Aspen Plus® Tips

Tips and Frequently Asked Questions

This quick start guide is intended to supply first time Aspen Plus users with helpful tips and advice to accelerate the learning curve associated with this product. It is desired to create a sense of community, as users are encouraged to develop and submit their own tips and advice to be included in this quick start guide to benefit people of varying disciplines and locations.

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AspenTech Customer Support

- Support Center

Visit the AspenTech Customer Support center at http://support.aspentech.com for technical support, self-help knowledgebase, software patches, upgrades and customer care services.
Aspen Plus Help

Aspen Plus has online Help, prompts, and expert system messages to give you information as you use the program. To access Aspen Plus Help press F1. In Aspen Plus Help you can search for a particular topic that you would like help on, or you can click on an item in Aspen Plus and then click F1. This will immediately open Aspen Plus Help to the section concerning what you had clicked on.

In Aspen Plus Help you can find what you need help with by navigating through the Contents, the Index, or you can use the Search function. Aspen Help contains a broad range of information, from very basic getting started information, to in depth details about convergence methods.
General

- **Starting Aspen Plus V8.0 in Windows**
  1. Go to the Windows Start menu and select All Programs.
  2. Find the folder labeled AspenTech
  3. Within the AspenTech folder find the subfolder labeled Process Modeling V8.0
  4. Select the Aspen Plus folder
  5. Select Aspen Plus V8.0 to open the Aspen Plus V8.0 user interface

  Tip: To open an existing file quickly, just double-click the file from Windows Explorer.

- **Starting Aspen Plus ➔ Selecting a Template**
  
  **General Template**: Use the General Template for a wide range of vapor-liquid applications

  **Petroleum Template**: The Petroleum Template defines defaults commonly used in the petroleum industry. It is also appropriate for petrochemical applications such as ethylene plants, which involve petroleum fractions as feedstocks.

  **Gas Processing**: The Gas Processing Template defines defaults commonly used in the gas processing industry. For example, stream flows are standard vapor volume flows in millions of standard cubic feet per day or millions of standard cubic meters per hour.

  **Air Separation**: Use the Air Separation Template for cryogenic air separation simulations.

  **Chemicals**: The Chemicals Template is suitable for a wide range of chemical (non-electrolyte) applications. It is also appropriate for petrochemical applications, such as MTBE production and VCM plants, where feedstocks are defined in terms of chemical components.

  **Electrolytes**: The Electrolytes Template is used for applications that require rigorous modeling of electrolyte species. You can use this template in any application where electrolytes are important.

  **Specialty Chemicals**: The Specialty Chemicals Template is for specialty chemical applications, with or without electrolytes.

  **Pharmaceuticals**: The Pharmaceuticals Template uses NRTL as the default base property method. You can use this method for two-liquid-phase systems, or vapor and liquid systems at low pressure.

  **Hydrometallurgy Template**: Use the Hydrometallurgy Template to model electrolytes and solids in hydrometallurgical processes.

  **Pyrometallurgy**: Use the Pyrometallurgy Template to model high temperature metals processing applications.

  **Solids**: Aspen Plus can model solids anywhere in a process flowsheet. A wide range of unit operation models for solids handling equipment is available including crystallizers, crushers, screens, and cyclones.
➤ Go to Setup to enter title and select units
When creating a new simulation, it is a good habit to first navigate to the Setup form.

In this form you can enter a project title as well as choose which global unit set you would like to use.

➤ Simulation and Properties Environments
In Aspen Plus V8.0 there are three separate environments: Simulation, Properties, and Energy Analysis.

Within the Properties environment you can select components and methods, define chemistry, create property sets, perform physical property analyses, and retrieve experimental data sets. Within the Simulation environment you can create a flowsheet and run a simulation using the components and methods defined in the properties environment. You can use the Energy Analysis environment to explore variations on your plant model to reduce energy costs. Aspen Energy Analyzer examines your plant and suggests changes that can reduce your energy costs.

➤ Aspen Plus Shortcut Keys

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<tr>
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<th>Function</th>
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<tr>
<td>F1</td>
<td>Aspen Plus Help</td>
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<tr>
<td>Shift + F1</td>
<td>What's This Help</td>
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<td>F2</td>
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<td>Ctrl + F5</td>
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<tr>
<td>Shift + F5</td>
<td>Reinitialize</td>
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<td>F7</td>
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<td>Command</td>
<td>Shortcut</td>
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<tr>
<td>Check Results</td>
<td>Ctrl + F8</td>
</tr>
<tr>
<td>Settings</td>
<td>Ctrl + F7</td>
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<tr>
<td>Stop Points</td>
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<td>Zoom Full</td>
<td>Home</td>
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<td>Zoom In</td>
<td>Page Up or mouse wheel up</td>
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<tr>
<td>Zoom Out</td>
<td>Page Down or mouse wheel down</td>
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<tr>
<td>Hide/Reveal Model Library</td>
<td>F10</td>
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<tr>
<td>Copy</td>
<td>Ctrl + C</td>
</tr>
<tr>
<td>Cut</td>
<td>Ctrl + X</td>
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<tr>
<td>Delete</td>
<td>Delete</td>
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<td>Paste</td>
<td>Ctrl + V</td>
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<tr>
<td>Rename</td>
<td>Ctrl + M</td>
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<td>Select All</td>
<td>Ctrl + A</td>
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<td>Align Blocks</td>
<td>Ctrl + B</td>
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<td>Center View</td>
<td>Ctrl + Home</td>
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<td>Exchange Icon</td>
<td>Ctrl + K</td>
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<td>Hide ID</td>
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<td>Reroute Streams</td>
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<td>Results</td>
<td>Ctrl + R</td>
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<td>Stream Results</td>
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<td>Unplace Block or Group</td>
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<td>Export File</td>
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<td>Import File</td>
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<tr>
<td>New File</td>
<td>Ctrl + N</td>
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<td>Open File</td>
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<td>Print File</td>
<td>Ctrl + P</td>
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<tr>
<td>Save File</td>
<td>Ctrl + S</td>
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<tr>
<td>Close Active Window</td>
<td>Ctrl + F4</td>
</tr>
<tr>
<td>Close Aspen Plus</td>
<td>ALT + F4</td>
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- **Completing Input Specifications**
  1. Define Components (conventional components, petroleum assays, and pseudocomponents).
  2. Define Methods. These methods are used along with data to calculate physical properties.
  3. Define the simulation flowsheet (blocks, streams, and connectivity) in the main flowsheet window.
  4. Define feed stream compositions, flows, and conditions.
  5. Define blocks (design and operating conditions for each unit operation block in the flowsheet).
  6. Define any reactions (define electrolytes chemistry, specify reaction kinetics for use in reactor and reactive distillation models).
  7. Specify convergence options, user defined tear streams, convergence blocks, and sequences.
  8. Add flowsheeting options (additional constraints and specifications to the flowsheet model).
  9. Specify Model Analysis Tools (sensitivity studies, optimization runs, data-fit problems)

- How to automatically assign a block/stream name with a prefix
  1. In the Aspen Plus V8.0 user interface go to File>>Options
  2. In the flowsheet display options check the boxes under ‘Stream and unit operation labels’ and enter the desired prefix

- How to change the unit of measure
  1. Aspen Plus provides the following global unit sets: International system units (SI), English engineering units (ENG), and Metric engineering units (MET). Find the units selector in the ‘Home’ ribbon
  2. Select a unit set
3. Click on ‘Unit Sets’ to create your own custom unit sets

- How to display stream results on the flowsheet
  1. While on the main flowsheet, find the ‘Modify’ ribbon and click ‘Stream Results’

  2. Check boxes to display temperature, pressure, vapor fraction, heat/work, mole flow rate, mass flow rate, and volume flowrate. When you run a simulation, the values for the selected results will be displayed on the flowsheet, as shown below.
How to change the name of a stream/block?
Select a block or stream and press Ctrl+M

Open the Control Panel prior to running a simulation
It is a good habit to develop to open the Control Panel before running a simulation. The Control Panel displays errors, warnings and diagnostic messages from the calculations. This can be very helpful when trying to converge a simulation.
Tips and FAQ

- Saving Checkpoints
  Save ‘Checkpoints’ as you go. Once you have a working section of the flowsheet, save the file as a .bkp with a new file name so you can revert to an earlier checkpoint and a known state.

- How to rotate and resize a block?
  Right click on a block and select ‘Rotate Icon’ or ‘Resize Icon’

- How to arrange windows in Aspen Plus
  You can change the way the windows in Aspen Plus are displayed by right clicking on a tab and selecting Floating, Dockable, or Tabbed. You can also click and drag the tabbed window into a dockable position; top, bottom, left, right, center.
How to select a unit operation

To select a unit operation model:

1. Click the tab that corresponds to the type of model you want to place in the flowsheet.
2. Click the unit operation model on the sheet.
3. To select a different icon for a model, click the down arrow next to the model icon to see alternate icons. The icon you select will appear for that model in the Model Palette.
4. When you have selected a model, click the flowsheet where you want to place the model. When you place blocks this way, you are in Insert mode. Each time you click in the Process Flowsheet window, you place a block of the model type that you specified. To exit insert mode and return to select mode, click the Cancel Insert Mode button on the upper left of the Model Palette or right click on the main flowsheet.

Tip: You can also place blocks in your flowsheet by dragging and dropping from the Model Palette to the main flowsheet window.

How to select the stream type

To select stream type:

1. Click the down arrow next to the stream type displayed in the Model Palette.
2. Select the stream type you want to place in the flowsheet (Material, Heat, Work)
3. Once a stream type is selected, simply click the ports on the flowsheet where you want to connect the stream.

Tip: When placing blocks and streams, the mouse pointer changes to the crosshair shape, indicating Insert Mode. After placing each block or stream, you remain in insert mode until you click the cancel insert mode button in the upper left corner of the Model Palette or by right clicking on the main flowsheet. You can also undock the Model Palette and use it as a floating palette.

➢ How to specify a pressure drop
When specifying operating conditions for different units, (such as a heat exchanger, reactor, mixer, etc.) you can specify a pressure drop by entering a negative pressure in the pressure field.

If you enter a number greater than zero, this value will be the operating or discharge pressure. If a number less than or equal to zero, this value will be the pressure drop over the block.

➢ How to use the ‘Next’ button
Click the Next button to move to the next input form or menu at any point in Aspen Plus. The Next button is on the Home ribbon, shown below. You can also access the Next feature by pressing F4.
Use Next to:

- Guide you through the required and optional input for a run by displaying messages
- Tell you what you need to do next
- Ensure you do not make incomplete or inconsistent specifications, even when you change options and specifications you have already entered

- Improving the Appearance of the Flowsheet
  You can change the flowsheet layout at any time to improve the appearance of your drawing.
  You can move:

  - Blocks
  - Block IDs
  - Streams
  - Stream IDs
  - Stream connection locations

  You can also:

  - Hide block and stream IDs
  - Reroute streams
  - Align blocks
  - Change block icons
  - Resize icons
  - Rotate icons

- Columns

  - Convention for stage numbering
    The numbering convention in Aspen Plus is that the condenser is stage 1 and the stage number increases down the column. For example, for a column with 10 stages the condenser will be stage 1 and the reboiler will be stage 10.
- Improve convergence by doing preliminary mass balances
  - If you can give Aspen Plus a better initial guess for operating parameters, such as distillate to feed ratio or reflux ratio, it will solve the simulation faster

**Equipment Geometry**

- **Vessel Geometry**
  - **Vessel Type:**
    - *Instantaneous:* Default vessel type for most vessels — requires no input for vessel geometry
    - *Vertical*
    - *Horizontal*

  **Vessel Geometry:**
  - *Head type:* Elliptical, Hemispherical, Flat
  - *Length*
  - *Diameter*

<table>
<thead>
<tr>
<th>FLAT</th>
<th>ELLIPTICAL</th>
<th>HEMISPHERICAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Flat Vessel" /></td>
<td><img src="image2" alt="Elliptical Vessel" /></td>
<td><img src="image3" alt="Hemispherical Vessel" /></td>
</tr>
</tbody>
</table>

**Dynamic Simulation**

- **Types of Dynamic Simulations**
  - **Flow Driven:**
    - *Feed flowrate and pressures are specified*
    - *Flowrate is not controlled by pressure differences*
    - *Useful for a first approach of the dynamic behavior of the process*
    - *Good for liquid processes (usually good flow controllability)*
Pressure Driven:
- Feed and product pressures are specified
- Flowrate results from pressure difference
- A bit more complex to specify (because you need to balance the pressures in Aspen Plus with valves, pumps, ...) but more rigorous

Reactors

➢ Modeling batch reactors in steady state simulations
  Aspen Plus models batch reactors in steady state, so a real-world plant running batch reactors would need several reactors in parallel with staggered start and end times to approximate steady state operation

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