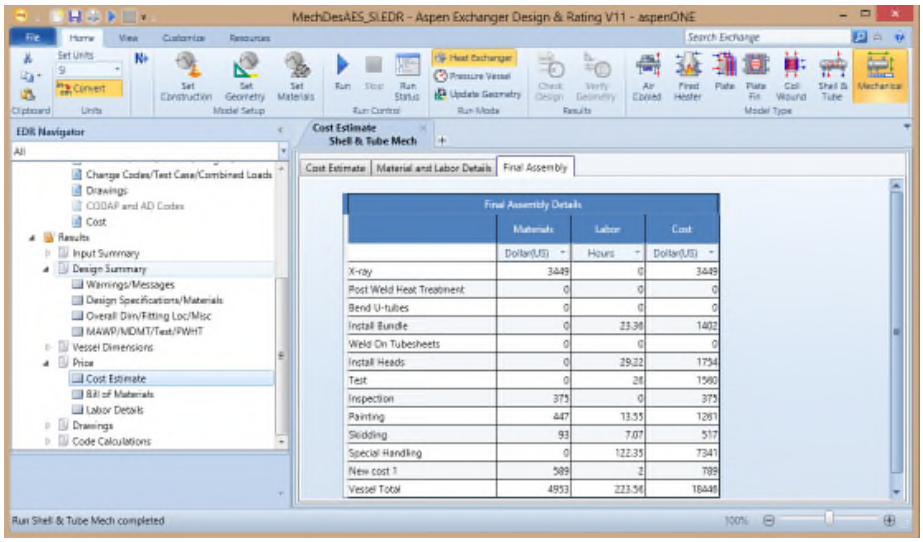


Added User-specified Additional Costs for Final Assembly Details

A new input form has been added at **Input | Program Options | Cost | Final Assembly** that allows the user to enter up to fifty items to be added to the final assembly cost calculations.

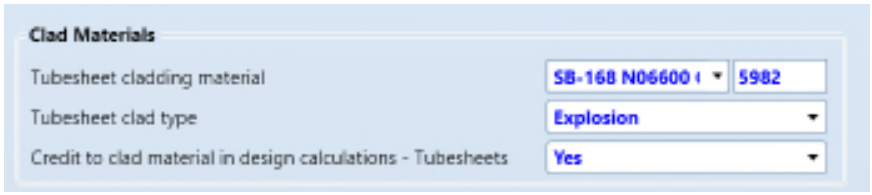


After the program has run, these additional items will show up in the results under **Results | Price | Cost Estimate | Final Assembly** and their associated hours and costs will be included in the Vessel Total.



Improved clad material processing

The program incorporates calculations for all components in which the alloy clad material processing has been optimized for strength credit. Additional inputs have been provided, as shown here for the tubesheet material:



Depending on the clad thickness versus overall thickness, the overall thickness savings can be in the order of 10-30% when the clad alloy can be used in the strength calculations. If using the ASME code, refer to UCL-23(c) for limitations.

Additional output has been provided in the tubesheet section:

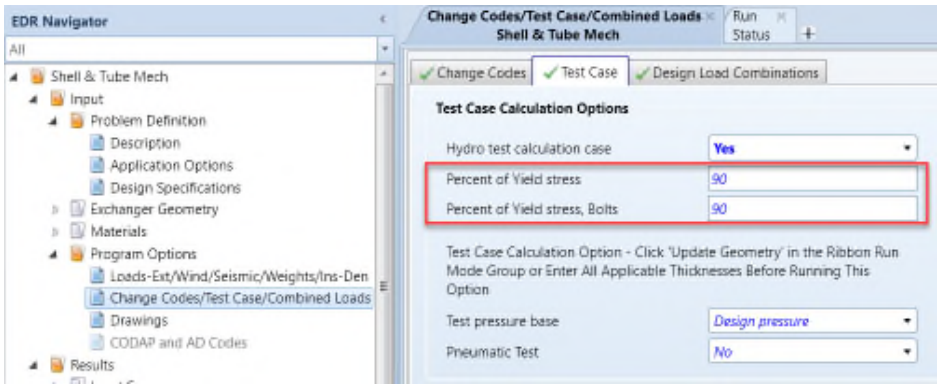
Clad material processing				
*** Tubesheet material:	SA-516 K02700 Grd 70 Plate			
*** Clad material:	SB-168 N06600 Cls h.r. Plate(G5)			
Tubesheet allowable stress	S =	137.9 N/mm^2	Base thickness	t_b = 42 mm
Clad allowable stress	S_c =	160.65 N/mm^2	Clad thickness	t_c = 8 mm
Allowable stress ratio S_c/S_b	S_c/S_b =	1	Clad effective thickness	t_{ce} = 8 mm
(S_c/S_b maximum of 1)			$t_{ce} = t_c \cdot \left(\frac{S_c}{S_b}\right)$	
Clad strength credit	Yes		Total thickness	T_n = 50 mm
Tubesheet thickness	h =	50 mm	Actual tubesheet thickness	h_a = 50 mm

Improved hydrostatic test calculations

In version V11 calculations will only show the first two loading cases of UHX for heat exchangers during the hydrostatic test calculations: The tube-side pressure only and shell-side pressure only cases, which simulate the actual hydrostatic test. Note that these calculations are not required per BPV Section VIII Division 1.

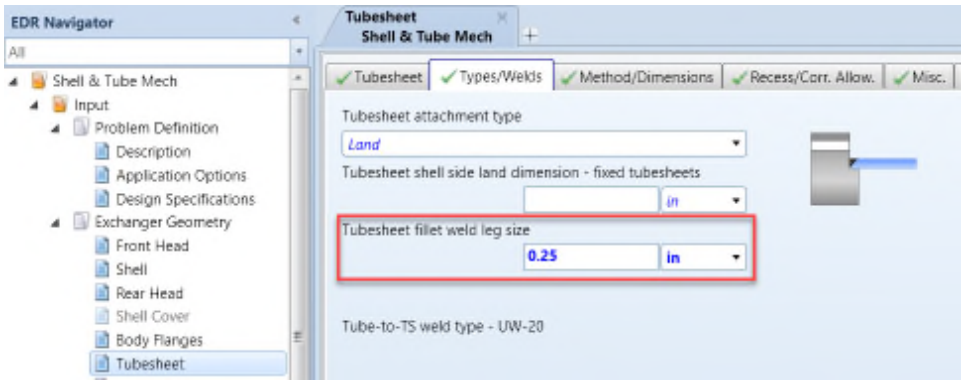
Units: Pressure/stress: N/mm^2	Distance: mm	
Controlling case:	***	
Load case	1	2
Factor Q_2	-2504	1252
Flange load, W^*	3737099.5	1811620.9
Factor Q_3	0.046	0.046
Factor F_m	0.072	0.072
Tube-side pressure, P_t	2.6	0
Shell-side pressure, P_s	0	1.3
Effective pressure, P_e	-2.6	1.3
Tubesheet Bending Stress	-42.3	121.2
Max Tubesheet Bending Stress	353.7	353.7
Min Tubesheet thickness	73.7	53.58
Tubesheet Shear Stress	-42.3	21.1
Max Tubesheet Shear Stress	188.6	188.6
Min Tubesheet thickness	24.71	14.86
Tubesheet thickness	88	88

The User will have further control on the percentage of yield used in the calculations as allowable stress. An additional input is available for the percentage of the yield stress to be used for the bolting calculation:



Added input for the tubesheet-to-cylinder weld leg dimension

With this addition, the User can better control the size of the weld between a tubesheet and the adjacent cylinder.



The output will also show the relevant ASME code paragraphs when applicable:

UW-13.2 Attachment Details		Fig. UW-13.2 (j)	
Weld Dimension a	$a =$ 0.5 in	Weld Dimenstion b	$b =$ 0.1875 in
Weld Dimension c	$c =$ 0.1232 in	Weld Height	$=$ 0.25 in

Improved processing of materials depending on thickness or diameter

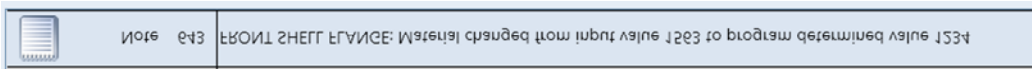
When the program changes materials because a thickness or diameter limit in the material specification has been exceeded, the program will use the correct material name internally selected and the program will issue a Note alerting the User of this change.

For example,

From: ***Flange material: SA-182 S30400 Grd F304 Forgings(<= 5)***

To: ***Flange material: SA-182 S30400 Grd F304 Forgings(> 5)***

A typical note would be:

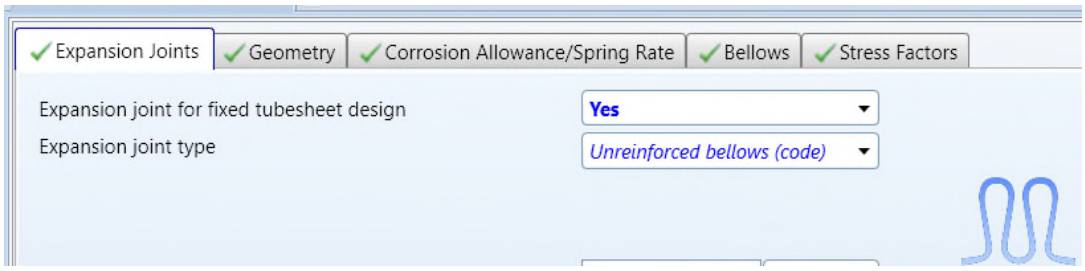


Improved optimization of bellows expansion joints

The program will now check if the default expansion joint can be used for a service and still meet all the ASME expansion joint constraints per BPVC VIII-1 Appendix 26.

If not, the program will select automatically the next bellows expansion joint type that meets the constraints.

The progression will be: unreinforced, reinforced and finally toroidal bellows.



Added the Equivalent Pressure on Nozzle Rating calculations (ASME Code Interpretation BPV VIII-1-16-85 / Code Case 2901)

The program will now calculate the equivalent external pressure on any external loads entered for nozzles (forces and moments). The external method analysis selected must be WRC-107. 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

Added automatic API 660 external nozzle loads per table 2

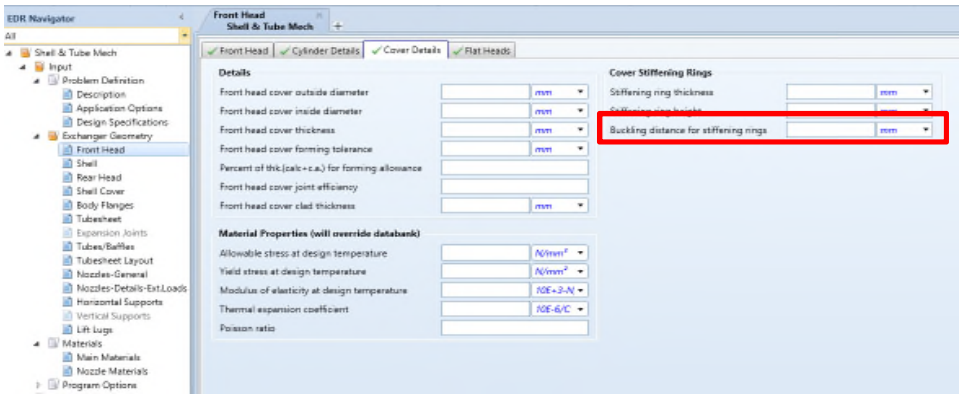
Now when the User selects API 660 as an option, and the WRC-107 external nozzle loads analysis method has been selected with corresponding inputted nozzle loads, the program will automatically read the loads from table 2 of API 660 and apply them to each nozzle. Typical output looks like this (partial):

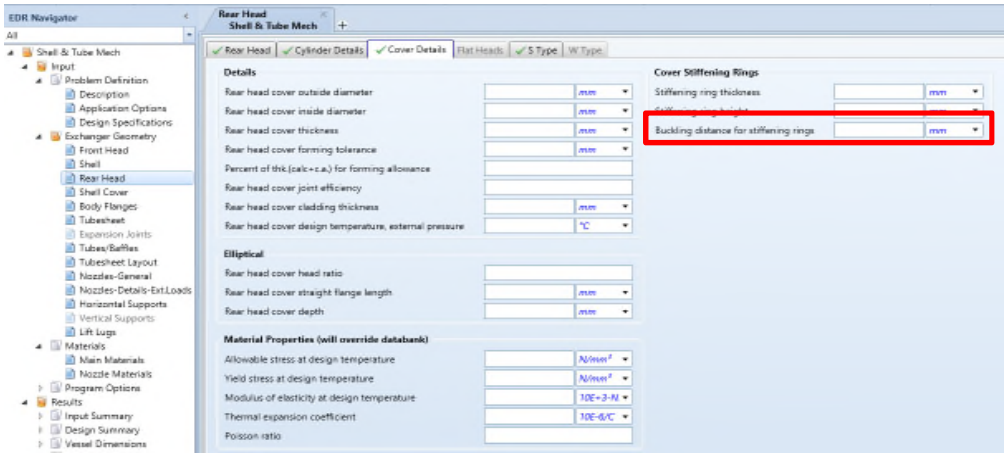
Loads from Table 2 - API 660

Applied loads			Geometric parameters (corroded cond.)		
Radial load	P =	8060 N	Vessel mean radius	R_m =	375.29 mm
Circumferential moment	M_c =	6120000 N*mm	Vessel + pad thickness	T =	18.41 mm
Longitudinal moment	M_l =	7770000 N*mm	Attachment radius	r_o =	109.54 mm
Torsional moment	M_t =	9890000 N*mm	$Gamma\ \gamma = R_m/T$	=	20.38
Shear load	V_c =	10080 N	$Beta\ \beta$ = 0.875*ro/Rm	=	0.255
Shear load	V_l =	10080 N	$\beta_1 = C_1/R_m$	=	0
			$\beta_2 = C_2/R_m$	=	0

Added inputs for buckling distance for cover stiffening rings

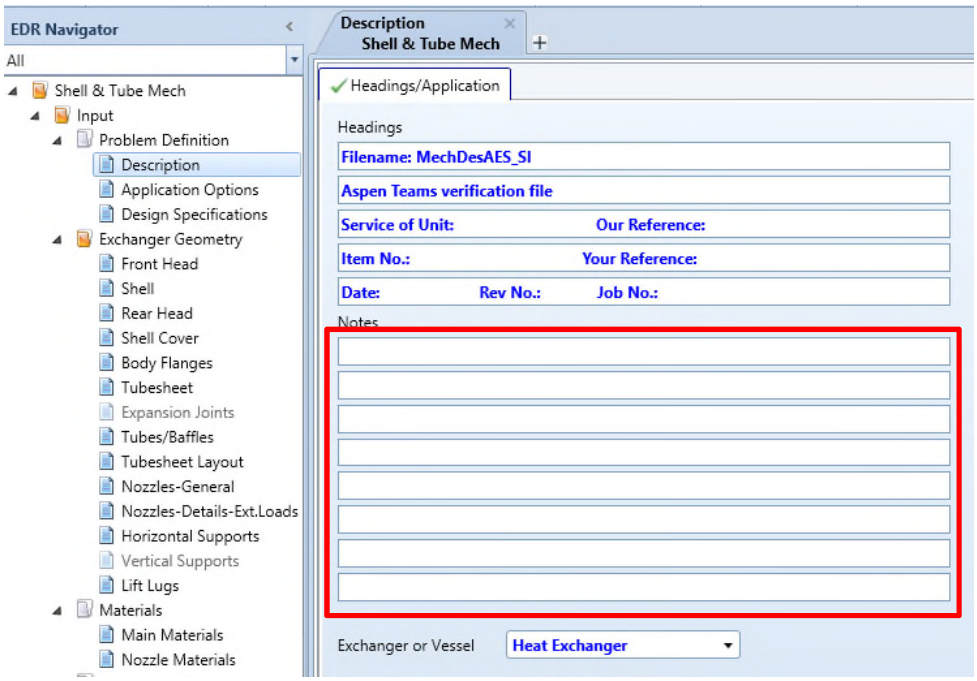
Input have been added for the user to specify the buckling distance for the front and rear head cover stiffening rings. The new inputs are shown below:



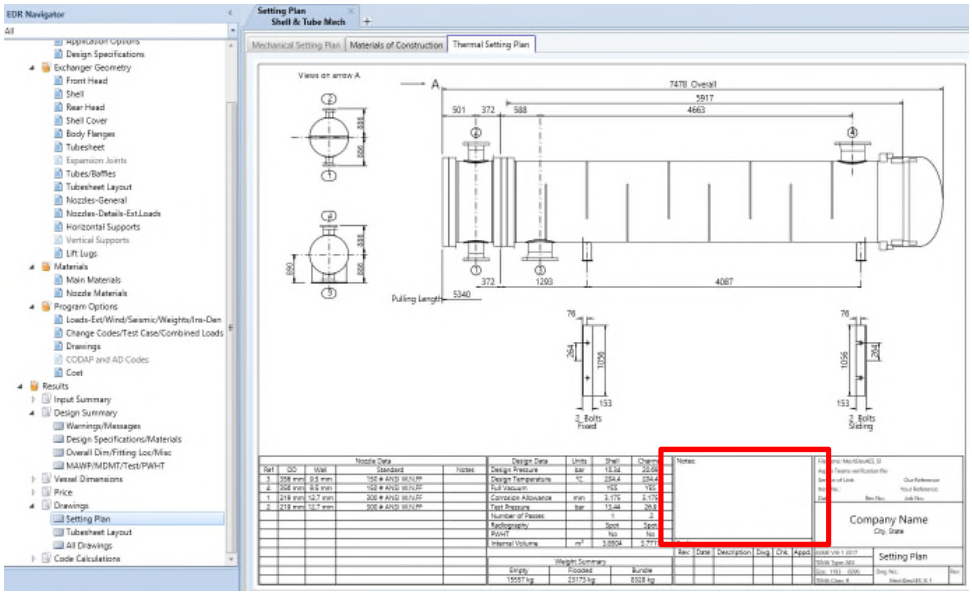


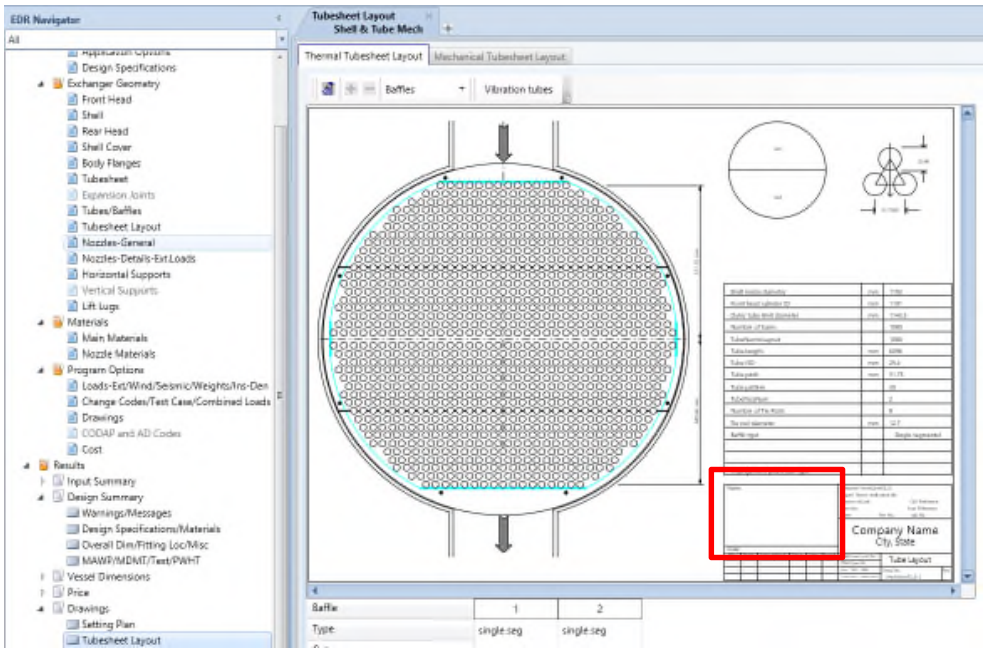
Added Notes field for display on the Thermal Setting Plan and Tubesheet Layout

A Notes field section has been provided for comments that will appear in the Thermal Setting Plan and Tubesheet Layout drawings. The notes will only appear when the 'Use Thermal' drawing option has been selected.



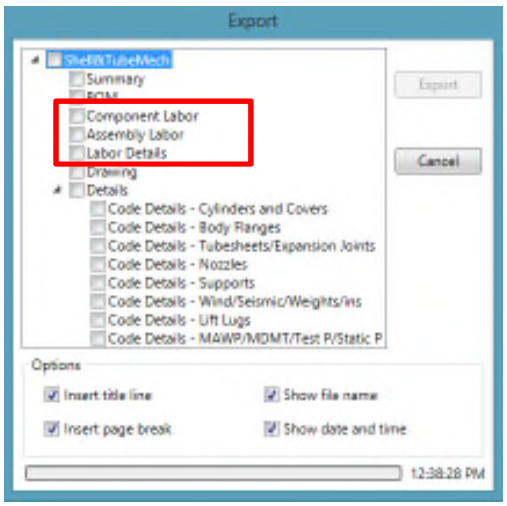
The notes will appear in the Notes: box on the Thermal drawings:





Added Labor Data output to Excel and Word export

The labor detailed output can be selected for export to Word and is included in the default mechanical Excel template.



Compatibility Notes for V11

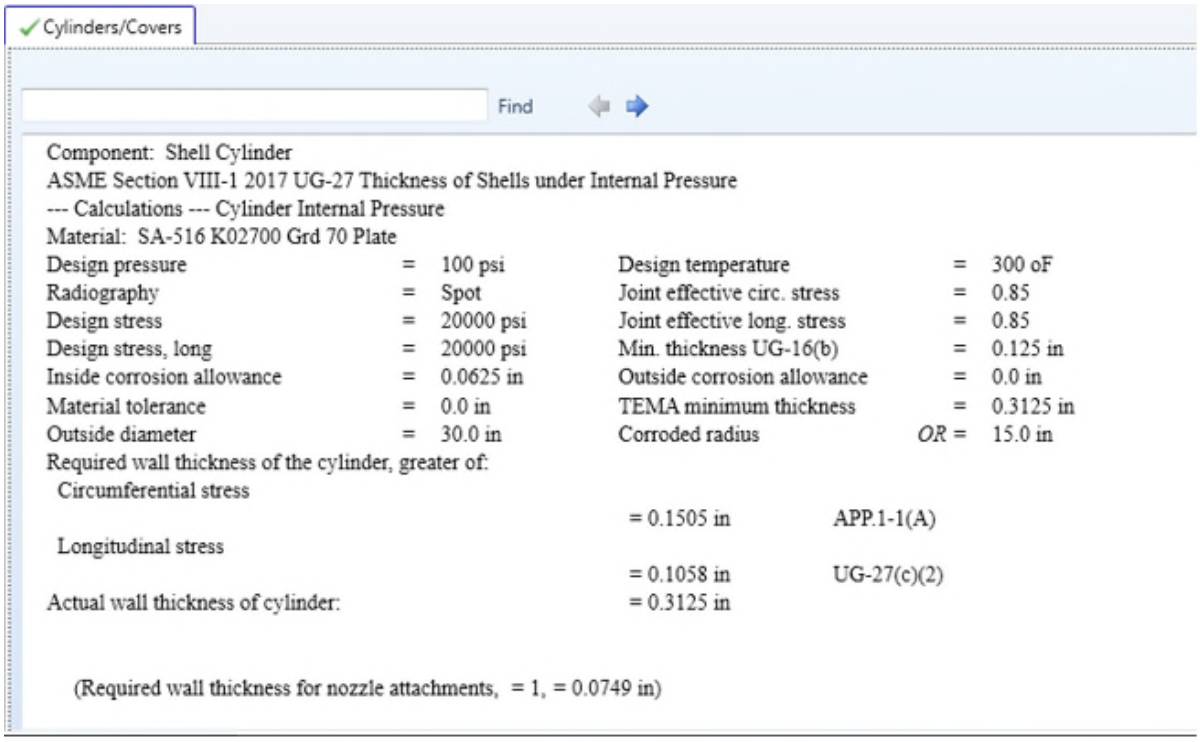
This section describes the differences that you might encounter between Aspen Shell and Tube Mechanical V11 and Aspen Shell and Tube Mechanical V10.1.

Coexistence

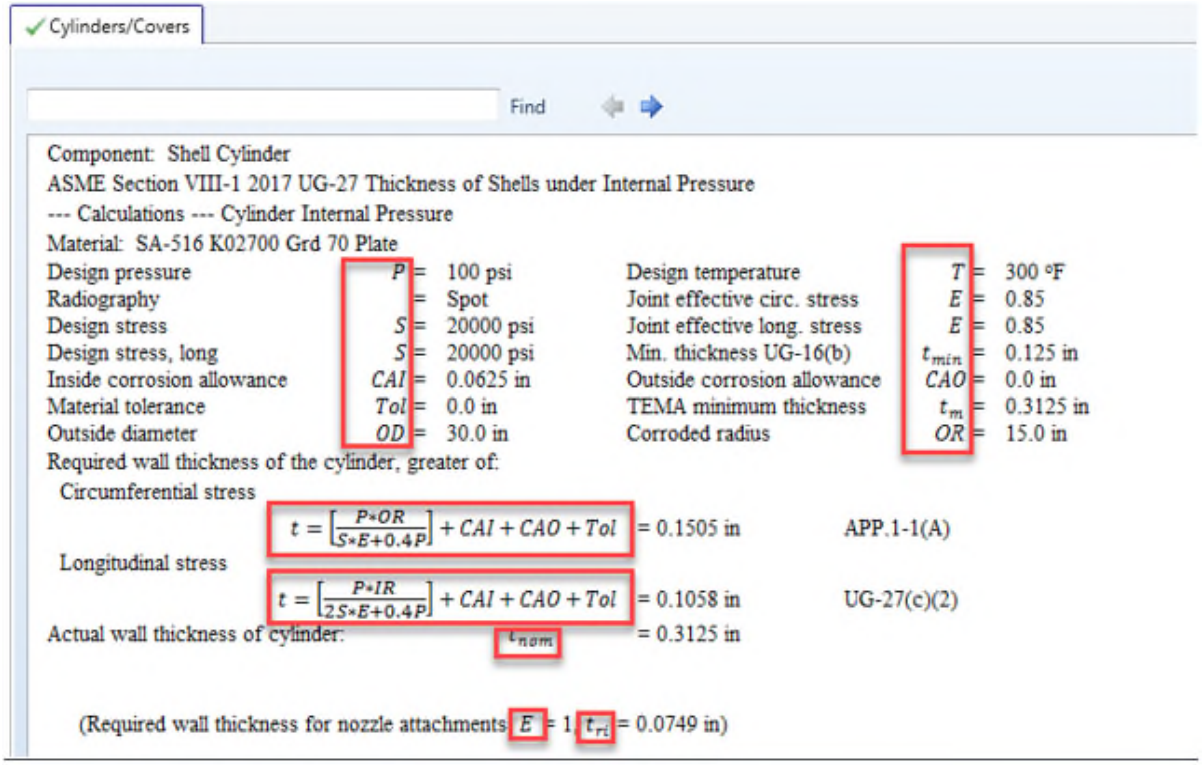
Aspen Shell and Tube Mechanical V11 can coexist with versions V10.1 and earlier.

Rich Text Code Calculations Report

Aspen Shell and Tube Exchanger V11 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 what the image above should look like with 64-bit Microsoft mathematics installed. The missing parts are shown within the red boxes.



What's Fixed in V11

The following is a selective set of issues resolved in Aspen Shell and Tube Mechanical in V11:

ID	Issue Description
363212	Added new message to explain why the conditions of applicability in UHX-13.10.2 were not being met
359124	Fixed - Extreme Fiber Elongation - UG-79 was not being calculated for plate nozzles
359413	Fixed - Cylinder external pressure calculations under CC2695 and using SI and Metric units was incorrect by a factor of ~10X
357319	Fixed – A front tubesheet calculated stress was being exceeded but no warning was being issued
350393	Fixed - Mechanical could not do a NTIW layout using the thermal layout component
353651	Fixed - Inputted external moment for the calculation of forces using continuous rings supports was not being shown on output
352281	Fixed - No warning was being issued when User enters a shell cylinder length adjacent to the tubesheet shorter than minimum length required by the ASME Code
351805	Fixed - Incorrect shell thickness in the corroded condition and tubesheet OD inputted was being ignored in a fixed tubesheet exchanger calculation
348710	Fixed - In a CFU exchanger, program was calculating the incorrect bolt loads for the front shell flange
020528	Corrected - Program was using 32" nozzle diameter when 44" was entered for nozzles
344427	Corrected welded flat cover OD for Figure UG-34(*h*) and (*i*) - Provided explanation for Weld Joint details in standard drawing #20
315939	Implemented - Enhancement Request - Display weight reflecting weir height
314281	Fixed - Incorrect Error message that was being issued for exceeding Code-allowable design temperature
313845	Corrected horizontal saddle support design that was coming up with an unreasonable support web thickness
310065	Corrected - Nozzles made of welded pipe were not being calculated with minimum thickness according to S/0.85 permitted by UG-37
306671	Stopped using factor 'f_T' in app A joint type 'e' even though the nomenclature states 'and expanded', The results did not match the formula for L_{max} for Joints type 'e'
304279	Added lap joint flanges to the GERMAN code (AD) for body flanges
302381	Program was ignoring very cold operating temperatures and was not issuing a warning concerning the MDMT
298497	Provided warnings in AD-2000 for flange calculations when the bolt shank diameter is insufficient and if the bolt stress is not enough
298444	Program was ignoring the User input for adjacent shell thickness resulting in an overstressed design
175033	Updated the calculations of weld caps for heads using weld cap material using pipe procedure according to ASME BPV VIII-1 UG-44
296491	Added to the detailed output applied forces and moments to a cone under external pressure
290864	Corrected flange calculation for R (hub to bolt circle distance) to consider the thickness of the shell cylinder at the tubesheet (not the general thickness)
284114	Corrected material settings for flanges in pressure vessels
283673	Made it clear that only DEU exchangers are available for D type front heads
281597	Corrected EN code vertical skirt support equations
020527	Initialized ID of flange for types that have it welded to the rear head cover
265047	Modified project settings to prevent problems with code calculations when F-shells are used with EN code
266326	Corrected mapping of indices for external pressure charts

ID	Issue Description
067322	Improved materials reporting of material names, so they would be consistent between material lists and code calculations
264515	Fix Customization of Materials Databases - removed constraint that the names must have a non-zero length. SQL reads empty strings as zero length strings.
175033	Implemented - Weld Caps for heads using weld cap material should be designed like pipe according to BPV VIII-1 UG-44
295235	Reinforcement calculation for nozzle on elliptical head had incorrect area required and parallel limit
290412	Front shell flange minimum gasket width and gasket compression stress calculations results were missing
287467	Incorrect warnings concerning EJ thickness and Circumferential Membrane Stress were being issued for U-Shaped Bellows Reinforced Expansion Joint
284979	Expansion joint bellows material design temperature per Appendix 26 was being violated with no warnings
272086	The design pressure on table U-5 should be without the hydrostatic head if specified
271811	Expansion Joint stress warning was being issued but results did not show any overstress conditions
268845	Incorrect tube expanded length for U-tubes in the corroded condition
268788	Incorrect warning (203) for channel thickness being too thin
267144	ANSI Body flanges geometry was not appearing in the Summary Output
265830	Data was missing in U-bend Details table
266224	The weight of the weir plate for this kettle exchanger was incorrect in SI units
265760	European code - Component: Front Tubesheet - 13.10.5 tubesheet flange extension calculation was missing
265048	Added TEMA bolted flat cover deflection calculation to the EN code
261586	For a "C" type front head, the shell side gasket material and OD are not shown in the code calculations
121711	Corrected a temperature conversion that was using C to F when the original value was in K (thermal)
258865	Tube pass multiplier is not being applied to the reported tube velocity (thermal)
245637	In the hydro test pressure calculation, the tubesheet should be looked at from both the shell side and the tube side since it is a common element
233725	In a CET exchanger, the front shell flange was being designed with the tube side design temperature
233193	Shell side hydrostatic test pressure greater than maximum external pressure for the tubes
230572	Incorrect size warning for tube-to-tubesheet welds
227359	Corrected setting plans for 'W' type
780270	The program ignores the number of bolts entered in flange design using the European code
780157	Obsolete error message being issued for a DKU unit
779846	Incorrect gasket 'm' factor on shell side of a U-tube unit

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 V11

There are no features listed for this release.

Compatibility Notes for V11

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 V11

Aspen Energy Analyzer includes the following new feature:

- 64-bit Aspen Energy Analyzer

64-bit Aspen Energy Analyzer

Aspen Energy Analyzer is now a 64-bit application and requires a 64-bit operating system. This change offers the following benefits:

- Reduced memory limitations for very large, complex cases
- Performance improvements and greater stability
- Support for 64-bit Microsoft Office
- Fewer compatibility issues and improved consistency with common operating systems
- Can be installed on 64-bit operating systems without encountering RAM limitations
- Meets common company guidelines and protocols

Compatibility Notes for V11

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 V11

Aspen Flare System Analyzer V11 includes the following new features and enhancements.

Support for Net Heating Value Calculation

The net heating value (NHV) for Flare Tip and Tee can be calculated with saved phase properties data. A warning will appear on the Flare Tip Editor or Tee Editor if the **Save Phase Properties** option on the **Preference Editor** | **General** tab is not selected. For hypothetical components, you must manually enter the heat of combustion on the **Component Editor** | **Identification** tab.

Support for Aspen Version Comparison Assistant

Aspen Version Comparison Assistant (AVCA) now supports Aspen Flare System Analyzer. AVCA lets you validate new versions of AspenTech products. It compares models from an older version with models from a newer version and identifies differences in the selected variables.

You can launch AVCA from the **File** menu | **Version Compare**. The **Results** screen of AVCA appears, showing differences between the current model and the selected model. You can adjust the tolerance values to determine the sensitivity of the comparison report.

Scenario-Specific Ambient Temperature

In Aspen Flare System Analyzer V11, you can specify a specific **Ambient Temperature** on the **General** tab of the **Scenario Editor**. This scenario-specific ambient temperature will overwrite the global ambient temperature specified on the **General** tab of the **Calculation Settings Editor** when calculating the scenario results.

Choke Summaries for Flare Tips and Tees

In Aspen Flare System Analyzer V11:

- When choking occurs in the Flare Tip, the **Choke Summary** tab displays detailed choking results for the flare tip outlet.
- When choking occurs in the Tee, the **Internal Choke Summary** tab displays detailed choking results for the Tee.

Improvements to Default Values

The following improvements were made to the default selections in Aspen Flare System Analyzer V11:

- On the **General** tab of the **Calculation Settings Editor**, the **Include Kinetic Energy** check box and the **Choked Flow Check** check box are now selected by default.
- **Beggs and Brill Homog** is now the default correlation method for both **Horizontal and Inclined Pipes** and **Vertical Pipes**.
- By default, the **Method** is now set to **Compressible** for the following unit operations:
  - Connectors
  - Tees
  - Vertical Separators

- Horizontal Separators
- Orifice Plates

Rated Flow Available as AIV Flow Basis

Starting in Aspen Flare System Analyzer V11, you can now opt to select either **Rated Flow** or **Required Flow** as the **AIV Flow Basis**. The default selection is **Rated Flow**.

Compatibility Notes for V11

This section describes the differences that you might encounter between Aspen Flare System Analyzer V11 and Aspen Flare System Analyzer V10.

Importing Safety Analysis Data from Pre-V11 HYSYS / Aspen Plus Cases is No Longer Supported

Starting in V11, Safety Analysis environment line sizing calculation results in Aspen HYSYS and Aspen Plus are no longer stored in the Microsoft Access database. As a result, Aspen Flare System Analyzer V11 does not support importing Safety Analysis data from cases saved in pre-V11 versions of Aspen HYSYS and Aspen Plus. You must upgrade these cases to V11 prior to importing the data into Aspen Flare System Analyzer.

Line Sizing Data from V11 HYSYS / Aspen Plus Cases is Not Transferred Properly

Starting in V11, Safety Analysis environment line sizing calculations in HYSYS and Aspen Plus use Aspen HYSYS Hydraulics, the same rigorous technology available in Aspen HYSYS. Prior to this change to line sizing calculations, Aspen Flare System Analyzer could import the equivalent diameter based on the inlet and outlet lines. After the line sizing update, the Safety Analysis environment in HYSYS and Aspen Plus can have complicated pipelines for both inlets and outlets, while the corresponding objects are not available in Aspen Flare System Analyzer. As a result, corresponding data cannot be transferred from HYSYS and Aspen Plus to Aspen Flare System Analyzer.

Different Calculation Basis for AIV

Aspen Flare System Analyzer uses a different calculation basis for AIV. Aspen Flare System Analyzer V10 used required flow as the calculation basis for AIV. In V11, both rated flow and required flow are supported as the calculation basis for AIV, with rated flow set as the default.

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 V11:

- 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 V11

The following new features and enhancements were added in release V11:

Icarus Evaluation Engine

The following V11 new features and enhancements are included for the Icarus Evaluation Engine.

Pricing Updates in V11

- 2018 Pricing Update Summary

2018 Cost Basis Update - Pricing Changes

The pricing basis for this release has been updated to the First Quarter 2018. The table below summarizes an approximation of material pricing changes from the V10.1 EP02 version of Aspen Economic Evaluation (i.e. 2017 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 What's Fixed section of 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 V11 (2018 Basis) vs. V10.1 EP2 (2017 Basis)**					
		US	UK	JP	EU	ME
Equipment		5.3%	5.9%	5.7%	7.0%	4.6%
Piping		6.1%	3.9%	6.4%	4.1%	0.7%
Civil		3.1%	3.1%	4.3%	4.1%	3.3%
Steel		0.8%	4.8%	7.1%	3.3%	-2.9%
Instrumentation (see note 1)	**Control Valves**	7.7%	2.9%	6.9%	2.5%	0.9%
	Instruments	3.6%	2.2%	4.6%	0.8%	0.2%
	Overall	3.5%	1.1%	5.1%	1.1%	-0.9%
Electrical		3.2%	0.6%	4.8%	-0.9%	0.1%
Insulation		3.6%	4.6%	1.4%	1.5%	2.6%
Paint		3.7%	3.7%	0.3%	5.1%	4.4%
Construction Labor - % represents avg wage rate change		2.3%	2.5%	2.7%	4.2%	4.7%
Engineering Labor - % represents avg wage rate change		-1.5%	2.4%	1.2%	2.8%	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 base (detailed descriptions and impact of these changes are documented elsewhere in this document):
  - N option missing costs in projects (386582)
  - Sandblasting sensitive to small pipe material (383009)
  - Vendor Cost of Pump with Gas Engine Driver does not contain Profit (368503)
  - Valve Cost Discrepancy (363641)
  - Include random packing weight for packed columns (305941)
  - Centrifugal Gas Compressor Cost anomaly (305624)
  - Single item Reporter Report Piping Weight might be incorrect when Number of identical items is defined (295114)
  - Missing Results for Some PVC Pipe Fittings in V10.1 (230059)
  - Epoxy grout generating too much quantities vs cementious grout (229746)

- Electrical wire pricing for each country basis is affected by the Copper pricing specification. The Copper pricing has been updated in the V11 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, A516, & A285C: ~ 0.9% increase
  - A202A/B: ~1.0% increase
  - A203A-E: ~7.6% increase
- Based on vendor data, the following seamless tube pricing changes have been observed:
  - A179: ~ 1.0% increase
  - A199C-F: ~1.0% increase
  - A209A/B: ~1.0% increase
  - A213A-F: ~1.0% increase
- Based on vendor data, the following tube pricing change has been observed for welded CS tubes:
  - A214: ~ 0.9% increase
- Based on vendor data, stainless steel plate pricing has shown the following changes:
  - SS304: ~7.9% increase
  - SS316: ~10.9% increase
  - SS316Ti: ~10.9% increase
  - SS317: ~10.1% increase
  - SS321: ~6.2% increase
  - SS347: ~6.6% increase
  - SS410: ~21.6% increase
  - SS430: ~1.9% increase
  - SS6MO: ~15.5% increase
  - Duplex (S2205): ~6.2% increase
- Based on vendor data, pricing changes for stainless steel welded tubing is as follows:
  - 304W: ~ 23.1% increase
  - 316W: ~ 30.6% increase
  - 321W: ~ 23.2% increase
  - 2205W: ~82.3% increase
- Based on vendor data, pricing changes for stainless steel seamless tubing is as follows:
  - 304S: ~ 17.0% increase
  - 316S: ~ 21.4% increase
  - 321S: ~ 16.9% increase
  - 2205S: ~17.7% increase
- Titanium plate and tube pricing have increased app. 9.6%.
- Based on vendor data, the following changes were observed for Non-Ferrous materials:
  - Hastelloy ~ 19.0% plate, ~ 9.5% tube
  - Inconel (I600) ~ 16.8% plate, ~ 8.4% tube
  - I800 ~ 15.5% plate ~ 8.4% tube
  - C20 ~ 15.5% plate ~ 8.4% tube
  - I825 ~ 17.5% plate ~ 8.4% tube
  - Monel ~ 21.8% plate ~ 11.0% tube
  - Nickel (NI200/201) ~ 21.1% plate, ~ 11.0% tube
- The following changes have been observed for Copper and Aluminum pricing:
  - Copper ~ 19.3% sheet, ~2.2% tube, ~ 20% wire

    - Aluminum ~ 8.9% increase plate & sheet, ~ 9.2% increase tubes
- The following Rebar pricing changes have been made for each location basis:
    - US Basis: ~ 0.5% increase
    - UK Basis: ~ 4.8% increase
    - EU Basis: ~ 3.3% increase
    - JP Basis: ~ 7.1% increase
    - ME Basis: ~ 5.7% decrease
- Ready Mix Type "B" Concrete pricing was updated in each location based on spot pricing received:
    - US Basis: ~ 3.3% increase
    - UK Basis: ~ 2.0% increase
    - EU Basis: ~ 2.1% increase
    - JP Basis: ~ 2.9% increase
    - ME Basis: ~ 0.5% 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.)	-0.1%	4.8%	7.1%	3.3%	0.0%
Stairways (avg.)	-0.1%	4.8%	7.1%	3.3%	0.0%
Platforms (avg.)	-0.1%	4.8%	7.1%	3.3%	0.0%
Steel Members (avg.)	1.6%	4.8%	7.1%	3.3%	-4.3%

Other Enhancements to the Evaluation Engine

New detailed material and labor line items for ducts (UC175601)

Currently for round and square ducts the material and labor line items do not contain the duct diameters. As a result, it is not possible to distinguish between two duct line items of the same

material but with different duct diameters in the unit rate file. To solve this, we have added the duct diameter in the item description.

The material cost line items for duct and fittings will have the duct diameter or dimension (for square duct)

For the duct labor line items (handle and erect duct), the details will be turned on only when user has "Create detailed labor line items" set to "Y" in the **Design basis --> Piping Specs --> General** form.

For the duct insulation material cost line item, the duct dimension and insulation thickness will be added to the line item description.

The duct paint line items will remain unchanged.

After evaluation, the duct material line items will show the duct diameters in the item description. If the "Create detailed labor line items" field is set to "Y" in the **Design basis --> Piping Specs --> General** form, the duct labor line items should also contain duct dimensions.

Add pipe schedule/thickness and flange class for lined pipe and fittings (UC175464)

In ACCE, lined pipe and fittings (e.g. pipe, elbow, reducer, tee, strainer etc.) are always estimated as flanged items. The cost is estimated by adding the cost of the two end flanges to the cost of the pipe/fitting. Therefore, the cost of a fitting or pipe segment of a given diameter and lined material depends on:

1. The pipe diameter
2. The pipe material
3. The pipe schedule or thickness
4. The flange class of the pipe

Currently Icarus reports only the diameter and the schedule. As a result, two lined pipe/fitting items with the same diameter, lined material and schedule but with different flange classes may get different unit material costs. This makes it difficult to reconcile the unit material costs of these items in the unit rate input file. To remedy this, we are including the flange class in the item description.

Note: For lined valves, the pipe schedule/thickness is not needed in the item description.

Pile diameter size increase of drilled and cast-in-place concrete piles (ID 95056)

The pile diameter (size) of drilled and cast-in-place concrete piles is increased to 48 IN [1200 MM]. The applicable pile types include AUGR - Auger cast piles, FRNK - Franki piles, and POUR - Poured concrete piles. The 48 IN [1200 MM] size has been added to the pile size dialog box available in the project/area level Civil specs. Additionally, the 48 IN [1200 MM] size has been added to the Drilled and cast-in-place concrete piles (SD POURED) component located in Site development, Piling.

Specification of Unions, Couplings and Bushings in Conduit Plant Bulk Form (UC 220054)

The system estimates conduit elbows, fittings, unions, seals, couplings and bushings for all conduit runs in a project. Currently, the number of elbows, fittings and seals can be specified for electrical and instrument conduit plant bulk items. However, the number of unions, couplings and bushings are only system generated. Users would like the option to specify these as well.

To address this, additional fields for the number of unions, number of couplings and number of bushings will be added to the Electrical and Instrument conduit plant bulk forms.

If these fields are left blank, quantities will be system calculated as follows:

- Number of couplings - Default of 1 coupling per two 30 FT [9 M] lengths of conduit.

- Number of unions - Default of 2 unions per elbow (1 elbow is estimated by default per 100 FT [30.48 M])
- Number of bushings - Default of 2 per conduit run. (Only estimated for above ground conduit)

If you specify quantities in these fields, the specified quantities override the system defaults.

Options to Specify Power Rating and Reporting Choices for Motor Operated Valves (UC 162581)

Currently, when a motor-operated on/off control valve is specified, a single cost value for an electric actuator is added to the control valve cost and reported as a single line item. This enhancement lets you specify the power rating of the motor for the motor-operated control valves. The material price of the motor-operated valve is based on the power rating of the electric actuator's motor. Additionally, you can specify whether the actuator and control valve costs are reported together or separately.

Two fields have been added to the Instrumentation bulk items form to specify 1) the power rating for motor operated control valves, and 2) to specify whether the actuator and control valve costs are reported together or separately.

For "Motor operated valve power"

- Enter a power rating (HP). Applies to motor operated remote on/off control valve type only. Electric actuator driven by low voltage 3-phase AC motor. Default is System calculated.

For "Motor operated valve cost option" -

- N - cost reported in the electric actuator line item.
- Y -cost reported in the existing control valve line item.

Improvements to Cable Tray Fittings and Supports (UC 220034)

Cable tray systems are widely used to provide orderly paths to house and support cabling both overhead and beneath the ground. Currently, ACCE estimates cable tray runs with only the option to specify generic '90 degree bends' in the electrical and instrumentation plant bulk items and no option to specify supports to the cable tray runs estimated in the project.

Plant Bulk Cable Tray Fittings:

With this enhancement, the option to specify a number of cable tray fittings will be added to the electrical and instrumentation cable tray plant bulk items only:

- Horizontal bends - 90°, 45°, 60° and 30° options
- Vertical bends - 90°, 45°, 60° and 30° options
- Tees - Horizontal and Vertical
- Crosses
- Reducers
- Splice plates
- Tray covers

The current field for 'Number of 90 degree bends' is renamed 'Number of horizontal bends' and any data in the 'Number of 90 degree bends' field from existing projects will be migrated into the 'Number of horizontal bends' field.

Plant Bulk Cable Tray Type:

The cable tray types for electrical and instrumentation cable tray plant bulk will be updated as follows:

- L| Ladder tray
- T| Ventilated trough tray
- B| Solid bottom trough tray

This is because there is now a separate field to either include or exclude the tray cover.

- If the C option is specified in previous versions, this entry will be migrated as the 'T' tray type AND the 'S' option in the tray cover field in V11.
- If the B option is specified in previous versions, this entry will be migrated as the 'B' tray type AND the 'S' option in the tray cover field in V11.

Project/Area Cable Tray Type:

The cable tray type descriptions in the project and area level specs forms will be updated as follows:

- L| Ladder tray
- T| Ventilated trough tray
- C| Ventilated trough tray with cover
- B| Solid bottom trough tray with cover

A new option will be added as follows:

- S| Solid bottom trough tray

Cable Tray Supports:

There are no specific requirements for cable tray supports in the NEC, the support span length (distance between supports) depends on the type of tray and the weight of the cables in the tray. However, the industry standard strongly recommends that only one cable tray splice be placed between support spans.

This enhancement will give users the option to include cable tray supports for all above ground cable tray systems in the project (in the case of project level specification), or include cable tray supports for all above ground cable tray systems in the area (in the case of area level specification) or include cable tray supports for the electrical and instrumentation cable tray plant bulk items. Users will be able to specify the distance between supports.

What's New: All Aspen Economic Evaluation Programs

The following V11 new features and enhancements are shared by all Aspen Economic Evaluation Programs.

Add steel fireproofing to mill building (ID 96290)

Previously, steel fireproofing was not generated by default for the BSTLMILL BLDG plant bulk. Steel fireproofing specified at the project and area levels is now applied to the steel mill building as is currently done for open steel structures and steel piperacks.

Add Equipment Fireproofing to horizontal vessel saddles, heat exchanger saddles, and air cooler legs. (ID 93921)

Equipment fireproofing has been added to the following equipment models which include heat exchangers, reboilers, and horizontal tanks

DHE FIXED T S	DHT DESALTER
DHE FLOAT HEAD	DHT JACKETED
DHE U TUBE	DHT MULTI WALL
DHE PRE ENGR	DRB KETTLE
DHE TEMA EXCH	DRB THERMOSIPH
DHT HORIZ DRUM	DRB U TUBE

Equipment fireproofing has also been added to the DHE AIR COOLER legs when the leg height is specified as greater than 0.

The equipment fireproofing for the equipment models above will be added to the estimated equipment material and labor costs when equipment fireproofing is specified at the project/area

levels. When equipment fireproofing has been specified, users will see higher material and labor costs for these equipment models due to this change.

Calculate Leg Height for Cone Bottom Vessel based on dimensions (ID 95070)

The default calculated leg height for the cone bottom vessel (DVT CONE BTM), has been updated based on the dimensions provided for the vessel. Specifically, the default calculated value is based on the cone height (determined from the vessel diameter and a 60 degree cone angle) and a 2 foot clearance below the cone. A user specified leg height will override the default calculated value.

Add saddle height field to horizontal vessels and heat exchangers (ID 97066)

A saddle height field has been added to the following equipment models, which include heat exchangers, reboilers, and horizontal tanks:

DHE FIXED T S	DHT DESALTER
DHE FLOAT HEAD	DHT JACKETED
DHE U TUBE	DHT MULTI WALL
DHE PRE ENGR	DRB KETTLE
DHE TEMA EXCH	DRB THERMOSIPH
DHT HORIZ DRUM	DRB U TUBE

The default saddle height has been specified as 10 inches [254 mm] to keep existing saddle weights the same [Moss Book]

- Minimum saddle height is 6 inches [150 mm]
- Maximum saddle height is 96 inches [2400 mm]

Previously the saddle material cost and shop labor wasn't included in the equipment cost. Users will now see higher equipment costs due to this change.

Add larger pile diameter for Drilled and Cast-in-place Concrete Pile (ID 95056)

We have increased the pile diameter (size) of drilled and cast-in-place concrete piles to 48 IN [1200 MM]. The applicable pile types include AUGR - Auger cast piles, FRNK - Franki piles, and POUR - Poured concrete piles. The 48 IN [1200 MM] size has been added to the pile size dialog box available in the project/area level Civil specs. Additionally, the 48 IN [1200 MM] size has been added to the Drilled and cast-in-place concrete piles (SD POURED) component located in Site development, Piling.

Add Civil to HE Spiral Plate (ID 96927)

We are now including a factored estimate for Civil in the EHE SPIRAL PLT heat exchanger component estimated costs. An 'OTHER EQUIPMENT CONCRETE' line item will now be estimated for this item in the details in the CCP report.

Add Sandblasting percent to project and area level specification (ID 98235)

Steel sandblast percent area and Equipment sandblast percent area fields have been added to the Project Basis - General Paint Specs and Area Paint Specs forms. The default sandblast percentage for steel and equipment at the project level is 10%. The project level sandblast percentage specification may be overridden at the area and component levels.

EE Reporter functionality and usability upgrade. (UC 1922)

The EE reporter has undergone significant changes to upgrade its functionality and usability.

This reporter database new features include:

- “Crystal reports” items are replaced with SQL Server Reporting Services (SSRS) also known as Report Definition Language (RDL) generated reports.

- A new SQL Server database is added (support for Local Database only) to support the SQL Server Reporting Services. It will run concurrently with the legacy Access Database solution. (Support for Access will continue for an undetermined time.)
- All current 'standard' reports are presented in a .pdf format. MS Word and HTML format reports are discontinued. (.pdf can be displayed in a browser if needed)
- Queries for Access database reports will be migrated to SQL Server database and queries for Crystal Reports will be migrated to RDL reports.

The Icarus reporter user interface update include:

- Basic usability improvements in existing forms
- Update of file creation/browse and loading forms to modern conventions

What's New: ACCE, AICE only

The following V11 new features and enhancements are included in both Aspen Capital Cost Estimator and Aspen In-Plant Cost Estimator.

Specification of Multiple Power Conductors per Phase (UC 163169)

Multiple conductors per phase, connected in parallel and electrically joined at both ends to form a single conductor, are often installed where large ampacity feeders or services are used. Currently, the Icarus engine estimates multiple conductors per phase when the current drawn by the motor exceeds then ampacity rating of the default or user specified maximum power cable size.

This enhancement adds a new field called Number of conductors per phase to the General Electrical Specifications tab under each of the High, Medium and Low voltage subareas of the form.

The field lets you specify the exact number of parallel conductors per phase for HV, MV and LV power cables in the project. Per NEC requirements, the resulting multiple parallel conductors will be of the same length, consist of the same material and be the same size in AWG/KCMIL.

The NEC requirements for 'Conductors in Parallel' outlined in Article 310.10(H) will be used to validate the user inputs for these fields.

You can override system defaults or calculations at a project level by specifying the number of power conductors per phase for HV, MV and LV power cables.

If you specify a value greater than 1 in the 'HV no. of conductors per phase' field, the feeder current from all HV components in the project will be split between the number of conductors per phase specified by the user of the same size and length only if the resultant cables meet the minimum cable size requirements for the voltage level or the minimum cable size specified in the general electrical specifications form. If the user specified value results in a cable which violates this restriction, this specification is ignored and the system default cable is estimated. For example:

If a component with a 10,000 HP motor driver (HV) is added to a new ACCE project, three 15 KV, 500 KCMIL single conductor wires of a total of 3105 feet are estimated by default. With this enhancement, if the user specifies, say, two (2) HV no. of conductors per phase, the system will split the current flowing in each of the three conductors between two 2/0 AWG parallel conductors per phase, giving a total of 6 conductors. Each conductor per phase will have a current carrying capacity of half of the current drawn by the motor and will be of the same length, therefore the total estimated cable length will double e.g. to 6210 feet in the example above. The number of terminations will also double. If the value specified is 3, the current would have to be split between three 14 AWG parallel conductors per phase, which are smaller than the minimum 15 kV cable size, which is 2 AWG. The system default 500 KCMIL single core wires are therefore estimated.

Notes:

If the user specified number of conductors per phase for any of the above fields results in conductor sizes that are less than the minimum allowable conductor size, a warning message will be generated to alert the user that the number of conductors per phase results in a cable that is smaller than the minimum and that the system default cable will be estimated instead.
Per NEC Article 310.10(H), multiple conductors per phase shall be permitted only in sizes 1/0 AWG and larger.
Conductors in sizes smaller than this will be permitted only if the ampacity of each individual conductor is sufficient to carry the entire current shared by the multiple conductors. Therefore if the user specified number of conductors per phase is greater than 1 and the resulting cable sizes do not meet the aforementioned requirements, a warning message will be generated to alert the user that the specified input does not meet the recommendations.

Option to Exclude Bus Conductor in Substation Input Form (UC 162574)

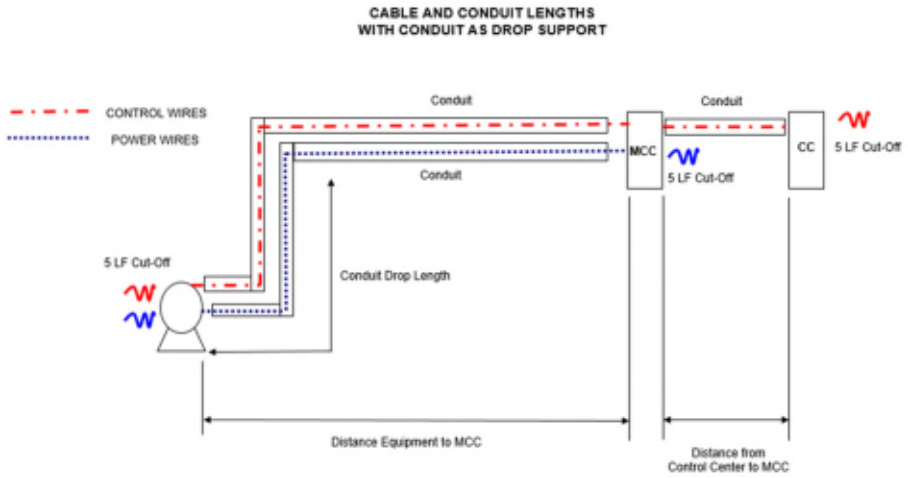
The bus conductor (bus duct or cable bus) is typically included in a switchgear section for the purpose of conducting current to the components connected to it. By default, the system currently estimates a bus duct as part of the switchgear components, with the option to estimate a cable bus instead of the bus duct.

In V11, you may choose to exclude the bus conductor from the estimate of the switchgear, for example in a case where the bus conductor is provided as part of the switchgear enclosure, as opposed to being a separate component. The option to exclude the conductor is part of the 'Conductor type' drop down list of the substation form. When users select the '-' option in the 'Conductor type' drop down in the Main or Unit Substation forms, the bus duct (estimated by default) will no longer be estimated and should not appear in the reports.

New Conduit Length Option Can Override Generated Conduit Length (UC 162571)

Currently, for single core and multi-core power and control cables pulled within conduit, the automatically generated conduit is equal to the length of the cable run estimated. Power cables estimated between equipment in an area and the Motor Control Center will have a cable run length equal to the 'Distance to MCC' specified.

The length of the conduit estimated for these cables is therefore equal to the 'Distance to MCC'. The length of control cable conduits estimated between equipment in an area and the control center will be equal to the 'Distance to MCC' + 'Distance MCC to CC'. See the figure below:



In V11, an option has been added to control the length of conduit generated. New '**Power cable conduit length**' and '**Control cable conduit length**' fields have been added to the project level electrical specification form, area level electrical specification form and to the electrical bulk items

Electrical Options form. These let you control the length of the conduit runs generated in the project, area, and for the component installation bulk items respectively.

Option to Add Supports for Electrical & Instrument Conduit (UC 162090)

In V10.1, an option to estimate conduit supports was added to the Electrical Conduit plant bulk. Users can specify the conduit support type (listed below) and the system generates the number of supports based on the NEC requirements.

- Conduit clamps
- Conduit hangers
- One-hole conduit straps
- Two-hole conduit straps

This V11 enhancement extends this capability to the project and area level electrical specifications, such that users may include conduit supports with all above ground conduit runs in the project (project level specification) or include conduit supports with all above ground conduit runs in a specific area (area level specification). In addition to the conduit support type, users can specify the distance between supports. Conduit supports will not be estimated for underground conduits.

Multiple Item Options for Control Cable in Electrical Bulk Items Form (UC 162579)

Currently the electrical bulk items forms allow adding three different power items. However, only one control item (control cable plus push button station) can be specified for each. In V11, you can specify multiple control items for as many as five different items. (All Programs)

This enhancement will therefore address this by adding the following fields under each item:

- Number of pushbuttons
- Control cable length
- Control cable no. of conductors
- Control cable type
- Control cable size
- Control cable conduit option

The 'Number of pushbuttons' field is required to estimate each of the five control items. If the 'Number of pushbuttons' field is not specified, the control item will not be estimated.

What's New: ACCE only

The following V11 new features and enhancements are unique to Aspen Capital Cost Estimator.

Automated Risk Analysis Model and Reports (UC 2711)

Estimators frequently need to use estimate and engineering data to assemble a stochastic-based risk analysis model and use third party tools to perform risk analysis. The new Risk Analysis feature allows estimators to conduct cost risk analysis within ACCE using a Monte Carlo Simulation approach.

The results of the analysis are

- a table of contingency values and percentages for various confidence intervals
- Total cost histogram and S-curve for total project cost and total direct cost
- Sensitivity chart for all the elements of the cost estimate that are included in the risk analysis.

Before you run the analysis, the ACCE project must have the required scope (process equipment, piping, plant bulks, design basis, contract structure etc.) defined. The "New Reporter" option must

be selected in the ACCE Preferences. Ideally the project should not have a contingency amount or percentage defined.

To use the risk analysis feature,

Click **Run** > **Risk Analysis** > **Create Input File**. The project must be evaluated before creating the input file.

In the Input file, User Input - Ranges worksheet, specify the min and max values for each of the cost elements included in the risk analysis. The default min/max % values in the input file are -10% and 10%.

Set the number of risk analysis iterations. The default number of iterations is 10000. The minimum is 5,000, the maximum is 50,000.

In the Input file, User Input - Correlations worksheet, specify the correlation coefficients between the cost elements included in risk analysis. The input file has default correlation coefficient values specified.

Save and close the file and then click the Run > Risk Analysis > Run Analysis menu item.

The results worksheet contains the table of contingency amounts and percentages for the total project cost for various confidence intervals, and the histogram and sensitivity charts (tornado charts) for the total project and total direct costs.

Option to Estimate Push Buttons with Motor Operated Valves (UC 220064)

If a Motor Operated Valve is specified in an instrument loop (installation bulks), ACCE currently do not automatically create a pushbutton station for the electric actuator. Users would like an option to include pushbutton stations for the motor operated valves estimated in the project.

To enable this capability, a field, 'Motor operated CV pushbuttons' will be added to the General Instrumentation Specs form with the following options:

- Exclude pushbuttons from motor operated valves (default option)
- Provide pushbuttons with motor operated valves

By default, the field will have the 'N' option. If this option is specified, there will be no pushbutton station estimated for the motor operated valves and nothing should change from the previous version.

If user specifies the 'Y' option, a pushbutton station (with 2 pushbuttons and pilot lights) and a control cable (from the pushbutton station to the control center) will be estimated for each MOV estimated in the project.

The length of the control cable estimated will be calculated as follows:

*((Distance equipment to MCC + Distance MCC to CC) + 10ft.[3 m.]) * 4 (Number of conductors)*

Distance equipment to MCC - specified in area electrical specs form

Distance MCC to CC - specified in CC form

Add Electrical Conduit Type Override at Area Level (UC 220059)

The 'Above ground conduit type' field at the project level allows specification of the electrical and instrumentation conduit material in the project, while the 'Below ground conduit type' assigns material type to the underground electrical conduit only since instrumentation cables are usually

installed above ground only. In V11 you can specify the instrument and electrical conduit material at area level.

To enable this, fields have been added to the area level electrical specifications form to allow override of the project level conduit type values for a particular area.

What's New: APEA Only

The following V11 new features and enhancements are unique to Aspen Process Economic Analyzer.

Tube Wall Thickness

An initial tube wall thickness value is needed for sizing in order to estimate the global heat transfer coefficient and therefore needed to calculate the heat exchanger area. The value is either read from simulator data or set to a default value. In V11 the value used for sizing is no longer written back to the project component, allowing the tube wall thickness to be calculated from the ASME design code when the component is evaluated.

Compatibility Notes for V11

There are no compatibility notes listed for this release.

What's Fixed in V11

Aspen Economic Evaluation V11 includes a number of software fixes that further improve the product. Selected defect fixes contained in APEA V11 and ACCE are listed below.

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.

Aspen Process Economic Analyzer

This section describes the software fixes to Aspen Process Economic Analyzer V11.

ID	Issue Description	Issue Resolution
345816	Activated Costing V11: The fluid type of CWW and Refrig are Steam.	This issue was fixed in APEA V11.
248326	Raw material/product stream error.	This issue was fixed in APEA V11.
164511	Air Cooler Duty is not updated in sizing expert window.	This issue was fixed in APEA V11.
102949	Reporting Assistant usage.	This issue was fixed in APEA V11.
102930	Custom Column Import from HYSYS: Stream Connectivity issue (due to inconsistency in _@COL suffixes).	This issue was fixed in APEA V11.
21534	When sizing a reciprocating compressor with a gas engine there is an error - Maximum exit pressure found to be less than the minimum inlet pressure.	This issue was fixed in APEA V11.
21120	APEA mapping takes a very long time for a single item.	This issue was fixed in APEA V11.

Aspen Capital Cost Estimator

This section describes the software fixes to Aspen Capital Cost Estimator V11. This list is a subset of all the corrections included in ACCE V11 and includes fixes made to the Evaluation Engine, Reporter and System Framework.

ID	Issue Description	Issue Resolution
386582	When the "N" option is used in ACCE to suppress default internal volumetric models, the user specified installation bulk pipe did not get appropriate paint/insulation bulks based on the pipe design temperature.	This issue was fixed in ACCE V11.
383009	In a custom pipe spec, if the pipe material in the extra-small diameter break was not carbon steel but the pipe material for subsequent diameter breaks was carbon steel then the sandblasting quantities were not properly estimated for a pipe on which the custom pipe spec was applied.	This issue was fixed in ACCE V11.
368503	For centrifugal pumps on which a gas engine driver can be specified, the vendor cost of the gas engine was incorrect, if the project currency was different than the country base currency.	This issue was fixed in ACCE V11.
363641	When the design temperature of a pipe is <= -20 DEG F (-28.89 DEG C), we estimate cryogenic valves and fittings for the pipe. For installation bulk pipe, if the design temperature of the project component was <= -20 DEG F (-28.89 DEG C), cryogenic valves and fittings were not being estimated because the design temperature of the pipe was not being correctly set when it was negative.	This issue was fixed in ACCE V11. **Note:** Design temperature for installation bulk pipes was being correctly set when the value was positive.
357462	Error in Direct Cost Metrics by RG Excel report.	This issue was fixed in ACCE V11.
350068	Post indicator valve diameter units mis-matched in Excel report.	This issue was fixed in ACCE V11.
350021	ACCE consumes an additional 8 tokens for scheduling feature.	This issue was fixed in ACCE V11.
347832	Some WIRE SIZES options not available in Electrical bulk items/Power cable size item.	This issue was fixed in ACCE V11.
346114	Question about Weld efficiency of UK project.	This issue was fixed in ACCE V11.
315318	When the pipe material is sanitary pipe material (304PS, 316PS) the material adjustments for pipe/fittings and valves specified on the custom pipe spec are not being applied.	This issue was fixed in ACCE V11.
313616	Program does not give CC bulks such as I/O cards with 0 specified for equipment indexing.	This issue was fixed in ACCE V11.
306440	Total Cost is missing compressors.	This issue was fixed in ACCE V11.

ID	Issue Description	Issue Resolution
305941	Weight of random packings specified for single, double or multiple diameter tower was not reported in the design data sheet.	This issue was fixed in ACCE V11. The packing weight will be reported in the design datasheet. Previously, since the densities of various packings were not encoded in the program, a conservative assumption for packing density was used while doing the wind/seismic and foundation calculations. Since more accurate values depending on the packing type are now being used, this may result in different values of wall thickness and concrete quantity for foundation for columns in which random packings have been specified, compared to previous versions.
305624	For a centrifugal gas compressor, the aftercooler cost was incorrectly added to the profit cost. Due to this the sum of the individual vendor cost items did not add up to the total cost in the design data sheet in the CCP report. **Note:** The total cost number was correct	This issue was fixed in ACCE V11. The profit will not include the aftercooler cost, so the vendor cost items will add up to the total cost. Note: The material cost already includes the motor cost. This is made clear by the note at the beginning of the vendor cost data in the datasheet.
301592	Chinese template project, COA of COATS BY SPRAY might be wrong.	This issue was fixed in ACCE V11.
296300	Cannot use zoom in and out option in ACCE separate windows.	This issue was fixed in ACCE V11.
295114	The weight of pre-fabricated pipe supports reported in the results database was incorrect when the number of identical items specified for the project component was greater than one. The weight of the supports was being multiplied by (number_of_identical_items)^2 instead of simply multiplying by (number_of_identical_items). Also, for the utility piping plant bulk item, the pre-fab pipe supports did not have any installation man-hours estimated.	This issue was fixed in ACCE V11.
290633	Error Code: ERROR> 'QCD- 3' ILLEGAL CHARACTER with Steel Structure remarks.	This issue was fixed in ACCE V11.
258423	Erroneous Tower Nozzle Diameter Errors.	This issue was fixed in ACCE V11.
244135	Conduit size calculating 20 in. where 1-2.5 in. are expected.	This issue was fixed in ACCE V11.
230059	When the PVC pipe is specified with sockolets & caps, the results for sockolets and caps were not reported.	This issue was fixed in ACCE V11.
229790	Enhancement Request: Vendor Cost Data for CENTRF IG should be broken down in the report.	This issue was fixed in ACCE V11.
229746	For a centrifugal gas compressor, when the intercooler/aftercooler type was specified as 'AIR' an unreasonable quantity of epoxy grout would get estimated.	This issue was fixed in ACCE V11.

ID	Issue Description	Issue Resolution
228093	Components lost from V9.1 project.	This issue was fixed in ACCE V11.
227483	File crashed - LOST ESTIMATE.	This issue was fixed in ACCE V11.
225321	Components Disappearing.	This issue was fixed in ACCE V11.
188789	Additional materials list does not appear, component freezes.	This issue was fixed in ACCE V11.
164019	TEMA type in ACCE.	This issue was fixed in ACCE V11.
21267	Project notes get scrambled in Standard report.	This issue was fixed in ACCE V11.
226339	Cost mapper performance problems.	This issue was fixed in ACCE V11.
350234	ACCE_Lost Components in Projects.	This issue was fixed in ACCE V11.
399772	Conveyor Model - Handrail showing twice in report.	This issue was fixed in ACCE V11.

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 V11

The following are new for V11:

Simulation Component Mapping Directly on the Flowsheet Form

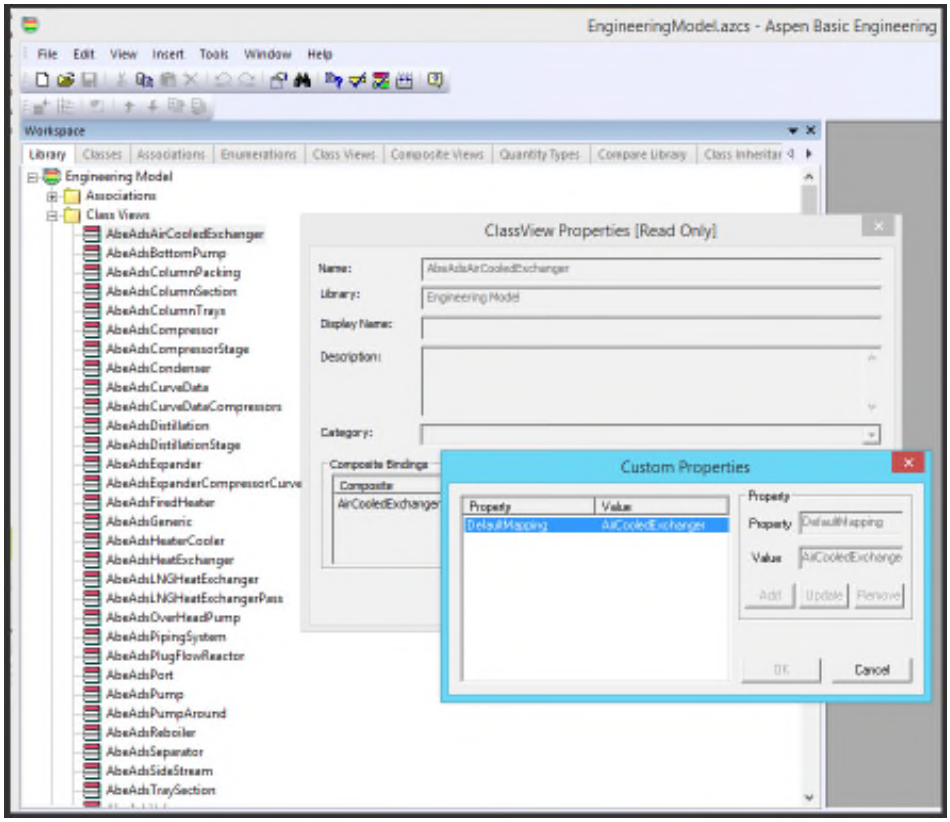
In the Web Simulation Mapper, the Map As and Workspace Object columns now have active drop downs. When you select a class to map, the workspace object column is populated with existing ABE objects of that class type. You can then pick the ABE object that you want the unit operation to map to. This saves you having to "click down" to a specific unit operation from the Flowsheet view in order to map it, as was the case in V10.

This can be done for all the streams and blocks that can have 1 to 1 mapping. For "1 to many" mappings it is still necessary to go to the details view for the mapping. All the default port mapping is done for 1:1 unit operations. To change the default port mapping, you can go to the details view to modify them.

New Custom Property String for Web-Specific Display Control

The "DefaultMapping" custom property lets you assign Web Simulation Mapper display names to class views via the data model class library. This controls the default auto map preferences. Auto mapping, where parts are mapped automatically between the flowsheet and the workspace library, occurs when a flowsheet object is named the same as a workspace object. Auto map by name is always active. If Automap does not occur, the mapper preferences for a workspace object are defaulted to "Create."

Using "DefaultMapping"



Direct Web Access to Explorer Disabled

Note: In V11, 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 V11

There are no compatibility notes for this release.

What's Fixed in V11

Aspen Basic Engineering Version V11 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
20334	Batch XML performance upgrade.	This issue was fixed in ACCE V11.
24214	In the Datasheet Definer the Datasheet Properties window: Font button does not work.	This issue was fixed in ABE V11.
45855	Datasheet Definer ribbon bar does not appear.	This issue was fixed in ABE V11.
230065	Simulation import error with ABE V10 and PRO/II V10.1.	This issue was fixed in ABE V11.
275230	ABE Licenses get hung up.	This issue was fixed in ABE V11.

ID	Issue Description	Issue Resolution
275234	Unit sets drop-down moves too quickly.	This issue was fixed in ABE V11.
278110	Cannot export datasheet to Excel	This issue was fixed in ABE V11.
293053	The folder view is not updated automatically when creating a new folder inside.	This issue was fixed in ABE V11.
307901	Exported package for any datasheet with an integer field filled with descriptive text gives error on import.	This issue was fixed in ABE V11.
344751	Print options not being utilized.	This issue was fixed in ABE V11.
346839	Activated Datasheet – List of options is partially off screen.	This issue was fixed in ABE V11.
347452	Energy Stream – Default UtilityMassFlow value.	This issue was fixed in ABE V11.
357459	Substitutions does not activate the "Show Descriptive Text" option as when typing numbers.	This issue was fixed in ABE V11.
357460	Activated Datasheet Explorer – Datasheet: when entering a duplicate item number, a warning message appears and the ServerProcess crashes.	This issue was fixed in ABE V11.
357468	Activated Datasheet Explorer – The Dimensions dropdown should be grayed for users without the correct privilege.	This issue was fixed in ABE V11.
358189	Activated Datasheet Explorer does not display all the available workspaces while the legacy Explorer does.	This issue was fixed in ABE V11.
358219	Activated Datasheet Explorer – Datasheet Top level menu: the dropdown menu does not appear when clicking another button	This issue was fixed in ABE V11.
358911	Activated Datasheet Explorer – Annotation and Markup appear italicized when turned off in Datasheet Options.	This issue was fixed in ABE V11.
359145	Datasheet Definer prompts to save multiple times.	This issue was fixed in ABE V11.
21229	Datasheet printing is not giving the same format defined in datasheet.	This issue was fixed in ABE V11.
21692	Issues activating the ABE Datasheet Definer Add-InDefiner	This issue was fixed in ABE V11.
21808	Release Notes Known Issue: How does the prototype DWG file under **Drawing Editor | Tools | Foreign Data | Export** help the exported DWG file?	This issue was fixed in ABE V11.
21830	Pressure units on PFD table do not match what is specified in the class library.	This issue was fixed in ABE V11.

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 V11

The following are new for V11:

Support Both 32-bit and 64-bit MS Office

In V11, Microsoft Office 32-bit and 64-bit both work with Aspen Batch Process Developer.

Compatibility Notes for V11

Must Use 32-bit Microsoft Visio

1. If 'Equipment Diagram' or 'Block Diagram' is no being instantiated, then it is a problem with Microsoft Visio.
2. The solution is to copy a list of Dlls into the Microsoft Office folder. The list and location are provided below.

   Dlls:

   - FacilityData.dll
   - CalendarDialog.dll
   - HelpWrapper.dll
   - Utility.dll

- ABPDTypesSimple.dll
- ConfiguratorCore.dll
- ErrorReporter.dll
- ABPDUnmanagedInterface.dll
- UnmanagedWrapper.dll
- Engine_DLL.dll
- ApropInterf.dll
- BPSharedClasses.dll
- AplusInterf.dll
- BPMaterial.dll
- ErrMsg.dll
- BPDataIO.dll
- BPComp.dll
- ACMInterf.dll
- DBConnection.dll
- ABPDTableDescriptors.dll
- ABPDInterfaces.dll

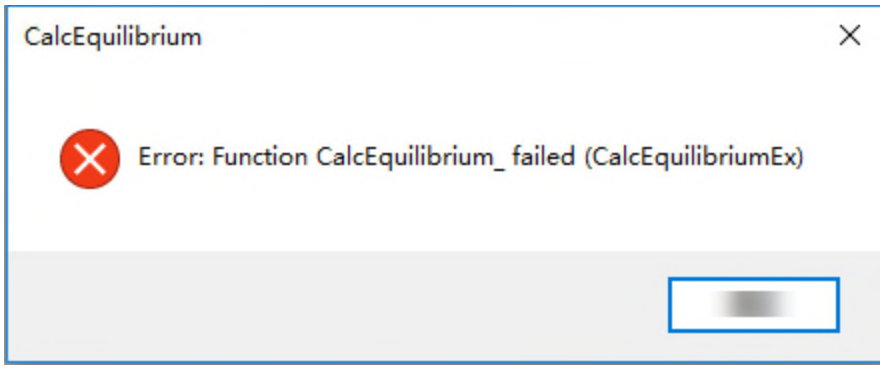
from 'C:\Program Files (x86)\AspenTech\Aspen Batch Process Developer V11.0\bin' to 'C:\Program Files (x86)\Microsoft Office\Office15'.

Note: For new PCs, move only 'HelpWrapper.dll' from 'C:\Program Files (x86)\AspenTech\Aspen Batch Process Developer V11.0\bin' to 'C:\Program Files (x86)\Microsoft Office\Office15'. Then check if Visio equipment diagram works.

3. Sometimes, you might have to install Visio again so that the registries are set correctly after copying the dlls.

Workaround for a Calculation Equilibrium Error

If you see an error message box as shown below:



The workaround is:

1. Please click OK and close this and all the subsequent boxes.
2. Then, close Aspen Batch Process Developer.
3. Go to Task Manager, and close all instances of Aspen Properties.exe, AspenPlus.exe, BatchPlus.exe and BPATLCOTermoSocketLibExe.exe.

4. Reopen Aspen Batch Process Developer and try running the simulation again.

What's Fixed in V11

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 V11

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

Compatibility Notes for V11

There are no compatibility notes listed for this release.

What's Fixed in V11

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 V11:

- 64-bit Aspen Operator Training
- Support for Additional Connection Types
- Improved Usability / User Interface Improvements
- Support for OPC UA Client and Server
- Stream Connections Between Multiple HYSYS Cases
- Ability to Run Aspen Operator Training as a Service
- Importing Data Tables from Simulators
- Aspen Operator Training Enhancements

64-bit Aspen Operator Training

Aspen Operator Training is now a 64-bit application and requires a 64-bit operating system. This change offers the following benefits:

- Reduced memory limitations for very large, complex projects.
- Performance improvements and greater stability.
- Support for 64-bit Microsoft Office.
- Fewer compatibility issues and improved consistency with common operating systems.
- Can be installed on 64-bit operating systems without encountering RAM limitations.
- Meets common company guidelines and protocols.

Support for Additional Connection Types

Support for Aspen Dynamics and ACM

Aspen Plus Dynamics and Aspen Custom Modeler (ACM) are now supported connection types for Aspen Operator Training. Generally, all features available for the HYSYS connection type are available for Aspen Dynamics and ACM, with the exception of the **Streams** tab.

- Before connecting to an Aspen Plus Dynamics case, make sure that the Aspen Plus Properties environment has been fully configured.
- For Aspen Dynamics and Aspen Custom Modeler, AOT only searches the top-level flowsheet in the hierarchy for data tables. As a result, to facilitate communication with AOT, you must create an extra data table that contains all necessary variables in the top-level flowsheet of your case.

Support for ABB and DeltaV

In Aspen Operator Training, ABB and DeltaV are supported connection types.

- The **ABB** connection type provides a controller emulator. The driver can connect to an ABB System 800xA Simulation.
- The **DeltaV** connection type allows you to connect to a DeltaV server.

As well as providing OPC connectivity for data exchange:

- The **ABB** connection type allows you to execute the following functions in the DCS:
  - SetSpeed
  - StartIntegrator
  - StopIntegrator
  - ExecuteNextStep
  - SaveSnapshot
  - LoadSnapshot
- The **DeltaV** connection type allows you to execute the following functions in the DCS:
  - SetSpeed
  - StartIntegrator
  - StopIntegrator
  - ExecuteNextStep
  - SaveSnapshot
  - LoadSnapshot
  - DeleteSnapshot

Improved Usability / User Interface Improvements

Aspen Operator Training V11 features a completely updated and redesigned user interface. Current and returning users will find that forms and setups retain all of the previous content and functionality but are now more intuitive to access and easier to use. Experienced users will quickly locate familiar tools for a more efficient workflow. New users will spend less time learning the software and will be able to take full advantage of all the capabilities available within Aspen Operator Training.

- The ribbon tab and **File** menu were updated to share the same "look and feel" as other AspenTech products.
- Tabs for **Resources** and **View** were added to the ribbon.
- The workspace is now customizable; you can control the size, shape, and position of each window. You can dock windows to any side of the screen, or “float” a window off of the Aspen Operator Training window and onto another display. The workspace is customizable; you can control the size, shape, and position of each window. You can dock windows to any side of the screen. You can click and drag, or "float", tabs to one side of the workspace to display them

side by side, or drag them out of the AOT window entirely (even to a second monitor, on a computer so equipped). You can save different layouts of windows and switch between them; these saved layouts and the current layout are saved with the project.

- Each tab displays the name of the form or other contents of the window. You can click and drag the tabs within the row of window tabs to re-order them.
- If you click and drag the tabs off the row of window tabs, they turn into freestanding windows that can be arranged as desired. You can also right-click in the window tab and select **Floating** to turn a tab into a freestanding window.
- You can also form separate window groups within the workspace. To do this, drag the window into one of the boxes superimposed on the workspace.
- A Zoom slider and related controls appear at the bottom of the main window.

Global Object Palette and Properties Pane

In V11, the Palette and Properties pane are global views. You can dock the Palette or Properties pane to any side of the screen or "float" it off of the main window and onto another display.

The Palette contains objects that you can add to your project. These objects customize the user interface. To access the Palette, from the **Editor** ribbon tab | **Show** group, click **Palette**, or press **F4**.

You can use the Properties pane to define and view properties of a currently-selected object. Depending on the type of object that is selected, the number and type of properties that appear in the Properties pane vary. To access the Properties pane, from the **Editor** ribbon tab | **Show** group, click **Properties**.

Dockable Windows

Certain windows, including the **Palette** and the **Properties** pane, are dockable. Other windows can be made dockable by right-clicking their titles and selecting **Dockable**.

Windows docked in this way have an **Auto Hide** feature. Right-click the title bar of this window and select **Auto Hide** (or click the pin icon at the right side of the title bar); then, when you move the mouse pointer out of the window, the pane collapses. Move the pointer back into the tab to reveal the window again.

Auto Hide applies to the whole pane of docked windows. While the group is in **Auto Hide** mode, you cannot drag these windows around to arrange them differently; you must first turn off **Auto Hide**. Turn off **Auto Hide** by right-clicking and selecting Auto Hide again or clicking the pin icon again.

Improvements to Grids and Tables

Grids and tables in Aspen Operator Training now offer the following features:

- Show alternating colors for rows.
- Support row and column selection.
- Support filtering, including custom filtering.
- Support sorting.
- Reorganization of Forms

The following forms or tabs were updated substantially to improve the user interface:

- The **Global** tab in Editor mode
- The **Synchronizer** form
- The **Configuration** form (available from clicking **Options** | **Configuration**)
- The **OPC Server** form

Support for OPC UA Client and Server

The OPC Client / OPC Server type available in V10.1 was renamed **OPC DA** in Aspen Operator Training V11. Additionally, **OPC UA** is now available as an OPC Client and OPC Server. OPC Unified Architecture is a machine to machine communication protocol for industrial automation developed by the OPC Foundation. This cross-platform protocol facilitates communication with industrial equipment and systems for data collection and control and features robust security. For information regarding configuring the OPC UA Server, refer to the "OPC UA Configuration" topic in the *Aspen Operator Training Help*.

Stream Connections Between Multiple HYSYS Cases

In Aspen Operator Training V11, a new **Streams** tab is available when the **Connection Type** is **HYSYS**.

Using a synchro project, you can connect HYSYS streams from different HYSYS simulations, providing a simple connection between HYSYS cases. This makes it easier to partition HYSYS cases.

- To do so, create a synchro project containing at least two projects with **HYSYS** connection types. The projects must have stream connections specified on the **Streams** tab. AOT connects all necessary variables for these streams.
- Each stream should be connected to a single stream from another project. Make sure to define the connected streams with the same names.

Ability to Run Aspen Operator Training as a Service

Starting in V11, Aspen Operator Training can be configured to automatically perform Runtime execution as a Windows service. This is a useful feature if you want to set up a machine to run automatically (in Runtime mode only) without requiring monitoring. The running of the OPC server is managed by AOT. You can connect to the service from another machine. Use the Aspen Operator Training Service Manager to run the service. For further details, refer to the following topics in the *Aspen Operator Training Help*:

- "Running AOT as a Windows Service"
- "Aspen Operator Training Service Manager"

Importing Data Tables from Simulators

For HYSYS, Aspen Dynamics, and ACM connection types, you can now import data tables from the simulator. On the Tags tab, you can click **Import Data Tables** to access the **Import Data Tables** dialog box. All data tables from your simulator case appear on this dialog box. For Aspen Dynamics and Aspen Custom Modeler, AOT only searches the top-level flowsheet in the hierarchy for data tables. As a result, to facilitate communication with AOT, you must create an extra data table that contains all necessary variables in the top-level flowsheet of your case.

Aspen Operator Training Enhancements

- When the **Execute Step by Step** check box is selected, the execution has been improved in Aspen Operator Training V11, resulting in a greater real time factor.
- The *Aspen Operator Training Help* is now context-sensitive. When you press **F1** on a specific tab or form, help related to the tab or form appears.
- For **HYSYS**, **ACM**, or **Aspen Dynamics** connection types, on the **Global** tab in Editor mode, an **Edit** button was added next to the **Case Name** field. If you click **Edit** and then modify the case, if you save the project, your changes to the simulator case are saved as well. Do not close the simulator case before saving the project.
- The **Synchronizer** form now contains an **Edit** button that you can use to edit a project used by the synchro project. The project opens in a separate tab, with **<SynchroProjectName>**

appended to the title. If you make changes and then save the project, all changes are saved as part of the synchro project. No changes are made to the original project.

- The user role management system was improved. Restricted users (for example, Operators) can no longer modify user role information.

Compatibility Notes

There are no compatibility notes listed for this release.

What's Fixed in V11

There are no software fixes listed for this release.

Aspen Operator Training Simulator (OTS) Framework

Product Description

Aspen Operator Training Simulator (OTS) Framework enables a large dynamic simulation to run in real time using parallel processing and enables the various components of an operator training simulator to link to the simulation via OPC.

The Aspen OTS Framework has a configuration mode used to identify the name and location of the partitions, make stream and control signal connections and publish tags.

The run mode launches the simulation cases, runs and synchronizes the partitions, exchanges stream data between them, and exposes simulation variables and commands via OPC. This enables simulation data to be displayed on the operator interface, and operator / DCS actions to be immediately sent to the simulator.

Note: Aspen OTS Framework is a deprecated feature. We recommend that you use Aspen Operator Training to accomplish the same tasks instead. Aspen Operator Training supersedes Aspen OTS Framework 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*.

New Features and Enhancements

There are no new features for Aspen OTS Framework for this release.

Compatibility Notes

There are no compatibility notes listed for this release.

What's Fixed in V11

There are no software fixes listed for this release.

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 V11

Aspen OnLine V11 contains the following new features:

- Aspen OnLine and all its components are now 64-bit programs. The 64-bit versions of simulators delivered in V11 work with Aspen OnLine V11.
- Aspen HYSYS models with EO subflowsheets, Aspen Custom Modeler models, Aspen Model Runner models, and Aspen Utilities Planner models can now be used in RTO mode. This provides the same feature set which has previously been available with Aspen Plus EO models. In Aspen OnLine projects with one of these RTO models, all other models are ignored.
- Aspen OnLine now supports the steady-state, estimation, and optimization modes of Aspen Custom Modeler and Aspen Model Runner cases in the same way that it does with Aspen Utilities Planner models.
- You can schedule model runs to occur sequentially, and optionally dependent on another run completing successfully, instead of each model being run independently at pre-set times. Use the **Project Configuration | Schedule** form with the option for a project-wide run schedule to configure this.
- You can copy model variables from Aspen Plus sequential modular models into the **Variable - Tag Mapping** form as you could previously do for Aspen HYSYS models, as an alternative to performing Offline-to-Online.
- You can now configure Aspen OnLine to clean up old files in the project folder after each model run. For each folder you can specify which file(s) to clean up and how old the files should be before they are deleted. On the **Project Configuration | Specifications** form, click **Clean Folders & Files** to configure this feature.
- Aspen OnLine now has configurable wait times used with Aspen Plus and Aspen HYSYS models to make opening and running models more robust. You can configure these on the **Models | Specifications | Specifications**sheet.
- It is now possible to start and stop Aspen OnLine and its data server and engine components via the command line. This allows these functions to be performed in external scripts. For more information, see Starting and Stopping Aspen OnLine Via the Command Line in the help.
- Normally, Aspen OnLine saves the model file after a successful model run. Now this is optional for non-dynamic, non-RTO models and an option on the **Models | Specifications | Specifications** sheet lets you turn off this behavior.
- You can choose the locale (language) for messages that the server components send. Set it in the **File** | **Options** dialog box.
- In Aspen Utilities Planner models, the **Aspen Utilities Optimization** run type is now displayed simply as **Optimization** for consistency with other models.
- The names of some fields related to units on some forms have been changed to make their purposes more clear. The **UOM string** is the units of measure from the DCS. The **Physical type** is the type of the tag in Aspen OnLine or of the variable in the model which determines which units apply, and the **Units** (of that physical type) are used for conversion when values are transferred between tags and variables.

Compatibility Notes for V11

Starting with V11, **Output to IMS** tags are only updated after the model is run if the tag is output from that model or independent (as with manual tags) or based on such tags. This avoids excessive IMS writes, particularly when you have many models in a case. See Writing Aspen OnLine Tag Values to the Plant IMS in the Aspen OnLine help for more information.

The Weight Tag from Aspen Utilities Planner models was formerly stored in the **StartPosition** field in the configuration database. This field is needed for the actual start position for RTO models, so the Weight Tag is now stored in a new **WeightTag** field. When projects from earlier versions are migrated to V11 via auto-migration or export/import, tags in the StartPosition field are automatically moved to the WeightTag field.

The result of a run of an Aspen Utilities Planner model with **Steady State** run type was formerly stored in the **FullCaseOutTag** field in the configuration database and **Full case** in the Aspen OnLine user interface. The FullCaseOutTag field is needed to store the full case results of RTO models, so the result of a Steady State run is now stored in the **TargetTag** field in the configuration database and **Param case** in the user interface. In real applications, Steady State run type is rarely used with Aspen Utilities Planner models (usually the Optimization run type is used), but if you have an Aspen Utilities Planner model from V10 or earlier using the Steady State run type you need to keep using in V11, contact AspenTech Support to have the configuration database updated.

Because Aspen OnLine is a 64-bit product, if you are using it with SQL Express 2014 (see Running the Aspen OnLine Service as Local System in the Aspen OnLine help), it must be a 64-bit version of SQL Express 2014.

Each model file name and its path must not exceed 128 characters in total. This is a limit imposed by the SQL database Aspen OnLine uses to store model variables, which is created with a .MDL extension in the folder with the model file. Earlier versions also had path name limits, but in updates to V10 was it possible to have paths exceeding this limit.

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 V11

The following new features and enhancements were added in release V11:

- Support for Aspen Flare System Analyzer Comparison
- Additional HYSYS and Aspen Plus Variables for Comparison

Support for Aspen Flare System Analyzer Comparison

Starting in V11, you can use Aspen Version Comparison Assistant to compare Aspen Flare System Analyzer models between versions of AspenTech products. All of the same features that are available for Aspen Plus, HYSYS, and EDR file comparison are now available for Aspen Flare System Analyzer as well, helping you reduce the time you spend testing your own models against new versions of AspenTech software.

- On the **Results** screen, if you want to read the relevant Aspen Flare System Analyzer compatibility notes to learn about important areas where you might encounter differences between versions, you can click the **Compatibility Notes** button.
- If results are present in your Aspen Flare System Analyzer case, you can compare it to another model while remaining in the product. You can launch AVCA from directly within Aspen Flare System Analyzer using the **File** menu | **Version Compare**. The **Results** screen of AVCA appears, showing differences between the current model and the selected model. You can adjust the tolerance values to determine the sensitivity of the comparison report.
- AVCA only supports the comparison of .**fnwx** files. Files with the extension .**fnw** are not supported.

Additional HYSYS and Aspen Plus Variables for Comparison

AVCA now features three additional variables for comparison for both HYSYS and Aspen Plus. This will improve model validation for V11.

The following additional variables appear for HYSYS:

- LHV Mass Basis (Std)
- Surface Tension
- Z Factor

The following additional variables appear for Aspen Plus:

- Lower Heating Value (Mass Basis) at 15 C
- Surface Tension, Mixture
- Compressibility Factor, mixture

Compatibility Notes for V11

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 V11

Aspen Simulation Workbook's components within Microsoft Excel are now displayed in the language of the operating system's locale, for English, Chinese, Japanese, and Russian. For any other language the English interface is used. The help opens in English, but you can use the Translate button to display it in a variety of languages.

Note: The AspenTech Language Utility used by a number of other products does not affect the language used by Aspen Simulation Workbook.

You can now export and import Tag-Variable mappings. From the Tag->Model view in the organizer, click  to export mappings to an .attmo file or click  to import them from a previously exported file.

When mapping tag attributes, ASW will now assign column mappings automatically if their headers match the English names of tag attributes or the localized versions ASW uses in supported languages.

In scenario tables, you can now enter any text string or date as the scenario name in the Scenario column, instead of the scenarios being forced to be called Case 1, Case 2, etc. In the Active column, you can now use formulas which resolve to the Boolean values TRUE or FALSE or the text strings True or False to indicate whether the cases should be run; past versions treated any non-empty cell (including ones with formulas that resolve to blanks) as an indication to run the scenario.

Since version V10.1, Aspen Simulation Workbook supports 64-bit Microsoft Office. There is a separate add-in manager for add-ins for 64-bit Excel which has 64-Bit in its name.

Compatibility Notes for V11

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 V11

Aspen Open Object Model Framework now provides ENCRYPT and DECRYPT commands. You can encrypt EBS script files with a password and distribute them without the files being able to be read or modified. Encrypted files can be invoked without the password.

Compatibility Notes for V11

There are no compatibility notes listed for this release.

Known Issues in V11

The Known Issues section provides information about issues in the V11 Aspen Engineering products.

Aspen Plus V11

Coexistence Issues	Workaround/Comment
Aspen Basic Engineering (ABE) Datasheets in the Simulation environment and documenting Safety Analysis calculations using ABE are not supported on Windows Server platforms, nor on Cloud environments.	N/A

Installation Issues	Workaround/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. **2** Expand Component Services | My Computer | DCOM Config | Microsoft Excel Application. Click OK on any dialog boxes that appear. **3** Select the Microsoft Excel Application. Right-click and select **Properties**. **4** Select the **Security** tab. **5** Click Edit... for Launch and Activation Permissions and Access Permissions. Make sure that ZyqadAdministrators is listed with full permissions.

General Usability Issues	Workaround/Comment
If you open the help, and then open a modal dialog box, you cannot access the help for the modal dialog box or view the existing help while the dialog box is open.	Close the existing help window before opening a modal dialog box to access help for the dialog box.
The Safety Analysis environment prompts you to save your case even in instances where you have not made any changes.	N/A

In the Safety Analysis environment, for fire scenarios using the **Semi-Dynamic Flash** calculation method, selecting the **Temperature** flash basis for a liquid full vessel where the liquid is subcooled at operating conditions may result in a moderate (less than 5%) error in the reported required area and required relieving flow. Additionally, in some cases, Aspen Plus cannot calculate the required relieving flow, and an **Internal Error** message appears in the status bar.	On the **Stepwise Flash Data** dialog box, set the **Flash Basis** to **% Vaporized** or **Enthalpy**. When this workaround is used, results will be accurate for the required area and required relieving flow. The relieving time may still be slightly inaccurate in some cases.
In some cases, performing the following steps in the Safety Analysis environment may cause display issues: **1** Select the **Scenarios** tab for a PRD. **2** Select the **PRD Data** tab and click **Add PRD**. **3** Return to the **Scenarios** tab.	If you experience display issues, they are can be resolved by minimizing and then maximizing the Aspen Plus window.
In some cases, if you switch from the Safety Analysis environment to the Simulation environment with the Datasheets **Mapper** form opened, and then return to the Safety Analysis environment, the **Mapper** form will not reload successfully.	To resolve this issue, close the **Mapper** form; then, on the **Datasheets** ribbon tab, click **Mapper** to re-open the form.
Safety Non-Certified Liquid Orifice Sizing records are not assigned a suffix to serve as a tag for calculation type.	Since all other PSV orifice sizing records have a tag, any orifice sizing records without a tag must be non-certified liquid.
When you copy a total flow type variable such as total mole flow or total mass flow from the stream summary into a custom table, the copy will not work, and Aspen Plus may crash.	Define a property set using an appropriate property such as MOLEFLMX or MASSFLMX, add it to the stream report, and copy this value into the custom table.
After opening, running, and closing a file from a network share, temporary files will be left behind on the network share.	When you know the files are no longer being used, delete the temporary files from the network share. They have names beginning with an underscore and a variety of extensions for the same name.
If you have loaded binary parameters from non-default binary databanks into your simulation, and subsequently reorder one of the components associated with those parameters, the parameters may be lost, potentially leading to changes in results.	Do not reorder components after loading binary parameters in this way.
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.

For Activated Datasheets, changing the .bmp image to a logo within the Datasheet Definer by adding the logo in the **\AspenZyqadServer\Basic Engineering37.0\WorkspaceLibraries\Templates** folder and clicking **Add** | **Bitmap** does not work.	Perform the following steps: Manually copy the image file from **C:\AspenZyqadServer\Basic Engineering37.0\WorkspaceLibraries\Templates** to either **C:\Program Files\AspenTech\Basic Engineering V11.0\SoloClient\wwwroot\Datasheets\images** (for the ABE Local Server) or **C:\inetpub\wwwroot\AspenTech\aspenONEABE\Datasheets\images** (for the ABE Enterprise Server). On the **Destination Folder Access Denied** dialog box that appears, click **Continue**.
For Activated Datasheets, in some cases, after changing the calculation method in the Safety Analysis environment, the Explorer fails to update the tags to reflect the new object display names.	Switch from the **By Equipment** View to the **By Document** View or the **By Folder** View to update the display names.
For Activated Datasheets, in some cases, if you transfer Safety Analysis data for one workspace, and then switch to another workspace, clicking **Transfer** on the **Mapper** form does not create any objects.	To resolve this issue, select **Create** from the drop-down list again on the Mapper form, and then click **Transfer** to create objects.
For Activated Datasheets, after you transfer an AirCooledExchanger to ABE for the first time, additional material ports are created for each subsequent transfer.	N/A
For Activated Datasheets, when you transfer an AirCooledExchanger to ABE, the fluid properties are not transferred.	N/A
For Activated Datasheets, when transferring a large simulation containing extensive data, the ABE Enterprise Server may fail.	Make sure that the ABE Enterprise Server meets the Platform Specifications described in the *Aspen Engineering Suite V11 Installation Guide*. This issue does not occur with the ABE Local Server. To avoid this issue, transfer selected objects rather than the entire simulation.
For Activated Datasheets, when a Heat Exchanger has no liquid phase on the tube side, the Mapper reports the shell side values as tube side values.	You can choose to avoid transferring these values to Aspen Basic Engineering by clearing the associated check boxes for these Heat Exchanger values in the attributes grid.
For Activated Datasheets, after attempting to connect to an Enterprise Server using an incorrect server name, an empty **Mapper** form will appear. After closing Aspen Plus, the **Aspen Plus V11** process continues to run in the Task Manager.	To resolve this issue, on the **Datasheets** ribbon tab, click **Change Server**. On the **ABE V11 Host Url Selection** dialog box, specify the correct server name.

OLI Interface V11

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 V11

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
The AutoSave options in the Files tab of the **File | Options** dialog box do not work.	Save Manually
If you have loaded binary parameters from non-default binary databanks into your simulation, and subsequently reorder one of the components associated with those parameters, the parameters may be lost, potentially leading to changes in results.	Do not reorder components after loading binary parameters in this way.

Aspen Custom Modeler V11

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 V11

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 V11

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 V11

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
If the Windows display language is set to **Turkish** and the **Country or region** is set to **Turkey**, in the **Cycle Organizer** the **Variable Find** function does not work.	Change the language to English while working with Aspen Adsorption. (Requires a Windows restart.)

Aspen Chromatography V11

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 V11

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
When the user switches databases from the default localdb to SQL Server, it may show the error message: "SQL Server Operating system error 5: '5(access is denied)" This is caused by the SQL Server database engine service account not having permission to read/write databases	Run Editors as an administrator. This is a one-time process.

Aspen HYSYS V11

Coexistence Issues	Workaround/Comment
Aspen Basic Engineering (ABE) Datasheets in the Simulation environment and documenting Safety Analysis calculations using ABE are not supported on Windows Server platforms, nor on Cloud environments.	N/A

Installation Issues	Workaround/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. **2** Expand Component Services | My Computer | DCOM Config | Microsoft Excel Application. Click OK on any dialog boxes that appear. **3** Select the Microsoft Excel Application. Right-click and select **Properties**. **4** Select the **Security** tab. **5** Click **Edit…** for **Launch and Activation Permissions** and **Access Permissions.** Make sure that **ZyqadAdministrators** is listed with full permissions.
For the ABE Enterprise Server, the Activated Datasheets 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 for Activated Datasheets 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/Comment
If you open the help, and then open a modal dialog box, you cannot access the help for the modal dialog box or view the existing help while the dialog box is open.	Close the existing help window before opening a modal dialog box to access help for the dialog box.

When using the **CPA** property package, enthalpy calculations may fail in some instances. If this occurs, the enthalpy value is reported as **nan.0000**.	To resolve this issue, select and then clear the **Ignored** check box for the associated unit operation.
When opening cases containing an **Amine Pkg** in HYSYS V11, if the package was associated with a Liquid-Liquid Extractor, and the associated component list contains amines and/or amine blends that are not supported by the **Acid Gas – Liquid Treating** property package, HYSYS fails.	Open the case in HYSYS V8.8, V9, or V10. A dialog box related to conversion to Acid Gas packages will appear. This dialog box indicates that these amines or amine blends are not supported, allowing you to remove the unsupported components.
When cutting or copying and pasting an LNG Exchanger with the **EDR – CoilWound** rating method selected, HYSYS may experience issues.	N/A
In some cases, cutting or deleting objects within an EO Sub-Flowsheet while **Equation Oriented** mode is selected causes HYSYS to fail.	Switch to **Sequential Modular** mode before cutting or deleting objects within an EO Sub-Flowsheet.
For cases containing large and complex Equation Oriented sub-flowsheets with multiple Specification Groups and User Connections, the case may fail to solve without providing an applicable error message.	N/A
When converting a section of the flowsheet to an Equation Oriented sub-flowsheet, if the external feed has a fluid package that is not an Aspen Properties package, and it is set as the **Property Slate Source** for the EO Sub-Flowsheet, HYSYS may fail.	To avoid this issue, before converting the flowsheet section to an EO Sub-Flowsheet, use a Stream Cutter with the **Petroleum Transition** type selected to perform the transition from the non-Aspen Properties fluid package to an Aspen Properties fluid package.
When attempting to convert an empty Standard Sub-Flowsheet to an EO Sub-Flowsheet, if the Default Fluid Package is not supported for Equation Oriented modeling, HYSYS creates an empty EO Sub-Flowsheet that cannot be entered.	N/A
The Safety Analysis environment prompts you to save your case even in instances where you have not made any changes.	N/A
In the Safety Analysis environment, for fire scenarios using the **Semi-Dynamic Flash** calculation method, selecting the **Temperature** flash basis for a liquid full vessel where the liquid is subcooled at operating conditions may result in a moderate (less than 5%) error in the reported required area and required relieving flow.	On the **Stepwise Flash Data** dialog box, set the **Flash Basis** to **% Vaporized** or **Enthalpy**. When this workaround is used, results will be accurate for the required area and required relieving flow. The relieving time may still be slightly inaccurate in some cases.

In some cases, performing the following steps in the Safety Analysis environment may cause display issues: **1** Select the **Scenarios** tab for a PRD. **2** Select the **PRD Data** tab and click **Add PRD**. **3** Return to the **Scenarios** tab.	If you experience display issues, they are can be resolved by minimizing and then maximizing the HYSYS window.
In some cases, if you switch from the Safety Analysis environment to the Simulation environment with the Datasheets **Mapper** form opened, and then return to the Safety Analysis environment, the **Mapper** form will not reload successfully.	To resolve this issue, close the **Mapper** form; then, on the **Datasheets** ribbon tab, click **Mapper** to re-open the form.
Safety Non-Certified Liquid Orifice Sizing records are not assigned a suffix to serve as a tag for calculation type.	Since all other PSV orifice sizing records have a tag, any orifice sizing records without a tag must be non-certified liquid.
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.
For Activated Datasheets, changing the .bmp image to a logo within the Datasheet Definer by adding the logo in the **\AspenZyqadServer\Basic Engineering37.0\WorkspaceLibraries\Templates** folder and clicking **Add** | **Bitmap** does not work.	Perform the following steps: **1** Manually copy the image file from **C:\AspenZyqadServer\Basic Engineering37.0\WorkspaceLibraries\Templates** either **C:\Program Files\AspenTech\Basic Engineering V11.0\SoloClient\wwwroot\Datasheets\images** (for the ABE Local Server) or **C:\inetpub\wwwroot\AspenTech\aspenONEABE\Datasheets\images** (for the ABE Enterprise Server). **2** On the **Destination Folder Access Denied** dialog box that appears, click **Continue**.
For Activated Datasheets, 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.
For Activated Datasheets, in some cases, after changing the calculation method in the Safety Analysis environment, the Explorer fails to update the tags to reflect the new object display names.	Switch from the **By Equipment** View to the **By Document** View or the **By Folder** View to update the display names.
For Activated Datasheets, in some cases, if you transfer Safety Analysis data for one workspace, and then switch to another workspace, clicking **Transfer** on the **Mapper** form does not create any objects.	To resolve this issue, select **Create** from the drop-down list again on the Mapper form, and then click **Transfer** to create objects.

For Activated Datasheets, after you transfer an AirCooledExchanger to ABE for the first time, additional material ports are created for each subsequent transfer.	N/A
For Activated Datasheets, when you transfer an AirCooledExchanger to ABE, the fluid properties of the hot and cold sides (required by EDR) are not transferred.	N/A
For Activated Datasheets, when transferring a large simulation containing extensive data, the ABE Enterprise Server may fail.	Make sure that the ABE Enterprise Server meets the Platform Specifications described in the *Aspen Engineering Suite V11 Installation Guide*. This issue does not occur with the ABE Local Server. To avoid this issue, transfer selected objects rather than the entire simulation.
For Activated Datasheets, when transferring Rigorous Heat Exchangers to ABE with hot fluid on the shell side, it is imported into ABE with the hot fluid on the tube side.	N/A
For Activated Datasheets, after attempting to connect to an Enterprise Server using an incorrect server name, an empty **Mapper** form will appear. After closing HYSYS, the **AspenHysys V11** process continues to run in the Task Manager.	To resolve this issue, on the **Datasheets** ribbon tab, click **Change Server**. On the **ABE V11 Host Url Selection** dialog box, specify the correct server name.

Aspen HYSYS Dynamics V11

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	No known issues

Aspen HYSYS Upstream V11

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 V11

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 • The **Feed Data** tab and the **Operation** tab of the Hydrocracker Calibration property view	N/A
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.

Exchanger Design and Rating

Exchanger Design and Rating Products V11

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.

Aspen Air Cooled Exchanger V11

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 V11

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 V11

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 V11

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 V11

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 V11

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 V11

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

Economic Evaluation V11 Product Family

The following section describes known issues that can apply to the Economic Evaluation V11 Product Family.

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
If the project or scenario name is long and if the new Aspen Reporter GUI is open, if you try to create a risk analysis input file using the menu item **Run → Risk Analysis → Create Input File** then you may see an Aspen Reporter error dialog box and the risk analysis file will not get created.	Close the Aspen Reporter GUI and then create the risk analysis input file.

Aspen Process Economic Analyzer V11

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 V11

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 V11

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
When a new spreadsheet is exported from ACCE using the Spreadsheet Import/Export feature, the spreadsheet is opened in Excel while the import/export dialog box is still open. If the dialog box is kept open, when you make changes to the spreadsheet and then you try to close the spreadsheet without explicitly saving the changes, the dialog box in Excel which prompts you to save the file does not appear. **Note:** This issue only applies when using 64-bit version of Microsoft Office.	After the spreadsheet is exported and opened in Excel, close the spreadsheet import/export dialog box and then make changes to the spreadsheet.

Icarus Evaluation Engine V11

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 V11

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. **7** 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.
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
For the Drawing Editor, when exporting ABE PDF or PID documents to AutoCad, the prototype file	Exported AutoCad files must be cleaned up manually after export.

General Usability Issues	Workaround or Comment
selected in the **AutoCad Export Options** dialog box has no effect on the output files.	
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 release into ABE V11, an error message regarding the **MaterialFlowPhase** class may appear.	Perform the following steps: **1** Using Notepad, open the package (.zpkg). **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.
Changing the .bmp image to a logo within the Datasheet Definer by adding the logo in the **\AspenZyqadServer\Basic Engineering37.0\WorkspaceLibraries\Templates** folder and clicking **Add** | **Bitmap** does not work. **Note:** This issue only occurs on web datasheets.	Perform the following steps: **1** Manually copy the image file from **C:\AspenZyqadServer\Basic Engineering37.0\WorkspaceLibraries\Templates** either **C:\Program Files\AspenTech\Basic Engineering V11.0\SoloClient\wwwroot\Datasheets\images** (for the ABE Local Server) or **C:\inetpub\wwwroot\AspenTech\aspenONEABE\Datasheets\images** (for the ABE Enterprise Server). **2** On the **Destination Folder Access Denied** dialog box that appears, click **Continue**.
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.
Attempting to open a datasheet in ABE Explorer when an Excel file is open causes ABE Explorer to fail.	To resolve this issue, perform the following steps: **1** Navigate to **C:\Program Files\AspenTech\Basic Engineering V11.0\UserServices\bin.** **2** Right-click **AZExplorer.exe** and select **Properties**. **3** On the **AZExplorer.exe Properties** dialog box, select the **Compatibility** tab. **4** In the **Compatibility mode** group, select the **Run this program in compatibility mode for** check box. From the drop-down list, select **Windows XP (Service Pack 3)**. **5** Click **Apply**.

Energy and Flare Analysis

Aspen Energy Analyzer V11

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
If you open the help, and then open a modal dialog box, you cannot access the help for the modal dialog box or view the existing help while the dialog box is open.	Close the existing help window before opening a modal dialog box to access help for the dialog box.

Aspen Flare System Analyzer V11

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
If you open the help, and then open a modal dialog box, you cannot access the help for the modal dialog box or view the existing help while the dialog box is open.	Close the existing help window before opening a modal dialog box to access help for the dialog box.
If you end the Aspen Version Comparison Assistant process using Task Manager while it is comparing Aspen Flare System Analyzer models, the Aspen Flare System Analyzer executable (**FlareSystemComServer.exe**) may not be terminated successfully. If it is not terminated successfully, the license will not be returned.	In this situation, after ending the Aspen Version Comparison Assistant process using Task Manager, check for and end the **FlareSystemComServer.exe** process to prevent license issues.

Aspen HYSYS Thermodynamics COM Interface V11

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	

Process Development

Aspen Batch Process Developer V11

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 V11

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	

Operations Support

Aspen Operator Training V11

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 OTS Framework V11

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 V11

Coexistence Issues	Workaround or Comment
No known issues	

Installation Issues	Workaround or Comment
No known issues	

General Usability Issues	Workaround or Comment
When performing Offline-to-Online for an Aspen Plus model, it may fail with the message **BatchGet failed**.	The Aspen Plus tree may contain invalid nodes which Aspen OnLine cannot process. See Offline-to-Online Fails in the help for instructions on filtering out the problematic variables.

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
If you end the Aspen Version Comparison Assistant process using Task Manager while it is comparing Aspen Flare System Analyzer models, the Aspen Flare System Analyzer executable (**FlareSystemComServer.exe**) may not be terminated successfully. If it is not terminated successfully, the license will not be returned.	In this situation, after ending the Aspen Version Comparison Assistant process using Task Manager, check for and end the **FlareSystemComServer.exe** process to prevent license issues.
AVCA generally compares Total phase values for each variable when comparing two files. However, for the Surface Tension and Compressibility / Z Factor variables, the Total phase value is not always present, even though other phase values are available. Therefore, for these two variables, AVCA displays comparisons for all of the available phase values (for example, Vapor, Liquid, and Liquid 1), so that the variable can still be compared even if the Total phase value is missing. However, when comparing Aspen Plus files from V8.8 and earlier versions: • For Surface Tension, AVCA can only compare Liquid phase values. • For Compressibility, AVCA can only compare Vapor phase values. Other phase values will not be included in the comparison.	N/A

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.
After you copy some variables from a HYSYS model into the ASW Organizer, then on the Model Variables tab of the Organizer click the path of the last variable copied, ASW and Excel crash soon afterward.	N/A
When running the HYSYS Optimizer using an ASW macro, ASW sometimes responds slowly and displays **Optimizer Running** in the status bar even after the Optimizer has solved in HYSYS.	N/A

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
No known issues	